

Statement to:

The Royal Commission on Genetic Modification

by

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Summary

I align myself with Dr Peter Wills who told the Commission:

Scant consideration has been given by the broader scientific community to the overall effects of the enterprise of genetic engineering and its capability of transforming biological reality beyond historical recognition.

I have thought exactly so for a quarter-century, and am deeply worried that control of this class of technology is still so poorly developed.

Control of GM in New Zealand has in some legal forms been ahead of many countries. But actual control of GM food has been almost comprehensively frustrated by the ANZFA staff. The politicians who front for these industry stooges are largely ignorant and appear to exert less power than depicted for ministers of the crown in 'Yes Minister'.

Within New Zealand ERMENZ is little better, and the politically-appointed ERMA board have interpreted the HaSNO Act far too permissively, issuing 23 approvals for field trials in 23 decisions. ERMA has turned out to be an expensive rubber stamp, collecting a lot of money from both the government and the applicants. It has exerted outrageously little control. ERMENZ staff have been very obstructive to some who advocate stronger controls of GM. The presence of a pro-GM ERMA agent (Ms Beale) on the RCGM staff is wrongful and seriously undermines the Commission's status.

Actual harm from GM food has almost certainly occurred - as reflected by \$4,000,000,000 in out-of-court settlements. Actual ecological harm is shown by scientific trials to be truly on the cards.

The burden of proof must be placed firmly upon the applicants to justify GM experiments, especially field trials.

If there were a genuine inspection system, with punishments for breaches, less regulatory charade & fees might be justified for the least hazardous GMOs in proper containment.

The strongest reasons for control of GM are theological.

The material I present to the Commission is compiled over the past two years from many sources. (I use various fonts to denote various origins.)

This information is organized under broad headings:-

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1. The Global Ecological Context

1.1 Ecological Decline

The context into which GM emerges is summarized in a recent report from the World Resources Institute (<http://www.wri.org>), the UN Environment Program, and other agencies. "Every measure used by scientists to assess the health of the world's ecosystems tells us that we are drawing on them more than ever and degrading them at an accelerating pace," Dr Klaus Topfer, Executive Director of the United Nations Environment Program said. Grave conclusions along these lines have been stated for 3 decades in *The Ecologist* and during that period by large groups of Nobel Prize winners etc. The Worldwatch Institute is one of the most reliable sources for science-based interpretation, notably in their annual 'state of the world' reports. I attach a commentary on one of their recent surveys, pointing out that they have been, if anything, insufficiently alarmist.

We are living through the early stages of what bids fair to become one of the most severe periods of extinction in the whole existence of the biosphere, and such organisms as survive are being subjected to increasing loads of chemicals and radiations causing mutations, cancer, malformations, and mental disturbances (where applicable). Care for Creation is evidently a low priority for the overdeveloped world, and for the elites of the never-to-be-developed world. Christianity can take little satisfaction from the state of the biosphere in which the human has lately become so numerous and so technologically intoxicated. Nevertheless I will argue that Christianity is the only known basis for solving the problems posed by GM.

1.2 Population

The human population is now expanding by about 90M/y, many of whom are born into severe deprivation & malnutrition. Starvation is a monstrous and growing problem. But the answers which are known are not being used. Meanwhile, education & practice in science are being warped in favor of the claim that GE can feed the hungry which, as the Prince of Wales and some scientists point out, is a claim devoid of scientific plausibility and reeking of emotional blackmail.

As a long-time university teacher of Environmental Studies I disbelieve that current trends, taken as a whole, will EVER double the human population. Tragically, instead of controlling population by known methods, we are delegating this task to the Four Horsemen of the Apocalypse.

1.3 The GM L-Tryptophan Case

Thus, the world upon which GM bursts is already in a very bad way, and being grievously damaged. Ecosystems are being degraded and destroyed. Species are being exterminated at a terrible rate. On top of all that, we now release novel organisms with combinations of genes that have never occurred, created by radically novel methods which may have unforeseen effects. In such a rapidly-changing context, severe damage can be caused by GM but go unnoticed. The toxic impurities in the GM versions of the 'health food' supplement L-tryptophan a decade ago

constitute an exceedingly important example which has been mis-depicted by the Royal Society of NZ. I have, with an international team of experts, written a 37-ref review of this very important evidence which is under consideration by a technical journal. Meanwhile I append an outline review.

2. GM generally relies on junk science

2.1 Outline of Relevant Science

In the limited time we have to discuss ethics of GM, we must take as read much of the science. The two best websites are <http://www.psrast.org> and <http://www.ucsusa.org>. You will soon see that the main commercial promoters of GM speak with forked tongues to you through PR deceivers. I am gravely dismayed that these operatives have been encouraged to do so by your failure to require oaths, so that lies to you are not liable to provoke prosecutions for perjury.

Here we have time only to note the outlines of the technology. Groups of genes from various organisms & viruses, often synthetic approximate copies, are inserted by more or less radically unnatural methods into living cells. Some of the processes used are reminiscent of viral infections, using modified bits copied from the only known tumor-causing plasmid of the plant kingdom. Another technology, favored for monocotyledons such as maize, uses the 'gene gun' to implement the technology of 'biolistics': the groups of foreign DNA are coated onto heavy-metal particles much smaller than the target cells and blasted in by a micro-shotgun. Nothing like this is known in nature. Not surprisingly, most of the target cells are killed.

The surviving cells are then challenged with an antibiotic, resistance to which is encoded by a gene which was attached to the main transgene of the foreign DNA 'cassette' that was inserted into them. Those few cells which grow despite that antibiotic in an artificial medium are likely to have incorporated also the desired transgene - in most of the commercial crops so far, conferring either resistance to a particular herbicide spray or ability to produce within themselves a modified proteinaceous insecticide.

These surviving cells are then grown into a whole plant. Cuttings may then be grown from that.

The assumption that an organism of such bizarre origins won't have unexpected properties is junk science, an imprudent gamble. And at best it represents extreme narrowing of the genetic robustness of the target plant. Even if all turns out luckily for the property desired of the transgene(s), other properties may turn out to be unpredictably odd (e.g. the 30% yield deficit of GM soybeans in N. Amer. drought districts, owing to unforeseen inferior stem properties). I emphasize the prudence of Prof. Patrick Brown, a consultant to some NZ gene-tamperers: <http://news.gefree.org.nz/patrick-brown-jul-2000.html>

Animal GM, using different methods, concerns some people even more than crop GM. I know of no way to compare them with any exactitude, but mammals share more pathogens with humans than do plants; and moreover, the issue of cruelty arises.

2.2 A Perspective on GM

I hope it does not seem immodest of me to say my policy has not had to change during the quarter-century of my sporadic involvement in this controversy. I reiterated it in my chapter 'Technological Blind Alleys', appended hereto. (A similar general review has been on the website <http://www.psrast.org> over a year, and no disputes about it have reached my attention.) But this chapter was suppressed by an RSNZ operative who edited it out of the book 'Designer Genes'. I return later to the tragic pro-GM bias of the RSNZ hitherto.

I believe that both the hazards AND the benefits of GM are, generally, speculative. Ill-founded claims of benefits have stimulated rushes to premature commercial deployment, leading to some flops (see <http://www.ucsusa.org>) and some known harm as well as perhaps some side-effects which remain unknown because nobody has looked for them or indeed they have not yet had time to emerge in those doomed to them. The broad picture is of gambling rather than care. Here is a tiny glimpse of the money involved:

2.3 100 Molecular Millionaires

<http://www.genengnews.com/news1.htm>

The 1999 edition of Genetic Engineering News

Biotechnology companies are used to the ups and downs of an entrepreneurial business fraught with risk. Depending on the financing environment, life often seems like a roller-coaster ride to them.

But for many biotech stockholders, particularly those with doctoral degrees, 1999 is proving to be a memorable year. The 1999 edition of Genetic Engineering News 100 Molecular Millionaires includes a record number of doctorates - 89! This compares to 69 last year and 72 in 1997. It looks like years of dedication to research and hours upon hours of work in the lab or clinic are finally paying off for those with a Ph.D., M.D., or Sc.D. This is made very clear when you consider that our list included only 63 doctoral millionaires in 1996 and 64 in 1995.

William K. Bowes, Jr., is our top millionaire with \$286,134,875 of Amgen stock. Our number one doctoral millionaire is Endre A. Balazs, Ph.D., with \$109,281,795 of Biomatrix stock.

The value of the biotech/pharmaceutical stock held by all 100 of our 1999 millionaires totals \$1.41 billion. This compares to \$1.76 billion last year, \$1.97 billion in 1997 and \$2.05 billion in 1996.

The equity markets for the biotech industry experienced one of their worst years in 1998. Large public financings were negligible as investors looked elsewhere to invest their money. Nevertheless, our list of Molecular Millionaires demonstrates that significant awards await many of those who remain bullish on biotech. The industry posted bioproduct sales of over \$13 billion in 1998 and saw 24 biodrugs approved. There are over 1,000 products in clinical trials and about 80 are already being sold on the market.

With the ongoing evolution of the new drug discovery paradigm, which is characterized by the novel technologies of high-throughput screening, genomics, proteomics and pharmacogenomics, the bioindustry appears poised for rapid growth in the new millennium.

Since many of these techniques are based on the advances of laboratory researchers and, increasingly, computer scientists, we can expect to see the number of new molecular millionaires to grow in the near future.

*Lindsay A. Rosenwald, Ph.D., owns shares in eight different companies. These include: Procept (\$7,948,876); Neose Technologies (\$7,043,451); Biocryst Pharmaceuticals (\$3,545,753); Cytoclonal Pharmaceuticals (\$3,241,838); Interneuron Pharmaceuticals (\$2,724,279); Avax Technologies (\$1,874,026); Titan Pharmaceuticals (\$1,324,733); and Ribogene (\$1,107,215).

This seems a suitable place to quote Nicholas Wade, one of the most experienced science journalists, who wrote in the New York Times recently that nearly all GM corporations have yet to win a dollar of revenue, let alone net a profit. Stock-market ramps up into mid-air are the usual situation.

2.4 The General Outlook for GM

I believe there may be benefits which will emerge from properly targeted transfers between closely-related strains of a given species. This is how GM began in this country, and I had no objection to that cautious beginning. I deplore the fact that this caution was soon thrown to the winds. The offensive rush to deployment which has lately taken over, in the hands of Novartis etc, is likely to provoke restrictions and, more practically effective, loss of reputation for science which will leave undone work that ought to be done. A much more cautious start would have led to surer building. I think that is a fair summary of Professor Brown's assessment.

"to stop means being left behind"

- Ed Teller

special interview, 'Science at War'

Prime TV (Auckland N.Z.) 00-1-17

On the contrary, let us resurrect the reasoning of the Nuclear Freeze campaign. When the USA govt had 30,000 nuclear weapons, Prof Frank von Hippel (Princeton), Sen. Mark Hatfield (Ore.) and many others pointed out that if you're in an elevator going in the wrong direction, in order to reverse you will have first to stop.

That campaign did succeed: expansion of the arsenal was stopped, and since then the USA has substantially decreased its nuclear arsenal.

Similarly, if GE is to be brought under proper control, expansion of the number of expts will have to be stopped, pending the first careful examination of which types of GE should be permitted and what conditions would make them acceptable.

To stop means, therefore, not to be left behind in any legitimate sense. My country chose to be "left behind" in nuclear power (and to exclude nuclear weapons). We are now conducting a full public inquiry by a Royal Commission. The world has to stop, in the sense of stopping the ill-examined expansion of GM. Much more stringent standards must be imposed. It is far from clear what low level of GM will continue after this process - it will be largely if not entirely in containment, I expect.

Resorting to my favorite analogy as expounded in 'Technological Blind Alleys', please reflect upon the scorn which has been, at last, earned by the nuclear fanatics. It is not inherent in science that such dangerous, expensive, unreliable, feared & despised technology will come out of applied science; but many young folk today seem to think the disreputable nuclear technologies are a fair example of where science must lead society. GM is already repeating or trumping the same offence against science, to my very strong regret & resentment.

Meanwhile, the practical question remains: how should current GM proposals be assessed. No nation has yet set up anything like a duly cautious procedure, with the result that farmers have been conned into buying dubious & possibly hazardous seed, and labs continue to conduct dangerous experiments which, if containment fails, could cause very nasty epidemics. (This latter issue, to the fore during the mid-70s debate, has been pushed to the background by the more obviously urgent issue of uncontained GM crops & animals; while fully understanding that relegation, I urge that we renew awareness of the labs.)

New Zealand Herald
EDUCATION Supplement 99-11-11

Massey zooms in on science

Hot on the heels of the recent Government announcement of its Bright Future initiative, Massey University has introduced three new science degree majors for 2000.

The university has launched program in food science, human nutrition, and sports science for students at its Albany and Palmerston North campuses.

The courses are the first of their kind in the North Island, the head of Massey's institute of food, nutrition and human health, Professor Paul Moughan, says.

He is anticipating a high demand for university graduates in these major areas.

"With an increasing awareness of the effects of nutrition and exercise on health and longevity, there are growing opportunities for employment using human nutrition and sports science knowledge and skills," he says.

"The students can expect a rigorous and interesting course of study built around an understanding of the scientific method. The courses will be aimed at developing the principles of science and will set the students up well for a multiplicity of careers in science."

Students can begin studying the new topics in the first semester of 2000. Enrolments close on December 15.

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This piece may not be the most dismaying in the 18-p Education® Supplement, but the Massey food science 'launch' concerns me in several respects.

This Massey announcement prompts me to peer into the 'Bright Future' of food science, especially the possible expansion & warping of tertiary education in food science intimately connected with commercial GM.

I have serious difficulty distinguishing Bright Future from the earlier Kraft durch Freude (Strength Through Joy, the initials KdF which adorned early VW). I resent & conspue its conspicuous econobabble.

It is a different set of slogans, but their psychological quality is similar to that of the totalitarian National Socialism chanting 'the Slavs are sub-human' as it delivered the economic goodies from the prototypical modern military-industrial complex.

Massey PR claims nothing so modest as training technicians or even technologists for the food industry; it is science that is to be the basis for bulk jobs, they claim.

I am sorry to say that even the best food science scene in NZ - the Massey setup - is no great centre of science. I fear the polytechs which are likely to corner much of the funding predicated on the need for GM infrastructure - research, development, deployment and monitoring - will be even less scientifically impressive. The visible Massey GM promoters - notably Brian Jordan, and Paula Jameson who has duly been appointed to the IBAC - have made inaccurate public claims exaggerating the usefulness and understating the potential harm from GM.

Science is in bad trouble in the universities. Government grants have tended to favor polytechnics over universities (while encouraging both to keep unqualified unemployed youth off the streets - a cynical sabotage of tertiary education) but total govt funding has been steadily decreased, forcing down the staff/student ratios, deleting technical staff, and purging biologists to make room for gene-jockeys who are expected to bring in money from venture capitalists.

Money has flowed relatively more to polytechs, some of which have claimed to become universities in which doctorates can be supervised by staff who lack any higher degree. These jumped-up polytechs have delusions of grandeur. They are blatantly devoted to training for industry, yet they strike academic poses.

The U of Auckland chemistry building has an empty hole in the basement for a nuclear reactor, and a little-used top storey of stainless benches in high-rate fume-hoods etc, predicated on the need to train the infrastructure of the nuclear power station program (now defunct). In a country claiming to have abandoned planning in favor of market forces, we now have huge subsidies - approx. \$120M to date - to GM which is evidently incapable of developing on the fabled 'level

playing field' where organic agriculture is left to struggle. The Massey launches may at worst turn out to be just another subsidy to GM.

The challenge to proponents of proper agriculture is to restore the status of the term 'agriculture' for a start - beginning with Massey's own degree and faculty repositionings.

<http://www.bmj.com/cgi/content/abridged/319/7220/1282>

BMJ 1999;319;1282 (13 November) [abridged]

THE IMPACT OF NEW TECHNOLOGIES IN MEDICINE

Mapping the human genome the genetics revolution

JUDY JONES ASKS R L ZIMMERN FROM THE PUBLIC HEALTH GENETICS UNIT,
STRANGWAYS RESEARCH LABORATORY,
CAMBRIDGE, ABOUT THE ARGUMENTS FOR AND AGAINST EXPLOITING THE
RECENT ADVANCES IN GENETICS IN CLINICAL MEDICINE

...

The psychological and social implications of greater genetic knowledge, and the ability of individuals to make their own risk assessments as a result of that knowledge, are difficult to predict.

Public opinion is divided over what constitutes progress, as the recent furor over genetically modified organisms has demonstrated. "The gene as an icon of scientific determinism, corporate power (as represented by the pharmaceutical industry), discriminatory practices, and the legacy of the eugenic movement have done much to dampen widespread enthusiasm for genetic and reproductive technologies," argues Ron Zimmern.

...

The complexities of biological phenomena may be so great that, even with advanced computing technologies at our disposal, the interactions between genes, and between genes and environment, may defy the power of human analysis.

This last paragraph aligns fully with the summaries by scientists such as Prof. Wills and myself. In such a context of ignorance, some of it never to be relieved, who should bear the burden of uncertainty? The claim of the GM industry is that they should be allowed to do their thing while the rest of us run the risk of harm (and largely pay for their experiments).

I contend this is immoral.

Here is a glimpse of what has been happening recently in our universities.

Biologists are being purged, down the road to make room for gene-jockeys who (it is claimed) will bring in money from GE venture-drongos.

At Auckland, the local expert on ferns & mosses is thus purged. Who cares? At VUW, the country's only university expert on classification of fungi has been given the bullet.

Who cares?

Long after the bubble of GM euphoria has burst, the real scientific intellectual strands of our culture will be struggling to recover from this sabotage. Who cares?

Meanwhile, sideshows fill the media.

I contend that a major tragic side-effect of the GM craze is degradation of scientific standards of truth.

Prof Bronowski's little book 'Science and Human Values' (London: Hutchinson 1961) rams home the point that science is - or was, until then - based on truth-telling as a convention. You can read it in a couple hours, which is well worth doing.

But today the GM fad has radically degraded this honorable convention.

2.5 Routinely the gene-jockeys lie

* They pretend the DNA & RNA alphabets have only 4 letters (GCAT and GCAU, respectively) e.g. "The DNA is a very long molecule built of only 4 letters."
- Dr Andy Shenk, Genesis R&D Corp (Auckland, N.Z.) TV1 'Holmes show' 00-6-27

But it is a well-known fact that DNA contains 'odd' bases - methylC, methylG, and others.

* They pretend that the primary structure - the sequence - of any protein will normally determine its folding (secondary & tertiary structure) when this is known to be less than generally true.

* They pretend that the effects of a gene inserted by drastically, usually lethal, unnatural methods are predictable, when they are known to be extremely variable.

* They pretend that a cell selected on just one property - usually resistance to an antibiotic - and then grown into a whole organism, e.g. a potato, will have all properties at least as good as a normal organism.

* They tell the public, and you, that no harm and great benefits are the record of GM.

Another tiresome example of misleading extremism is the common attempt to make out that ONLY the neoDarwinian model holds - that no other sort of inheritance also exists. This junk

science has lately the stupid & dangerous motive of propping up GM, trying to maximize the commercial potential of the structural genes which GM can insert.

One of my favorite refutations of this crudity is the inheritance of the induced state of the lac operon in certain *E. coli* strains thru many generations in inducer concentrations so low that they are incapable of inducing that operon. This is not readily intelligible to the public, or even to many scientists that have not studied that classic operon. But it sure is Lamarckian inheritance.

In addition to positive lying, GM is characterized by endemic secrecy, for commercial motives. This too is inimical to science. There is no such thing as secret science - sooner or later it jumps the rails, as evidenced by the nuclear industry.

I could go on. The point I'm making, in a spirit of grief for one of the greatest creations of the human intellect, is that never since the Nazis attempted to legitimize racism has science been so suddenly & drastically degraded. Greed has swamped truth & cooperation. This alone is a good reason to control GM far more than has yet been done.

A prominent gene-tamperer, Dr Phil l'Huillier of AgResearch Ruakura, purported to correct me after my invited speech at the NZ Dairy Expo (Hamilton 00-1-27). Dr l'Huillier's "correction" took the form of asserting that GE began with the 1953 double helix DNA structure. I responded that this structure is merely a postulate for the short-range folding (secondary structure) of 2-strand DNA, and has extremely little to do with GE which relates to the sequence of bases (primary structure). He thus unconsciously amplified the evidence that gene-jockey science is junk science. He was so anxious to assert to the dairy farmers & others present that I was in scientific error that he delivered a ludicrous scientific error himself.

"If we can help just one MS sufferer . . ." says on TV this same man, whose proposed insertion of a human nerve-cell gene into cows was being held up not for scientific or ethical reasons but because some Maoris were saying it could be "culturally offensive" and somehow affect their whakapapa. At the Dairy Expo I asked this man whether he really believes that, as he has claimed, drinking milk containing a human nerve-cell protein is likely to work as a treatment for MS. His reply, correctly reported in the February Dairyman, was only that he hoped it will.

2.6 What You Don't Know CAN Hurt You

Here is another example of how GM can cause harm - though in this case intercepted before release.

Klebsiella planticola, a common soil bacterium, was genetically engineered by a German research institute to make ethanol for industrial purposes. The inventors had planned a recycling system: farmers would give them agricultural slash, which would be used for the bacterial fermentation; the resulting ethanol would be separated out, and the sludge could be given back to the farmers to spread on their fields as fertilizer. It all sounded very good for the environment, but how much soil ecologists impinged on the planning is unclear.

Dr Elaine Ingham of Oregon State University and her graduate student M.T. Holmes discovered to their alarm that soils containing the engineered organism killed wheat seedlings, most likely through alcohol production in the root system, which kills roots at very low concentrations. Mycorrhizal fungi were also killed.

Had the engineered sludge been returned to farmers, it would have drastically degraded their soil, rendering them unable to grow many or all plants. Since *K. planticola* is a ubiquitous organism, found in the root systems of plants all over the world, the GM mutant could have spread and made ALL soil unable to support crops! Microorganisms are easily spread on surfaces of insects, on the feet of birds, on people's feet, etc; this engineered bacterium could have spread world-wide quite rapidly.

Luckily Dr. Ingham and her student did the work before commercialization and were able to warn the company, who didn't commercialize it. The references are: Holmes T M. and E.R. Ingham (1999) Ecological effects of genetically engineered *Klebsiella planticola* released into agricultural soil with varying clay content. *Appl. Soil Ecol.* 3 394-399; Holmes T.M. and Ingham E.R. The effects of genetically engineered microorganisms on soil foodwebs. in: Supplement to Bulletin of Ecological Soc. Of America 75/2, Abs of the 79th Annual ESA Meeting: Science and Public Policy?, Knoxville, TN, 7-11 August, 1994. Dr. Ingham can be reached at: inghame@bcc.orst.edu.

The story really shows the awesome power of genetic engineering, the multidisciplinary nature of the review it requires, and the folly of releasing GM microbes before very extensive contained studies.

This is a very good example of how slight changes in a highly evolved bacterium can greatly change its ecological significance. *Klebsiella* spp have adapted to many different niches; some are also not-too-virulent human pathogens. *Klebsiella pneumoniae* rarely causes human disease but is a common cause of aspiration pneumonia in alcoholics (i.e. a leading cause of a somewhat rare condition). We know that small changes in bacteria or viruses often tip the delicate balance between a pathogen and host and result in large-scale outbreaks of disease. Many "new" diseases have occurred, like syphilis in the 15th century, when slightly changed microbes suddenly cause epidemics. The 1919-20 influenza pandemic, which killed about 20 million - more than the Great War it closely followed - was caused by a simple mutation in a virus.

It is an intriguing fluke that this *K. planticola* fiasco is reminiscent of one of the very first GM microbes, New Zealand's own bold 'nitrogen-fixing mycorrhiza'. A dozen pine seedlings in the preliminary pot-trial died, and the transgenic fungus, derived from one which had been normally ectomycorrhizal, was found at autopsy to have invaded pine root cells.

This caper was written up to some extent:

Giles KL, Whitehead HCM (1975). The transfer of nitrogen fixing ability to a eukaryote cell. *Cytobios* 14: 49-61. Giles KL, Whitehead HCM (1977). Reassociation of a modified mycorrhiza with the host plant roots (*pinus radiata*) and the transfer of acetylene reduction activity. *Plant and Soil*. Preprint.

Two decades on, how much has been learned?

Epidemiology on harm from GEF involves great difficulties even if the GEF is labeled. The ever-changing context is illustrated by the story below.

June 10, 2000, New York Times

Dead Birds Are a Portent Of Return of West Nile Virus

Three crows found dead -- two in New York State and one in New Jersey -- were confirmed yesterday as this year's first known victims of the West Nile virus, the mosquito-borne disease that killed seven people in New York City last year, health officials said.

<snip>

Last summer's outbreak prompted widespread fear of the virus, and sweeping efforts by city, county and state health officials to monitor for the disease this year and to try to eradicate the mosquito population through treatment of breeding grounds with larvicide and public education campaigns.

Officials hope to avoid the aerial spraying that was used last year, when the outbreak was discovered late in the summer and many less-drastic methods of preventing mosquitoes from hatching would no longer have been effective.

Yesterday's cases surfaced much earlier in the year than the first cases last year, but Dr. Ostraff cautioned against any inference that the disease may be more widespread this summer. "Last year," he said, "nobody was looking for the virus."

2.7 The enormous venture-capital bubble of DNA sequencing

When the BBC World Service interviewed me on this, I stated the 'human genome project' is a vulgar con-trick. I stand by this condemnation.

This commercial racket is based on junk science and is grossly over hyped using crude caricatures of biochemistry & genetics.

The recent fad of exaggerating the biological & social significance of genes has been ably criticized by Dorothy Nelkin in her book 'The DNA Mystique', and earlier by Jonathan King one of the pioneer critics of GE and still a professor at MIT. If we really want to improve health & welfare, we know many good methods without gambling on GE; and the outer limits of credible potential benefits from GE are very modest compared with the hype.

To the extent that genes are important, the idea of improving on them by "engineering" has been enormously overblown.

And the sequencing corporations generally underplay the little-understood importance of the minor bases within DNA. It is not only journalists who oversimplify by stating The Big Four Rule OK; your actual 'genome' enthusiast typically tries to patent rows of 3-letter codons in just the 4-letter alphabet of the journals.

But the truth is that other, minor ('odd') bases occur in DNA. Some of them are methylated derivatives of the Big 4, notably Me-C and Me-G; but there are others, and this fact has been known 4 decades. What is actually sequenced is almost always copy molecules made in systems which make not true copies but drongo polymers on the slogan The Big Four Rule OK. Thus the sequences for which patents are sought will be, generally, false.

The leader of the Arabidopsis Genome Project, my sometimes MSc student, responds that he thinks odd bases other than Me-C must be very rare, but he admits we 'haven't got a handle on them'.

Even if they were all true sequences, their usefulness is far more limited than the enthusiasts make out. The general business model is: find a mutated sequence correlated with an illness, or failing that a pseudo-illness (e.g. AAT deficiency), and then work up an image of correcting that dud gene either by gene therapy (of which few if any actual examples exist) or by other biochemical intervention. There is more wrong than right with this model.

Along with most other GE, this approach is futuristic rather than realistic. The gene-jockeys, intoxicated with power over life, pretend that they are about to deliver something useful, in order to get funding for their experiments from venture-capitalists who don't understand.

I realize many will find it hard to believe, but there you have it. The "exact copies" of genes in the constructs inserted by GE are based on the simplistic assumption that the Big Four A, T, C & G will suffice, even tho' minor bases are reasonably thought to exist at unknown spots in the real sequences. These 'odd' bases have apparently been carried on in evolution but they are assumed to be non-functional in the sense that the 'nearest' of the Big 4 can be blithely substituted. There are 64 codons all accounted for, so we'll move freely to & fro between nucleic acids and polypeptides on that self-consistent but simplistic model.

Every time I look into some part of GM science I find an intellectual brothel.

2.8 Prestige of Objectors

Among the more dishonest furrphies from GM PR is the image that no prestigious scientists share grave reservations about GM. From the invention of GM in the mid-70s there has in fact been a slender but prestigious minority strand of scientific objection.

One of the best-known genetics experts, Reith, lecturer while he was still at Aberdeen, says the same as I've said all along about transgenic organisms in general. Note he says this notwithstanding his declared animosity & contempt toward conservationists:

The Guardian February 26 1999

Risk of escaped GM food genes

Sarah Hall

GENES from genetically modified foods could evade scientists' control, "leak out" and infect other organisms, an eminent genetics professor warned yesterday.

Steve Jones, professor of genetics at University College, London, said evolution was "predictable" and organisms' genetic make up altered naturally as they developed resistance.

He added: "The genes you put in may actually leak out and get to places where we can't control them ... Genes can leap in the most extraordinary and alarming way. There's no reason to say the same thing cannot happen in genetically modified plants. It only has to happen once. The dangers are really quite real."

Prof Jones was speaking last night at a Guardian debate - GM Foods: Where does the truth lie? - at Westminster Central Hall, central London.

Likening the Green movement to Nazism in its reactionary ignorance and emotiveness, he said he [nevertheless] supported a moratorium on growing GM crops in Britain.

"I definitely think we need more knowledge before we make the same mistakes with GM foods that we made with penicillin - and I most clearly think we should stop doing this until we know more about it," he said.

Guardian columnist and visiting professor at Green College, Oxford, George Monbiot, warned there was a major gulf between the manufacturers' claim for GM foods and what they really intended to do: rather than increase food production in the next century, they would be "the hunger merchants of the new millennium. "

He said the aim of genetic engineering was to wrest control of "the biggest commodity market of all - namely food".

Other examples of the fallacy "what you don't go looking for won't hurt you" include the fact that it remained unnoticed until the 1940s that rubella early in pregnancy is likely to cause malformations.

I would be glad to explain further evidence on this problem - that surprisingly intelligent people presume lack of evidence equals proof of safety.

2.8 Ranking of Hazards

I copy to you the following list which I presented to our statutory authority the ERMA 10-12-98 - a rough suggestion for how, on general biological grounds, one might rank priorities for prima facie hazard.

A DRAFT ORDER OF INHERENT BIOLOGICAL HAZARD IN TRANSGENIC EXPERIMENTS

(from least to most hazardous)

within one species - the only type of transgenics we would normally approve, and then only after very careful detailed scrutiny

from one species to a related species e.g. potato to tomato

from a non-food related species to a food species e.g. Arabidopsis to mustard

from an unrelated food species e.g. salmon to a food species e.g. tomato

from an unrelated non-food eukaryote e.g. African clawed toad to a food species e.g. potato

from a non-food prokaryote to a food species e.g. TB bacillus to banana

and finally, the most perversely stimulating for the gambler-experimenter, from a non-food prokaryote to a non-food eukaryote - NuFood®.

The ERMA took no apparent notice of this suggestion. Their PR chief Karen Cronin refused to give me a copy of the decision.

I would like it discussed, because I drew it up on the instigation of my most successful ex-student, who is now a professor of biochemistry AND of medicine (unprecedented in this country). I consider it a prudent preliminary approach to the biology in question.

By contrast, the 'Lego' model of biology, an unspeakably crude assumption shared by most gene-jockeys, pretends that the context of a gene is immaterial, as long as it gets expressed (i.e. the protein for which the transgene codes does get made in the target cell).

2.9 The Flagship of the Small Fleet

Today's flagship of the GE fleet, recombinant human-type insulin, took some years longer to produce than the venture-capitalists had been told it would. The original concept was that the gene for human insulin would be expressed in a bacterium, in something like a micro-brewery, and the insulin then purified from that culture would give diabetics more benefit than the byproducts of the meatworks.

To cut a long story short, it turned out that this smallish protein could be assembled by the bacteria but not then folded properly. (Until then, a dogma had largely prevailed that a given

sequence of amino-acids, combined to form the primary structure of the protein, would automatically fold into the right shape - the right secondary & tertiary structures.) Some interesting active processes to fold and otherwise process proteins post translation had to be discovered before the GE insulin reached commerce.

Former colleagues in the local med school include leading experts on some aspects of diabetes. They tell me the biggest, most impressive-looking of the studies on rhIns in clinical practice have indeed reported: no statistically significant differences in frequencies of harm. Thus the advantage of faster action continues to commend recombinant human-type insulin to most medicos.

At the same time, impressive detailed BBC TV journalism alleges higher frequencies of 'hypos' (bouts of low blood sugar) induced by rhIns.

The situation is indeed somewhat unclear. What is less unclear to me is whether a byproduct of abattoirs is actually more costly to purify than the rhIns which took, as few recall, years longer to bring to market than had been predicted. If the true R&D costs were fully reflected in the price of 'Humulin', I doubt the GE stuff could compete with an established purification method using essentially free feedstock.

If I may hazard a guess, I think rhIns will turn out to have subtle anomalies of secondary structure (folding) so that even when the primary structure is exactly the same sequence of amino-acids as real human insulin some different molecular shape(s) can occur. That vague message seems to be the nearest to sense coming out of the prions (BSE, scrapie, CJD) puzzle, which turns on secondary structures.

Three decades ago, Crick's awful 'central dogma of molecular biology' was rivaled or even exceeded in repute by the doctrine that primary structure determines secondary and tertiary structure in proteins. This belief was crucial in the over-optimistic plans of the GE-insulin engineers. They then had to learn some news about folding of proteins, before they could offer for sale the rhIns which is now well established commercially.

I suspect there are subtle differences which are still little understood. And the practical question of whether rhIns is better medically than pig or cow insulin remains unclear. That the picture is this murky may be annoying, but it should be reported as such if only because rhIns is the flagship of the small fleet of GE benefits, nearly all of which turn out - so far - to be trivial, uneconomic, or downright fakes.

I see no reason to concede that rhIns is a great medical advance. And whether it really saves any money I gravely doubt. But I doubt even more whether we will ever find out! The flagship will be cross-subsidized to whatever extent is necessary to keep it selling up large, and the fanatics will continue to make out that this commercial success in contained labs means we must let the corporations with the Martian names let loose any GE organism they like.

I must add that the burgeoning demand for insulin as prevalence of diabetes expands will continue to make rhIns a booming product, even if porcine and bovine insulins get thoroughly exploited.

2.10 Secrecy in GM

Here is an instructive example.

The Vancouver Sun
July 18, 2000

Opinion Editorial

Ottawa clings to an absurd code of secrecy on GMOs: When a scientist asked for data regarding genetically modified canola's effect on bees and honey production, civil servants responded with a suspicious skein of silence.

BY Mark Winston

I'm a bee scientist and beekeeper by occupation and pastime. Beekeepers have two concerns about genetically modified crops.

The first is that European consumers have become shy of anything genetically modified, and our Canadian beekeepers export honey to Europe. Genetic engineering does not affect honey directly, but bioengineered crops such as canola are major sources of honey in Canada, and so honey has been swept along in the general biotech hysteria.

The second concern is that a protein resulting from genetic engineering of plants might get into pollen, which bees collect and feed to their young, and perhaps could have some unforeseen negative effects on colony populations or bee behavior.

There is no evidence to date that either honey or bees have suffered from genetic modification of crops, and nothing of concern was revealed at a recent "bear pit" panel I participated in during the annual beekeepers conference in Saskatchewan. Included on the panel were a honey packer, a representative from the canola industry and an official from the Canadian Food Inspection Agency (CFIA).

Nevertheless, I remain a hard-core scientist at heart, and when the CFIA spokesman said that pollen from GM crops did not harm bees, my data-sensitive antennae twitched and I made a mental note to obtain the relevant studies.

Upon returning to Vancouver, I e-mailed the CFIA staffer, asking him to substantiate the results alluded to in his talk. In my circles, providing data for fellow scientists to corroborate statements is akin to passing the salt at the dinner table. It's good manners, if nothing else.

I knew something was amiss when my e-mail message was bumped up to a higher-level civil servant. The questions I asked were straightforward, seeking information needed to develop an informed opinion about an issue that could seriously affect beekeepers' livelihoods. The answers also were straightforward, although not in the way I expected:

Have honey bee adults or larvae been examined in tests to evaluate effects of GM pollen on bees?

Answer: Yes.

What GM crops were tested?

Answer: Can't tell you that; it's proprietary information.

Where did the data originate -- from industry or an independent source?

Answer: Can't tell you that; it's proprietary information.

Can you provide me with the experimental protocols for these tests?

Answer: Can't tell you that; it's proprietary information.

What were the results?

Answer: Can't tell you that; it's proprietary information.

Why can't you reveal the protocols and results from these tests?

Answer; We deem those to be confidential business details.

I'll be blunt. There is absolutely no reason for this information to be kept confidential. I can understand a novel process, or even the nature of a particular gene product, being kept under intellectual-property wraps. But how could information like number of replicates, methods and experimental protocols used, what plants were tested, and how many bees lived or died possibly be considered a threat to patent protection or industrial confidentiality?

If a GM crop is safe for bees and people, the public should be allowed to see the data that says it's safe. If it's not, we should have clear information about the danger. Period. Our government needs to be a trustworthy arbitrator of such issues, and their secrecy stance torpedoes credibility.

It's not just bee data, and it's not just GM crops that we should be concerned about. As one CFIA official put it, "secrecy is business as usual as far as we're concerned."

There are many issues larger than bees and pollen. Our government makes decisions about biotechnology products, pesticides, antibiotics fed to livestock and myriad other health and safety matters based on copious data provided by industry.

I don't happen to share the deep distrust expressed by many on the environmental left about industry-generated data, but I do share the opinion that such information should be publicly accessible when it relates to human and environmental health.

Nor do I have any particular reason to mistrust the quality or professionalism of the staff at the CFIA or other Canadian government agencies. I've worked with regulators on many issues, and found that the on-the-ground workers are dedicated, honest and as helpful as they are allowed to be. They often have told me stuff they are really not supposed to reveal because they, too, see the foolishness of overdone silence.

The problem lies in government policy that has handcuffed our civil servants. Stealth may be necessary -- for an undercover military spy. But can someone explain to me why the number of bees killed or not killed by GM canola pollen is a government secret?

Or, if a pharmaceutical company develops a new antibiotic for livestock, why can't I see the data presented to government on residues in meat, even without top-secret information on the identity of the antibiotic? How about the inert ingredients in which pesticides are dissolved before being sprayed?

The underlying issue is trust. The consequence of secrecy is that we perceive conspiracy by shadowy government-industry cartels at every turn, whereas the opposing perspective, transparency, would reduce our anxieties about new and potentially beneficial technologies.

Anything less than full disclosure on information pertinent to human and environmental health is an affront to the public interest. How about it, Ottawa? I await the data.

-

Mark Winston is a professor of biological sciences at Simon Fraser University, and a regular contributor to The Sun.

3 The Roles of Propaganda

3.1 A Warped Context

http://www.lifesciencenz.com/pb/about/code_ethics.asp

"Biotechnologists should use the principle of precaution. This principle implies that in scientific research and the application of its results (as far as can be foreseen at that moment) the starting point should be that one should not progress unless one can make plausible that no harmful or irreversible consequences will occur, that the risks can be sufficiently estimated, and that the possible side effects are justified for the community by the purpose and the expected advantages of the application. "

"We simply do not know the long-term consequences for human health and the wider environment [of genetically modified crops]. . . . If something does go badly wrong, we will be faced with the problem of clearing up a kind of pollution which is self-perpetuating. I am not convinced that anyone has the first idea of how this could be done."

-- Charles, Prince of Wales
June 1998

I juxtapose these two quotes with intent to call in question the sincerity of the 'Life Sciences' PR corporation. They say roughly as does the Prince; but their behavior belies this image. Well, that's PR for you!

3.1.1 In GM perhaps more than any other field, confusion reigns between fact and fantasy, between reality and hope. It has turned out to be very easy to put up a PR image of some beneficial properties in some hoped-for GMO, but every time such an image is investigated with any scientific skepticism we find many problems, usually including scope for harm that had not been noticed by the enthusiasts. And in many examples, the distinction is blurred between what is real and what is only hoped for by the promoters. Many mundane, unglamorous aspects lag behind in the real world of measurement, such as yield, growing conditions, pest vulnerabilities, side-effects (e.g. Bt toxins harming soil ecology), completely unimagined toxins (e.g. the Showa Denko L-tryptophan impurities), as well as cultural aspects (e.g. acceptability of yellow rice). To some extent these lags are inherent in the very nature of, on the one hand, the readily-sketched fantasies of techno-benefit and, on the other, the incorrigible delays of measuring yield etc. But such lags fit ill with the enormous venture capital sunk into these capers.

3.1.2 We are thus faced with wave after wave of superficially plausible images which have already gained funding from ignorant gamblers, promoted by compliant media stooges heavily influenced by that depraved trade PR. The RSNZ got thoroughly caught up in this pattern - a very sad disgrace. Your main expert on that would be Dr Judy Motion, senior lecturer in marketing, U of Auckland, who has with a colleague conducted a detailed study of the RSNZ involvement in the deception exercise 'Genepool' partly funded by Monsanto. I urge the Commission to subpoena this expert. She can also tell you much about the King Salmon caper, executed by the same PR agent who put across the Genepool racket.

3.1.3 I give one example out of many of how PR deceives people on GM.

<http://www.the-times.co.uk/news/pages/tim/99/07/22/timnwsnws02012.html?999>

Tree trial survives protest attack

BY NICK NUTTALL, ENVIRONMENT CORRESPONDENT

A PIONEERING experiment to make environmentally friendly paper from genetically modified poplars has been partly salvaged a week after an attack by protesters.

Activists against modified crops struck at the Berkshire field where 115 test trees were growing, snapping saplings and stripping bark off more mature trees leaving them wilting and dying.

Scientists with Zeneca, the British biotechnology company behind the trial, believed that years of work had been lost. Yesterday, however, the company, which has altered the poplars' genes to produce less of the woody material lignin, which turns paper yellow, announced that it had managed to recover 1,900 tons of genetically altered wood.

Nigel Poole, a spokesman for Zeneca, which has been carrying out the studies under a European Union research program, said that the 48 salvaged trees were enough to take the research forward to the pulping stage.

Laboratory studies indicate that the gene-altered trees, when processed into paper, will need 15 per cent less of the bleaching and other chemicals used to make paper white. The scientists, using the salvaged experimental trees, now plan to test this at Domaine University in Grenoble, where there is a centre for paper research.

Dr Poole said that if the pulping and paper-making confirmed laboratory studies, they would have to decide on their next move. They plan to modify the fast-growing eucalyptus to test its potential for making paper with less chemicals. He said, however, that given the damage at the poplar test plot it was unlikely that any future plantings will be in Britain and the research is expected to go overseas.

Dr Poole said: "I think these people went too far this time. These trees are designed to benefit the environment. The local newspapers here have called these activists eco-terrorists not eco-warriors."

Jack Cunningham, the Cabinet Office Minister, yesterday criticized protesters for "trashing" genetic crop trials. He told the House of Commons that it was a serious and difficult situation.

He was speaking after another incident, last weekend, when up to 500 protesters destroyed a trial at Watlington, in Oxfordshire, one of Britain's biggest test sites.

[IMAGE]

A Zeneca research scientist salvaging genetically modified wood from among the damaged poplars. The timber will be turned into paper

Photograph: BEN GURR

.....

This story implies a growth rate hundreds of times faster than any trees have ever been reported to achieve. It is not to be believed. Yet the Murdoch press refused to print a simple letter of correction. Mass media that have been taken in by PR often refuse to carry corrections.

3.1.4 Here is another example of mass media coverage of GM.

USA ambassador Josiah Beeman (leaving for home the following day), Radio NZ 99-12-8 0940 said:

"We've been eating genetically-engineered food in the United States for years, and our streets are not full of people with two heads."

This is especially interesting in his context of advocating that only **SCIENCE-BASED** restrictions on international trade can be tolerated.

He asserted that for NZ to exclude US GEF would be pure whimsy, not at all science-based; and he threatened retaliatory exclusions.

One of the penalties exacted from us to date by the media putting to the fore non-scientific spokespersons is that Beeman (& others) can get away with this falsehood that objections to GEF are not science-based. Some certainly aren't, but the key point is that more than enough are.

The interviewer Fiona Hill (one of the chief media problems instrumental in publicizing mainly emotive feminist politicians and hardly any scientific objectors to GEF) did not at all challenge Beeman's claim that GEF is scientifically flawless. She didn't say "yes - 2 or 3 years" in response to his misleading claim for how long GEF has been eaten - let alone "EMS symptoms didn't include bicaputism but did kill dozens and maim thousands".

This example illustrates that the PR trade is succeeding in its deceitful aims partly because the media lack interest in investigative journalism.

3.1.5 I have argued for a couple of years that discussion of GM is especially prone to resonating paranoia. Here is an instructive example I contributed to the email GE-list: 27-11-98

J M Fitzsimons list MP has accused Monsanto and Hon. John 'Satchmo jr' Luxton (Minister of Food Fibre & Furphies) of trying to import Terminator® seed which would cause difficulties for organic growers. Satch responds that market forces would allow organic horticulture to prosper notwithstanding availability of Terminator® seed.

Monsanto Australasian PR chief Nik Tydens said two days earlier, but Radio NZ now excerpts the tape as if it were a response to Fitzsimons' accusation today, that Terminator crops will simply be a 'single-use' item which nobody is forced to buy and which cannot biologically affect other crops.

What nobody has mentioned in the media these few days - or any other time that I know of - is that the Terminator® patent does not entail any evidence that such a seed exists or could exist.

Attached is a good account whose author Assoc-prof Martha Crouch agrees with me when I point out patents are granted without regard to whether the invention would work . . . unless the application describes a blatant violation of scientific law - e.g. perpetual motion machines - a patent may be issued for what the examiner is convinced will not work . . . Most people are surprised when they learn this fact about patent law, but the reasons for it are not hard to see.

In my opinion such criticisms can reasonably be leveled against some aspects of the Terminator patent. They may be no more than wishful thinking. If so, that of course has no bearing on the moral status of the Terminator concept.

It does envisage a racket - but at the moment, so far as we know, it is only a vision. Sordid, warped, wicked - yes, all those, but if it is not real let us refrain from amplifying the paranoia which is all too readily generated around GE.

To denounce the intention of the Terminator concept is our main duty; to warn that it might not work as tidily as claimed is also urgent; but to credit anyone with having it incipiently on sale is

worse than saying Windows 98© really works as claimed. We must not accord power to lying creeps when they have not actually achieved what they desire and perhaps cannot. Let us not make them look more technically competent than they really are! . . . The Monsanto PR man denounces Ms Fitzsimons' Terminator warning as alarmist. The facts as I see them, briefly set out above, seem to make that a fair comment - tho' for different reasons than he states.

If so, where did the alarmism start? I believe Monsanto PR may well have planned to 'monster' us 'greenies' with the Terminator image; then if Terminator™ seeds never come to exist, or if something approximating the patent concept gets realized sometime but doesn't work as reliably as hoped, or in a variety of other scenarios, Monsanto can sacrifice The Terminator™ as a commercial project, at least for an indefinite period, while still pursuing research on it and claiming to have been green, clean, sensitive, harpie-compliant, etc. in 'abandoning' it.

This is indeed what Monsanto PR has since done. I do not doubt they are still working on this technology in their labs and the announced delay in trying to deploy it is only making a virtue of necessity.

3.1.6 Another lulu:

Dr Dewar, an entomologist, was furious that some of his research for AgrEvo had been destroyed by activists. . . . "Destroying these crops is destroying knowledge. . . . "

This definitely belongs with the immortal testimony of Ed "Father of the H-Bomb" Teller to the U.S.A. senate cttee considering the partial {above-ground} nuclear test-ban treaty of 1963 - reported in H. York 'Arms Control' (Freeman). Teller told the cttee that to ban nuclear explosions in the atmosphere would be "against knowledge".

3.1.7 More PR:

>B.S.Ahloowalia

>Principal Research Officer, Agriculture and Food Development Authority,

>Kinsealy Research Centre, Dublin, Ireland.

>

>Perspective

>

>Biotechnology and transgenic crops are here to stay as are the

>multinational seed companies. Plant breeding based on genetic

>modification has two innate values:

They are in fact extremely far from innate. The two categories of value which B.A. now defines are very far indeed from being inherent in GE. In fact, almost all cells into which bundles of transgenes are inserted go badly wrong after the abuse entailed in foreign genes inserted by glass needle, or by micro-shotgun, or by infective particle of whatever sort. Then to select a tiny minority of survivors by one property (antibiotic resistance) and assume the resulting organisms will be exactly as wished, even quantitatively e.g. soybean yield, is rotten science.

B.A. continues:

- >1. Social value which results in benefits to the society at large,
 - >e.g. use of less chemicals and pesticides in case of disease resistant
 - >genes.
 - >
- >2. Commercial value from increased yield or improved product quality by
 - >changing traits that enhance the agronomic performance in a positive
 - >manner, e.g. early maturity, disease resistance, bigger fruits, more
 - >colorful flowers.
 - >
- >The use of transgenes (so far mostly single genes)

It is tiresome to find this lie still promulgated. What the gene-jockeys call 'single genes' turn out usually to be bundles including not only a gene for the desired property but also a vector, promoter, and antibiotic-resistance 'marker' gene. There are serious grounds for concern about each of these, and it is sleazy pseudo-science to claim that functionally this amounts to a 'single gene'.

- >for the enhancement
- >of commercial value

to whom?

- >of plant varieties does not constitute anything
- >different than [sic] conventional gene transfer
- >through crossing and selection

This is *THE* classic lie of advocates for GM. The whole point is to insert genes which the target organism could not acquire by any usual biological process - to overwhelm barriers of not only geography but also cell biology, e.g. inserting African clawed toad genes into a potato which could not normally acquire such genes. The 'commercial value' is indeed supposed to derive from this novelty which can NOT be bought by conventional breeding. This is thoroughly different from 'crossing and selection'. Yet when possible drawbacks are suggested, we are next told that GM is just nature revved up - natural processes, unusual only in the speed. Here is one of my published responses to this deceit.

NZ Herald
Letters, 99-11-16

Your correspondent Colin Little asserts that genetic engineering is no more than science speeding up cross-breeding and selection of varieties to obtain more and better food.

This is seriously misleading. Dr Little has unfortunately been taken in by a line of propaganda designed to obscure the fact that genetic engineering usually performs artificial transfers which are not believed to occur in nature.

Toad genes do not get into potatoes in the course of nature's workings, nor human genes into cows. The properties of these artificial chimeras are unpredictable. They may well include poisons or allergens previously unsuspected. And the process of growing GE crops may cause ecological harm, even in cases where the resulting food turns out OK; 'food safe' does not equal 'ecology safe', which is one good reason why labeling is not sufficient.

No GE food should be distributed, or even grown outside containment, before thorough testing which has scarcely begun. yrs etc.

3.2 Flops

Where is the refereed account of the FlavrSavr® debacle? There have been many flops in GE, as averred by the Union of Concerned Scientists' head GE expert; but the number of those flops that have been properly published as scientific reports is few indeed. That is not our fault! Note the double standard normally prevailing: the failures are denied by GM PR unless described in a peer-reviewed journal, but the successes often achieve an image of reality (e.g. in speeches in the NZ Parliament) when they are still nothing more than fantasies.

3.3 A NZ Flop

3.3.1 Letters to the Editor

The Press

P B Christchurch 17 June 1993

Dear Sir,

Your report of June 11 on the part-human goats proposed by Prof Bullock of Lincoln University, funded by Genzyme Corp of the USA, was less misleading than any other I've noticed in the media, but nevertheless requires correction. The professor's formal proposal is written, and ancillary mass-media propaganda has been slanted, so as to create the impression that the Genzyme/Lincoln work is based on some scientific hypothesis which could well lead to therapy for cystic fibrosis. This is a misleading impression.

Even if it proves feasible to insert the gene for the human lung protein CFTR (cystic fibrosis transmembrane-conductance regulator) into goat zygotes or embryos, leading to goats' milk containing significant quantities of human CFTR, there will still remain the difficulty that no therapy is in prospect using any concentrated preparation of CFTR. The leading relevant experts in paediatric biochemistry will confirm for you that pure CFTR has no foreseeable use. The proposal's phrase "the drug produced" is therefore false and deceptive.

The leading medical experts on cystic fibrosis have found themselves in the unpleasant role of breaking the news to the parents of CF sufferers that, contrary to the Genzyme/Bullock image, no therapy is in prospect. It is cruel to raise hopes which must thus be dashed by others.

The public should also learn that permission was denied for Prof Bullock's conjoint proposal to produce similarly in goats' milk a second human protein, AAT, which has even less prospect of utility or market value but which he termed a "pharmaceutical protein".

Genetic engineering's brief two decades of history has been characterized by exaggerated claims of benefit, confusing hope with fact in attempt to allay natural fears (and to stimulate stock-market ramps).

Yours faithfully, [RM]

[the rest of the story: the Ministry for the Environment published a couple of sentences saying the experiment was a complete flop, the goats had been destroyed, and Prof Bullock had moved overseas. If this is the standard of reporting of GE science, it must be adjudged totally unsatisfactory.]

3.3.2 Yet another lulu:

I think it would be safe to say that GMOs have been tested a lot more extensively than is the case for non-GE crop varieties introduced routinely by seed companies.

Leaving aside for the moment the facts, what is more important about this line of talk is its logic: it quietly assumes transgenic organisms are of a very similar kind to organisms arising by natural breeding.

This is a radically bold assumption. The behavior is not within the same limited range. The tiny minority of cells surviving the unguided insertions of transgenes (plural!) by processes not believed to occur in nature may exhibit behavior never suspected in the species thus targeted. It is not reasonable to assume that transgenic organisms have only the narrow range of properties foreseeable in ordinary breeding.

Therefore it is not reasonable, but is misleading, to suggest that the testing regimes for transgenic organisms should be anywhere near as permissive or loose as the testing of new strains arising from ordinary breeding, selection, Granny Smith watching with eagle eye in an Australian suburb, etc.

3.3.3 The assumption that the safeguards built in to natural breeding are no more reliable or effective than those of gene-jockeys is more important than many have yet understood. I completely disagree with this assumption.

The issue thus opened is, in theological terms, whether nature is unplanned, not designed but merely the outworking of laws of chemistry and random mutations. That model, most notably expounded by Dawkins, is in my opinion one of the most outrageous intellectual cons of all history.

The other view, which originally fostered the science now so tragically vulgarized & rebellious, is that nature is designed by God (and then trammled by evil). I find much of Genesis 3 very

mysterious, but it is nevertheless the original statement of that view, and is to my mind infinitely truer than Dawkins' nihilistic caricature of nature.

I am arguing, at a minimum, for vastly more respect for nature than is shown by those who vilify and abuse her. I further argue that such respect is entailed in true religion, and is gravely threatened by the typical atheistic values of the apologists for mainstream GM.

3.3.4 Ace cow cloners David Wells & Phil l'Huiller (The Geniuses according to the Waikato Times page-wide headline) have threatened to take their project overseas if they don't get even more public funding.

Also they were mysteriously held up for legal permission from the ERMA on their most radical trans-species project; on this I have publicly expressed sympathy with them. There are good reasons under the ERMA's authorizing statute for refusing permits for GE, and the ERMA should use those reasons based in science & ethics; but instead, ERMA has staged large cowardly delays, vaguely alluding to its special Maori cttee (prime mover Mere Roberts). This is an undermining of the rule of law, and an evasion of duty. It is not a proper ground for refusal; and the ERMA hasn't the courage to refuse, but dishonestly delays, perhaps hoping the applicant will give up.

But on the general issue of threats to flounce off if they don't get their way: some leading scientists ran out of public funding in a certain European country a half-century ago and were permitted to shift to another major military-industrial complex to pursue their hi-tech enthusiasms. Was it unjust that they ran out of funding in their homeland? Was it right that they got funded elsewhere? If their fatherland had refused them funding for moral reasons, would we admire or deplore that restraint?

The possibility that The Geniuses would be allowed to continue their radical transgeneses elsewhere is no reason for us to let them do such expts here.

3.3.5 The commentary Kuiper et al. produced on Pusztai's paper in The Lancet, October 16 1999 deserves careful study.

Two parts I comment on:-

> Another shortcoming of the study is that the diets were protein
>deficient; they contained only 6% protein by weight.

A different impression is produced by mentioning, as few have remarked, that the GE potatoes were 20% down in protein content. Both facts should be mentioned, when one has space.

To my mind the most remarkable aspect of argumentation by Kuiper et al. is that they simply refer to

> GM potatoes containing the GNA lectin

whereas the main point of the experimental design was to compare potatoes

- (a) containing the GNA lectin simply added
- (b) containing similar levels of that lectin, but by the different history of having the gene for that lectin inserted by modern GM.

Having conflated these two for the naive reader, they then proceed to denounce Pusztai for inadequate controls!!

The commentary is as if from a great height of scientific purity, and conveys the impression that extremely high standards, similar in stringency to those required in testing novel medicines, prevail in the actual regulatory regimes under Codex, WTO, and all those transnational bureaucracies.

Take the following para and ask whether its scrupulous vision is in force anywhere:

- >Particular attention must be given to the detection and
- >characterisation of unintended effects of genetic
- >modification. Inferences about such effects can no longer
- >be based solely on chemical analysis of single
- >macronutrients and micronutrients and known crop-specific
- >antinutrients or toxins. New methods have been developed
- >to screen for potential alterations in the metabolism of the
- >modified organism by analysis of gene expression
- >(monitored by microarray technology, mRNA
- >fingerprinting), by overall protein analysis (proteomics),
- >and by secondary metabolite profiling.^{11,12} Depending on
- >the outcome of these studies, further toxicological and
- >nutritional studies may be needed.

Is it claimed that such stringent testing has been done on current RR® soybeans, NuLeaf™ potatoes, etc?

If someone reliable can tell us where these tests have been documented, I expect then to have further comments. As far as I can tell, the truth is that no such testing has yet been done. But GEF is on sale.

3.3.6 Meanwhile, I would interpret the main facts of the Pusztai affair as illustrating: the great difficulty of choosing WHEN to blow that poorly-known whistle; the duty to alert relevant authorities to preliminary results, though not conclusive, if they imply important hazard; the scope for disinformation from PR agents; the laziness of the media; the unwisdom of commercializing science, especially university research schools; the extreme authoritarianism of many time-serving scientists; the hypocrisy of some scientists in talking about stringent standards that they don't intend to see enforced; the extreme dishonesty of many scientists mired in the GM bubble's collapsing foam of deceit; the atavistic cowardly childish misbehavior of those who hope to gain approval from big money &/or big science by endorsing whatever seems to be all the go just now, and personally attacking anyone who seems to be annoying the heavies; the cleverness of those such as Kuiper who put up a convincing impression

of joining the previous category but then slip in proposed requirements which, if diligently enforced, would probably wipe most if not all GEF; the fact that lists like this can be extended

The similarity is noteworthy to the Losey et al. vilifications. Facts which, though preliminary, were worth disclosing are minimized; the obvious incompleteness of the preliminary study is sneered at as if a moral breach; money is poured into muddying the waters rather than pursuing the leads opened up for research; caricatures of various origins are vilified in a straw-man stunt as if they were the original authors' careful statements; etc.

It is worth adding that Pusztai, a leading expert on lectins in diets, has stated that he expected no harm to the rats in his now-famous preliminary tests.

Let us keep focused on the real significance of those tests. They revealed enough evidence of harm that to repeat and extend them should be a very high priority. In order to do so, exactly the same Durham U potatoes will be needed. Let us hope that GE line has not been expunged as the Showa Denko GM bacillus strains are claimed to have been.

Alongside those tests, Monsanto's NuLeaf® Bt-potatoes should also be tested.

3.4 Labelling of GEF

3.4.1 An associate Minister of Health, John 'Tuariki' Delamere, stated, with no attempt at justification, that a labeling regime might double the price of food. I don't know of anyone who believed that sourceless assertion.

He was soon removed from the topic of GEF, replaced by the then Minister (and deputy Prime Minister) who stated after the council of health ministers of Australasia that the increase would be 6%. This figure is not pulled out of mid-air, but is not much better: it's said to be in a secret 'report' by the transnational accountancy corporation KPMG. Again, I don't know of anyone who believes it. Still more recently, an unsworn agent of the same corporation stated to this Commission a yet lower number, the justification for which was not revealed. Why not require KPMG to produce their reasoning?

The ANZFA is being used as a trial run for a regulatory charade. It is not possible to create a thorough system for checking all the possible harm GEF could do to people (& other species), and some of the delayed categories of harm could be very severe before noticed, if ever, by epidemiology.

The testing regime for GEF might have to be ludicrously expensive - as stated early by New Zealand Assoc. Minister of Health 'Tuariki' who asserted a doubling. And then it could not screen for the numerous possible human disorders that could conceivably arise from even minor changes in key macromolecules of life. Labeling is therefore not the answer if the precautionary principle is to be honored. GEF is such a generally dangerous idea that it should be stopped a.s.a.p.

How soon might that be?

3.4.2 I regard as very reasonable the suggestion that campaigns for labeling are actually intended to ban GEF. The broad pattern has been for industry to claim that, say, seatbelts or cleaner exhausts are expensive, and then to deliver at vast price some technical fix (which always has its own failure modes). Labs closely involved with transnational accounting corporations (e.g. KPMG) will channel more money into molecular biology in the Crick tradition.

We in NZ have had over a year of internecine dispute between those who say that labeling GEF will lead to "market failure" - they claim the market for GEF will collapse if consumers are able to identify it by labels - and those such as myself who think labels will not suffice.

Why should labels on GEF affect sales much more than is now achieved by labels on organic food - which of course is all already certified non-GEF?

Furthermore, 'food safe' does not equal 'environment safe' - we cannot safely permit the processes in the fields which produce GEF, because their ecological effects may be very harmful. We ought not to leave these issues to the fabled 'market forces'. They will no doubt help, but will not suffice. The processes which lead to GEF on the shop shelf are, in general, so dangerous they shouldn't be permitted - even if the GEF itself were demonstrated safe (which it certainly isn't).

3.4.3 What is needed instead of course is much more crop rotation in most circumstances, and advanced organic agriculture applying science in the service of mankind. Prince Charles is completely correct about this. Organic agriculture is the superior alternative to not only GM farming but also current toxic agriculture.

GE crops are just the latest stunt from agribusiness, but of an unprecedentedly hi-tech quality and therefore genuinely harder to understand than what Steinbeck sketched in 'The Grapes of Wrath'.

The brilliant article in Le Monde Diplomatique by Lewontin & Berlan underlines that the Terminator patent is only the latest (and worst) concept within the strand of biology and of commerce exploiting 'hybridity' in F1 hybrids which do not breed true.

3.5 Ethics of Direct Action

3.5.1 My friend the founding editor of The Ecologist was permitted to advocate direct action in one NZ newspaper early last year:

'Sunday Star Times' 25-4-99
National Affairs Editor Patrick Smellie

'Destroy GE crops says campaigner', with a good photo of Teddy Goldsmith.

New Zealanders should rip out of the ground the first local [,] commercial plantings of genetically modified crops, says one of the world's leading opponents of the practice, Teddy Goldsmith. "If I were you I'd organise yourselves and pull the stuff up," said the

70-year-old during a public meeting in Wellington.

He advocated "non-violent direct action, even if it involves breaking the law".

Far from helping to feed the world, genetically modified crops would increase the accelerated depletion of farmland through industrial farming techniques, and the replacement of staple foods for local consumption with export crops.

3.5.2 Soon after Goldsmith's urging, a group calling themselves Wild Greens uprooted - leaving in the field all the living material plus their own clothes - an inadequately-contained trial plot near maturity of potatoes in our South Island. The particular spuds were GM to contain an 'improved' copy of a toxin gene from the African clawed toad - for the little-needed purpose of inhibiting bacterial rot. The offender, Tony Conner PhD, told the nation on TV that he had put only one gene into the spuds - a lie.

The action was carried out at night with no hazard to anybody.

The offending subsidized research institute fronted on TV a pretty Canadian grad student stating she "felt violated", near tears at what she claimed to be the destruction of a year's work. This may not be true. The potato crop in question was at or near maturity. The expt was stated not to be a yield trial, but by the look of the uprooted crop on TV the yield would be measurable to some useful accuracy. And the living material was all there - just unable to grow any further - so it was not at all apparent that biochemical analyses could not be performed as originally intended.

3.5.3 Democratic processes have drastically failed to appraise GE crops, and GE animals, which deserve far more scrutiny than they have yet had. For those who realize that this dereliction entails unprecedented hazards on scales up to global, the concept of sabotage arises. Gandhi is the big name for most, but Te Whiti is the big name here, and many of us are inspired by the example given in the Cleansing of The Temple.

3.5.4 The issues raised by this type of direct action are well traversed, at least in outline, regarding previous threats. The Revs Berrigan were widely inspirational, and many noble examples shine down thru history reminding us that existing laws do prove too sluggish sometimes. The questions then become e.g. how is damage to people prevented; what compo do innocent parties get (farmers, in the present discussion) for any property loss; and do the saboteurs represent some reasoned, legitimate cause.

3.5.5 Having helped Greenpeace as early as 1973, I have followed with mounting horror their withdrawing into an obscure relatively remote subculture largely dominated by PC including some very unreasonable wimminsLibbers. I no longer assume they represent reasonable, scientifically informed priorities. This has been my view from the time I chaired the biggest branch of our nation's main conservation group a decade ago. In 1994-95 I tried hard to get some cooperation from Greenpeace NZ regarding GE, but this was vetoed from Europe. Talk about transnationals!

3.5.6 The general principle seems to me to be that when the government has persistently, drastically failed to protect people &/or ecosystems from a serious hazard then we must fall back on direct action as urged by Goldsmith.

3.5.7 Advocates of GEF routinely claim no harm has been recorded from GEF. The first answer to this deceitful line is the new disease EMS caused by Showa Denko L-tryptophan impurities - thousands poisoned, scores killed by a "pure" natural compound which is indeed required by the human.

The second main answer is that large numbers of people could be seriously harmed by GEF while no medicos, let alone politicians, noticed. If the SDKK tryptophan had caused not the new illness EMS but a common illness such as asthma, or delayed harm e.g. severe mental retardation in some of those whose mothers took it early in pregnancy, we would still not know it to be harmful. I am astonished at medical school profs who deny this.

GEF is typically unlabelled, whereas the SDKK Trp was subject to traceback studies.

3.5.8 I hasten to add that labeling is not an ethical answer if propounded as essentially the only governmental action needed. Tracing the cause is cold comfort to the crippled. I therefore despise politicians such as Susan Kedgley list MP who claim labeling will cause market failure - GEF so labeled will be boycotted on her advice, causing collapse of the market, she claims. Even if this megalomania were plausible, it fails to protect people from the severe harm that GEF may do before she learns of it.

3.5.9 I deplore the mischievous gagging writ lodged by the PR company Communications@Trumps™ against Ms Fitzsimons MP claiming 'defamation' for her revealing a leaked copy of CT's advice to King Salmon NZ Ltd to suppress all mention of malformations.

<http://www.environmentaldefense.org/pubs/Reports/Aquaculture/transgenic.html>

Claims such as '8x faster growth' and my favourite '37 times bigger' are often heard from this sector of gene-jockism. Why have no veterinarians been heard thru the media regarding possible harm from such expts?

The persistent slackness of ERMA in this matter will, I'm sure, interest the Royal Commission.

3.5.10 A corollary of the Bunkle/Coney/Cartwright travesty is insertion into ethics committees of a fast-turnover sisterhood, some of them selected also on the further criterion of race, who lack more or less completely the qualifications which would enable understanding of the proposed science and technology, so that they cannot make any informed assessment of the ethics entailed. ERMA is only one level of such corruption, and Kedgley has recently introduced legislation to expand the realm of ethics committees.

3.5.11 Ace gene-jockey Tony Conner asserted on TVNZ '20/20' some preliminary claims from his CRI experiments at Lincoln (Canterbury, NZ).

Conner says the question for discussion is not the safety but the ethics; he then expounds "I know that animals and plants share most of their genes already, so for that reason I have no difficulty about these experiments".

He proceeded to show a couple of caterpillars on leaves, asserting that one was smaller because of eating a GM insecticide in that leaf. The question I wish to raise is whether Conner will be attacked & vilified for putting across his claims on TV rather than reporting them in a refereed scientific journal. A very accomplished scientist, Dr Pusztai, was sacked & vilified for summarizing on TV damage measured in many organs of rats eating a certain GE potato. Conner's TV announcement does not appear to be based on much evidence at all. But as he is asserting benefit, rather than harm, the Royal Society will not vilify him. Indeed, this very man has been allowed to supply the RSNZ with its public position - a false one - on the Showa Denko poisonings. This type of bias represents an awful degradation of scientific standards, in the service of commerce.

3.5.12 The NZ Association of Scientists put out a questionnaire thru the RSNZ weekly email 'Alert'. It was a glaringly biased questionnaire, obviously designed to promote GE and to make out that legal controls on GE will force scientists out of the country.

My answers which I sent in may be of interest.

- >It is possible that a proposed moratorium on releasing
- >genetically modified organisms (GMOs) may be extended to field
- >trials for the duration of the Royal Commission of Inquiry into
- >Genetic Engineering.
- >
- >1. Is the current public debate about the safety of genetic
- >engineering and GMO release affecting your ability to do
- >science?

I am not a current experimenter in the field, but I was in molecular biology before most of the current practitioners and I attempt to contribute from that perspective to what some term the debate. I regard this 'debate' as very scanty & sporadic & even inchoate, but it is something toward what should happen. To resent it as if it could cease rather than expand is severely unrealistic. There is no chance that the period of unchallenged secretive experimentation in GE will persist; a main practical difficulty is that some of the enthusiasts have yet to face up to this fact. It is not a proper role of NZAS to assist the attempted protraction of this period of unscrutinized GE. I refer you anew to the NZAS policy under President W Q Green which advocated public scrutiny (not case-by-case in the expensive ERMA rubber-stamp charade, but more fundamentally scrutiny of policy).

- >2. Would a moratorium on field trials affect your long-term
- >commitment to staying in New Zealand?

Yes, it would strengthen that commitment.

>3. In relation to Point 2, have you had a job offer from
>overseas?

No; and if Phil l'Huiller has, then let us wish him Godspeed.

>4. Would you advise a student to take up a career in gene
>technology?

Of course not - the artificial commercial bubble is about to burst, and there are far too many scientists in the field already to be sustained by any reasonable future developments. Biologists are being purged from university positions to make room for molecular biologists in a 'gene rush' less rational than a typical gold rush.

Most seriously for the NZAS, science itself is being seriously degraded by the secretive commercialism which characterizes this gene rush. Most of the gene technology that is being done lately is based on junk science anyhow. NZAS has done nothing that I know of to arrange critical discussion of this science. Have you foreseen how this will look to the Royal Commission and to the public?

I have indeed advised several promising recent graduates to stay out of this fad as it is most unlikely to lead them to a career at all, let alone a career in real science.

3.6 The Conflict with 'Animal Rights' Activists

Those who advocate proper testing of GE food are, logically, immediately in disagreement with the 'animal rights' activists. The tests of GEF would certainly use considerable numbers of animals - mainly rodents such as the rats sacrificed by Dr Pusztai.

The 'animal rights' crowd are among the most extreme fanatics that I know of in our country. They have invaded labs to wreak serious damage, and have carried out loathsome raids on the homes of leading scientists. I am happy to record that the media have very decently refrained from publicizing these crimes, but I can assure you they were committed. So far as I am aware, no culprit has been caught.

I don't know how this clash is to be resolved; I simply wish at the moment to point out the looming conflict.

3.7 Involvement with the Computer Trade

3.7.1 A further neglected dimension of GM is its intimate interweaving with the computer trade - one of the most notoriously dishonest realms of modern life.

I give some notes on this.

file: faith in komputink

3.7.2 When first 'fly-by-wire' (computer-control) airliners were mooted, the union of flight engineers in NZ investigated thoroughly because their jobs would evaporate to the extent that these types of airliner would be deployed.

Perhaps the most amusing item they discovered was the description of an event soon after the first computer-controlled Airbus entered into routine service.

It was at an airport where taxiing is done not on the planes' engines but by a special tow vehicle. The passengers were all loaded, the doors closed, the checklists moving along calmly between the two flight-deck crew.

The tow vehicle backed in and hooked onto the nose-wheel strut.

The plane's engines immediately roared up to full forward thrust, accelerating the plane straight ahead, strewing ground-crew and the tow aside (without serious injury, by good luck).

As the plane raced faster & faster across the field, the pilots quickly confirmed that their 'throttle' T-handles were as if disconnected. Evidently the computer control had over-ridden the pilots' normal control. Perhaps the immortal sounds "I'm sorry Dave, I can't do that" echoed thru their fevered minds.

The captain had only seconds to decide whether to try to take off across the field - which might well have worked in that they might have got off the ground, but perhaps at the price of damaging some tyres as they drove across the edges of the runway & taxiways, and with the prospect of flying around at full power until they consumed all the fuel - speeded presumably by dumping fuel - and then glide in once the motors had stopped (if they stopped simultaneously). It must have been an uninviting prospect.

Fortunately the co-pilot extemporized a way to disconnect the fuel supply from the engines soon enough to allow them to brake to a stop before the far side of the airfield.

The explanation turned out to be simple. The computer program had a subroutine to detect the state 'in the air and below (stall speed + 20kt)' and when this condition arose, automatically slam the engines to full ahead in order to prevent stalling.

The definition of 'we're in the air' for the purpose of this fail-safe automated safety subroutine was: no pressure on the nose wheel strut. As the tow vehicle hooked on, it momentarily produced that condition. And the airspeed was certainly below (stall speed + 20kt); so the subroutine took over and prevented the "imminent stall" by slamming the motors to full ahead.

3.7.3 You may recall the mid-1988 crash of a similar Airbus at the Paris air show. A senior test pilot instructed to carry out a simple, safe maneuver to help sell billions of dollars' worth of airliners does not crash the plane, but he was killed so it was convenient to blame him. I have never believed he did anything wrong; I think some other subroutine kicked in and over-rode the pilots' controls, in this case depriving them of power needed to climb.

3.7.4 You may also recall that, soon after Boeing had gone the same way, a near-new twin-engined Boeing of Lauda Air, climbing thru about 30,000 ft over Thailand after takeoff from Bangkok, suddenly was destroyed because one engine was slammed onto full REVERSE - a maneuver the pilots could not do even if they wished.

3.7.5 These mishaps in aviation occurred despite the fact that the IT experts in the aviation industry shun such piles of junk as Windows® which, for instance, allowed the "Life Sciences" PR outfit to send you and all your email list a potentially troublesome computer virus.

3.7.6 Blind faith in komputink has worried me. Refusal to admit even notorious frequent errors is a new kind of lying by those who feel their future income somehow depends on such collaboration. I find such corruption sad & worrying.

My further point is that what has so distressingly become mainstream komputink, largely using Gates' appalling piles of junk, has now become intimately interwoven with transgenic expts. The reliability of the DNA & protein sequences read out from such komputink will be less than hoped, won't it?

I append an example, sent by a gene-jockey, of this stuff.

3.7.7 I challenge those who have detailed understanding of this dishonest komputink to produce some analysis of how GM is rendered more dangerous by relying on Windoze etc.

This Commission may well feel unable, in the time available, to go into this topic. In that case I ask you to report that suitable experts should.

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> B 1 MADAEDIEPLVCDNGTGMVKAGFAGDDAPRAVFPSIVGRPRHTGVMVGMG 50
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> A 51 QKDAYVVGDEAQSKRGILTLKYPIEHGIVSNWDDMEKIWHHTFYNELRVAP
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> B 51 QKDXVVGDEAQSKRGILTLKYPIEHGIVSNWDDMEKIWHHTFYNELRVVS 100
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> A 101 EEHPVLLTEAPLNPKANREKMTQIMFETFNTPAMYVAIQAVLSLYASGRT 150
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> B 101 EEPXVLSXEAPLNPKVNRES.AQIMFETFNVPAMYVAIQAVLSLYASGRT 149
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4. Relevant Theology

4.1 Crude Atheism

This theme may be introduced by a glimpse of a relatively candid advocate of gene-tampering:

<http://www.independent.co.uk/news/UK/Science/2000-05/dna170500.shtml>

James Watson endorses scientists "playing God"

At the annual meeting of the British all-party Parliamentary and Scientific Committee held in mid-May, James Watson argued that there is nothing intrinsically wrong with the idea of scientists "playing god" by manipulating the human genome. Watson rejected criticism of human germline engineering by asking, "[I]n all honesty, if scientists don't play god, who will?"

A further introductory glimpse is the following letter from me to a British newspaper about one of their columnists:

The leading environmental journalist George Monbiot has made some of the most penetrating comments on genetic modification (GM). It is therefore a shame that he now presumes to set up several false antinomies for the purpose of attacking Prince Charles' view of the issue.

Monbiot begins with the assumption "Prince Charles's solution to the environmental crisis is spiritual transformation, rather than political awakening". Monbiot seems to assume that political awakening can be achieved without spiritual transformation, or anyhow these are mutually exclusive, alternative pathways.

This is a fake counterposition. The big efforts to achieve political awakening aside from, or in direct opposition to, spiritual advancement have been disastrous - the French and Russian

revolutions, for instance. And today's dominant money-worship (your Thatcherism, our Rogernomics, etc) is all the more insidious because it uses PR instead of guns. Either way, not only spiritual health but also ecology suffer drastically under ideological materialism.

Monbiot takes from his Bible that " God granted man dominion over nature" and suggests this idea is contrary to any environmental ethic. Again, a false antinomy. When man takes care of nature on his best understanding of God's plan, he does relatively well; but in Genesis 3, and in the big GM corporations today, man presumes to know better than God, and tends to cause ecological & social mayhem.

And again: "the need to protect the environment springs not from 'a sense of the sacred', but from social justice." Why can this "need" not spring from both sources? Why imply they are in conflict? (Where does Monbiot get his sense of justice, by the way?)

Monbiot asserts "human life, resulting from a series of evolutionary accidents, is arguably meaningless". If it were so, why should anybody care for the biosphere in which the human species will live or die? Ethics has no logical or workable basis except in religion; and the religion which our monarchy defends, and which Monbiot evidently dislikes, is the only known basis for a decent society and for properly taking care of nature.

The media have, over the past decade at least, presented every issue as a one-dimensional bipolar gladiatorial conflict. I had thought Monbiot above this type of journalism. But apparently his antagonism to religion has misled him to join the common game. In so doing he has misused the hard-won right to voice criticism of the heir to the throne. yrs etc

The strongest reasons to be extremely cautious about GM are theologically-based ethical reasons. Sure, the fears of poisonings by GEF, and of ecological disruption, are generally sound (as I have indicated above); but the fear of unethical gene-tamperers playing God is - with all its admitted vagueness - to my mind more important.

In thus aligning myself with some other Christian people I am of course aware that this ground is, in the minds of most New Zealand citizens today, weak or even nonexistent. I refer them to the other category of reasons, which are quite strong enough to justify a proper ANZFA and ERMA in place of the present cynical charades.

Those who will release uncontained GMOs, falsely claiming they've been properly tested and can be foreseen to cause no ecological harm, can only be called liars. They are doing this partly from greed. But there is a deeper reason for their reckless lying. They crave the power over nature which is a fleeting shadow of God's pleasure in Creation. Never has such a power been accessible to the human. Its use will evidently require great restraint - primarily self-restraint by those who can perform the manipulations.

Rebellion against our Maker is depicted in Genesis 3. I freely admit I cannot make much of that dense, profound set of myths; but I do take it as, at the very least, a warning that when humans pretend to know better than God how the biosphere should be we can create colossal trouble.

The devious Comstock purports to answer by solemnly discussing an alleged notion that all technology could be bad. As a practical technologist in several fields and an observing Christian, I advise you to ignore this caricature. Nobody is saying that all technology is bad, so Comstock's knocking-down of that straw man (his main mode of arguing) is irrelevant.

4.2 'Maadi Religion'

I deplore the very recent attempt by Mere Roberts and a few others to make out that some alleged ancient Maori religion is a strong basis for opposing GM today. The appended letter to Roberts gives some idea of this rort.

Australasia has been for a couple decades approx 85% urban; we have really gone in for the 'parasitical cities' blunder. In particular, the people who had arrived first (tho' as late as mid-way thru the Christian era) were at most 15% urban as late as the end of WW2 but by now have largely quit growing food. They nevertheless maintain to some extent a philosophy of living which has been summarized thus: walk backwards into the future. We can't know much about the future, so look to the past as we try to act wisely in the present. I used to arrange Dr Ranginui Walker to lecture my main Environmental Studies class most years, and am glad that many hundreds of students were taught this wisdom - one of the philosophical lessons by which Maori culture can improve New Zealand.

But I do not see evidence that the religion alleged by Roberts existed until a few years ago, and I deem it a very weak reed for the purpose of appraising GM (or any other purpose).

In the ERMA hearing 98-12-10 the chairperson of their special Maori cttee was elevated to the ERMA Board itself for the occasion. She raved at me incoherently. I asked your staff to procure, thru Agent Beale, a transcript of this rave; no response has yet occurred. I again recommend that you get this transcript, for some idea of the quality of the tendency which I am criticizing.

4.3 A Respectable Expert

I now give my comments on the relevant philosophy of one of the less silly ideologues - far more sensible than Dawkins - available for propping up GM: Professor Paul Davies, the best-selling author of many books featuring phrases like 'The Mind of God', now at Adelaide on a similar footing to what Asimov enjoyed at BU:

Paul Davies THE FIFTH MIRACLE - The Search for The Origin of Life
Allen Lane 1998

p5

The living cell is the most complex system of its size known to mankind. Its host of specialized molecules, many found nowhere else but within living material, are themselves already enormously complex. They execute a dance of exquisite fidelity, orchestrated with breathtaking precision.

Vastly more elaborate than the most complicated ballet, the dance of life encompasses countless molecular performers in synergetic [sic] coordination.

but he goes on immediately:

Yet this is a dance with no sign of a choreographer. No intelligent supervisor, no mystic force, no conscious controlling agency swings the molecules into place at the right time, chooses the appropriate players, closes the links, uncouples the partners, moves them on. The dance of life is spontaneous, self-sustaining and self-creating.

He seems to realize this is implausible:

How did something so immensely complicated, so finessed, so exquisitely clever, come into being all on its own? How can mindless molecules, capable only of pushing and pulling their immediate neighbors, cooperate to form and sustain something as ingenious as a living organism?

pp 32-3

The source of semantic information can only be the environment of the organism, but this begs the question of how the information got into the environment in the first place. It is surely not waiting, like fragments of a pre-existing blueprint, for nature to assemble it. The environment is not an intelligent designer. . . . In the end, the environment is the entire universe. Follow the chain of causation and the question becomes one of cosmology. We are then confronted by the ultimate question: Where did the information content of the universe come from?

pp35-6

The reason that the universe can have zero energy and still contain 10⁵⁰ ton of matter is because [sic] its gravitational field has negative energy - a peculiar concept . . . A convincing mechanism was found to explain how positive energy was channeled into matter, and an equal quantity of negative energy went into the gravitational field. So in effect, all the cosmic matter was actually created for free!

p42

No law of Nature forbids a left-handed DNA molecule, yet nobody has ever found one.

{This is an outright error. LH helices are perfectly respectable among the mainstream DNA theorists, X-ray analysts, etc. - tho' admittedly not as common as RH helices. That Davies could make such an error suggests he does not bother to get his rapid writing checked by experts.}

pp81-2

To fully comprehend how life arose from non-life we need to know not only how biological information was concentrated, but also how biologically useful information came to be

specified , given that the milieu from which the first organism emerged was presumably just a random mix of molecular building blocks. In short, how did meaningful information emerge spontaneously from incoherent junk?

(note 2 question-beggings: 'presumably . . . ' and in the last sentence 'how did . . . ' when no good reason has been advanced for believing THAT it did.)

p76

Having thus SEDUCED the right tRNA molecule to berth at the production line . . . [my emphasis]

...

It is worth repeating that, in spite of the appearance of purpose, the participating molecules are completely MINDLESS. Collectively they may display systematic cooperation, as if to a plan, but individually they just career about. The molecular traffic within the cell is essentially chaotic, driven by chemical attraction and repulsion and continually agitated by thermal energy. Yet out of this blind chaos order emerges spontaneously. [my emphasis]

p77

I began by explaining the geometrical forms of molecules, the structure of DNA and the sequence of base pairs, then I sneakily started describing messages and information and specifications. In short, I shifted from the language of hardware to that of software. A gene is a particular material form in three-dimensional space, but it is also an instruction to do something. The secret of life lies with this dual function of biological components. And nothing better illustrates this duality than the genetic code.

{ next section: THE GENETIC CODE }

. . . p81 I have subjected the reader to the technicalities of the genetic code to make a general conceptual point that goes right to the heart of the mystery of life. Any coded input is merely a jumble of useless data unless an interpreter or a key is available. A coded message is only as good as the context in which it is put to use. That is to say it has to mean something. . . . The information distributed along a strand of DNA is biologically relevant. In computerspeak, genetic data is semantic data.

. . . p83 Like the floppy disk, DNA is itself hardware, but again the crucial feature is not the stuff of which DNA is made but the message written into its base pairs. Put this message into the right molecular environment - in the right semantic context - and, what do you know, life happens!

. . . p84 I have described how life, at rock bottom, has the same logical structure as a computer.

(he hasn't , and it hasn't)

p219

For 300 years science has based itself on reductionism and materialism, leading inevitably to atheism and a belief in the meaninglessness of physical existence.

Tell that to Newton and Faraday! It was to at least some extent vice-versa. He implies science is inherently reductionist & materialistic; he overlooks the fact that it has been made so lately by atheists but is not inherently so. He should read Rev Dr Harold Turner's 'The Roots of Science'.

p221 . . . the principles of Darwinism rule out the teleological notion of life striving for betterment.

Are these of similar authority to 'the principles of the Treaty of Waitangi'? Has Davies stated them? Where can we read The Principles of Darwinism?

Those comments on a prominent scientist's purported philosophy will, I hope, give some idea of how far adrift atheism has led scientists. It does matter that such crude epistemology is common among gene-tamperers. They are therefore, as a group, less to be entrusted with dangerous technology.

4.4 A Better Path

I am aware the Commission will be receiving detailed theological material from Christian groups, to which I leave most of that role.

I simply close by saying that what we should do - not resembling what gene-tamperers are now doing - is:

- design technologies with all the prayerful awareness we can muster of God's intentions for this world;
- test our inventions carefully & fully; and only then, if they have passed stringent tests,
- deploy them with due prudence and close monitoring.

The vagueness in that outline may seem daunting - it certainly does to me. But that is no excuse to shrink from this, our calling as stewards of God's Creation.

* * *

I would be glad to discuss any of the above with the Commission. I briefly presented my credentials in my application to take part more fully from the start; it is unclear whether Mr Brown QC showed you that document.

As the person who first proposed this Royal Commission (in 1977), I have been dismayed at aspects of its composition, terms of reference, biased & unhelpful staff, lack of sworn evidence, etc. These concerns have made me all the more anxious to do whatever I can to help.
