

Institute for the Study of Christianity in an Age of Science and Technology

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How wonderful are the things the Lord does! All who are delighted with them want to understand them. Ps 111:2 (GNB)

Editorial

Science, technology, and the environment

This is my first editorial as the new editor of the ISCAST Bulletin. I feel that Alan's shoes will be difficult to fill, but I am confident that if I do, it will because you the readers have been prepared to submit material of value and interest to all of us. So please, if you think you have something to share, then share it. If you disagree or agree strongly with something, tell us, if you have read an interesting book, write a review so that we can all learn from your experience.

This issue of the ISCAST Bulletin is devoted mainly to questions of science, technology, and the environment. Like death and taxes, technology and the environment are inescapable. We all use technology and we all live in an environment. The issue thus becomes, not whether we should use technology, but how we should use it and the ends to which we use it. ISCAST's brief is to study our faith in a scientific and technological age. We have done quite a bit on the scientific front and how scientific ideas interact with our philosophy and theology. We have done far less on how our theology influences our attitude to and use of technology, or even how technology may influence our theology.

Can our technology affect our theology? Perhaps, for good and ill, but it can certainly powerfully illustrate it. The Bible is full of technological metaphors for God and His work in the world and in us: we are His workmanship, He is a refining fire. Robert Bank's marvellous book *God the worker* explores some of the Biblical images of God as technologist; he is pictured as metalworker, potter, farmer, doctor, builder, architect, tent

maker and garment worker. The liberal use of such imagery in the Scriptures not only wonderfully illuminate God's work, it also sanctifies the image itself; these technologies are God's gifts to us and, properly used, allow us creatures to be co-creators and co-sustainers in God's world.

As sinners, such technologies are also used to abuse our powers, so that creation groans. The challenge for Christians is how, as finite redeemed sinners, we are best to use God's gifts to us. In this issue of the Bulletin we explore perspectives on some of the technologies: mining, genetically modified crops, and energy production. In his article Bruce Craven highlights the dangers of hypocrisy on one hand decrying technology but at the same time taking advantage of it; complaining about the burning of fossil fuels while at the same time driving cars and using electricity. Ian Hore-Lacy emphasises that the many challenges that face us, such as energy production and waste disposal, require godly understanding and application of technology now, not at some date in the future.

As individual Christians and churches contemplate these issues we need to remember that there are many Christian technologists who deal with issues of technology and the environment every day in their professional capacity. We should do more to avail ourselves of their experience and wisdom and make use of them.

I believe it is important for Christians to take leadership in these issues. It is encouraging to see that many Christians have. The work of Professor Sam Berry in bioethics and Professor Robert Bryant in genetic engineering are well known to ISCAST and its associates. Perhaps less well known are the roles of Christians like Sir Ghillean Prance in forest conservation.

Vivian Bound's letter in [Bulletin 30](#) on a theory of miraculous beginnings continues to excite response. I believe this discussion has highlighted some important questions about the way God acts in the world, which reveal some of the differing theological assumptions we have in this area. These often go undiscussed and unexamined, exchanges of view on these issues are helpful and I hope that the discussion will continue.

The next few issues of the Bulletin will try and follow particular themes. The first issue for 2001 is appropriately "The final frontier: space travel, extra-terrestrials, and science fiction". Articles, news items, book and film reviews, letters, and reflections are all welcome. Articles on topics other than the main theme are also appreciated, but may be kept for future issues.

Jonathan Clarke

News

ACT

Jonathan Clarke gave a series of three lectures at St Marks College on the interaction of geology and theology as part of a science and religion course run by Mark Spickard.

NSW

Emeritus Professor Ken Campbell gave a talk to a gathering of interested people in the Physics Common Room at the University of New South Wales on the night of November 13th. He gave a fascinating description of various ancient species, emphasising the large changes in body structure that are seen to occur which cannot be explained in terms of the normal Darwinian evolutionary concepts. He also argued that a somewhat different approach to the question should be adopted as compared with a recently circulated [discussion paper](http://www.iscast.org.au/creationevoln.html) from the Victorian branch of ISCAST (<http://www.iscast.org.au/creationevoln.html>). Ken stated that a scientist first observes what is in nature and tries to understand developments in the light of current scientific knowledge. Only then will these findings be related to our theological beliefs - for example, maybe God created His world in such a way that the laws of physics operated on the environment so that the observed changes came about.

Ken Campbell's abstract will be published in a future issue.

SA

CTNS Workshop in Adelaide in 2001

The Australian component of the CTNS Science and Religion course program will be run in Adelaide at the end of January 2001. Supported by ISCAST, ATF, AUSREN, and CTSC, and directed in Australia by ISCAST Board member, Dr Mark Worthing, this will be an opportunity for university, seminary and college faculty to learn how to teach interdisciplinary courses in science and religion. The program awards prizes for outstanding courses and it is hoped that the interest this program creates will increase the number of courses in Australian tertiary institutions.

For information contact:

Hilary D Regan (Mr), Secretary,
Australian Theological Forum,
PO Box 504, Hindmarsh, SA. 5007.
Phone (08) 8340 3060
Fax (08) 8340 3450
Email:

QLD

ISCAST has received some welcome publicity among University chaplains. Recently, at a meeting of the Senate Chaplaincy Committee at the University of Queensland, a

member of the Anatomical Sciences Department raised the problem of students who accepted creationism. Some of the students had been complaining to teaching staff, and wanting to know why creationism wasn't taught alongside evolution, or, in extreme cases, asking for "equal time" for creationism. Rev. Dr Ian Howells, SJ, the Catholic Chaplain (PhD in mathematics), sent a message to the Tertiary Campus Ministry Association discussion list, asking if this was a problem at other campuses. Ian has attended most of the ISCAST meetings in Brisbane, bringing a number of Catholics with him. Part of his message read:

There is good material on the ISCAST website at

This received a number of responses. None of them were critical of ISCAST, and among them were:

The ISCAST site/material is certainly a helpful resource for chaplains, staff members and students. Emailing information to all accredited students on your campus/campuses of UQ would ensure that these groups have awareness of resources - since it's likely that at least some of the students who are vocal in classes have contact with these groups.

Assoc. Prof. Robert Stening @ UNSW has a course within the science stream there, GENS4010 Science and Religion. He is, I believe, a member of ISCAST, and could be contacted re. the course content - which can be accessed via his website:

We have bought some careful commentaries from a fairly conservative bookshop, and they all find, for example, the broader understanding of the 'days' of Genesis as perfectly consistent with Christian faith.

Many thanks for the website it is most helpful.

While not a creationist (well actually I am - just not sure when God did it or how or what process were involved?!). While I'm not a creation scientist (for scientific and theological reasons) I am certainly not a fully blown evolutionist by any stretch of the imagination (for scientific and theological reasons). The debate is often presented so that you must belong to one of the two extreme points on the spectrum - there is plenty of room in the middle - though I'm not exactly sure where to put myself!

The search for truth is crippled by a few in both the scientific and religious communities by a refusal to acknowledge the value of the other. Both scientism and creationism are ideologies, which build artificial barriers to the search for truth because they refuse to question their own dogma. Any good scientist will acknowledge that a theory, no matter how persuasive and seemingly complete, is still a theory which may be rendered invalid by future discoveries. Any good theologian will acknowledge that any revelation based upon faith is subject to doubt, for faith, by definition, is not certain, and may have to be discarded when tested against experience.

These come from chaplains from a wide range of denominations: Anglican, Baptist, Catholic, Uniting - and are fairly typical of other responses I have encountered from other thinking people.

So, provided we do our homework carefully, and produce well thought out statements, people who are not necessarily in full sympathy with our evangelical stance will listen to us and, perhaps more importantly, refer other people to us for expert advice on some issues.

Ken Smith (writing as a Chaplain's Assistant at Chaplaincy Services, The University of Queensland).

Tas

A group of Christian staff and the chaplains at the University of Tasmania's Hobart campus are planning a lecture series dealing with faith, science and culture issues, to start next year. At this stage, two lectures are planned in each semester.

Alastair Richardson

VIC

The inaugural annual lecture of ISCAST (Institute for the Study of Christianity in the Age of Science and Technology) was held on the evening of the 11th October, 2000 at St. Jude's, Carlton. It was a privilege to have the Revd. Dr. Mark Worthing speak on the topic of *God and SETI* (the Search for Extra-Terrestrial Intelligence). The evening started with a welcome message from Dr. Brian Edgar, Chairman of ISCAST (Victoria) who noted that this annual event, sponsored by the Victorian chapter of ISCAST, is an occasion for local and international experts to deliver a lecture on matters relating to the interaction between science and the Christian faith.

In introducing the topic of SETI, Dr. Edgar also provided beautiful images of various cosmic phenomena which were well appreciated by the audience. The speaker, Revd. Dr. Mark Worthing, was then introduced by Dr. Jia-Yee Lee, a fellow of ISCAST, who also chaired the occasion. Revd. Dr. Worthing, an ordained Lutheran minister, is currently the head of the Department of Historical and Systematic Theology at Luther Seminary in North Adelaide. His book, *"God, Creation and Contemporary Physics"* was awarded the prestigious John Templeton Foundation's prize for Outstanding Books in Theology and Natural Sciences in 1997. He now serves as the Regional Director in Australia and New Zealand for the Science and Religion Course Programme, a joint programme of the Centre for Theology and the Natural Sciences, Berkeley, California (CTNS) and the Flinders University and Adelaide College of Theology Centre for Theology, Science and Culture (CTSC).

The SETI programmes which involve the analysis of radio signals received from outer space, have been in existence since the late 1950s and in recent times have gained world wide interest through such films as *Species, Independence Day, The Arrival and Contact*. As explained by Dr. Worthing, SETI is "part of our larger human quest for knowledge". Indeed, an interest in extraterrestrial life goes as far back as 5th century BC with the various Greek and Roman philosophers debating the existence of a plurality of worlds. Having taken the audience through a history of such debates, Dr. Worthing proceeded to

explore the implications of extraterrestrial life for the Christian faith. He noted that many people believe that the discovery of extraterrestrial life would present profound difficulties for the Christian faith, though this is not his understanding. On the contrary, the verification of the existence of extraterrestrial life would:

1. tell us more about the universe and its creator;
2. indicate a greater diversity and complexity of creation than before imagined, prompting greater awe and wonder;
3. increase our understanding of the scope of God's providence;
4. shift the centre of focus (in our understanding of God's providence) away from earth and humanity;
5. require us to see such life as a part of God's good creation.

This search challenges centuries of philosophical and theological hubris concerning the place of humanity in the universe. Dr Worthing took the audience through some 'thought experiments' focused on questions such as "What kind of relationship might extraterrestrial intelligent life forms have with God? What might be the consequences if they are in a fallen state, or in a state of original grace? Would the event of God's Incarnation need to be repeated on each of a myriad of planets, or is the death and resurrection of Christ a unique event?"

Following the lecture, the Revd. Dr. Andrew Sloane, a lecturer from Ridley Theological College and an ISCAST fellow was invited to respond and to join Dr. Worthing in addressing questions put from the audience. It was certainly an enjoyable occasion and ISCAST(Vic) takes this opportunity to thank Dr. Worthing for a thought provoking lecture.

Dr Jia-Yee Lee

Copies of Dr. Worthing's lecture (\$3 posted) may be obtained from the ISCAST(Vic) Administrative Secretary, Dr. Helen Joynt, (see address on the contact list at the front of the Bulletin). We hope to publish the text of this talk in the next Bulletin.

Articles

Technology and Ethics

Bruce Craven

Although technology is so critical to our lives, ISCAST has said little about it, and likewise Christian churches generally. There are reasons for this. The bible says little about technology; and church leaders trained in theology are usually not well informed about it. Indeed, when a preacher refers to technology, or science, he usually gets it so wrong, as to embarrass any listeners who are competent in these areas. But there are large moral issues involved, and also much conflict with the holders of power.

There is not a great deal in these remarks that is specifically Christian. Perhaps it is rightly so. We are not called on to rewrite an ethical code, at any rate in those large areas where what C.S. Lewis called the Tao is common to many traditions. Rather, we are called to take it seriously, and try to do it.

I offer some provocative instances.

(1) Maritime trade over great distances has done much to improve living standards for many, yet for many centuries the sailors on which it depended had often to work under atrocious conditions, ill rewarded, and too often under compulsion.

(2) The English cotton manufacturers in the nineteenth century not only prospered its owners, but also provided clean and affordable clothing to many millions who never had it before. Yet this industry was based on slave labour in America to produce the cotton, and sweated labour in English factories, who were often fed worse than the Negro slaves.

(3) Cars and aeroplanes have solved the "tyranny of distance" in Australia, and elsewhere, but at a great price. The environmental cost is well known; more critical is the dependence on the "mining economy" of oil extraction, and the supplies are rapidly running out. Because cheap fuel is available, much is wasted; and too many people are located where they cannot live without it.

(4) While various intellectuals have lamented the replacement of many human skills by machines, they seem unaware of the backbreaking labour which most people had to do in former times. Seldom does one see an advocate of "back to nature" pump his own water or hoe his own field, and live on what it grows. A "no dams" advocate still wants electric power in his home, and food grown from irrigated areas. Indeed, many environmentalists seem almost totally ignorant of what it is possible to do with the means available. Often they demand the fruits of technology, without the technology.

(5) Upper class people in former times usually managed not to see the conditions of the lower classes who had to do the hard work. This myopia is not dead. Clean air is important, for the suburbs where the prosperous live, maybe not for those who must live in poorer industrial areas. How often have opponents of nuclear energy been down a coal mine? Have they any notion of the dangers involved? And if we ban an industry because of hazards, or exploitation of workers, how do we propose to feed the people who depend on it for their living? Dare we pass by on the other side, leaving it to someone else unspecified to solve these questions?

(6) None of the "sunrise industries" show any serious prospect of employing large numbers of semi-skilled workers.

While the end does not justify the means, we are often limited to very imperfect results by the restricted means available to us. If we do one thing because of a moral principle, we must not ignore the predictable consequences of our action. Some Asian cultures maintained that if you rescue a man out of the river, then you are responsible for the rest of his life. (Do they leave him to drown?) But there is some truth in it; if we change one thing, we must also do something about what then happens. We must use our brains to predict what may happen, and not just wait for it to happen.

Confucius gave a negative version of the golden rule: "What you do not desire to be done to you, do not do to others." I quote it here, because often we do not know what would be

good for people in circumstances different from ours. What are we doing to others, in pursuit of what we see as good?

Technology is not morally neutral; all too often (as some of the above examples show), a new technology brings both good and bad, seemingly mixed together and beyond separation. We should not follow the fashions, either of supposing that a new technology is wonderful because it is new, or of condemning it automatically on green ideological grounds. Too often, even experiment on some new technology is prevented, because no absolute guarantee of safety can be given, for lack of information. In the other direction, some innovation may be imposed on the whole community or nation, again in the absence of essential information. To what extent are the results of a new technology reasonably predictable? Note that we usually cannot go back to an earlier state of affairs, whether or not desirable. We may need new technology in order to fulfil some desired end, including environmental objectives.

The implementation of serious technical advances depends on ethical qualities in the community integrity and mutual trust. If no group will concede anything until they get their cut first, then technological advances are likely to be cosmetic only. The current fetishes of "privatization" and "outsourcing" demand the lowest prices, obtained by a level of performance that someone reckons to be just adequate. This approach leaves no resources for improvement, and no provision for the future. High standards cannot be guaranteed just by documents - contracts and specifications - but demand personal qualities of the people involved.

In many cases, what is needed is a controlled experiment, on a limited scale so that a decision is not irrevocable. It is precisely the lack of proper controls, so that valid comparisons cannot be made, that is so frequent with innovations made on political grounds. In addition, when something goes wrong with a new technology, informed criticism should be encouraged, rather than suppressed as usual, because this is the only way to get faults mended. There is indeed a risk of destructive criticism, which may misrepresent the facts to serve a political objective, but the risk must be taken. What is advocated here are procedures to let the truth come out, something that scientists and Christians should support.

As Christians, we may oppose a technology, in particular if it will dehumanize the people involved (eg. in a third world country). But even this is futile, if the people have no workable alternative. (Some of the recent protests about petrol prices illustrate this; some of them come from areas where there is no rail or other alternative to road transport.) It is no use berating people for not doing some good thing if they can't.

Quite often, technologies are introduced which do some required job in a complicated and expensive way, where something simpler could also do the job. Apart from being wasteful, poor people are denied access to things that might help them considerably. For example there have been several proposals for cheap simple solar-powered radio receivers, for third world countries. Somehow, such devices never seem to get produced. We hear much of "property rights", but these are not the only things that matter. There could be many reasons. The originators of technology have indeed a moral right not to

have their inventions stolen; but should this entitle them to prevent any improvements, or to price the product so high that only the prosperous can afford it? The present system of patents, and copyrights, is crumbling under pressure of recent technologies. We should be thinking of what should be set up to replace the present legal arrangements.

Popular perceptions of risk are, indeed, often very different from objective measures of risk. However, people have often serious reasons for mistrusting some large-scale new technology.

For example, there was a widely reported proposal for genetically modified seeds, which would not only confer immunity to various pests, but also would grow plants whose seeds were infertile so a farmer could not save his own seed for the next year. It seems that a farmer who went this road could not go back to his previous arrangement; he would be as tied to one supplier of modified seeds, as a junkie is to his drug. Of course, genetically modified seed does not have to be of this kind; but who will believe reassuring statements now? One unethical piece of behaviour, or even proposed behaviour, does much to discredit a whole direction of innovation; and, sadly, the innocent are damned with the guilty.

Why is it so difficult for "appropriate technology" to get set up and used (whether to help poor people or the environment)? The hindrances are not usually technical (although there are always technical problems), nor are they all attributable to strong opposition by makers of existing products. An administrative difficulty can stop an innovation. (An early attempt to introduce powered invalid wheelchairs to Melbourne was stopped by the inability of officials to register any road vehicle other than an existing make of car.) Most serious, perhaps, is the inertia of ordinary people, who find innovation disturbing and often reject it, no matter how useful it may be for them, unless (sometimes) the new thing is promoted and advertised by established authorities or firms. However, there seems to be a growing mistrust of innovations in some technical areas, though certainly not all - look at the popularity of mobile telephones, for example. The popular opposition to certain technologies is so strong, as to prevent rational discussion. For example, the opposition by some groups in England to any form of genetically modified plants has become a quasi-religious crusade, beyond all argument. Recently, some such people resorted to violence, and destroyed an experimental crop, and then an English jury supported their actions. However, it does seem that many people have little hope for the future. Scientists, who are Christians, and who are not linked to commercial interests, may have a role to play here, in presenting future possibilities to the public.

bdc@labyrinth.net.au

Technology: service or pride?

The following notes supported a presentation by Ian Hore-Lacy at the "Fire in the Belly" meeting of ISCAST (Vic) earlier this year and reported by Helen Joynt in Bulletin 30.

As we move on from meal to metaphor, you will have to work out how much is "Fire in the Belly" and how much is cobwebs in the brain.

Fundamentally: Just how ambiguous is technology for the Christian? Is it the epitome of human creatureliness human in the image of God grappling with the challenges of providing for the material needs of people on earth? Or is it (eg Ellul) an expression of sinful technique, - man competing with and marginalising God in the world? - or at least so hopelessly flawed that it is futile to look for good in it.

Then: How do we understand the environment and its natural resources in a theological context, and in the context of the spirit of the age? the secular spirituality, the re-enchantment which is pursued outside the churches and which is arguably a renaissance of Romanticism? - cf Sam Gregg's small book *Beyond Romanticism - questioning the Green Gospel*, CIS 2000.

The creation mandate states God made it good; creation is incredibly bountiful, we lack nothing that we need, quantitatively. It also charges humans with stewardship (not merely passive) to make resources available to people, to improve life, to grapple with poverty, sickness etc.

And what about Tacey's re-enchantment? "Nature is a favourite site of spiritual renewal because nature is not made by human hands, and provides a sense of solidity that transcends the merely human." "Youth are again instinctively drawn toward eco-spirituality" etc (cf Zadok Perspectives # 67). Is this simply a new mysticism? Is it effectively pantheism (and I note he is very soft on the panentheists)?. But on the positive side, it is perhaps post postmodernity!

And I would love to know how he sees all this impacting on forestry, for instance. How is the utilitarian balanced with the admire-respect aspect?

The particular area where I am trying to understand better the ethical issues and undercurrents is nuclear energy:

1. Take electricity demand and the nature of it (mostly base-load) as a given.
2. Leave aside economic considerations for the time being.
3. What are the ethical and theological aspects of the options for meeting this demand safely? It must be met reliably, having regard to environmental aspects, with resource sustainability as a high priority, and we need to accept the need to solve any problems in this generation.
4. But note CS Lewis and Tolkien in their negative view of high technology, and note the strong parallels with public "debate" (read scaremongering) regarding GMOs/ GM foods.

So:

... Is it right to meddle with nature thus?

... Is any offence to Romanticism backed up theologically (or otherwise) from Christian side?

... Or is it in fact unlocking God's provision more deeply in the elements of nature?

... Is it getting to grips with how he enables humanity to enjoy abundance of energy, and the need to focus on management of it rather than churlishly reject or spurn it?

... Is it perhaps the epitome of stewardship via technology and the major key to applying

the bounty of God's creation for all people?
... Is harnessing nuclear energy essentially natural or unnatural?

uic@mpx.com.au

Some Thoughts on GM Foods

Rob de Feyter PhD.

"Would you eat this potato chip if you knew it was genetically engineered?" asked the reporter as he pointed to the plain (unlabelled) bag of crisps. I remember the question well, with the microphone aimed toward the scientist for a response. It was in 1994 and at the first official taste-testing of a genetically modified (GM) food grown in Australia. The news reporters were on hand, trying to get an angle on the "new thing". Very few Australians had heard of GM foods at that time. It struck me then that the question could be asked with different emphases, focussing on the potential risks and unknown dangers or alternatively in a simple and straightforward manner. What could be more mundane, after all, than eating a potato chip?

Our society has been asking many other questions since then about GM foods and, more widely, genetic engineering. I'd like to briefly consider the issue of GM foods. I have been through a long process of asking myself questions and seeking answers, both as a professional scientist and as a Christian. How do the potential risks stack up against the potential benefits? How do we evaluate the ethical issues? What about food labelling? From a Christian perspective, we have to ask what God meant when He said to our ancestors "Be fruitful and multiply, fill the earth and subdue it" and gave them "every green plant for food" (Gen 1). Did God mean to include GM foods?

The potential benefits of GM crops are obvious. In Australia for the last four seasons, we've grown insect-resistant GM cotton that needs less than half of the spraying with insecticides. That must be a good thing for the environment. In the future, we're likely to have bananas that produce vaccines, "golden rice" with elevated vitamin A to reduce blindness in developing countries, and broccoli with more antioxidants (but the kids still have to eat it!), and many other plants with various improvements that benefit mankind. Some GM crops may be considered in the luxury category, for example the blue carnations being grown by a Melbourne company (actually, more like a mauve colour), or coffee beans modified to be decaffeinated. Increasing food demand and population pressures are expected to require a doubling of worldwide food production in the next 30 years, all on the same amount of acreage as now being used. This kind of challenge will require new technologies.

The biological risks that have been mentioned widely include "escape" of the transgenes into wild plant populations, "superweeds", the transfer of antibiotic resistance genes into bacteria, or production of new allergens in plants. Another type of risk is the possible domination of international agriculture by a few multinational agricultural companies through their control of intellectual property. These are all issues that deserve careful scrutiny.

Are we simply developing another technology with our God-given abilities, or are we "tinkering" with God's creation? After more than 20 years of thinking and debating, I am convinced that there is nothing inherently unethical about recombinant DNA technology per se, now widely used in the pharmaceutical field as well as agriculture. I easily dismiss the argument that GM foods are inherently "unnatural" many of the crops grown today are artificial hybrids, engineered or mutated and selected. GM simply provides a more precise tool to do that. Those who argue against the "unnatural" must logically argue against, for example, Caesarian births etc. It is really another variation on the old argument "If God had meant us to fly, He would have given us wings". That argument doesn't get off the ground with me! At the same time, we must recognize that any new technology can be used or abused, and will have downsides as well as benefits. Cars kill and maim many people each year! Therefore, we need to evaluate every particular GM application for benefit and risk, case by case. This is very clearly what our regulations do.

Many people assert "a consumer's right to know what he is eating" with regard to food-labelling laws. Although I don't know where such a right could come from, I tend to think that if consumers want to know, well, put the label on the packet! However, recognise that there are costs involved in keeping GM and non-GM segregated, audited and tested. Also, labels carry an implicit warning message in most people's minds, particularly as most consumers don't understand GM technology. There is also the difficulty of defining what is and what is not GM, eg. processed or refined foods. Perhaps the greatest danger is that we might lose altogether the potential benefits of GM crops as food processors bail out of the industry. I think it is more likely, however, that the tight labelling laws proposed in Australia are equivalent to laws passed 100 years ago that required a man with a red flag to walk in front of cars as a warning! History will tell the answer!

Unfortunately, I see that the debate in Australia and overseas has become polarized and full of misinformation and slogans. This does not help for a rational evaluation of the benefits and risks. Also, it obscures the fact that each GM application is unique with its own characteristics and needs to be judged accordingly. I, personally, am disappointed in the "Green" movement, as I believe they have taken the wrong side in the debate. As I have explained to friends, GM generally means "cleaner and greener" with some exceptions. It will be interesting to see how the debate unfolds in the next few years. We live in fascinating times!

So, would you eat the potato chip if you knew it was genetically engineered? My answer at the time was "Yes, because it's likely to have less pesticides in it". I remain convinced that GM technology has tremendous potential for the benefit of mankind and is a valid part of our "Cultural mandate" before God.

Wind of Change in Australian Science and Industry Policy?

Thinking about technology is not only a theological or ethical exercise, it involves issues of policy and the political processes as well. As the following article by Professor John White shows, Christians, including ISCAST fellows, have played a role in the formulation

of advice to the Australian government in the area of science and technology. This is part of what it means to be salt and light.

The Federal Government of Australia is currently considering measures which could set the scene for Australian science and industry policy and funding for many years to come. A review of the National Health and Medical Research Council (NH&MRC) in 1999 was favourably received by the government and the funding for that Council for medical and health research will be approximately doubled over a five year period starting this year. What about other science and scholarship in Australia? What about Australia's need for a concerted industrial policy to ensure that our great natural wealth flows through into a modern economy based upon knowledge and modern science?

These are the questions which have been addressed first in the preparation during 1999 for the Innovations Summit held in Melbourne in February 2000 and, in parallel by an in depth study by the Chief Scientist, Dr Robin Batterham, FAA (who is also organist at Scots Church, Melbourne) of the strengths and weaknesses of the Australian science base including the higher educational system.

The report flowing from the Innovations Summit "Innovation Unlocking the Future" was released on 4 September 2000 and the Chief Scientist's discussion document "*The Chance to Change*" came out just before that in August. The final version of the Chief Scientist's paper was released on 17 November 2000. These are key papers and their recommendations deserve strong support from all sections of the community. Through the Australian Academy of Science, I have been involved in a number of submissions towards their preparation. Their recommendations provide a major opportunity for remedying some of the current malaise in the Australian innovation system.

The Innovation Summit document, "*Innovation Unlocking the Future*", has dollar figures attached to the cost of the programs recommended although in some cases the recommendations are not yet costed. Approximately \$2.5 billion over five years is the suggested amount that government might invest in major developments such as doubling the funds available to the Australian Research Council. We should note the current ARC success rate for proposals is only about 20% and the average grant of about \$50,000 per annum far too low if we are to match the performance of Singapore, the United Kingdom, let alone Japan and the United States).

\$2.5 billion sounds a great deal of money but if one looks at Figure 2.2 in the "*Chance for Change*" one sees that the business investment in research and development as a percentage of the gross domestic product from 1995 declined compared to the trend that was establishing itself at that time by about this amount. The \$2.5 billion would only just "fill that hole". But this is a rather simple way of looking at things a structurally prioritised distribution is required and this is what the two documents provide.

Attention is given to the higher education sector (producing more than 60% of Australia's scientific and technological research) by the recommendations for restructure and better financing of the Australian Research Council, recommendations for reinvestment in major scientific and academic infrastructure as well as encouraging students to enter

science. There are proposals for major research facilities and targeted funding to address major skills shortages in the enabling sciences including mathematics, information technology and related areas. To stimulate innovative growth and business investment in research it is recommended that the research and development tax concession should be raised to a base of 130% and to between 170 and 200% (mimicking Singapore for example) for business investment which is above a defined threshold.

Excellent as these reports are, there still may be a complementary policy gap concerned with Australia attracting really major investment such as that for computer hardware production or reestablishment of a strong chemical industry. As concerns Information Technology we are heading for deficits in the national balance of trade \$20 billion pa. Professor Lawrie Lyons has been at the forefront advocating an address to this problem. Again, how can Singapore with no natural resources have a \$17 billion pa. profit from chemical industry (including pharmaceuticals) and Australia a \$7B trade deficit? Australia is now at a real cross roads. Great economic benefits could come from development of the Pillbara and Timor Sea resources. We have some far-sighted initiatives in our chemical industry which would respond to a national initiative.

Because the Australian states are closely involved in the recommendation there is a real possibility for pluralistic support and greater diversity in what is done across the country if the Commonwealth gives the lead to implement the reports. I hope all who read this will take the trouble to look at the papers on the web (<http://www.isr.gov.au/science/review/>) and (<http://www.isr.gov.au/industry/summit/ISIG/isig.html>) and lend their vocal support in the next month or so towards the time when the Prime Minister might be expected to make an announcement of the government's intentions.

John White, President of ISCAST

Book Reviews

Does the Bible mandate environmental rape?

Cohen J. *Æ"Be fertile and increase, fill the earth and master it" the ancient and medieval career of a Biblical text¹* Cornell University Press. 1989.

Lynn White's 1969 paper "*The Historical Roots of our Ecologic Crisis*" has been highly influential. His central thesis, that the environmental crisis is a direct result of the dominion mandate of Genesis 1:28, is accepted as a truism by many in the environmental movement, and has been used by some to argue for an alternative, environmentally sensitive spirituality. This has usually been model on pantheistic, primal, or Buddhist beliefs. Much of the Christian response to environmental issues has been defensive as a result, either attempting to demonstrate that the dominion mandate is one of accountability and stewardship not exploitation, or saying that there must be a new "ecotheology" sensitive to environmental needs that radically breaks with past theologies.

Few, if any studies have examined whether Biblical commentators have actually interpreted Genesis 1:28 in an exploitative way.

Jeremy Cohen's book partly addresses this question. In an exhaustive review of Jewish and Christian commentaries, he examines how scholars have understood the meaning and application of Genesis 1:28 over a period of 1500 years. His conclusion is summarised on page 4:

"My research on the career of Gen. 1:28 has yielded three kinds of conclusions. first, with regard to Gen. 1:28 itself, the ecologically oriented thesis of Lynn White and others can now be laid to rest. Rarely, if ever, did premodern Jews and Christians construe this verse as a licence for selfish exploitation of the environment. Although most readers of Genesis casually assumed that God had fashioned the world for the benefit of human beings, Gen 1:28 evoked relatively little concern with the issue of dominion over nature."

So, at least in the premodern period, Lynn White's thesis has no validity. Unfortunately, Cohen's book is in this sense incomplete, as it does not cover the reformation and post reformation periods. It would be interesting to continue the review of exegesis of this verse up to 1969, to discover whether Genesis 1:28 was used as a mandate for environmental exploitation during this period. If this can be demonstrated for theologians in the modern period as well, then it would appear that the White thesis is as pernicious a myth as the 19th-20th century warfare myth of Draper and White with respect to the relation of science and theology.

What did the scholars find in Genesis 1:28, if not dominion? Ancient and medieval Jewish and Christian commentators regarded the text as being about sexuality, gender relationships, and reproduction. Some of their preoccupations and applications seem odd to modern readers, and the discussion of sexuality by the Jewish writers in particular, was extremely wide ranging.

I did not find this an easy read by any means. Rather I found it highly technical and rather dry at times. However, it is salutary to be reminded that there is more to the text of Genesis 1 than the present preoccupation with origins (dominant in the last 150 years) or environmental stewardship (in the last 30 years) would indicate. However I believe it is an important resource for anyone interested in the historical development of our understanding of Genesis 1.

Jonathan Clarke

Education issues:

Science and Creationism - a view from the National Academy of Sciences, 2nd edition, 1999, National Academy Press, 45pp, USD\$ 9.60 via web + p&p. ISBN 0-309-06406-6.

Arising from the controversy about teaching evolution in US schools, the National Academy of Sciences has produced two books, this and a longer one addressed to educators. This slimmer volume summarises the issues and positions and is designed to

"lay out for a broader audience the case against presenting religious concepts in science classes".

The book covers origins of the universe, earth and life, then biological evolution (the fossil record, common structures, distribution of species, development similarities, and new evidence from molecular biology), and finally but briefly, human evolution. It is an excellent summary of these, but the statement and rebuttal of creationist arguments in respect to each is somewhat cursory.

The book is adequate science but makes surprisingly little effort to grapple with any theistic perspective at all. It is a pity that there is no theological input to show why "most religious groups have concluded that the concept of evolution is not at odds with their descriptions of creation and human origins".

While keeping creationism out of science classrooms is a worthy aim, it almost completely fails to address the integrity of knowledge and truth, the lack of which leaves students open to epistemological schizophrenia. Even a secular treatment such as this could have more than a brief paragraph about knowledge and understanding beyond science. With the intellectual resources of the US National Academy of Sciences behind it, it is a pity that the book does not go to the root of the problem and will probably be unconvincing to any audience which it is intended to persuade.

The book is also available online at www.nas.edu, and readers are referred to www.nas.edu/opus/evolve.nsf for further information on science and creationism.

Ian Hore-Lacy

Teaching About Evolution and the Nature of Science - Working Group on Teaching Evolution, National Academy of Sciences, 1998, National Academy Press, 140pp, USD\$19.95 via web. ISBN 0-309-06364-7.

I enjoyed reading this book. The first third is one of the nicest summaries of evolution and its rationale that I have seen for a long time. It is attractive and readable. For those familiar with the content, it is a pleasant and assuring read. However its focus is more upon the reader who has some familiarity with science, and who is trying to find out what evolution is all about.

As you would expect, there is plenty of Darwin, with a touch of Mendel. But it is the extent of the evidence that gives a strong testimony of evolution as the best explanation that we have for data including plate tectonics, molecular evolution, eco-geography, etc.

There are some good sections for people concerned with communicating about evolution to others, especially in schools and universities. One interesting part is the section on how concepts, linked to evolution, are introduced to school children at various ages. This is useful for all scientists who need to communicate with the general public about their craft and who doesn't?

'Frequently Asked Questions' is a useful chapter. In answer to the question 'Can a person believe in God and still accept evolution?' we have a three-paragraph answer which begins 'Many do. Most religionsŠ do not have any direct conflict with the idea of evolution. Within the Judeo-Christian religions, many people believe that God works through the process of evolutionŠ Religions and science answer different questionsŠ'[p 58]

'What is "creation science"?' 'The ideas of "creation science" derive from the conviction that God created the universe.... all at once in the relatively recent past. However scientists from many fields have examined these ideas and have found them scientifically insupportable'[p 55]

The book is aimed at science educators who are uncertain about the place of evolution in the school curriculum and those who have to justify their practice of teaching evolution. This topic is a bit like getting rid of weeds in the garden just when you think you have eradicated them, another crop comes up while you were looking the other way. For science educators, this book achieves its aim with distinction, earning a place in the library of a school science department and university faculties of education and science.

Another potential use is as revision for year 12 biology students studying evolution. Its habit of introducing terms without explanation inhibit its use as an introductory text, but for students who are looking for a pleasant way of developing their biological knowledge, this is a good read.

There are some good activities for the classroom. I tried one about natural selection and found it well conceived, although not quite as polished as I expected.

Most of the more philosophical comments made by Ian Hore-Lacy about the companion volume are also true for this volume. His review includes relevant web sites.

Murray W. Seiffert.

Web Site Reviews

Earth Ministry <http://www.earthministry.org/index.htm>

They describe their mission as engaging individuals and congregations in knowing God more fully through deepening relationships with all of God's creation. Their address contains many useful links to various organisations, Christian and otherwise.

The Evangelical Environmental network<http://www.esa-online.org/een/>

This network was initiated by World Vision and Evangelicals for Social Action as part of a growing movement among Christians to respond faithfully to our biblical mandate for caring stewardship of God's creation. The web site has ideas for small groups, churches, and electronic archives of their magazine Creation care.

The Au Sable Institute <http://cesc.montreat.edu/ceo/asi/index.html>

The institute describes itself as a Christian Environmental Institute designed to bring healing and wholeness to the whole of Creation. It does so through tertiary programs, research, teaching in schools, and providing information to the Church at large. Based at Montreat College, North Carolina (Presbyterian), the centre runs an environmental studies program which can be taken internally or externally. The site has a number of papers and links.

American Scientific Affiliation <http://asa.calvin.edu/index.html>

As mentioned in the web site reviews in Bulletin 30, the ASA is one of leading evangelical organisations exploring the science-faith interface. Their journal, Perspectives on Science and Christian Faith, has over the years contained many articles on theology, the environment, and creation care. Their main web site contains a number of important discussion papers on the theology of creation care from a number of different evangelical and reformed perspectives.

What Scriptures Tell Us About Environmental Stewardship
<http://www.conservativenews.org/Enviro/archive/envi0610.html>

This is a highly critical view by SC Carter of the approach taken by most of these organisations from a Christian associated with very conservative (some would say reactionary!) political perspective, the American Center for Public Policy Research. Given the Center's role as a political lobby group, many of its statements are very much focussed on the American political scene. As many Christians in the United States (and elsewhere) associate themselves with conservative political views, often emanating from the United States, such critiques guide the thinking of many evangelical Christians on the subject of creation care. As many Australian Christians seem to look to the United States for leadership, the ideas represented by such organisations may be influential in Australia also.

Science, Religion, and Technology Project <http://www.srtp.org.uk/srtpage3.shtml>

This site is run by the Church of Scotland and was set up in 1970 to examine some of the vital issues of our times. They aim to provide professional expertise for informed and penetrating comment for technologists, educators, media, the Church, the public. The unit has been awarded a Templeton Prize for its work. The site has a range of useful resources of various technological and environmental issues, including energy use, nuclear power, genetic resources, cloning, embryo harvesting, risk management, and information technology. Some of these are in the form of single page discussion sheets, useful for classroom and small group discussion.

Uranium Information Centre <http://www.uic.com.au/>

Not a Christian website as such, but an essential starting place for anyone interested in issues relating to the nuclear power, uranium mining, research reactors, and waste disposal. An information resource rather than a lobby group, the UIC provides essential

information to help people make develop informed views on these issues. It is run by Ian Hore Lacy, an ISCAST fellow.

Jonathan Clarke

Letters

The editor reserves the right to edit correspondence, if necessary, in the interests of brevity.

Towards a theory of miraculous beginnings?

Dear Editor

I read the item "Towards a Theory of Miraculous Beginnings", by Vivian Bounds, and the response by the editor in [Bulletin # 30](#). The editor expressed some of the concerns I have, but may I add two more.

The first is about the title. Why should we hope, or even try, to develop any sort of theory about the miraculous? We believe that God is a supernatural entity and, as such, beyond our finite comprehension. It is only through the eyes of faith that an event can be discerned as a miracle, and not as part of the normal working of the physical universe. The "strong east wind" of Exodus 14:21 was seen as a miracle only by the Israelites. If we try to develop a theory about God's miraculous dealings with this universe, aren't we trying to strip him of his supernatural nature?

Another objection I have relates to some words Mr Bounds wrote in the second paragraph: "... I believe that some theory of miraculous beginnings is necessary to account for the possibility of miracles within human history." Why should this be thought "necessary"? This seems close to the proposal put forward by Norman Geisler and Kerby Anderson in their 1987 book *Origin Science*. They proposed that normal science should be relabelled "operation science", and that something else, which they called "origin science" was also needed. The proposal floundered because they were unable to offer any way of deciding what areas of science fell into which of these two categories.

Can I offer a paraphrase of part of Mr Bounds item to illustrate one concern expressed by the editor? "Because I believe in a theory of miraculous beginnings, there is no need for me to believe in a biological theory of the beginning of my children." This shows just one problem associated with splitting God's activities between what we think of as "normal" and what we usually consider "miraculous".

Ken Smith

Monism, dualism, triplism

The nature of the human person also continues to excite comment.

I was amazed at the correspondence on dualism and monism. I was at college (St John's, Cambridge) with Malcolm Jeeves who although not one of the authors of "Whatever happened ... " works closely with them and thinks to some extent in the same way, certainly favouring monism. At that time, over 40 years ago, before modern neuroscience was even thought of, dualism (like triplism!) was being doubted for purely theological reasons based on conventional biblical interpretation. Many expositors from the stable of IVF (as it then was) considered that "body and soul", "body and spirit", "body, mind and spirit" or "body, soul and spirit" were not defining different categories, but ways of stating "all of a person".

It is extremely surprising that people in Australia more than 40 years later are still hung up on this, even to the extent that the Westminster Confession is considered to have greater authority than the Bible. I hope such problems are very much a minority occupation!

John Bausor (UK)

I was most interested to read in the recent edition of the ISCAST Bulletin (No 30) a discussion concerning the nature of the human person in relation to the "soul". This is an ancient issue, yet one which still generates a lively discussion, even within Christian circles. I was most impressed with Dr. Edgar's statement, which supports an understanding which is both contemporary and yet faithful to the original Christian revelation. Some years ago I engaged in a Masters research program with the University of Queensland (my first contact with ISCAST), which examined this very issue. After five years research, I came to a conclusion which agrees with Dr. Edgar's perspective.

My work has been published by Mellen Biblical Press (Lewiston USA) under the title, "*Hebrew Understandings of the Human Person In the Hellenistic Era: Philo and Paul*" (1995). I am enclosing for your interest, a recent article on the subject (published in *Reo: A Journal of Theology and Ministry*, Melbourne, 1999), which presents a very brief survey of my thesis. Obviously the whole subject requires much more extensive discussion (having written some 75,000 words on it yet still not exhausting the issue!). However I simply wish to reaffirm the position which has been taken by ISCAST on this issue as responsible, and consistent with the biblical data. We must be prepared to decontextualise much of the traditional theological understandings if we are to rediscover a genuinely biblical theology which maintains the integrity of the biblical texts, yet also makes sense to the contemporary era.

Graham Warne

Science and Christian Belief

The Journal of Christians in Science (UK). It comes out twice a year and contains many thoughtful articles.

Cost: Aust \$42 for one year's subscription

For subscription contact Helen Joynt, Administrative Secretary ISCAST (Victoria)