Ensuring the koala’s future

Two Monash zoologists are the main beneficiaries of research money generated by recent publicity predicting doom for Australia’s best loved symbol, the koala. Koalas are afflicted by a serious illness, they say, but in no danger of extinction.

IN THE PAST year, the Australian National Parks Service has become concerned with the state of health of one of our best known living symbols, the koala. The problem is an infection which can cause blindness and leave females infertile.

The issue has been front page news, and caught the eye of American Express which began a campaign to collect money to help conserve the koala. The result was $200,000 to be spent over the next two years on increasing our knowledge of koalas. Half is to be used for basic survey work and the other half for research projects.

The lion’s share of the first year’s research money — $40,000 — will come to Monash University, where it will be used to further the work of Mr Roger Martin and Ms Kath Handasyde who have been quietly burrowing away at the problem for eight years.

Although they are concerned about the infertility problem, neither think the koala is in any danger of becoming extinct. Not only do they know of infected populations where the koalas are still breeding at a level which would sustain their numbers easily, but there are also areas which are completely disease-free.

And Handasyde has shown that the infection is not passed on from mothers to offspring. “It would be simple to create a disease-free population,” she said.

It is not surprising there are popular misconceptions about the koala. Despite its notoriety, few field studies had been carried out on the animal before Roger Martin got to work in 1977. In Victoria no field research had been conducted on koalas since the 1950s. And the most recent work had been done in South Australia in the late 1960s.

Martin began by studying a population at Walkerville, across Waratah Bay from Wilson’s Promontory. He arrived at a biologically interesting time.

The animals were at fairly high density, about three to a hectare (the average is about one), and were defoliating and damaging their preferred tree species. They knocked the swamp gum back severely and the population numbers crashed. The older animals died during the winter and the younger ones dispersed.

But there was another population characteristic that was even more fascinating. The two most recent studies — on French Island and Kangaroo Island — had reported that typically 65-70 percent of females in a population bred each year. At Walkerville the figure was 25-30 percent.

“At first I thought perhaps it was something to do with nutrition. The growth rates were slow and the animals rather stunted.” But just at that time Fisheries and Wildlife officers were moving some animals off Phillip Island.

“The trees were in reasonable condition

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and the animals were big and healthy, but the reproductive rate was 10 percent. So it looked as if the effects of nutrition, if any, were indirect.

Then Roger Martin met a researcher from the University of Queensland Department of Veterinary Anatomy, who had an X-ray technique for studying koala reproductive tracts. He told Martin that most koalas he had studied in Queensland had reproductive tract diseases and an associated trachoma-like eye disease, known as ‘pink-eye’, was also a problem.

The two arranged to survey Victorian populations, and sure enough, about 90 percent of the females on Phillip Island were diseased, some displaying cysts the size of oranges near the ovaries. Pink-eye, however, was not nearly so common.

To find out what was causing the problems, Martin went to the Department of Agriculture’s Veterinary Research Institute. They began doing autopsies on koalas killed on the roads of Phillip Island, and became convinced it was some sort of bacterial infection. But no matter how hard they tried, they could not find a cause; it seemed there were only standard, digestive system bacteria in the diseased reproductive tracts, which were unlikely to be the main cause of the disease.

There was another problem. Koalas in different areas reacted differently to the infection — some were even able to continue breeding. This suggested that the progress of the disease was complicated by some other factor. Both Martin and the Queensland group began to feel that something, perhaps in their food, was setting koalas up for infection.

The clue came from an old paper claiming that eucalyptus oils contained substances which acted like the female reproductive hormone, oestrogen. Koalas are very susceptible to oestrogen, and agricultural researchers had described an oestrogen-related disease in sheep which resembled what was happening to the koalas.

So Kath Handasyde, who already was looking at the feeding preferences of koalas, began to test the eucalypts for oestrogen. She found oestrogen-like substances in all the species on which koalas fed.

While there is yet no evidence from koalas, research on sheep has demonstrated that oestrogen in the diet can affect the neck of the womb, the cervix, which normally acts as a barrier to infection. But what was causing the infection?

The answer came from a chance conversation. Roger Martin had gone to a lecture on pink-eye. The vet remarked that parts of the koala’s reproductive tracts looked good places to find infection caused by Chlamydia, a virus-like bacteria responsible for infections of the human female reproductive tract. If this were so, it would account for the fact that no bacterial infective agent had been discovered, because Chlamydia is difficult to isolate.

The group rushed out and took blood samples from 30 animals on Phillip Island. Twenty-seven (90 percent) were positive for Chlamydia antibody. Of 87 animals from disease-free French Island, only six (seven percent) were positive, and the antibody was present in levels lower than what would normally be classed as an infection.

But Chlamydia antibody detected in the blood does not necessarily imply a reproductive system infection. It proved much more difficult actually to detect the bacteria in the reproductive tract, but that also finally was achieved.

In an attempt to get a better idea of what happens in bush, Handasyde took some animals from French Island, equipped them with radio collars and introduced them to Phillip Island. She ended up with three groups: the fertile French Island animals, fertile Phillip Island females and infertile Phillip Island females.

What she found was that a greater proportion of Phillip Island females feeding mainly on blue gum, compared with those feeding on manna gum, were infertile. It appeared the young only became infected after sexual maturity, and the infection seemed to spread during the mating season suggesting it was sexually transmitted.

The French Island females gradually became infected, and as soon as they did, they stopped breeding. On the other hand some of the Phillip Island animals were able to breed for one or two years after infection.

Using the research money, Martin and Handasyde intend to further this by focusing their attention on the koalas of the Brisbane Range National Park, north of Geelong, which appear to have a healthy birth rate despite infection. They want to follow the course of the infection in the entire group to work out how the disease is transmitted, what precise effects it has and what the impact of diet is. Other Victorian populations of koalas will be surveyed. The aim is to come up with a plan for managing koalas effectively.

Martin says that, although evidence is scarce, he believes the reproductive tract infection has been with koalas for thousands of years. He said the majority of Queensland koalas held in nineteenth century anatomical collections have diseased reproductive tracts, and historically the problem has been reported regularly by those who have looked.

'It obviously causes a lot of strife in some populations and not in others.'
The tarball moons of Uranus

Dr Andrew Prentice of Mathematics
its equator at precise intervals where the
centripetal force — the force that throws
you around in a car as you go round a
corner at speed — pushing away from the
sun’s centre exactly matched the
gravitational force pulling towards it.
The rings would be nearly circular, all in
the same plane and whirling in the same
direction as the sun. In Prentice’s model
the formation of the outer planets and
their attendant moons is seen as a rerun on
a minor scale.

Laplace’s ideas were discarded by many
astronomers because there seemed to be
no good reason why these rings should be
shed and then come together to form the
planets. But Prentice thinks he has found
the answer in the concept of “supersonic
turbulence”, a concept first suggested by
Dutch physicist ter Haar.

Supersonic turbulence is a form of
convection. Hot eddies of gas are seen as
shooting out from the centre of the
whirling sun towards its edge at greater
than the speed of sound. Their place is
taken by cooler gas falling towards the
centre.

Few of Prentice and ter Haar’s
colleagues, however, believe that
supersonic turbulence exists — “They’re in
for some cultural readjustment,” says
Prentice — which accounts for the fact that
Prentice’s model was not widely accepted
before Voyager reached Saturn. It was
published only after being rejected some 10
times.

Uranus has given Prentice a lot of
trouble. It is unique among the planets in
that it spins around its orbit lying on its
side like an overturned top. Prentice says
the difference is because it has a rock and
ice core making up two-thirds of its mass.
The other planets have rocky cores too,
but in his predictions for Saturn and
Jupiter, Prentice was able to ignore them
because they comprised less than one
tenth of the planets’ masses.

But the problem of the core was
fundamental, because a significant rocky
core would mean the whirling gas balls
would not contract uniformly upsetting the
smooth process of shedding equatorial
rings of gas.

“I really sweated on this. I just about
blew a gasket. I tried hundreds of trials,
even developed a new theory of
turbulence, which failed. Then I got really
desperate.”

Finally it all came together in October
around a property of the gas that Prentice
had been able to ignore in the past,
viscosity — a measure of the interaction
between the convection eddies and the
other components of the gas cloud.

When he finally incorporated viscosity
into the model, his figures began to make
sense for the first time. Whether they make
sense for all time we will find out in
February.

A computer-generated picture of the projected path of Voyager 2 through the Uranian system.
Delay in acquiring language can affect a child's whole life. The university's kindergarten runs a special program to help such children.

William is fictitious, but the above description is typical of a group of children who suffer from a delay in language development. These children are neither deaf nor mentally retarded. It is just that their brains are slower at developing the capacity to process language. But language is so fundamental to human communication, learning and contact with the world outside, that this delay can result in devastating and persistent problems. The Elwyn Morey Child Study Centre at Monash contains one of two kindergartens in Victoria which run special programs aimed at helping these children cope.

Now in its fourth year, the language group is supervised by Dr Lawrie Bartak of the Monash Faculty of Education and is taught by Miss Barbara Lewis, who has been with the kindergarten for 18 years. The group is financed with money from the Victorian Department of Community Services assisted by the Health Commission and is open to any acceptable child with reasonably easy access to Monash.

"The program is like a normal kindergarten with a teacher and an assistant, but there is more emphasis on activities requiring language and we are visited one day a week by a speech therapist. We use the same kind and the same range of activities, but we use them in different ways," Lewis said.

The results have been very encouraging. Of the 19 children who passed through the group between 1982 and 1984, all showed marked improvement in language, comprehension or behavior. Before coming to the group, 13 of these children had shown significantly disturbed behavior. Twelve of them made significant progress and the other improved.

At the moment, there are 11 children in the program in two groups each attending four half days a week. Success is at least partly due to the high staff to student ratio and the large amount of time the children devote to the program.

Named for Associate Professor Elwyn Morey, who was killed in a car accident before the kindergarten opened and whose great interests were early childhood development and special education, the child study centre has been operating since 1968.

The facilities are excellent. In addition to the central activity room, for instance, there are several small rooms for individual or group work. Attached to the kindergarten is a large well-equipped playground, and even a place to house visiting animals of interest to the children.

As it is subsidised by the Department of Community Services, the kindergarten has always been open to any child in the area. In fact, at the moment, of the 41 children attending, only four have parents associated with the university.

Because it is part of the Faculty of Education the kindergarten is fully equipped for research with a large sound-proofed observation room overlooking the main activity area through one-way glass. Parents are made fully aware of this function when they enrol their children, and they also know that the kindergarten has access to the considerable educational, psychological and medical expertise of the university.

The child study centre's kindergarten was one of the first in Victoria to reserve some of its places for children with special needs, but as other kindergartens began to do the same, the pressure for such places eased. Lawrie Bartak says that the impetus to set up the language group came as a consequence of this and a visit from two English educators interested in delayed language development.

Initially, in line with present educational policy, it was decided to try to integrate the language group children with the rest of the kindergarten as fully as possible. But that is not how things have worked out.

Bartak said: "We found that the language group kids could only go on up to a point. Total integration is not always the best thing. Kids rapidly go to the wall if they can't keep up with others talking. One of the things Barbara Lewis first noticed was..."
how quiet the language group is because there is not the rich context of language and talking."

The children do mix in the playground and for special events such as puppet shows, for instance. But even at play, the relationship can sometimes be uneasy.

"The other day I watched a language group kid digging with a spade. One of the children of the regular group decided he wanted the spade and asked for it. Now the language group child wanted to keep the spade, but he did not have the capacity to argue. So he just swung the spade to try to clout the other child. He had no alternative," Bartak said.

Lewis said: "Delayed language affects so many other areas of development, such as way children think and interact. For instance the language group children often lack initiative and imagination, because they don't think as well abstractly. They have problems with maintaining attention and their motor skills can be awkward."

Left alone, Bartak said, they often end up being left behind by the education system and being classed as mentally retarded. Worse still, they can pick up emotional and psychiatric problems because of the sheer frustration of their position as children who are in no way retarded, but simply lack the means to communicate fully.

Working with the children involves a lot of patience and a good deal of common sense. Bartak said: "Often these kids are all over the place like a fly in a bottle. You get a kid sitting on your knee. He's very friendly, but he's grabbing your book and grabbing at other things. He cannot sit still long enough to find out what's going on."

"So the first lesson is getting him to sit quietly, to wait before starting an activity, to react to a cue. We use rewards, social rewards. Praise, smiles, nods, hugs and attention or an activity a child prefers doing can be used as a reward."

In the case of someone like William, the teacher could begin to pay attention only when the voice is lower and quieter, or demonstrate what listening to him is like by only replying to him in the same sort of voice he uses. The activities in which the children get involved are designed always to have a language component, such as making phones using string and jam tins.

"Those kids with problems only of expressing themselves often will get over them with application, but those who also have a comprehension difficulty generally will continue to have problems. We hope we can get them to the level where they can benefit from other educational programs. There is a great need, however, to get to them at the pre-school level," Bartak said.

"Our major success has been in reducing behavioral disturbance. Language is often the last thing to improve. Because it is so complex, it takes longer to do anything about."
A GROWING number of retailers consider the immediate benefits of automating their checkout process great enough to justify the cost of installing electronic product scanners.

But Dr Robin Shaw of the University's Department of Administrative Studies says the savings in time, labor and increased accuracy of automatic over manual checkouts are nothing compared with the potential value of the marketing data that electronic scanning systems record.

"Those op art symbols made up of bars and numbers now printed on most products sold by supermarkets are passed across a beam of light and "read into" a computer. The symbol number not only alerts the computer to the exact product and its manufacturer, but also the size or amount. It is instantly matched to a pre-programmed price which is displayed on the cash register.

"The computer remembers every single product sold. It's automatically recorded. That means there is a huge untapped resource of information on item by item movement, and very little has been done to make use of it," Shaw said.

That data is the stuff of which accurate marketing projections are made, the sort of information manufacturers and retailers now pay millions and millions of dollars a year to obtain, sometimes with dubious results.

At the moment, he said, such information is largely collected by retail audits, counting up how much of a product is still on the shelves, adding an estimate of how much was stolen or broken, and subtracting the total from how much was delivered.

But with the right software, accurate sales information could be available immediately for whatever time period was specified. "The system needs further development to extract the real benefits," Shaw said.

And to undertake the research necessary to provide such software, Monash University's Department of Administrative Studies and Data Sciences Pty Ltd. have put up one of the first teaching company scheme proposals to be financed by the Victorian Government.

The teaching company scheme was first introduced in 1984/85 by the Federal Government. The idea was to provide money for research projects in industry to be carried out by postgraduate students, thus bridging the gap between tertiary institutions and industry. The costs of the research project are shared equally by government and the company for which the research is being done, the researcher being located at and paid by the company.

The Victorian Government's Department of Industry, Technology and Resources decided to extend the amount of money available through the scheme to Victorian companies. For this project the Department has allocated $40,000 towards the salary of a researcher at Data Sciences for three years. The project will be supervised jointly by Shaw and Mr John Atchison of Data Sciences.

Shaw said: "Development of this sort of software, even in the US, has barely scratched the surface. There is enormous scope for creativity, and our ideas are just as good as anyone else's. Also there are problems unique to Australia, because of the structure of retailing and grocery manufacture."

He said the project would proceed as far as it could along the path of what needed to be done. The first job would be simply to develop programs to process and present information on product movement, so that retailers, suppliers and producers could tell exactly what had been sold in what period instantaneously at any time.
'Open Door' spells planning problems

In Tianjin the revolutionary posters of Mao Zedong have been replaced by posters of Toyota, Seiko and Mitsubishi, says geography PhD student Dave Edgington who has just returned from a two-months study there.

He said China is in the grip of Deng Xiaoping's 'new Open Door' policy, trying to update her antiquated manufacturing industry with an injection of foreign high technology. "Chinese labor and raw materials are now being employed in hundreds of joint ventures which will have strong spatial and geographic outcomes."

And if the Tianjin experience is any guide, he said, this policy of rapid development will present planning problems on a massive scale.

The third largest city in China, Tianjin is developing a port and industrial area on a salt pan 50 km from its central business district. Within five years the area will be home for up to 500,000 people. "It's a potential environmental and social disaster."

Dave Edgington's PhD thesis is on the geographic and town planning effects of Japanese investment in Australia. During his two months in Tianjin, he studied the same problem there, but the idea for the trip originally had nothing to do with his postgraduate work.

It all started when he was working for the Melbourne City Council as a town planner. Tianjin is Melbourne's sister city and Edgington was invited to give a two-week course to representatives of the Chinese government, and the local university and social sciences academy on Australian planning and the history and development of Melbourne.

What he found was a city about the size of Sydney just inland from the coast lying at the junction of five rivers. Tianjin sits astride an important railway junction about 220 km due east of Beijing. To the north are coal mines and to the south an important oil production area.

The mid-nineteenth century Tianjin was a foreign treaty port, as were almost all the cities being developed under the 'Open Door' policy.

Last year Tianjin was granted special autonomy as one of 14 open coastal cities and has worked out a detailed development plan for Tanggu, which it sees as being Beijing's port. Thirty square kilometres close to the harbor were set aside for an economic and technological development zone.

About one tenth of this land will be developed initially and three factories will be completed by the end of the year, the first being a Dutch factory for the production of bicycles for export. The harbor is being extended radically, the railways are being upgraded and a new freeway is being built direct to Beijing airport.

But, Edgington said, the whole project is overshadowed by the legacy of one of the recurring tensions of Chinese history, the relationship between central and provincial government. Until last year Tanggu was controlled by the central government, and the wealth it generated was not put back into the area to develop services.

Public transport in the area, for instance, is horrendous, but the project is proceeding too quickly for the development of such services to keep pace with it. So it seems that hundreds of thousands of people are going to be trapped in a treeless city built on a salt pan where little provision has been made for their welfare, he said.

"They are trading quality for time. They treat building sites like army manoeuvres, and don't appear to notice the cracks in the

Map of the Tianjin area showing the proposed development at Tanggu.

- The changing face of Tianjin's posters buildings. When the Mayor of Tianjin came to Melbourne, he remarked that he could have the new Parliament House in Canberra built in two months."

Edgington said the development of coastal cities like Tianjin under the 'Open Door' policy also would exacerbate another traditional source of tension in China — the disparity between the prosperous coast and the poorer, more backward inland areas.

In 1949 when the communists came to power, about three-quarters of China's output came from the core coastal area. In the 1950s and 1960s under Mao, the peasant leader who advocated self-reliance hence decentralised production, this figure was reduced to two-thirds. But under Deng, the coast will reassert itself, because coastal cities are much better placed to accept foreign investment — and the gap will widen again.

The authorities are well aware of the problem, but they have no real plans to cope with it.

And what was the reaction of Dave Edgington's hosts to all he had to say? "They said it was all 'very interesting'."

Mr Edgington's visit to China was financed by the Australia-China Council.
The law and the legal system are concerned with human beings, and lawyers need the skills and sensitivity to relate on a personal level to their clients and all the other actors in the legal drama. Australia no longer consists merely of a majority culture, a forgotten Aboriginal people and a small number of rapidly assimilated migrant groups. But Australian legal education is still based on the unspoken assumption that the people and society have not changed.

Our society is now composed of people from an astoundingly diverse range of cultural and political backgrounds. The legal system, and the lawyers who work within it, must adapt to take account of this diversity. In order to function effectively, the legal system must be responsive to the society and individuals whom it exists to serve.

The law is not immutable. It is created by us. Governments enact legislation and judges interpret it. So the law represents an interplay of forces and, unless you get everybody agreeing on what a particular law should be, a compromise.

For instance, while "Thou shalt not steal" is always true legally, it depends on what property is and how you define ownership. When the Europeans settled Australia, they declared the land was legally uninhabited, which meant that taking the Aboriginal land was not construed as theft under European law.

Anglo-Celts often consider wrong the power a Turkish husband traditionally exercises over his wife. We have laws enshrining the legal rights of women in marriage. But how many wives in our society move interstate independently of their husbands to pursue their careers?

It is written somewhere that what we present in law is the ideal, and then we look at other systems in practice and say, 'Gee, you diverge far from our ideal'.

Perhaps we could learn from other systems of law by examining their underlying values and the material conditions that support them and considering whether these values might not be appropriate for Australia. If there are large numbers of people in Australia who would prefer, for example, a less formal method of resolving disputes, then it may be possible to allow for this by the setting up of community justice centres.

But there is a great fear of the altering of structures such as the legal system to accommodate different cultural values. This is, in part, the result of training lawyers primarily in the British tradition. It is an issue that ought to be raised at appropriate points within the law curriculum.

More is needed than a course in how to use interpreters. We need an awareness of other cultural values, an understanding of how they are expressed through a legal system, and a consideration of how our system could evolve to make it more appropriate for a multicultural Australian society.

In 1984, the Faculty of Law sought and obtained funding of $35,000 from the Victoria Law Foundation to develop a curriculum incorporating intercultural issues into legal education.

This year, two out of eight streams of first year law students at Monash were exposed to such material. In Legal Process, the common core subject of their year, in one stream, multicultural material formed the basis of a long assignment the outcome of which was explored in class, and in the other it provided a framework and case studies for the lectures.

Recent educational theory suggested that intercultural issues should be integrated into traditional subjects rather than taught as optional topics. A separate treatment suggests concern with examining the problems 'they' (outsiders) are having with 'our' system. This allows students to edit out the material as peripheral to their concern with 'real law': 'real law' being the material reflecting the dominant Anglo-Celtic culture.

Most 'traditional' introductory legal texts begin with a description of the introduction of British law into Australia. Our curriculum begins with the topic of Aboriginal Customary Law, the logical beginning of law in Australia.

The second topic was The Introduction of British Law, but this was given a new treatment. Instead of the establishment of the British system being seen merely as a matter of the passage of the necessary legislation, we explored the effect on the pre-existing legal system. And we discussed the dispossession and dispersal of the Aborigines and the use of the legislation to commit 'legal genocide'.

The course also included case histories from the Turkish, Vietnamese and Greek communities and students made use of agencies and bureaux connected with these groups. On their visits to courts they were expected to study how accessible they were to non-English speakers.

A questionnaire conducted at the beginning of the course found some aggression amongst the students towards migrants and Aborigines. There was some amount of feeling that migrants and Aborigines were getting a good go out of the system.

Some students were worried that the course was potentially divisive; that order for Australian society to remain cohesive we had to share common values. But the students stayed with us. No-one dropped out.

The results of another questionnaire conducted at the end of the course in comparison to the first showed there was a shift in opinion in both streams which were presented with material on intercultural issues. The shift was towards understanding of and sympathy with the position of Aborigines and non-English speaking migrants. In the other streams, views had, if anything, hardened.

We feel that within 10 years every law student in Australia ought to be exposed to such intercultural material. In August we delivered a paper at the Australian Professional Legal Education Conference in Melbourne. People from Sydney said they wanted to introduce similar courses and participants from New Zealand and New Guinea also were interested.

Next year the Law School has decided that four of the eight first year streams will be introduced to intercultural material. We have put in a submission to the Australian Studies in Tertiary Education committee (financed by the Australian Bicentennial Authority) for two years funding to continue the project, and perhaps produce a book.