

AUSTRALIAN NATURAL HISTORY



SEPTEMBER 1975 VOLUME 18 NUMBER 7 \$1

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GALAH



FIG PARROT



RED-COLLARED LORIKEET



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RED-SIDED ECLECTUS PARROT

AUSTRALIAN NATURAL HISTORY

SEPTEMBER 1975 VOLUME 18 NUMBER 7 PUBLISHED QUARTERLY BY THE AUSTRALIAN MUSEUM, 6-8 COLLEGE STREET, SYDNEY
PRESIDENT, MICHAEL PITMAN ACTING DIRECTOR, DESMOND GRIFFIN



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COVER: The quarries of
Blue Metal and Gravel
Limited, Prospect NSW.
(Photo: John Carnemolla)

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LETTERS

A FORESTER'S VIEWPOINT

Dear Sir:

I enjoy reading this informative magazine, however, I wish to register a protest against the publication of Stephen S. Clark's review of *The Fight for the Forests* by R.&V. Routley (ANH, March 1975).

This book is full of inconsistencies, errors, half-truths and unsubstantiated statements, many examples of which could be quoted.

It is conceded that the Routleys may have had a case to publish a book such as this, written in this manner, in the knowledge that it will be accepted by many as an accurate picture of the operations it criticises. However it is considered that publication of Dr. Clark's review does little credit to a scientific magazine such as yours. His review is nothing more than a summary of the book and a reflection of his acceptance of all the Routleys' statements at face value. No attempt has been made to analyse any of the statements made and the review is equally as misleading as the book.

It is suggested that publication of a more critical review in a future edition of *Australian Natural History* would give your readers a more balanced view of the controversial matters dealt with in *The Fight for the Forests*. One such review is that written by S.D. Richardson and published in *Australian Forestry*, (Volume 37, Number 1, 1974).

J.W. Golding
French's Forest, NSW

THE AUTHOR REPLIES:

Since I reviewed *The Fight for the Forests*, several people have drawn my attention to errors of fact in the text. I would agree with Mr. Golding that these errors are certainly most unfortunate. It would be reassuring if we could, because of these errors disregard the book as having no basis in fact whatsoever; I would argue, however, that the central thesis of the book remains valid. All Australians must begin to ask some very searching questions about the future of their forest land and how it is to be used. If the

Routley's book contributes to public debate and dialogue on these important questions then it will have made an important contribution indeed, regardless of its shortcomings.

Stephen S. Clark

CAN WE LEARN FROM THE WEST GERMAN NATIONAL PARKS SYSTEM?

Dear Sir:

In West Germany about one quarter of all land is park. To have a larger percentage of Australia's land surface protected appears highly desirable, particularly in the high rainfall areas east of the dividing range. Perhaps this could be achieved by adoption of some of the principles of West Germany's park legislation.

There are three grades of park in West Germany:

(1) NATIONAL PARKS are "large wilderness areas or man made natural areas... which for their specific characteristics are strictly protected" and available for recreation only in limited parts. The emphasis in these areas is conservation, not recreation.

(2) NATURE PARKS are large areas comprising whole mountain ranges and several shires of "outstanding natural beauty, which have to be protected against harmful development and other impacts". They are important for outdoor recreation and usually consist of forested mountain ranges criss-crossed by trails marked out by ubiquitous hiking clubs, which in conjunction with local government provide such amenities as sign-posting, maps, benches, explanatory literature, sheltersheds, lookouts, picnic facilities, etc. One third of West Germany's area is forest, most of it privately owned, but all forests are accessible to the public during the daytime, if without motor vehicles. Parking areas are provided by local government and other road authorities on the fringe of all forests, where the marked hiking trails start. This, of course, applies also to all nature parks. Private land is not repossessed within a nature park and existing agricultural and forestry pursuits are contained.

However, much of the agricultural land adjoining forests which is falling into disuse in West Germany is immediately replanted with forest. "One tree" every German schoolchild will tell you "oxygenates as much air as three hectares of pasture" and "the value of forest is not primarily its timber". Much public commotion was generated in West Germany last year by the disclosure at the National Forestry Conference in Freiburg (1974) that within the

waste products, large clearfellings, cutting of hedgerows, scrub and trees are to be avoided. Examples: areas of forest and woodland, lakeshores, hilly regions and open heather and moorlands, especially close to settlements". Private property also, is not repossessed in a Landscape Protection Area.

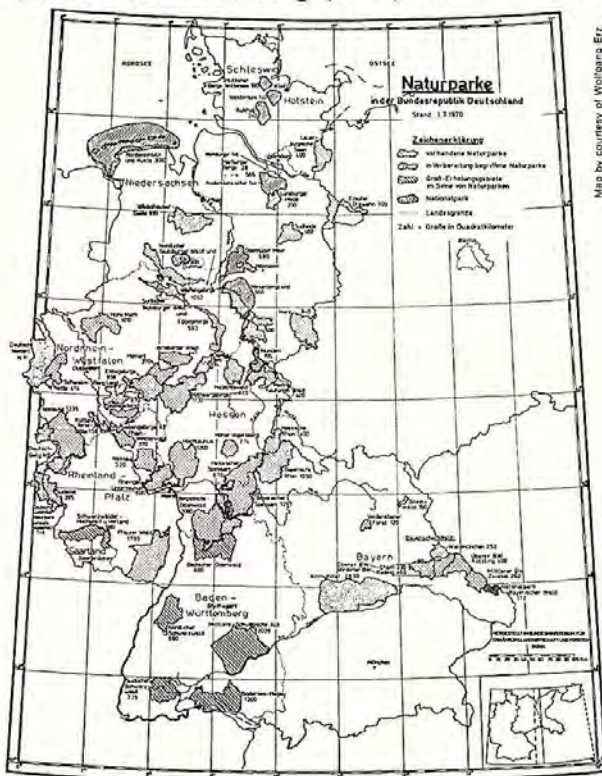
The grading of protection in this manner allows limitation of highly unpopular property resumption and makes for much better public support and cooperation.

If the area north of Newcastle in New South Wales were in West Germany, the entire Dividing Range from, say, the Williams River catchment to the Myall Lakes and the entire shores of Port Stephens right to the skyline would be Landscape Protection Areas. There would be no question of companies like the Australian Mutual Provident Society or Commonwealth Sugar Refineries being allowed to clear hundreds of square kilometres of hills of their treecover for pastoral development. There would be no forest-clearing for vineyards.

Nature Parks and Landscape Protection Areas are important buffer zones surrounding National Parks. Most woodlands and other areas of interest need this protection. There is evidence that forest-clearing in the high rainfall belt of eastern Australia has already gone too far, resulting in erosion and flooding, particularly in the catchment areas of rivers. Recreational areas have to be considerably larger than national parks if preservation of some land in its natural state is to be accomplished. This would have particular application to coastal areas with fragile dune vegetation, vulnerable to four wheel drive and general motor vehicular invasion, and even widespread camping. And from a national health point of view, walking rather than driving deserves considerable encouragement.

Hanns Pacy
Tea Gardens, NSW

Reference: Erz, Wolfgang: *Nature Conservation and Landscape Management in the Federal Republic of Germany — Dates, Facts and Figures —*; The Federal Institute for Vegetational Research, Nature Conservation and Landscape Management, Bonn-Bad Godesberg, 1970.



Map by courtesy of Wolfgang Erz.

last hundred years two-thirds of the forest had become pine plantation whereas two-thirds before had been conservationally more valuable beech and oak 'undergrowth' forest.

(3) LANDSCAPE PROTECTION AREAS are "protected against impacts on the balance of nature and decrease in their recreational value. A well planned development and traditional agricultural and forestry land-use may be contained, provided they fit into the landscape pattern and ecological conditions. Settlement in the open country, indiscriminate disposal of



Most stories have beginnings and endings.
The story of the earth has more beginnings and more endings
than any other tale told by man.
But the story of the earth itself may never be told
if we continue to lose ourselves
in speculations on how it began
and, in prophesies, of how it will end.
The time has come to face the realities of existence as they are.
Do not be surprised if you find them beautiful.
Truth is.

The gigantic forces that shaped the world and placed it in orbit
are still with us today.
That miracle was not a one-time event from prehistory;
it is a persisting phenomenon
which continues to supply the stimulation essential to life.

Of these forces, our sun is the most easily recognized
as a source of energy.
Our generous sun delivers all the energy that keeps our world alive,
thousands of times the power needs of man.
Sunlight energizes green plants to grow into food
and release oxygen.
Sunlight illuminates our vision.
Sunlight warms our lives and our dispositions.

In the ultraviolet range there are rays
which cure rickets, stimulate the production of Vitamin D,
tan our beautiful bodies,
cause skin cancer and kill bacteria.

X-rays exist in nature in amounts which are tolerated by life.
Artificially generated X-rays are directed through living tissue
and they record on film useful pictures of their selective passage.
Since learning what these pictures cost in human tolerance
we have developed protective shields and
progressed to using abnormal doses to kill malignancies.

We live in perfect harmony with nature's supply of gamma and cosmic rays.
More penetrating than X-rays, they know fewer locked doors.
But what of artificially stimulated high speed particles?
Research continues even though ignorant minds
Express their terror of "egg heads" by bombing an accelerator.

We bask in the warmth of infrared rays from sunlight
and have learned to bask in sidewalk cafes long after sundown.
Infrared technology has benefited photography, night vision,
and even fireless cooking.
Microwaves, telecasts, radio transmissions and radar beams
pass through our bodies daily and we seem unaffected,
still able to love Lucy.
Yet a flock of wild geese flying in their instinctive formation
scramble and seem to become disoriented in a radar beam.
A radar technician might not survive immediate exposure
but your casserole is done in minutes in your new radar oven.

Once
Upon a Time
They Lived
Happily
Ever After

BY ERNEST R. ROOK

ERNEST R. ROOK is Curator of Exhibits at the California Academy of Sciences, San Francisco.



John Carr

Visible light from the sun penetrating our atmosphere
is clearly revealed by the moisture prisms in rainbows.
Our atmosphere is a superb screen
that accepts and retains life-supporting energies while rejecting dangerous rays.
This gaseous blanket has always seemed too vast to suffer
any indifference life could produce . . . until now.
With 99% of the sea of air a delicate balance of oxygen and nitrogen,
only one percent remains to contain everything else in the atmosphere.
It is that one percent we have been disturbing,
and it is easier to do than we ever dreamed.
With the enormity of our progress
we are now in danger of overwhelming that little one percent
and affecting the balance of the whole.

Only after a rain shower
do we see the air as it once was.

Air on our restless planet moves as prevailing winds
which we learned to harness for free energy.
But even free energy could not compete with dependable energy
and the economy bloomed with a steam device
and the fabulous internal combustion engine.
For the first time we began to consume free oxygen on an unpredicted scale
as controlled fires covered the earth.

Since most of the earth's surface is open sea,
most of the solar energy we receive
is spent evaporating millions of tons of water
into the atmosphere daily.

This gigantic investment of energy,
greater than the combined GNP of the world,
raises up to useful heights our entire supply of fresh water
and potential water power.

So automatic is this enormous gift of the sun
that we forget to acknowledge our debt
and we abuse this liquid treasure wherever we encounter it.
In its journey down the watershed,
fresh water is used many times over.

Only with proper planning
can this multiple use be continued and extended.
Our tendency to exhaust every stream by the time it reaches the sea
is false economy and a global scandal.

This same solar still which renews our fresh water supply
also concentrates the residue in sea water.
In this enriched liquor, self-perpetuating life developed
when sunlight reconstituted water and minerals
into free oxygen and carbohydrate molecules.
The carbohydrate structures could continue to perpetuate themselves
as long as the sun shone on water and minerals,
and the atmosphere would accept the free oxygen.

The plant kingdom was born
and fixed oxygen began to infuse the atmosphere.
Since we cannot set a date to commemorate the event,
we celebrate various rites of spring.

Plants adapted to life in fresh water
and paved the way for animal life to follow.
This perishable habitat suffers easily from human proximity.
Aquatic plants grew to withstand dehydration on land
and a great variety of vegetation
awaited the landing of the amphibians.
Land plants grew structures strong enough
to survive gravity and storm
and eventually sheltered whole animal populations to come.
Land plants became firmly rooted;
surviving fires, retarding erosion, reducing rock to soil.
In our ignorance we were able to convert these green pastures
into dust bowls.

The rhythms of night and day and the winter-summer cycles
stimulated growth patterns reflected in day-blooming lilies,
night-blooming cacti, harvest seasons, and annual rings.
Adaptations are endless because they continue
and are even accelerated by new hybrids from experimentation.
Our growing menu includes such concoctions as heavy-yield grain
and tomatoes tough enough to be harvested mechanically.

Anthony Healy



A riot of life.
Plants are the food which fuels all animal metabolism.
Fossil fuels and regenerating forests are the plant fuels
that man has mastered, even squandered.
Perhaps one day timber, coal, and oil may become too valuable
as sources of raw material to burn for heat.
The oxygen we breathe and consume in our controlled fires
is also a gift of plants.
We should find out what other laws of nature depend on plants
before too much vegetation is paved out of existence.

Plants are infinitely more efficient and essential
than any factory we have devised . . .
that things so beautiful could be so practical escapes us.
The beauty of nature is not superfluous,
but a population who thinks so may very well be.
If we set aside the beauty of a flower,
we are still left to marvel at the perfection of its structures;
all life's purposes are served by these ingenious designs
which render every function complete.
Nothing more appropriate to its purpose has ever been designed.
By comparison a Rolls-Royce,
the latest computer,
the Pentagon Building,
are the gross fumbblings of amateurs.
Plants are masterpieces of biological engineering.

If we lack the courage to audibly thank a tree,
at least we should let it help us live.

John Carmichael

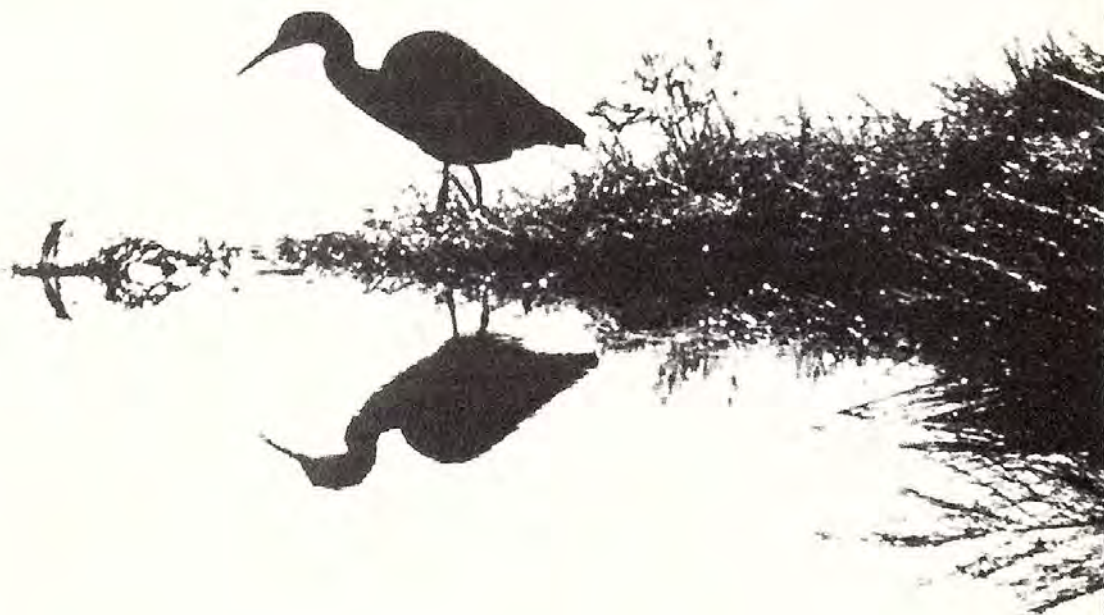




Anthony Healy

Given this verdant world, it was only a matter of time before animal life appeared and established itself by occupying those processes not already pre-empted by plants. Animals do not have to be able to use sunlight to combine elements into the ingredients of metabolism . . . plants were already doing that for them. By eating plants or other animals which ate plants, animals could acquire the nourishment they were incapable of manufacturing for themselves. To do this, animals require oxygen to burn the food-fuel. This oxygen is provided by plants as a by-product of their metabolism . . . how convenient. But equally ingenious, the by-products of animal metabolism are the same minerals plants use to grow. What appears to be a grand perpetual motion machine is really not, because solar energy from the outside is fed into the process by plants. But the design is so exquisite it requires no protection by copyright.

David Milledge





Wendy Clayton

The menagerie of the world, living and extinct,
is an animal parade more fabulous than any circus.
The variety, the ingenuity,
the performances defy our imagination.
It would seem that nature will try anything:
from a simple living gut
to the impersonation of a flower,
from a transparent nymph
to a gaudy reef fish,
from a tiny jerking crustacean
to the giant whale who devours it
and grows to eclipse any animal who ever lived.

Life is comprised of the possible.
Consequently, some highly improbable animals
appeared and thrived or faltered and died out,
with survival the mother of invention
and natural laws the only rules of the game.
Just as we are lost in the admiration of some exquisite gazelle
we remember the surviving platypus,
surely the work of some disbanded committee.
Things live because they can.

By the time we appeared on the scene
the world was ready to support us handsomely.
It was a veritable garden, a paradise,
where everything happily ate something else.
With our superior curiosity we learned to eat everything,
including each other until tribal laws intervened.
Our benevolent world was worshipped in many ways.
"Man's celebration of nature is the tradition
that runs without break from . . . Magdalenian cave paintings
. . . right down to Golden Gate Park."
As we discovered natural laws we prospered
and could afford to specialize.
With the new affluence it became necessary
to superimpose tribal laws over natural laws
and we were on the road to civilization.

In effect, by standing on the shoulders of plants,
animals were able to evolve ever more intricate processes
such as: warm bloodedness, mobility beyond the planet
sensitivities organized into intellect.
This dazzling new intellect is facile but forgetful
and so basic natural laws fell into disrepute.
Animals acquired such supremacy that the word "vegetable"
became a term of derision rather than the glorification
of the source of all life.

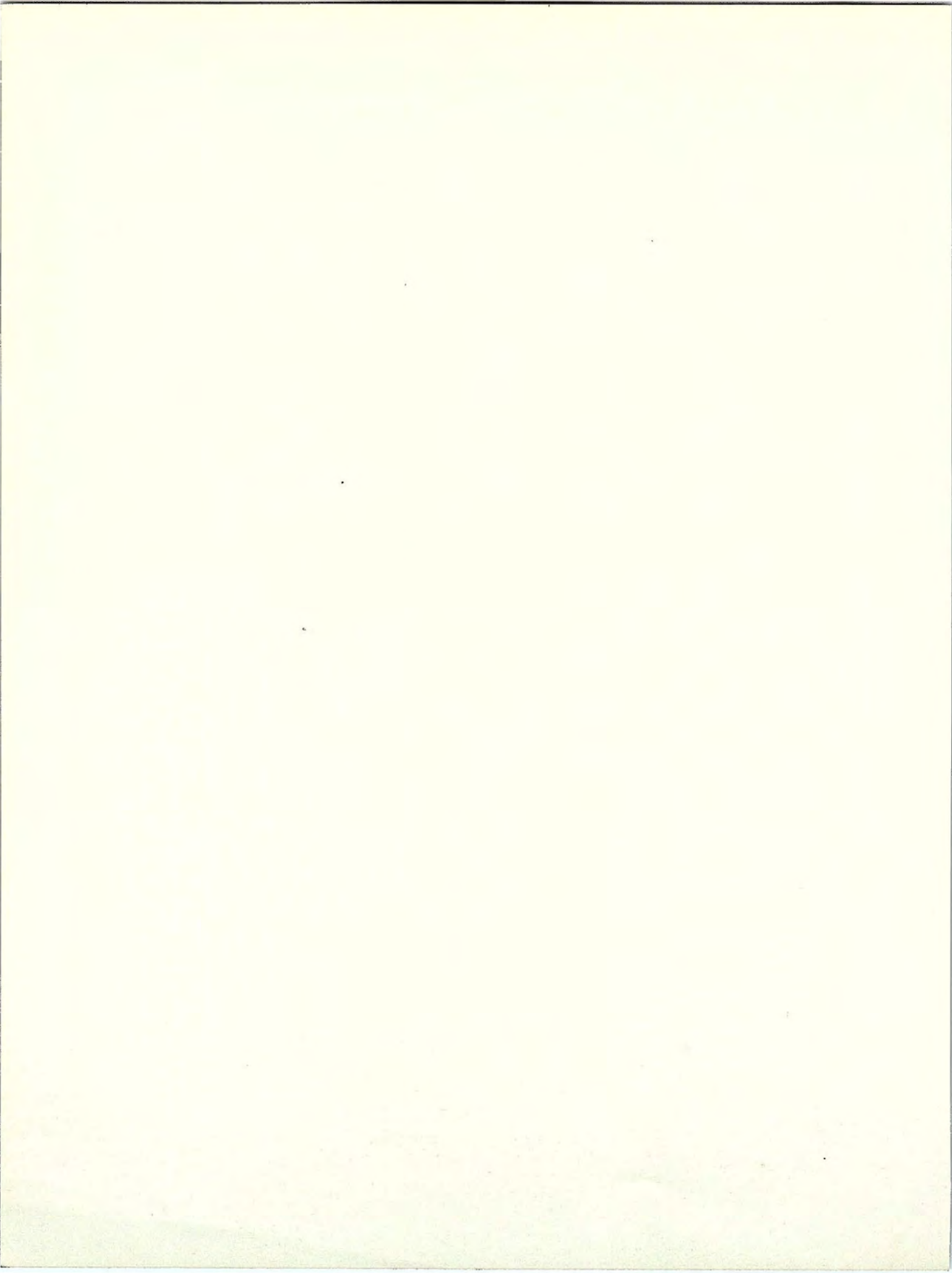
Brilliant but superficial explanations
supplanted unbending realities.
Truth became "awful" instead of filled with awe:
the light of day, "cruel."
Rights replaced responsibilities
and for the first time in nature
we introduced the "unnatural" and the "supernatural."

We are free to explore life's intricacies and observe the changes;
we are encouraged to copy and even make minor modifications.
But any attempt to alter natural laws significantly must fail
as the giant cycle restores its own balance.
Our universe is governed by discoverable laws
and only within these laws can it function.
It is not nice to fool Mother Nature
. . . not nice and very temporary.

On the road to civilization
some have recognized the need for international law.
What they fail to recognize is
that natural laws are international.
We have never been without international laws.
Until we obey them, civilized man remains only a goal.
Proclaiming "One World" is redundant since there is only one.
Cherish it.

Anthony Healy







MINING IN AUSTRALIA

FOUR VIEWPOINTS

AUSTRALIAN NATURAL HISTORY/A SPECIAL SUPPLEMENT
SEPTEMBER 1975

Mining is one of the most controversial issues in Australia today—on both economic and environmental grounds. There are many arguments, both for and against, and many opinions on how, when, where and by whom Australia's mineral resources should be used. This special supplement of AUSTRALIAN NATURAL HISTORY presents four viewpoints— from the mining industry, the Aborigines, the federal government and the conservationists. The viewpoints vary widely and we have taken no editorial stand. This forum of opinion is presented to encourage Australians to take an active interest in the mining controversy as an issue of direct and immediate concern to all who are interested, one way or another, in the future development of this country and its quality of life.

—N.S.

Overleaf:
The headtower
of F58 shaft at
Mount Isa. This
shaft is used for
the haulage of all
copper ore,
currently at the
rate of about five
million tonnes per
year. A conveyor
belt takes the ore
from F58 to No. 4
concentrator for
treatment. Photo:
Courtesy of Mount
Isa Mines Limited.

THE INDUSTRY

BY G. PAUL PHILLIPS

THE ABORIGINES

BY JOHN MORIARTY

THE GOVERNMENT

BY R.F.X. CONNOR

THE CONSERVATIONISTS

BY MILO DUNPHY

G. PAUL PHILLIPS, OBE has been Executive Director of the Australian Mining Industry Council since its formation in 1967. He is a Bachelor of Agricultural Science and Master of Public Administration (Harvard).

JOHN MORIARTY was awarded a Churchill Fellowship in 1971 to study ethnic minorities and is presently a researcher with the Commonwealth Department of Aboriginal Affairs in Canberra. He has a BA from Flinders University, South Australia.

R.F.X. CONNOR, MP is Federal Minister for Minerals and Energy.

MILO DUNPHY, an architect, is Vice-President of the Australian Conservation Foundation and Director of the Total Environment Centre in Sydney. He was the first Secretary of the Myall Lakes Committee and Press Secretary of the Colong Committee.

The Trustees of The Australian Museum gratefully acknowledge a grant-in-aid from Mount Isa Mines Limited, The Broken Hill Proprietary Company Limited and the Australian Mining Industry Council towards the production of this special supplement.

THE INDUSTRY



Photo Courtesy of Mineral Deposits Limited

This area at Sandbar, NSW supported a crop of sorghum which was planted in 1972 to provide a temporary stabilizing cover after land soils had been reconstituted and topsoil replaced to protect emerging native species. By 1974, the species had matured and the seedlings raised from seeds collected in the area will be planted out.

The mining industry is an easy target for attack on environmental grounds, as minerals are so much an integral part of the environment that it is impossible to move, process, or utilise them without in some way affecting the environment. Almost every mining proposal, therefore, comes under the close scrutiny of conservationists.

This is not in itself a bad thing, provided that the examination of mining proposals is objective, and it would be foolish to deny that responsible conservationists have done Australia a great service. Largely due to their efforts, environmental impact assessment has become an integral part of all project planning, and all sectors of industry must now take a more responsible attitude towards the environment, despite the cost. Indicative of the mining industry's attitude to the environment, for instance, is the fact that it plans to spend over \$205 million on pollution control during the period 1974-78.

However, miners are conservationists too, dedicated to the most efficient and least wasteful extraction of the minerals on which society depends for its existence. The mining industry

has a responsibility to ensure that Australia's mineral resources are discovered and utilised wisely and we must, therefore, be certain that environmental improvements undertaken are essential, practicable, and within the technological capabilities of the day.

An offshoot of the community's heightened interest in the environment has been the development of what might be called the 'perfect knowledge cult'. Its followers are generally the environmental scientists — archaeologists, entomologists, botanists, etc. — who for years have struggled against apathy for funds to advance the state of knowledge in their professions. However, now that the environment has become an issue of such political and polemical importance, many of these scientists are aiming at the overnight acceleration of environmental knowledge to the near absolute, without giving due regard to any other interests which they may obstruct. What is not considered is that in doing so, particularly in the case of the mining industry, they may discourage further investment and destroy one of their own prime sources of information. No one would deny that our knowledge of our environment should be

increased at a faster pace than in the past, but, whether we like it or not, economic factors must always be a part of environmental planning.

On the one hand society demands a steady, assured supply of minerals, whilst on the other it demands that the environment be protected. Both the informed conservationist and the miner are therefore aware of the necessity for a trade-off between economic and ecological imperatives. Striking the balance is clearly the responsibility of governments, and the widespread introduction of legislation for the preparation and examination of environmental impact statements, clean air Acts, clean water Acts, and so on, indicates that Australian governments have accepted their responsibilities in this regard.

Occasionally, but not often enough, industry, government, and conservationists have all worked together to their mutual advantage. In 1965 the Government began to examine the possibility of establishing a large National Park in the Alligator Rivers region of the Northern Territory. Little was done about this proposal, and during the period March 1969 to January 1970, prospecting authorities were granted to nine companies over areas in or around the proposed park. These companies spent over \$30 million on exploration, and in September 1969 the first uranium deposit was found at Nabarlek. Subsequently, additional deposits were found at Jabiru, Koongarra, and Jabiluka. The Federal Government was placed in a quandary, for pressure was mounting for the declaration of a national park, and the Government had no way of knowing whether the park and mining would be compatible.

The Government and the mining companies therefore got together and in May 1972, agreed to finance jointly a series of environmental fact finding studies covering an area of about 19,000 square kilometres, at an all in cost of about \$½ million. The studies sponsored were land evaluation, entomology, wildlife, climate, fresh water quality, hydrology, landscape, recreation and forestry, geology, archeology, Aboriginal art and atmospheric conditions. Overall management was entrusted to an Executive Committee on which Government, the mining companies, and the Australian Conservation

Foundation were represented. The study was completed in December 1973, and copies of all the reports plus a summary report were distributed to the mining companies, various Government Departments, and the ACF. The Executive Committee also approved the donation of complete sets to all tertiary institutions and major libraries.

The study found that, so far as is known, present mining developments are not disturbing any sensitive features. It warned, however, that the drainage system has a very low capacity to absorb wastes, and waste containment systems will therefore need to be very carefully planned. The potential wastes from uranium mining are listed with the methods that are available for controlling them, and the report notes that sufficient information is available to formulate conservative discharge authorisations for all known economic uranium deposits in the area.

The study was unique in Australia, bringing together a group of specialists in environmental fact finding, for a comprehensive examination of an area about which little was known. The enormous amount of knowledge accumulated will form the basis of future planning for the area, starting with the environmental impact statements which the companies will submit, and will enable the Government to make decisions based on hard environmental facts. It is worth stressing that had the Government, the mining industry and conservationists not decided to co-operate and pool their resources, all concerned would now be planning without the necessary basic data, perhaps with disastrous results.

Mount Isa Mines Limited has been experimenting with the revegetation of tailings dams. (Tailings are the waste from the mineral milling process and are pumped to dams where the water content evaporates leaving a hard, flat surface which is normally devoid of vegetation). This picture shows a section of tailings planted with various grasses and shrubs which is now attracting wildlife.

Photo Courtesy of Mount Isa Mines Limited



The Kakadu controversy is just one further example of the land-use planning problem in which the mining industry finds itself continuously enmeshed. It is, of course, impossible to mine without in some way changing the environment, and the mining industry can make no apology for this. What the industry can do is to ensure that mining creates the least possible disturbance, and it will do so through the environmental impact system.

Few people appreciate their dependence on the mining industry, or realise that most of the items essential to modern living would be impossible without a continuous supply of minerals. Even harder to visualise is that the supply of minerals is dependent on a continuous exploration programme. We have all read the fanciful predictions of the so-called 'doomsters', who specialise in forecasting that the world's supply of various minerals will be exhausted in the next few decades. What the predictions ignore, of course, is that stated resources give no indication whatsoever of the mineral resources which are as yet undiscovered, or which are uneconomic to mine at present. In this regard, a recent study based on random sampling indicates that the top mile of the earth's crust contains at least one million times the known reserves of every industrial element. However, what the doomster's predictions highlight is the importance of continuing mineral exploration. Mineral exploration is essential if modern civilisation is to be maintained, but at the very time the search needs to be accelerated, the area available to exploration is being rapidly diminished.

Many other land users are opposed to exploration, because of a fear that exploration could lead to mining, and mining would disrupt their environment. Few people see mining as the temporary land use which it is, or realise that

modern technology can repair a mined-out site to the extent that it is difficult to visualise that a mine was ever there. The scars of old mines which were worked earlier in the century are not a feature of modern mining. The extent of mining operations should also be kept in perspective — currently, mining occupies about 0.0035% of the Australian land surface, or less than the present size of urban Canberra.

Nevertheless, it is essential that the mining industry should operate within a clear system of environmental rules. That is, a land use planning system should be devised which will be suited to mineral exploration whilst protecting the rights of other land users, including conservationists. The requirements of such a system should be:

— Access to land for the purpose of mineral



THE ABORIGINE

Since Europeans colonised this continent the Aboriginal people of Australia have been exploited socially, politically and economically and have become paupers in the country which they believe to be theirs. Unfor-

tunately, a majority of white Australians genuinely believe that those 'old days' are over and that a new deal has been given to the original inhabitants of this country. This is not so. Today the destruction, demoralisation and

search should be maximised, and hence geological initiative be encouraged.

— Rights of other land-users should be protected.

— Mineral explorers should be given security of title to the actual mining stage.

— Special environmental features and the environment generally should be given adequate protection.

— Elected governments should retain all powers of control over mineral activities.

— Administrative procedures should be as straightforward as possible.

Working within these guidelines, the Australian Mining Industry Council has devised a land-use concept which it believes would be fair to all land-users. Basically, the Council's

John Carnemolia



suggestion is that legislation be introduced which will adequately describe all types of land-use, and will lay down rules governing mineral activity in relation to each land classification.

It should be relatively easy to describe an area of land as agricultural, urban, forest, national park, uncommitted Crown land, and so on. Once this is done, both the mineral explorer and other land users within a particular area should have little difficulty in identifying the land classification of the area involved.

Following land classification, the mineral explorers will know exactly what is required of him, through the legislation applicable to each type of land, and for many sensitive classifications, it may be necessary for an explorer to submit an environmental impact statement before consideration could be given to his mining proposal.

For some land types, the issue of a mining title may be unlikely, and the explorer would have known this at the start of his exploration program, but he would also know that his development proposal would nevertheless be investigated within an orderly non-emotive land management system based on the environmental impact assessment concept.

It is apparent that an urgent need exists to establish land management procedures which will ensure long-term administrative stability, so avoiding the situation whereby mining companies and environmentalists engage in continuous battles with neither winning the war. The Australian Mining Industry Council believes that the system outlined above would be acceptable to both the general community and the mining industry, and would have the desirable result of encouraging the incentive for mineral search whilst at the same time protecting areas of legitimate environmental significance.

Copper mines at Mount Isa, Qld

exploitation still continue — perhaps at a more alarming rate than previously. The process may be a little different, that is, in a more sophisticated form, but sadly for the Aborigines, the end product is still the same. The mining in-

dustry is but one of the agents of the majority society which, in the long term, brings about the total destruction of Aboriginal society, particularly in the isolated tribal communities in the north. In their quest for profits, mining con-

Two Aborigines observe an oil rig belonging to Oil Drilling and Exploration Pty Ltd on their land at Renners Rock Station, NT.

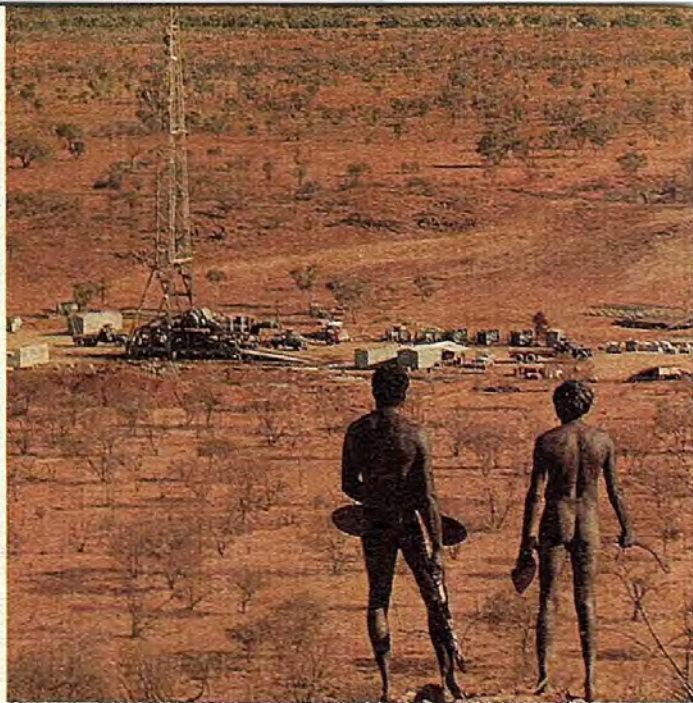
cerns have rapidly brought about changes in these isolated societies, most of which are, in the long term, detrimental to the people.

Mining has had the greatest impact on the Aboriginal communities in the north of Australia where tribal ways are still practised, particularly on land designated as 'Aboriginal Reserves'. But it would be quite wrong not to consider many urban-dwelling Aborigines as they too are 'refugees' from rural areas and could claim some relationship to the areas where mining is taking place.

Regardless of where Aborigines live and what status they have reached in the general Australian society, the majority are advocating land rights and/or compensation for land lost in the colonisation process. Some may place only traditional religious values on the land, some economic; some want a mixture of both; others just want the security to live their lives in peace without molestation or humbug. However, the question of 'land rights' is paramount in Aboriginal affairs today.

Today, Aborigines can be classified as those living in traditional ways and those living in towns and cities. Their similarities far outweigh their differences despite attempts to divide them. Their 'psyche' is distinctly different from that of white Europeans and their attitudes, like those of any group of people, vary. These attitudes would probably be best clarified by placing them in the following categories:

(i) the tribal or traditional cultural groups who, for various religious



Douglass Baglin

reasons, held sacred all tribal land and would be totally opposed to any disturbance of land in their area by mining activities.

(ii) some tribal people who, because of tribal beliefs, hold that *certain* areas of their land are totally sacred and should not be disturbed at any cost. They would therefore have opposition to mining activities in these designated sacred areas.

(iii) other tribal people, such as those of the Pilbara area in Western Australia, who have mined certain minerals fairly extensively for some decades. The people of this area, in order to survive, have had to mine, and in the process some land had to be disturbed. Apparently these tribal people had a different approach and attitude towards disruption of the land, including mining activities, but this is unique among Aborigines.

(iv) those 'assimilated' Aborigines who, due to historical factors have no cultural belief or understanding of the traditional values of their people, would have no objection to mining on any given area of Aboriginal tribal land. The view held by this group would be similar to that of Europeans. Mining would create an industry which would offer employment and a chance to earn good money. Employment would not be available otherwise

An Aborigine learns to drive a tractor at a bauxite reserve at Gove, Arnhem Land, NT.



Douglass Baglin

except perhaps pastoral work and probably at a very low income. This group comprise a very small percentage of Aborigines.

As can be seen, there are widely varying attitudes among the people and when a 'survey' is carried out, the findings are usually predictable. Whoever is doing the survey may be looking for a particular result and it is usually found!

There have been a number of instances where large-scale mining has taken place on an Aboriginal Reserve involving millions of dollars in development. Among these are Weipa in North Queensland and Nhulumbuy and Groote Eylandt in the Northern Territory. These operations have been in existence for some time. It would be quite a useful exercise for an unbiased comprehensive study to be made on the impact of such ventures on the recipient Aboriginal communities.

It is well known that Australia is divided into specific areas and that to prospect on these areas a lease must be granted by the Federal Government. Such leases don't necessarily end at Aboriginal Reserve boundaries. Companies having such mineral leases on Reserves usually have automatic entry, but the general public is restricted. The Federal Government, particularly in the Northern Territory, enforces certain rules to protect the Aborigines from 'undesirable elements' yet allows all staff of mining interests unrestricted entry. At no stage do the Aborigines make the decisions as to who should enter their reserves or when. This decision is made for them.

Once the prospecting has been completed, if the mining concern has not located any minerals of worth, the Aboriginal land is not disturbed further. If, on the other hand, minerals are found and the company wishes to mine them, the usual negotiating process begins.

The whole process of negotiating with the Aboriginal community in order to come to an acceptable agreement is a painful one and history shows that it has been a one-way deal with the Aborigines always losing in the end.

Looking at the situation more closely, we find that the mining company, which could either be a large national, or worse, a multinational corporation with the sole aim of gaining maximum profits for its shareholders, has little or no regard for the people of the area or even for the environment on which the Aborigines depend for survival. Such companies can and do wield tremendous political and economic influence and often ride roughshod, not only over the minority groups, but over larger

sections of the Australian community. What hope would an Aboriginal clan or group have who, in the country as a whole, comprise only about one percent of the population (and this one percent with virtually no political or economic power). The Aborigines, being in such a weak bargaining position, have little hope of getting fair deal.

Negotiations usually begin with the body responsible for Aboriginal affairs of the area calling together the interested parties for discussion. It would not be incorrect to say that it is the uneducated, pauperised, ill-informed Aboriginal group, isolated to perhaps a clan or tribal group, versus the mining company and all its resources backed, most probably, by the Government. There is no question of whose interest will be protected. Is it justice when Aborigines who have lived in an isolated community for years, have had virtually no education, and are not adequately advised by experts that are unbiased, must make a well-judged and balanced decision which could affect their very survival?

This map shows the locations of Australia's main mineral deposits. (The source of information used was the handbook, *Australia*, published by the Australian Government Publishing Service, Canberra, for the Department of Labour and Immigration.)

Map by Mer Solo

- ALUMINIUM
- ANTIMONY
- ⊠ BISMUTH
- ⊞ BEACH SANDS
- ★ COAL
- COPPER
- ∇ DILOMITE
- ⊙ GOLD
- ▲ GYPSUM
- IRON
- LEAD
- LIMESTONE
- ∇ MANGANESE
- ★ NICKEL
- ▲ OIL & GAS
- ⊙ OPAL
- ⊙ PHOSPHATE
- ⊙ POTASH
- ⊙ PYRITES
- ⊙ SALT
- ★ SILVER
- ★ TIN
- ⊙ TUNGSTEN
- ⊙ URANIUM
- ∇ ZINC
- IRON & STEEL
- OIL REFINING



This has been the pattern in the past and will, it appears, continue to be for some time yet. Some informed Aborigines see the present development of Oenpelli and the uranium mining in this light.

The deal thus made includes such things as royalties paid on a percentage basis, promise of more and better houses, employment with opportunities for advancement, job training and, in general, sharing of the wealth of the company. The Aborigines have been sadly disillusioned with the deals, particularly in the areas mentioned. Although the percentage of royalties agreed to have been honoured, all the other aspects certainly have question marks beside them. Homes of decent standard have not been provided in any significant numbers;

This sacred fig tree, important in Aboriginal legend was to be bulldozed to make way for the Nabalco Aluminium bauxite plant. After protests from Aborigines in the area, the tree was saved and is now a popular attraction for tourists visiting the plant.

the number of Aborigines in skilled or semi-skilled jobs is still negligible and neither the companies nor the Government have any real commitment to train more Aborigines in skilled professions. There is no written contract stating that, for instance, fifty percent of the skilled workforce of the company will be trained with perhaps, some assistance from the Government and that these (Aborigines) will be guaranteed employment with the company — no one wants to make a firm commitment.

The deals that were made in the Northern Territory were made with the local Aboriginal Council where the mining was to take place, but the royalties were paid into a trust fund for the 'benefit' of all Aborigines of the Northern Territory. Another peculiarity was that this trust fund was controlled by the Government. Individuals from Aboriginal communities are selected from time to time to sit on the board that authorises where and how much of this money is spent. They are 'advised' by the white Governmental officer who is the Secretary of the body. On occasions, this body has spent trust money in lieu of Government funds for such

trivial items as cutlery for a hall. Little has been done to invest what little funds were received from royalties (a pittance in contrast to comparable deals overseas) in capital investments that are more meaningful for Aborigines, particularly in the long term.

After years of outsiders mining on Aboriginal land, the Aborigines are still no better off. They still have few employment skills; their housing remains totally inadequate; their way of life is disrupted and loss of control over their own destinies is further complicated. Most importantly, they still do not have control of or title to the land which is rightfully theirs.

There is a great deal of animosity directed towards the mining industry from all sectors of Aboriginal society, from urban to tribal traditional. The industry is easily definable physically and the work they do or don't do is recognised by even the least sophisticated. Their very existence on the remote Reserves creates too many quick and undesirable changes which, under the present conditions, are detrimental to the well-being of the Aboriginal people.

THE GOVERNMENT



E. O. Rayner/ Courtesy NSW Geological Survey



Debra van Buren

ENT



Australia has abundant resources of basic raw materials, including iron ore, bauxite, manganese, lead, copper, zinc and nickel... and we have matching energy resources—black and brown coal, natural gas and uranium—upon which to base the continued development of our processing and fabricating industries.

All of these resources are the property of the Australian people and, accordingly, the policy of the Australian Government is to ensure that they are so managed as to confer optimum benefit on this country.

If this objective is to be achieved, ultimate responsibility for the exploration, development and processing of minerals must rest with Australians: all enterprises, Australian or foreign-owned, engaged in exploration, development or processing, must conform with the national interest.

The Government desires, as a major objective, to promote Australian equity in and control

Greta open-cut coal measures at Muswellbrook, NSW.

of its resources and industries, and maximum Australian ownership compatible with Australia's long-term capital requirements and its needs for access to markets, advanced technology and know-how.

The Government recognises that private participation in exploration and development will continue and that there is a role for both public bodies and private enterprises. In regard to energy minerals the 1975 Federal Conference of the A.L.P. endorsed a proposal that 'Labour will achieve and maintain full ownership and control of coal, oil, natural gas, uranium and all other fuel and energy resources'.

The legislation creating The Pipeline Authority passed through both Houses of Parliament

Export hydrocarbons in liquid or gaseous form when and if export permits are granted by the Australian Government.

The national pipeline project will be the largest engineering achievement in Australia's history and good progress has already been made on the first stage—an 864-millimetre diameter line linking Sydney-Newcastle-Wollongong with Moomba, in the Cooper Basin gas fields of South Australia.

The pipeline will be continued from Moomba to Palm Valley, in the Northern Territory, thence to Dampier, on the north-west coast of Western Australia. Under the terms of the Pipeline Auth-

A Mineral Deposits Limited sand mining plant about 100 kilometres north-east of Newcastle in the Myall Lakes area. Each plant treats 280 tonnes of mineral-bearing sand per hour.

Photo Courtesy of Mineral Deposits Limited



in the 1973 Autumn Session, and the Authority is now functioning as a Statutory body. The Act empowers the Authority to:

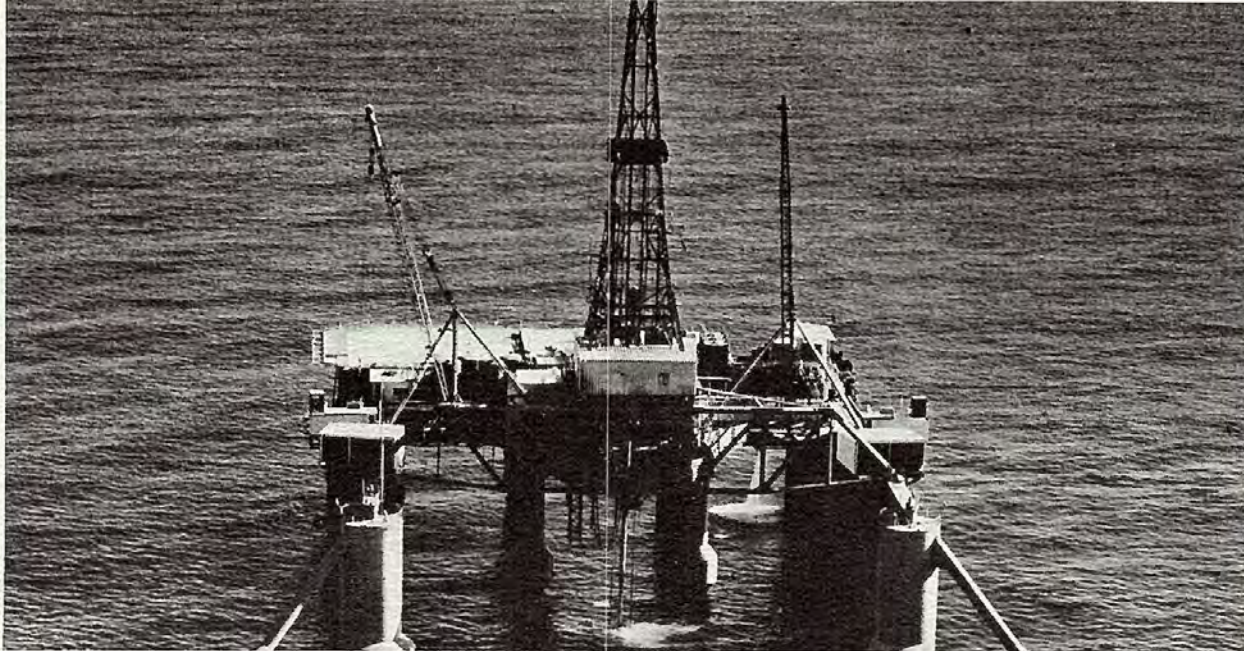
- Transmit hydrocarbons in liquid or gaseous forms by inter-state pipeline systems.
- Ensure the continuity of supplies of natural gas throughout Australia.
- Have trading rights to buy and sell hydrocarbons in liquid or gaseous form.
- Sell petroleum products, including natural gas, for reticulation to appropriate authorities and corporations.

ority Act, the Authority will take delivery of natural gas at the well-head on the North-West Shelf.

The Government has established the Petroleum and Minerals Authority to develop our natural resources with Australian participation, ownership and control. Legislation passed by the joint sitting of Parliament in August, 1974, empowers the Authority to explore, develop, produce, transport, process and sell Australian petroleum and minerals.

The legislation, however, is the subject of a States' challenge in the High Court of Australia.

A similar situation exists in relation to the *Seas and Submerged Lands Act* which became



Douglass Baglin

Huge oil exploration in Bass Strait.

law in December, 1973 and which asserts Australian Government sovereignty over off-shore areas.

The previous Government used Constitutional powers to control the export of selected minerals. Early in 1973 the new Labor administration extended controls over all mineral exports, whether in raw or semi-processed form, the chief aims being to ensure:

That export prices for Australian minerals are fair in relation to export prices received by other countries.

That the Australian Government has full knowledge of all details of export contracts, particularly the currency denomination and protection clauses, if any.

Balanced development of Australian mineral resources so

that production for export should be consistent with the best interests of Australia.

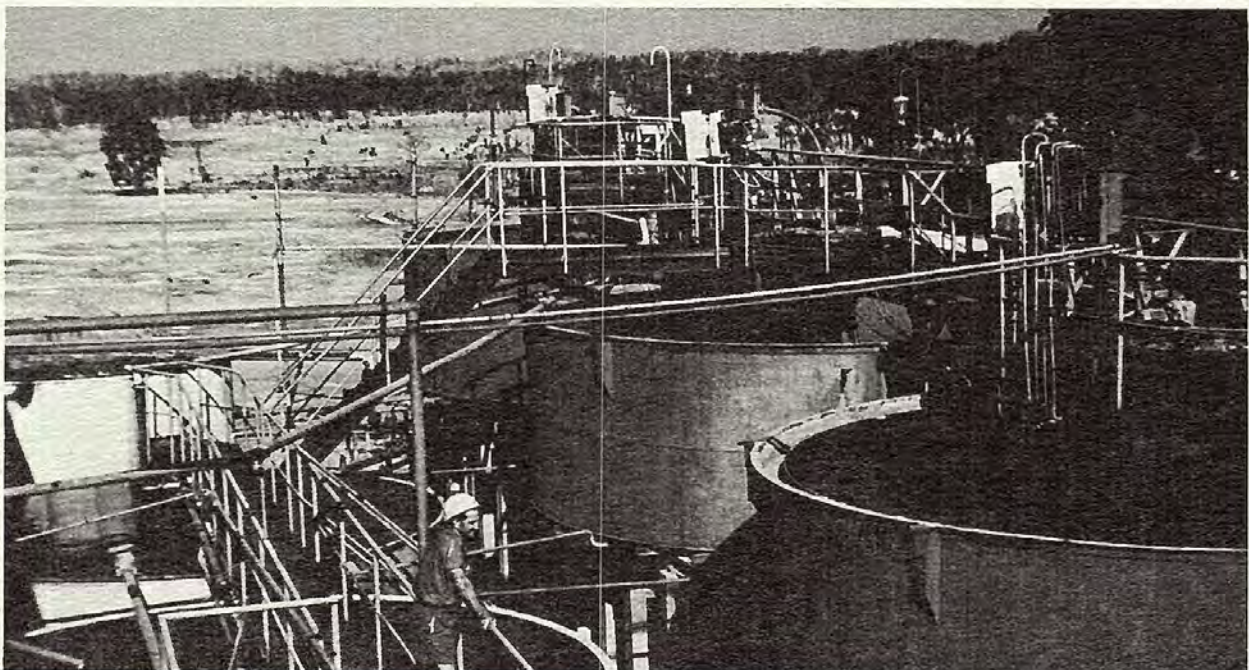
The controls were extended in 1973 to include petroleum products and fabricated and semi-fabricated copper products. The success of the Government's policy has been well illustrated in substantial increases in iron ore and coal export prices. Careful supervision of iron ore contracts and those for coking coal had resulted in substantial gains for Australia.

Under powers conferred by the Atomic Energy Act 1953-73, the Labor Government has undertaken a programme to see that the extensive uranium resources of the Northern Territory are developed in the best interests of the nation.

The Australian Atomic Energy Commission participates as agent for the Australian Government in the mining and treatment, and will undertake the sale of the Government's uranium

A uranium mining plant near Pine Creek, N.T.

Douglass Baglin



located in the Northern Territory. The Commission will also undertake all new exploration in the future for uranium in the Territory.

Under an agreement signed last October, the Atomic Energy Commission will mine and treat ore from the Ranger deposits in conjunction with the successful explorers, Peko-EZ. At an appropriate time, similar arrangements will be

made between the Commission and the discoverers of other deposits.

It should be emphasised that while I have questioned the propriety of approvals of uranium export contracts given immediately prior to December, 1972, the Australian Government will ensure that the commitments under those contracts are met.

THE CONSERVA



John Carnemolin

The town of Broken Hill in western NSW. This area is the principal producer of lead and zinc in Australia.

In 1957, The Sydney Morning Herald began a series of major annual supplements recording the economic hopes, boasts and doubts of Australia moving into a mineral boom. They were titled 'Australia Unlimited'—a name which seemed to capture the essence of a whole school of Australian development.

The mineral discoveries of the '60s gave rise to the view among some mining industry leaders that Australia could become a quarry for the whole world. Today, over sixty percent of the production of the mining industry is overseas-controlled and so the title 'Australia Unlimited' was indeed well chosen in 1957.

Another element of public opinion gained momentum in the '60s. Large sections of the public became absorbed in the environment and conservation movement. It became apparent that Australians were subsidising overseas

mining companies while National Parks and other valuable areas were being mined for resources that are quite non-renewable.

As attacks from conservationists increased, the Australian Mining Industry Council produced a statement of principles, 'The Mining Industry and the Environment', which simply attracted more hostility by asserting that the only areas of Australia which should not be opened for mining were those containing 'unique' features. "For a feature to be considered 'unique'" they said, "it must be one of a kind; for a feature to have special value it must be sufficiently rare throughout the whole of the nation or be an integral part of an ecosystem being considered for preservation." As one commentator said, "Presumably, on these criteria, Ayers Rock at least is safe".

Among the more extreme groups of miners are the east coast beachminers, the Rutile and Zircon Development Association. Using NSW Geological Survey maps, Alan Catford of the National Parks Association, NSW, recently calculated that nearly a quarter of the NSW north coast has been mined already.

The best north coast landscape is the area known as Myall Lakes. Much of it has already been dedicated National Park, but despite the State Government's promise to dedicate parks and reserves irrevocably, two-thirds of the land area of the park is covered by beachmining leases. One dredge is working the foredunes, another has begun work in a northern area proposed to be added to the park and a marvellous forest of 200-year-old blackbutt and redgum is being destroyed.

Headed by the National Trust, the Royal Aus-

This attitude is in line with our desire that Australia should maintain and enhance her international reputation for fair dealing and adherence to terms of contract.

The Government has taken every opportunity to assure Australia's major trading partners (notably Japan) that we will not act capriciously or unfairly in regard to the supply of basic

industrial raw materials. But the Government does not intend to see our national assets sold short, it being quite clear that as time progresses we wish to achieve greater processing of our minerals before export and to move from being primarily an exporter of raw materials to a substantial exporter of semi-processed and processed materials.

TIONISTS

tralian Institute of Architects and the Australian Planning Institute, a group of NSW organisations summed up the beachmining threat in 1969: "The present official policy" they said "is to allow beach miners first option over the coast before dedicating any complete parks. Few other countries would allow such savage treatment of their most valuable public lands..."

The thousands of individual protests to the NSW government were met with standardised letters. "You may be assured that every effort is being made", replied the NSW Premier to one of my letters in 1971, "that where mining is permitted, efficient and adequate management will ensure proper regeneration of worked areas". What can you say to a politician who chooses to believe that a forest of seedlings is a substitute for 200-year-old trees?

The regular clumps of marram grass on the obviously artificial dune shapes, the dried-out wheat plantations, the salt-killed or wind-burned exposed edges of the remaining forest, the diminished variety and uniform age of the few regenerated heaths—what sort of a substitute are these for genuine Australian beachscapes?

With a few notable exceptions the general concern of unions in environmental disputes in rural areas has been to maintain or extend available jobs regardless of environmental cost. In the case of Myall Lakes, the unions concerned chose to ignore the fact that the company concerned, Mineral Deposits Limited, holds extensive alternative leases. These unions have identified themselves with an eighty four percent overseas-owned company which is destroying the best possible coastal National Park in NSW.

Another continuing cause of public dispute is

the insistence by cement companies that they have a right to mine the nearest, the largest, or the purest deposits of limestone, regardless of any environmental consideration. Bungonia Gorge in NSW, has been described as 'Australia's Grand Canyon' and to protect its scenic edges, Public Reserves were notified in 1900, 1925, 1941 and 1962. Both Southern Portland Cement (a BHP subsidiary) and APCM(A) the Australian subsidiary of the world's biggest cement combine, Blue Circle, held leases abutting these Reserves. For years they allowed thousands of tons of rubble to fall into the Reserves, contrary to the express provisions of their leases. Without prior notice to

Tons of detergents, used to suspend debris from drill holes, covers countryside near oil drilling sites in central Australia.

Douglass Baglin





John Carnemolla

Exploring for copper
in the Durack Ranges,
north-western WA.

the public, the Government revoked two groups of the Reserves and possession was immediately taken by the companies for mining purposes. Two mining warden inquiries and one State Pollution Control Commission inquiry later, the two companies have emerged with considerably enlarged leases, legally entitled to destroy even more of this splendid scenery.

The most beautiful cave in Queensland is being destroyed at Mt. Etna near Rockhampton. The Central Queensland Cement Company holds all of Mt. Etna and practically all the caves and the public recreation reserves originally proclaimed to protect them. The initial cut opened up beautiful Resurrection Cave. Subsequent operations severely damaged it.

So far we have talked about mining operations which have been damaging to particularly important scenic sites—to the coastline or to a geological feature. There are, however, several branches of the mining industry causing damage to vast areas as well. These are open cut coal mining, alluvial tin mining and bauxite mining. Of these, space only allows discussion of bauxite mining here.

South of Perth, bauxite mining leases cover an area approximately 320km north to south by 65km east to west including more than 850,000 hectares of State Forest. The bauxite lies three metres thick at depths down to twenty or twenty-five metres and the deposit here is continuous, so it is likely that open cut mining will take place over most of the area. After overburden is removed and stacked, the bauxite removed, and the overburden replaced, an attempt is made to replant the surface. Mining companies at first attempted to revegetate with pine which suffered badly from windthrow caused by poor

root penetration. Revegetation is now being attempted with east coast eucalypt species. In this area of high transpiration, roots of the existing eucalypt forest go down 20 metres or more, keeping water tables low. Removal of the forest cover, which is necessary for mining, is likely to induce a rise in the ground water level with resultant salting of streams. As the operation occupies much of the Perth Water Catchment it could endanger the city's water supply. The bauxite leases were strongly criticised by Government foresters who consider that the forests should be exploited for the timber industry.

One of the most disturbing features of bauxite mining is the 'red mud ponds' of bauxite tailings, which may cover more than 2000 hectares. One ponding site is over sixteen square kilometres in area. The standard method of lining these is with clay. Leakage of the caustic wastes into ground waters and the permanent nature of such eyesores are further debits in the bauxite mining ledger.

Western Australia also possesses huge reserves of iron ore, and mining operations to date have made relatively small inroads into these reserves. High-grade iron ore reserves are estimated to be 20 billion tonnes with additional vast supplies of ore of lesser quality. The Western Australian Deputy Premier recently stated that "Lower-grade ore of a quality being mined in other parts of the world exists in our State in quantities loosely measured in hundreds of cubic miles".—Why then must iron ore mining be permitted in the state's major National Park?

The Hamersley Range National Park is the largest in Western Australia and contains the state's highest mountain, Mt. Bruce. When this park was first recommended in 1962, apart from some mineral claims only two temporary Mineral Reserves (for asbestos) were included. The National Parks Board formally applied for the area in 1963. Six years later when the area was proclaimed a National Park, thirty-one temporary Mineral Reserves had been approved within the declared boundaries, and the Mineral Reserves occupied thirty percent of the total proclaimed area. Thirty of the 160 kilometres of gorge systems recommended for inclusion in the park by the Australian Academy of Science were excluded for mineral rights.

At the present time, it is uranium mining that is most controversial. In 1962, Australia's four major uranium mines had ceased production for lack of markets; the town of Mary Kathleen was populated only by caretakers. Today the firms of

Noranda, Pancontinental, Geo Peko, Pechiney, Queensland Mines, Trans American, CRA and Esso are trying to extract uranium mining leases from the Australian Government. They refer to the area containing these leases as the 'Uranium Province'. To many of us it is the proposed Kakadu National Park.

Kakadu is the most important natural area under the control of the Australian Government. This is the area where the National Parks Act could set a standard of park management which would be an example to the states, but management of Kakadu is already prejudiced by uranium prospecting. A road system unrelated to park needs, a proliferation of vehicle tracks, airstrips, extensive clearing, cutting and burning, constant movement of automobiles and planes, permanent camps, mobile camps, abandoned drums and other debris, and interference with Aboriginal sites are all to be seen in the area.

The dangers of overflow or leakage of radioactive materials are clearly spelled out in the Review Report of the Alligator Rivers Region Environmental Fact Finding Study prepared for the Department of the Northern Territory and the Australian Mining Industry Council. The report states that seasonal concentrations of the heavy metals (i.e. copper and zinc) in the natural waters, approaches or exceeds toxic levels and any increase of heavy metal content in billabong

or stream waters would be deleterious to aquatic fauna. Escape of radioactive wastes from Rum Jungle Mine has already turned at least twenty-one kilometres of river into a wasteland.

Noranda proposed in 1973 to floor its tailings pond with a flimsy polythene sheet covered in fifteen centimetres of sand. It would be blind optimism to expect no leakage through acres of this thin membrane and no overflow in the downpours of a monsoon climate.

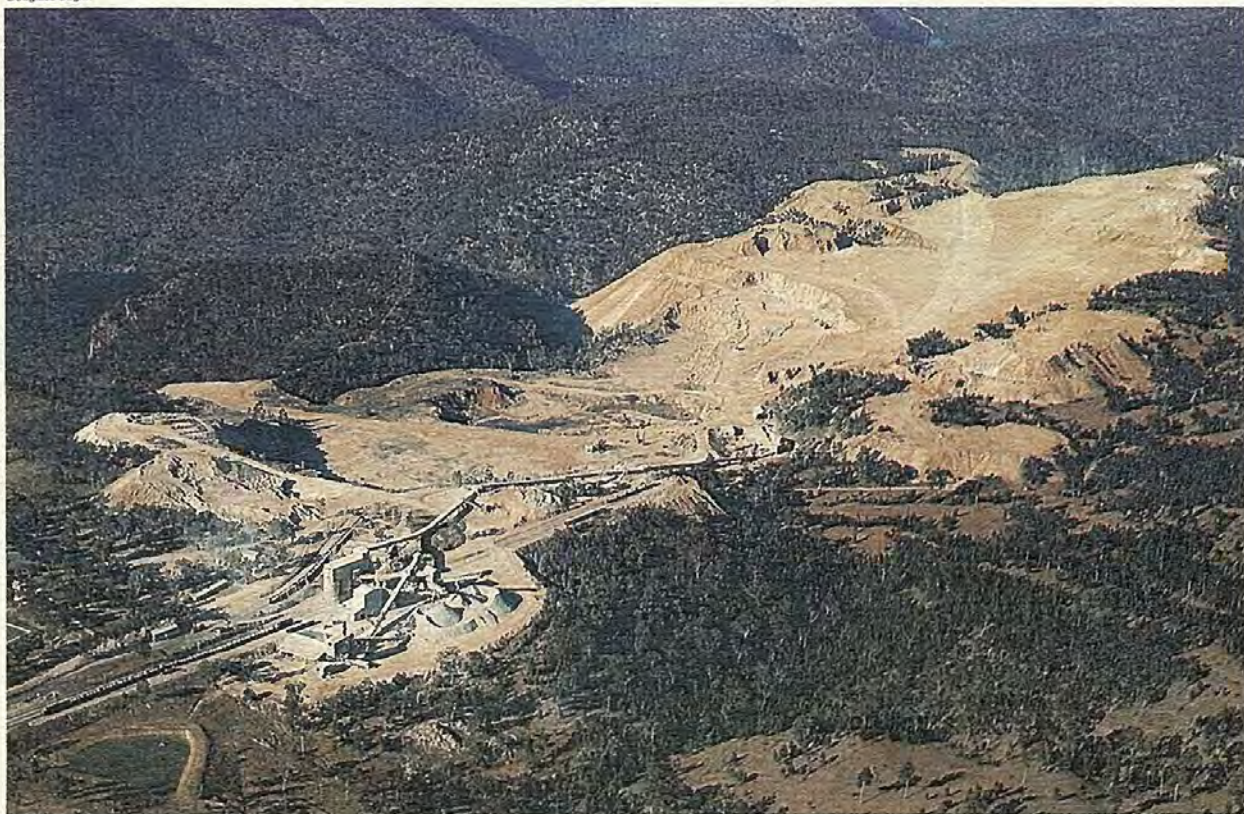
The vertebrate fauna of the Kakadu area has been described by a team from the CSIRO Division of Wildlife Research as being "very rich in species" and as having the richest fauna of any region in the Northern Territory—being matched in Australia only by some areas of northeast Queensland; of the invertebrate fauna, 4,500 insect species were recognised. Up to fifty per cent of species in some faunal groups are new to science and about fifty-six per cent of the flora species are endemic to Australia.

More than 120 Aboriginal sites, up to 25,000 years old, are recorded in the area, representing the earliest known settlements in tropical Australia. These have provided the world's oldest edge-ground stone axes and the oldest grindstones in Australia. The most numerous and anthropologically significant series of rock paintings in Australia are also found in the proposed Kakadu National Park.

The reasons for not mining Kakadu because of

The view from Marulan Lookdown, NSW, marred by limestone mining operations.

Douglas Baglin



the damage mining will do to the area are strong, but in addition there are a series of overriding arguments against uranium mining. The greatest of these is that under present technology, no adequate way of disposing of the long-life wastes of atomic power plants is available. All we can do is seal them in metal or concrete and store them where they can be constantly monitored. Such monitoring will be required for the impossible period of 250,000 to 500,000 years! Uranium mined for power production also provides the raw material for the manufacture of nuclear weapons.

I have singled out the minerals mining industry as providing some of the most extreme examples of mining philosophy, but this outlook is to be found in other industries as well—there are numerous examples in the pastoral and agricultural industries. Today, the greatest example outside the minerals field is of course chipmilling which, as we know it in Australia, is simply wood mining.

I think four conclusions come out of our quick look at the mining industry. Firstly, we are losing some of the most scenic and scientifically important areas of Australia. Secondly, there is an enormous rate of expansion to many of these operations. Thirdly, we should realise how powerful, persistent and tough many of these companies are. They owe little allegiance to anything but the annual balance sheet—which is often a secret balance sheet at that. Fourthly, although the Labor Government has cast aside much of the freewheeling, 'rip-off', sell-it-overseas approach of the previous government to the mining industry, it has yet to take serious account of the effect of mining on the environment.

The most effective long-term solution to the conflict is, of course, the establishment of a comprehensive planning procedure—rational land-use decision-making. However, virtually all of the consultant firms in the planning profession are at the disposal of the mining industry for an appropriate fee, so that even where there are proper planning procedures and statutory planning schemes, mining companies are in a strong position to influence them. In addition, statutory planning in Australia is tied to decisions over the use of parcels of land. It is a poor instrument in the more complicated fields of ecology and pollution amid the complex and largely unstudied natural systems of Australia.

The landscape planning system of Ian McHarg from Pennsylvania University, USA seems a useful technique for Australia. McHarg prepares successive transparent overlays, each overlay

illustrating a particular constraint or value. Any combination of site characteristics can be quickly appreciated by putting the appropriate overlays together. This is a convenient technique and computer programming makes it even more convenient. The CSIRO Division of Land Use is attempting to formulate such a computer programme, which will be generally applicable, with a pilot study based on the NSW south coast.—But the value judgments still have to be made and the old battle between exploitation and preservation fought out again and again.

Environment Impact legislation is being enacted in the Australian Parliament, as it has been in several of the states, but environmental impact studies are just as subject to manipulation by governments, exploiters and their consultants as any planning application. Indeed, the disastrous decisions at Myall Lakes and Bungonia are the result of environmental impact investigations. It is my opinion that in NSW, the bureaucratic nature of pollution control legislation shields the responsible politicians from an increasingly concerned public.

In any case, environmental impact studies on individual projects can never be adequate substitutes for regional planning schemes. The true role of the environmental impact study is as a secondary check to see that the parameters of the regional planning scheme are being

This scooping machine operated by Mount Newman Mining Company, Mount Newman WA, transfers iron ore from the quarry site to a conveyor belt.



maintained, yet in NSW the environmental impact study is, in many cases, being used as a primary planning tool.

So how do we make wise land-use decisions, particularly in the mining field, while the nation catches up with its vast backlog of planning? The President of the National Parks Association of NSW, Mr. John Dorman, outlined a partial solution to the beachmining conflict: "The industry has learnt part of the lesson only as yet, namely a more responsible approach to revegetation, but has yet to learn respect for National Parks and Nature Reserves. It is essentially only in this field that conflict persists, yet the industry is spending large sums on public relations in an endeavour to sustain a right to mine these. Exclusion from all the areas proposed for conservation would not affect their viability or their profitability except during the period of readjustment. The sooner they learn this lesson and seek a genuine compromise the better for all concerned. The miners could save themselves money and the conservationists could concentrate on other pressing issues."

It seems to me that the most appropriate short-term measure would be to pass legislation in the states enabling citizen organisations to lodge park proposal applications in the same way as miners lodge mining applications. Such applications could be heard in either planning tribunals or land tribunals. In this way, National Parks could achieve equal standing with mining

John Carnevala



in land-use determination. Right of appeal against a negative decision would belong to the applicant in the same way that a mining company has right of appeal to a State Pollution Control Commission or to the Minister for Mines. Such a system would allow the vast and growing conservation movement a short-term legal avenue for its constructive proposals. No longer should we have to endure the thirty years' wait which has been customary in NSW between the first proposal for a National Park and its eventual dedication. We waited thirty years for Kosciusko National Park, Blue Mountains National Park and many others.

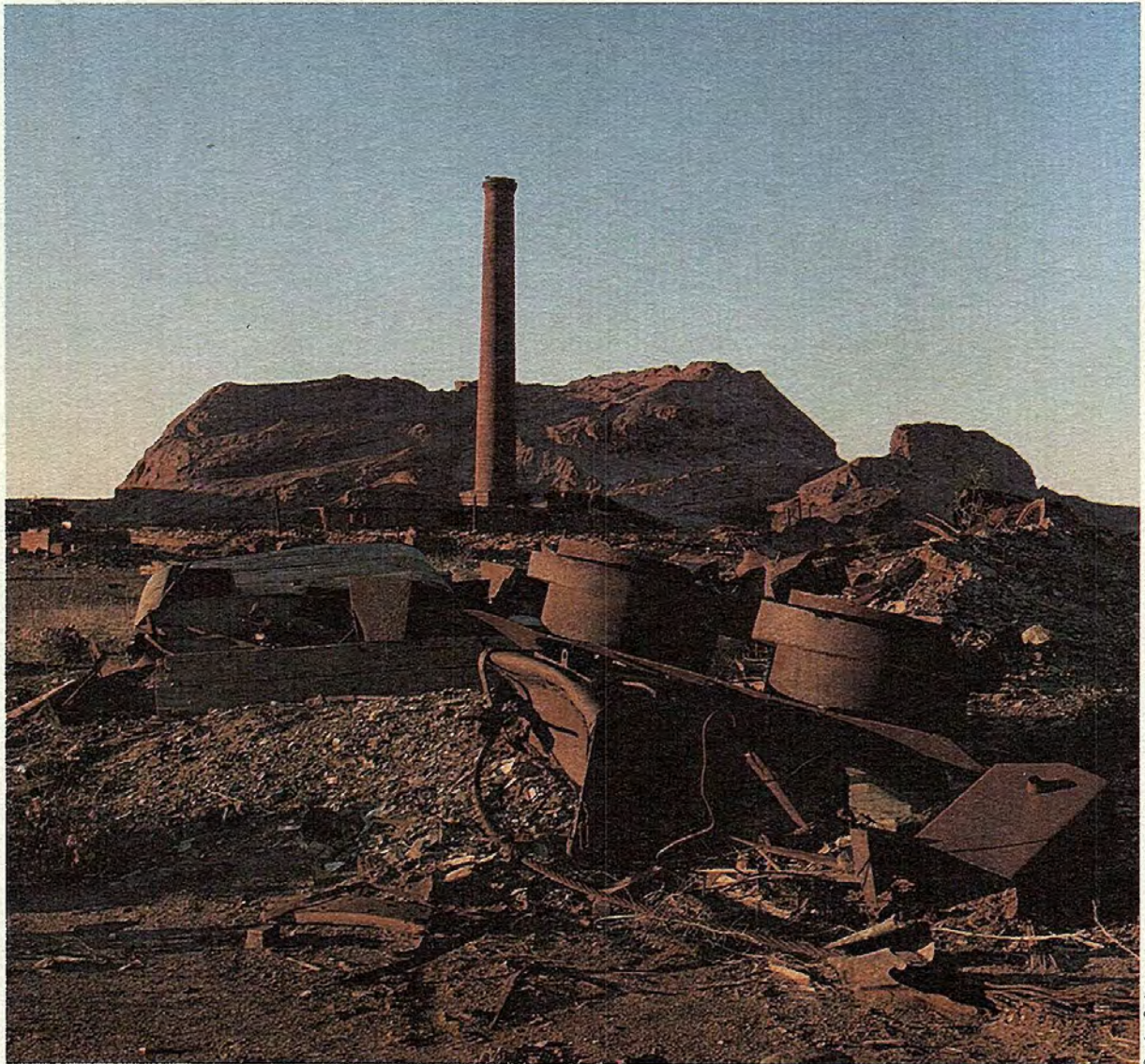
The Australian Government has gone a long way toward recognising the widespread public desire to preserve the most beautiful and interesting parts of Australia. Grants for consultant studies, legal expenses and office services to conservation organisations constitute a revolution in governmental approach to land use. To make these new initiatives effective—to put citizen groups on a par with mining companies in land use decisions—should be a goal for governments in the very near future. A rapid build-up of national park staff and funds is necessary, too, if vital areas are to be dedicated on a systematic basis and managed in a proper fashion. The Australian Government should make use of its export licensing powers to prevent damage to existing or proposed National Parks. Recommendations to this end could be part of the task of the proposed National Heritage Commission.

Another urgent goal should be that Australia register its most outstanding areas under the World Heritage Convention of UNESCO. Moss Cass, former Federal Minister for the Environment, attempted to do this through his National Parks Bill but the states have defended the exploiters rights to destroy by deleting the relevant clause in the Senate. Thus we will be prevented from protecting: the world's greatest coral reef system, the world's best collection of rainforests, the biggest sand island in the world, the most southerly coral island in the world and the best remaining temperate wilderness in the Pacific.

Australia and the world are losing these and other natural treasures while we continue to prevaricate with the miners. We must put an end to the 'rip-off' school of Australian development. Mining is important to the economy, but not if it destroys irreplaceable natural features.

Australia is big but it is not unlimited. Both time and Australia are slipping through our fingers.

Overleaf: Waste of the abandoned Leonora Mine, south-west of the Warburton Ranges, WA.



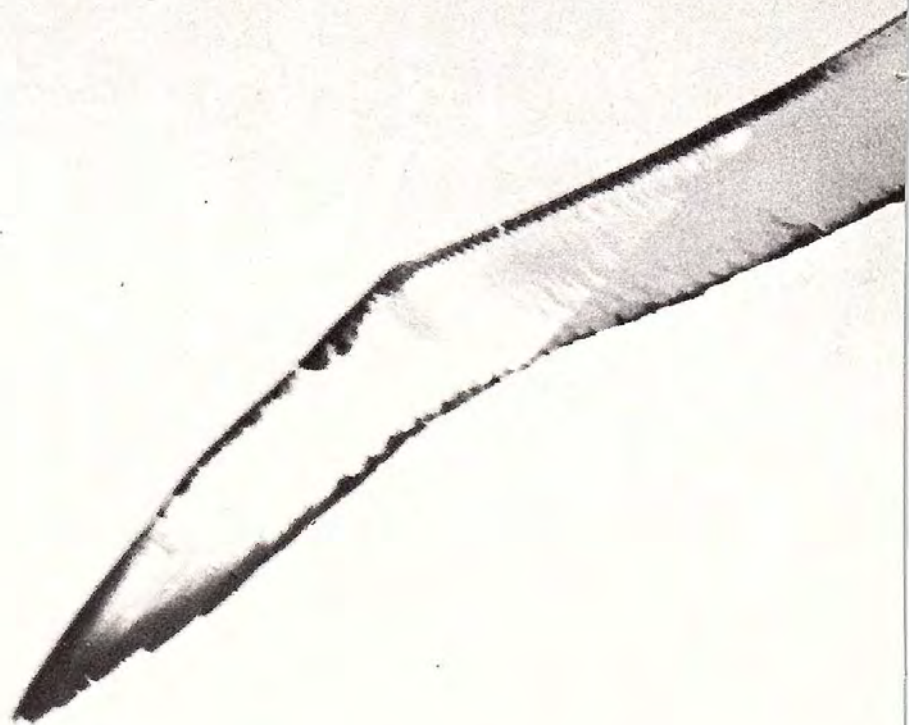
Douglas Baglin

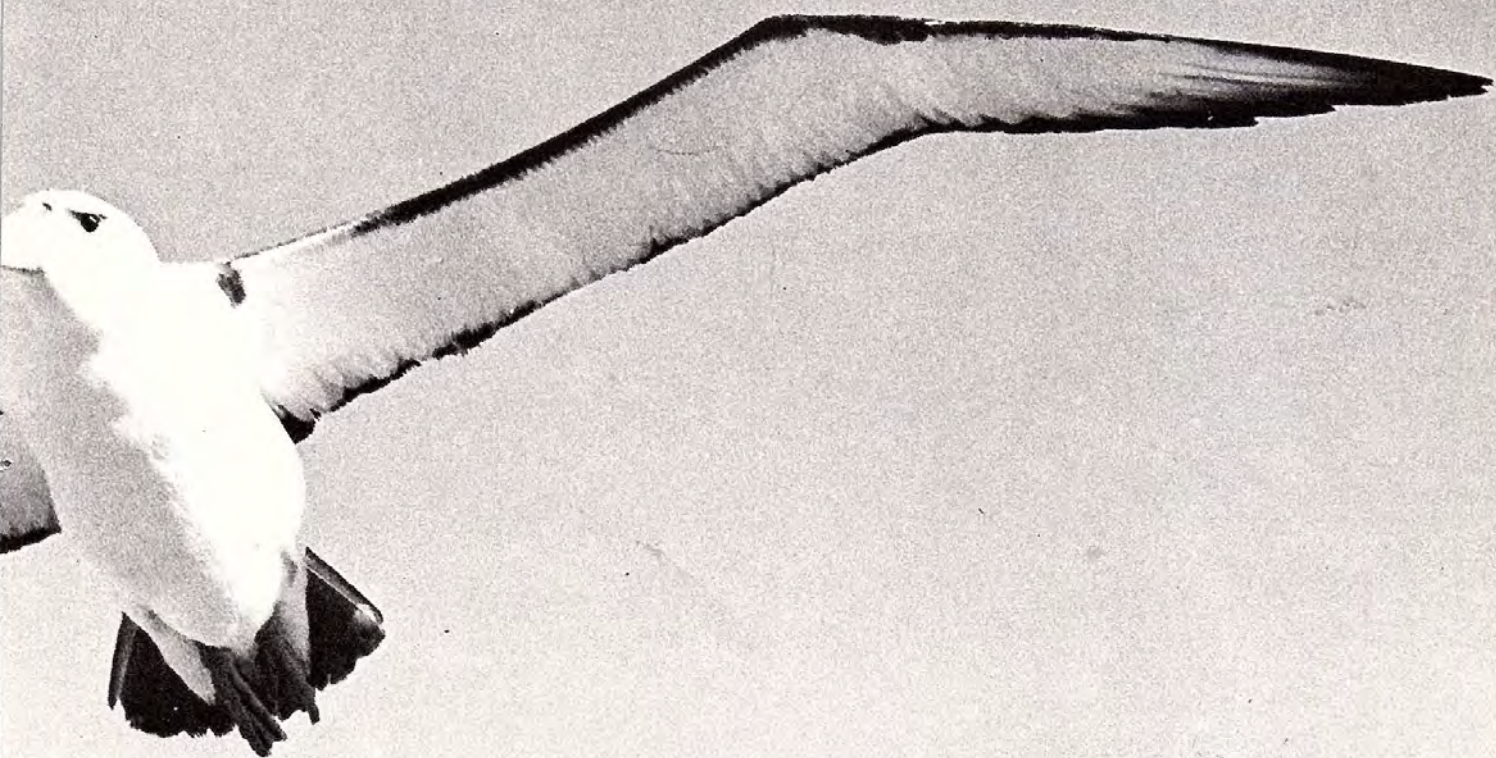


A BIRD OF GOOD OMEN

BY DAVID MILLEDGE

A White-capped Albatross, *Diomedea cauta*, soars over its breeding grounds on Albatross Island, Bass Strait. This species has a massive two-and-a-half metre wingspan and a distinctive underwing pattern of white with narrow black edging.





PHOTOGRAPHS BY THE AUTHOR

DAVID MILLEDGE, Technical Officer (Scientific) with The Australian Museum's Department of Environmental Studies, is particularly interested in the ecology of seabirds and is presently engaged in a survey of seabirds off southeastern Australia.

The albatross, immortalised in Coleridge's *The Rime of the Ancient Mariner*, has always had an aura of mystique, perpetuated by seamen's legends to the present day. "At length did cross an albatross, through the fog it came..." The Ancient Mariner's ship was favoured by a good wind and fair weather and the bird followed the ship as it sailed north through the fog and floating ice. Foolishly, the Mariner shot the albatross and through the elements the bird's spirit wrought a terrible revenge on the Mariner, his crew and his ship. "And I had done a hellish

Albatrosses are long-winged pelagic seabirds with most species inhabiting the oceans of the Southern Hemisphere. They have extraordinary powers of flight, gliding on motionless wings for days on end, and are never seen on land except at their breeding colonies on remote islands. Pairs probably mate for life and some species nest only once every two years, taking up to twelve months to rear their single young. Research has shown that individuals may live as long as forty years and probably longer and may circumnavigate the Earth twice a year in



A general view of the main rookery on Albatross Island.

thing, and it would work 'em woe: for all averred, I had killed the bird that made the breeze to blow". Nowadays the presence of an albatross is always welcomed as portending good fortune, and no true seaman would harm one.

Albatrosses have also figured in real-life sea dramas. What is believed to have been a Wandering Albatross was beach-washed in Western Australia in 1887, bearing a short but graphic message punched into a rough tin collar around its neck. Thirteen sailors shipwrecked on the Crozet Islands in the southern Indian Ocean had released the bird forty-six days before it was found, in a desperate attempt to make known their plight. Unfortunately the albatross's 4800-kilometre journey was to no avail, as authorities were too slow to act, and when a rescue vessel finally arrived at the Crozets, the men had set out for a nearby island in a makeshift boat and were never seen again.

the southern westerly wind zone of the 'roaring forties'. They normally obtain their food—fishes, squids and other marine animals—by surface seizing, but are capable of diving a short distance below the water's surface.

Nine species of albatross have been recorded from Australian waters. These fall into three distinct groups—Great Albatrosses, Mollymawks and Sooty Albatrosses—based on their physical characteristics. Two species, the Wandering Albatross (*Diomedea exulans*) and the Royal Albatross (*D. epomophora*), comprise the Great Albatrosses, the largest of all with wingspans up to three metres. Adults of both these species are all white except for black-edged and tipped wings and flesh-pink bills.

The Mollymawk group has the largest number of species with five recorded from the Australian region. These are the White-capped Albatross (*D. cauta*), the Black-browed Albatross (*D.*

melanophris), the Grey-headed Albatross (*D. chrysostoma*), the Yellow-nosed Albatross (*D. chlororhynchus*) and Buller's Albatross (*D. bulleri*). They are smaller than the Great Albatrosses and have white bodies with dark-coloured backs continuous with the blackish colouration of their upper wings. Several have grey heads or faces with dark, 'frowning' brows and their bills have bright patches of colour at the tip or along the upper and lower edges. Mollymawks are the most commonly observed albatrosses off the Australian coast, but because the five species are difficult to separate in both adult and immature plumage stages, only close observation from the deck of a boat can assure a positive identification.

The Sooty Albatrosses with their wholly dark plumage and bills and long, pointed tails make up the third albatross group. Both species, the Sooty Albatross (*Phoebastria fusca*) and the Light-mantled Albatross (*P. palpebrata*) appear to stay mainly off the continental shelf and are only rarely reported in Australian seas. Most records are of specimens beach-washed during storms and picked-up by an alert contingent of beach-combing ornithologists. Sooty Albatrosses are smaller and more graceful than the Mollymawks and are easily identified by their narrow wings, pointed tails and dark appearance.

With the exception of one species, all albatrosses found in Australian waters are non-breeding juveniles or adult winter visitors from nesting colonies on sub-Antarctic and Antarctic islands in the southern Atlantic and Indian Oceans and from south of New Zealand. Only the White-capped Albatross breeds in the Australian region, on two small, rocky outcrops—the Mewstone, off the southwestern coast of Tasmania near the Maatsuyker Group islands, and Albatross Island, which lies thirty kilometres from Tasmania's northwesternmost point and west of the Hunter Group islands in Bass Strait.

Virtually nothing is known of the remote and inaccessible Mewstone, a jagged tooth of ancient rock thrusting its tip some eighty metres above sea level. Its nesting albatrosses have only been viewed from the air and scientists have yet to set foot on its precipitous shores. The Mewstone remains as one of the few major Australian seabird colonies yet undescribed, and presents an intriguing challenge to some intrepid zoologist willing to brave the hazardous landing.

The Albatross Island breeding site is, on the other hand, relatively well-known; six ornithological expeditions have made visits



A sub-adult White-capped Albatross occupies an unused conical nest mound. During the nesting season, birds nearing maturity come into the colony during the day to 'practice' nest-building and other breeding activities.

An albatross chick fixes the photographer with an inquisitive stare. Too close an approach can lead to a soaking with partly-digested fish and oil ejected by the chick as a defence mechanism.





The gaping display, used during aggressive encounters between adult albatrosses (right) is also used between chicks and adults (left).

With elaborate ritual, a parent albatross feeds its chick by regurgitating partly digested fish, squid and other marine animals.

there since the 1890s. Prevailing westerly winds and pounding swells from the Indian Ocean batter the Island throughout the year, scouring and sculpting its landforms and cloaking everything in a blanket of salt spray. There are no trees—only a low cover of salt-resistant grasses, herbs and a few woody shrubs. The Island rises to thirty-five metres above sea level and is roughly one and a half kilometres long (north to south) and a third of a kilometre wide. Half a kilometre from the northern end, a deep, dry gulch cuts the conglomerate rock almost to sea level, and pieces of driftwood and seaweed littering the floor indicate that severe storms

must have this split almost awash. At the eastern end of the gulch, caves about twenty metres above the floor open out into a box canyon on the southern side and into a boulder-strewn ravine to the north. Three of the Island's four breeding rookeries are south of the gulch and contain about one thousand pairs of birds. The other rookery is northeast of the ravine at the far northern end of the Island. The total number of pairs nesting on Albatross Island in one year is at present about 1400, slowly building up from the four hundred-odd pairs reported by ornithologists Ashworth and Le Souef in 1895. In the early 19th century, a sealer's colony on the Island killed off a great number of adults and nestlings for their feathers and probably reduced the numbers of birds from many thousand to a few hundred. Thus the White-capped Albatross, which lays only one large, white egg and takes six months to raise its young to flying stage, probably only breeding every second year, would take a long time to stage a recovery from such low numbers and it is this process which we are now witnessing. Albatrosses now have total protection in Australia and Albatross Island is a State Conservation Area—so perhaps in another fifty or a hundred years this island will again be populated with "vast numbers of birds, almost covering the surface of the ground" as reported by the explorer Flinders in 1801.

A visit to an albatross colony such as Albatross Island is a unique experience, a spectacle of sight and sound which Australian



ornithologists are indeed fortunate to have within such relatively easy reach. Although the initial landing on the Island's rocky coast can be tricky, it is an easy scramble up through the gulch to the top of the Island.

Egg-laying starts in late September after breeding pairs have, with elaborate ritual, established their territories and made 'running repairs' to their conical nest mounds of earth, plant debris, bones and excretia. Although the pre-nesting displays of the White-capped Albatross have not been described, they probably resemble displays given during the later stages of breeding activity. After the eggs hatch activity becomes intense as parents busily attend to their young and the air is continually filled with a cacophony of strange, donkey-like braying calls of greeting or aggressive encounter.

The adult birds display spectacular and often uncontrolled landing manoeuvres as they fly in with food for their young. Being seabirds and having evolved for effortless flight over a frequently wind-swept ocean, their long, narrow wings give them a high stalling speed which makes precision landings very difficult without some wind assistance. When a wind is blowing, the approaching albatrosses drop down into it with wings fully angled, tail fanned and webbed feet spread like the brakes and steering flaps of a giant airliner. Often birds aim for unoccupied, high ground and then walk down to their nests, but they then have to content with other adults defending their territories and with aggressive young chicks. Landings on still days are



frequently disastrous with birds often misjudging their approaches and having to pull-away at the last moment, to come in again for another attempt. Sometimes, however, it is too late and they end up landing, bill-first, in a most undignified manner, creating turmoil and attracting displays of aggression from whole sections of the rookery. Landing adults occasionally overshoot into the box canyon and although some birds may come to grief, most seem to escape by scaling the walls or by walking out through a cave into the gulch and then ascending to the main rookery. Bones and carcasses which prompted early observers to call this box canyon an albatross trap, probably remained from the activities of the resident sealers.

An ornithologists' camp in the box canyon on Albatross Island. The entrance to the cave inhabited by 19th century sealers is seen at the far end of the canyon.

Birds taking off from the colony on windless days literally throw themselves from the edges of cliffs to become airborne, again having to tolerate territorial aggression on their walk down

Adult albatrosses settle a territorial dispute with a ritualised billing ceremony.





Wings held aloft, an albatross waits for a gust of wind to lift him from his rocky perch.

to the cliff edge. On windy days, take-off is easier as the albatross simply stands on a rock, raises his wings high and lifts off into a gust.

Both adults and chicks have distinctive aggressive displays for intruders, although these are used primarily on other adults as the albatross has few natural enemies. Birds straying into others' territories, which often seem to overlap considerably in the tightly-packed rookeries, are first subjected to a bowing display and then to a pulsating, braying call. The head, neck and bill are angled sharply downward and the cheek patches drawn back to

expose a bright orange strip of skin running under the eye from the base of the bill. The tail is also fanned, the bill clattered and the head and neck moved up and down. Strangely, this display is also used by adults greeting their chicks when returning to the nest site with food.

The gaping display is used when the bowing display is not heeded. The bird stands upright with its neck stretched, tail fanned and bill wide open. The head is jerked from side to side as the wings are raised threateningly and the braying call is given again, although louder and more stridently. When two adult albatrosses actually confront one another, ritualised billing displays are used. The bills of both birds are pointed skyward with the tails fanned, and often the bills are aligned side by side, the tip of one near the base of the other or pointed skyward again with necks intertwined. Actual fighting between adults is extremely rare as their massive razor-edged bills would almost certainly inflict fatal injury. Instead, combat is ritualised in these displays and the defeated bird, which almost appears to know the outcome at the start of the contest, retreats in submissive posture with body hunched and neck held in.

The albatross chick, when approached, initially uses a rapid bill-clapping display, which is then followed by the ejection of a stream of evil-smelling, partly-digested, oily food. This is delivered with uncanny accuracy over a distance of up to two metres at the intruder who fails to heed the first warning.



The distribution of most albatrosses in Australian waters is not well understood at present and many intriguing questions about the status and origins of several species and some subspecies remain unanswered. Apart from a few sections of Western Australia, South Australia and New South Wales, regular coverage of the southern Australian coast by observers in boats is lacking, particularly around Tasmania. Although some information about the more common and easily-identified species—such as the Wandering, Black-browed, White-capped and Yellow-nosed Albatrosses—can be obtained by coast-watching or observing from high, prominent headlands, this practice is not satisfactory for distinguishing the rarer species, many of which are exceedingly difficult to identify. Much more data is needed on the occurrences of the Royal, Grey-headed, Bullers, Light-mantled and Sooty Albatrosses around Australia. The distribution and frequency in Australian waters of the New Zealand breeding races of the Black-browed Albatross (*D. melanophris impavida*) and the White-capped Albatross (*D. cauta salvini*) also needs to be established.

With one of the two Albatross colonies in Australian waters still undescribed and the status of several species uncertain, much work remains to be done in this region. The present upsurge of interest in seabirds—particularly through the recent formation of the Australian Seabird Group—should, in the near future, bring

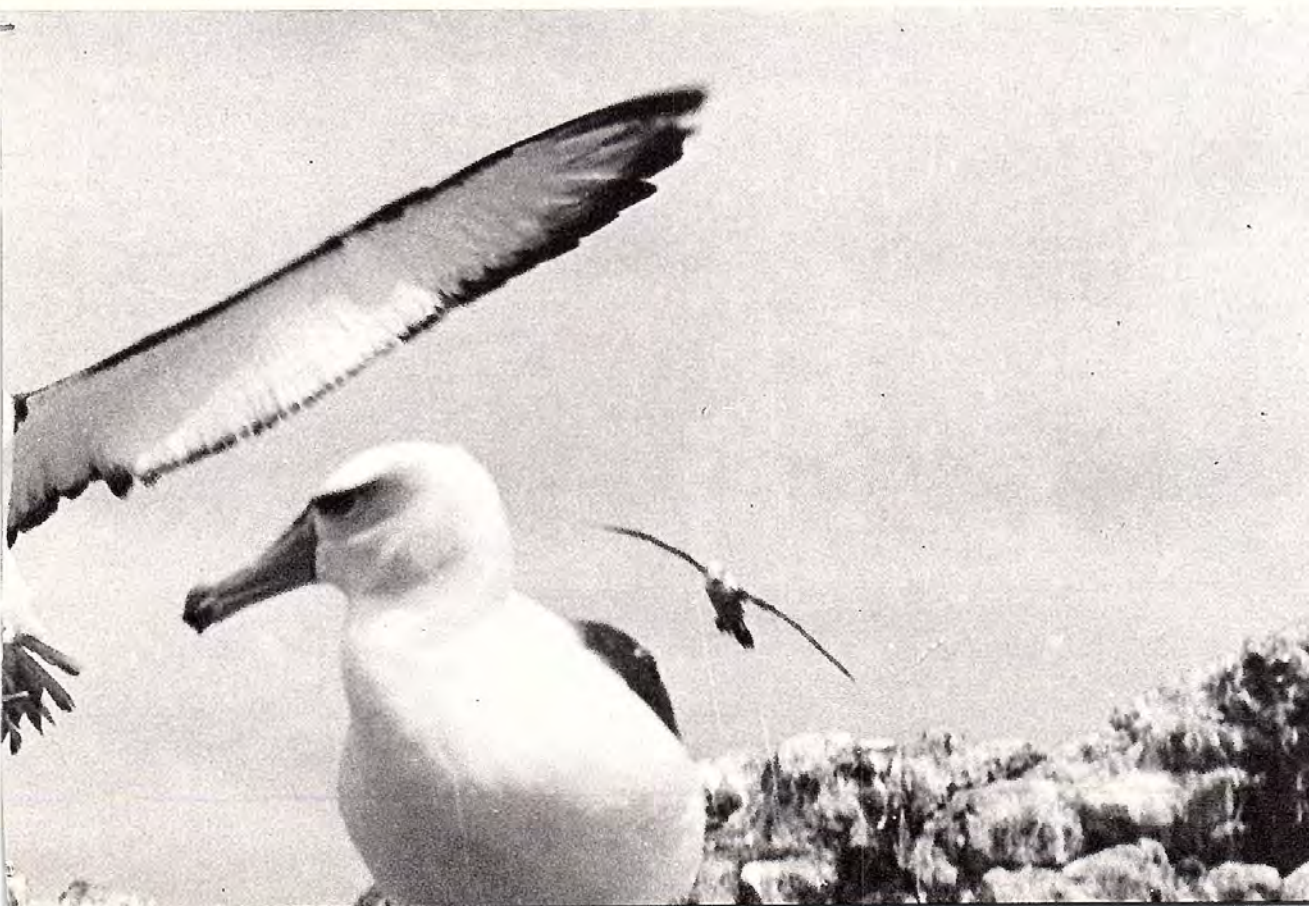


to light badly needed information on these long-winged ocean wanderers.

Attempting to land during windless conditions, an albatross veers out of control. Moments after this photo was taken the bird crash-landed, bowling over several adults and chicks scattering them in all directions and creating furor in that part of the rookery.

FURTHER READING

- Green, R.H. "Albatross Island, 1973"; *Rec. Queen Vict. Mus.* 51, 1974.
- Johnstone, G.W., D. Milledge and D.F. Dorward "The White-capped Albatross of Albatross Island: Numbers and breeding behaviour"; *Emu* 75: 1-11, 1975.
- Serventy D.L., V.N. Serventy and J. Warham *The Handbook of Australian Sea-birds*; A.H. & A.W. Reed, Sydney, 1971.
- Simpson, K.G. *Birds in Bass Strait*; A.H. & A.W. Reed, Sydney, 1972.



With wings and tail fanned and feet in position, an albatross brakes into the wind for a perfect two-point landing.



Grey-crowned
Babbler: loose
sheet A52
from the
notebooks
of John
Cotton.

JOHN COTTON'S BIRDS OF THE PORT PHILLIP DISTRICT OF NEW SOUTH WALES. 1843-1849, by Alan McEvey, Collins, Sydney & London, 1974; 127 pages, illus. limited edition, \$25.00.

This is an unusual book combining ornithological history with illustrations of Australian birds and a detailed list of birds of the Port Phillip District. As Chisholm points out in his foreword, John Cotton was the first resident Victorian compiler and illustrator of birds. His list contains species which are rare or not found in the district now, showing how habitat and bird population have changed.

Cotton's great-granddaughter Lady Casey, through her cousin Sir David M.D. Scott, now has nearly two hundred of his drawings and water colours. These drawings are very accurate as well as beautiful and it is clear that John Cotton knew the birds well in the field. Besides the main water colour of the bird there are often small drawings showing other attitudes and also sometimes specific features like the legs, feet, tongues. Beside the illustrations Cotton wrote valuable notes on colours and when the birds were in the district and, often, notes on their nesting as well.

The author gives the history of ornithological thinking in Europe at the time (Darwin and Wallace had not expounded their theory of evolution) and shows that Cotton believed in the Quinary System, but it is uncertain whether he adhered to this view after he moved to Australia.

The author discusses Cotton's failure, through his brother William in England, to get the specimens he had collected and sent over sold and, later, why his proposed book, Ornithological sketches by a Resident of Port Phillip, NSW, did not get accepted. McEvey also discusses the birds of the district as Cotton reported them and as they are now. He then gives a catalogue of the drawings with the modern scientific name and a short description of the drawings on the page of the sketch books or loose sheets. One or two errors were noticed in the catalogue. On Page 5 of Sketch Book 1, listed on Page 58 of the book, the family of the Noisy Friarbird is misprinted as Inctorial instead of Suctoria. On Page 75, Grey Shrike Thrush Took(!)bourn in pencil is given, this appears to the reviewer to read Foot brown in Cotton's handwriting on the page with the drawing. On Page 79 the bird at the nest would appear to be a Tree Martin at a hole in a tree and not a Welcome Swallow.

The catalogue is followed by a list of the collections and where they are. Next comes an annotated list of all the Australian species drawn or otherwise recorded by John Cotton—a total of 151 with a further 7 in the addenda making a total of 158. Finally the addenda lists important drawings and manuscript material found after the main book had been submitted to the publisher. This scholarly effort by the author and his meticulous care is a worthy tribute to John Cotton's own careful attention to detail. The book is exceptionally well printed and, although rather expensive for the individual

GALLERY OF AVIAN ART

ornithologist, should be in all reference libraries as it contains a wealth of information, both historical and on the birds themselves, with valuable notes.—*H.J. de S. Disney, Curator of Birds, Australian Museum.*

THE MITCHELL BEAZLEY WORLD ATLAS OF BIRDS by C.H. Fry, J.J.M. Flegg, et al., *Mitchell Beazley Publishers Limited, London, 1974; 272 pages, illus; \$30.00. Published in Australia by The Macmillan Company of Australia Pty Ltd, Melbourne.*

If at first sight this book looks like yet another of the richly illustrated 'art gallery' kind, it soon proves to be very different. It is a book with a purpose—to provide the reader with a simple, ready appreciation of the ecological basis of bird distribution and, in so doing, it presents an exciting insight into the rich diversity of habitats and bird life.

The book has an impressive list of authors, comprised of notable ornithologists and naturalists from around the world; Peter Slater has written the section on Australasia. In addition, a large battery of artists and photographers have provided over 500 full-colour portraits, 250 line drawings, 150 maps and diagrams, and 50 colour photographs.

For readers with a limited background in bird biology, the introduction (33 pages) reviews such general topics as evolution, anatomy, flight, behaviour, and migration. It continues

with short accounts of the six regions or realms into which the world's birdlife is divided—in anticipation of the main part of the book—together with a selection of endangered or extinct species from each realm. It is sobering to note that man is responsible in one way or another for the plight of over three-quarters of the species cited.

The six realms—Palaeartic, Nearctic, Neotropical, Ethiopian, Oriental, and Australasian—are treated individually and in much more detail in the main part of the text (190 pages.) For each there is an introduction, replete with climatic and vegetation maps, followed by sections on the different habitats of that realm. The latter usually comprise a brief habitat description—often with illustrative photograph—together with short accounts of four or five birds considered typical of that habitat and a map to relate the distribution of some of these birds with their habitat. Over 50 boxed topics are included in this part of the book, dealing with especially interesting aspects of individual species or groups of species. Examples are the fascinating association between woodpeckers and giant cacti, the modification of wader bills for different feeding habits, and the quite remarkable use by the sandgrouse of its breast feathers for carrying water to its young. The impact of man—usually destructive but occasionally beneficial—on the survival of birds is

Australian Ground Thrush: loose sheet A51 from the notebooks of John Cotton.





Kagu
*Rhynochetos
jubatus*
58cm

a strong theme throughout this part of the book.

The final section (40 pages) provides a classification of the bird families of the world, with added information on such aspects as their distribution, morphology, breeding, feeding, social behaviour, and habitat preferences. A species representative of each family is also illustrated. A short glossary of terms precedes an extensive index.

While the basic concept of the book is excellent, its realisation is less so. The title itself is misleading, for the book is not an atlas in the true sense but rather a highly selective presentation from the wealth of information available more importantly, and this attempt to popularise a very complex subject is not without shortcomings. It is a pity, for example, that the definition of habitats has not been related more clearly to either the classical vegetation maps in the introduction to each realm or to current national and international ecological classifications. Simplification has also made difficult the choice of species to represent particular habitats. For example, the almost ubiquitous Owlet-nightjar (pp.188-9) seems a poor choice for savanna woodland, or the Sulphur-crested Cockatoo (p.184) for coastal sclerophyll forest.

It is also a pity that the emphasis on bird diversity so evident through most of the book is not pursued as zealously in the final section on bird classification. Why, for example, illustrate the megapodes with the Mallee-fowl (p.233) when this bird is already depicted in the main text of the book (p.194) and any one of eleven other species of megapodes could have been used instead?

The book is generally well-written although, on occasion, individual styles and preferences show more clearly than the bevy of editors might lead one to expect. For example, the consid-

erable interest in systematics evident in the species accounts for the Ethiopian realm is virtually absent for the Australasian region.

The book has more than its fair share of errors. It is quite extraordinary to find north Africa excluded from the Palaeartic realm in some places (pp.28 and 100) but not others (p.29.) There are also errors in the distribution of particular vegetation types. For example, one is unlikely to find tropical rainforest either in the Palaeartic realm (p.28) or continuously along the northeast coast of Australia (p.180.) Major faults may be found even within individual habitat sections—as in the use of a rainforest photograph to illustrate “coastal sclerophyll forest” (p.184.) Finally, there is the usual sprinkling of topographical errors.

The book is profusely illustrated, so much so that the illustrations are at times too small and seem unduly cramped. The majority of birds are adequately portrayed, although with occasional errors in plumage and posture; the maps are of a consistently poor standard. The use of different shades of blue and green in the vegetation maps makes interpretation difficult, while the migration map on pages 20-21 is very unsatisfactory in both concept and presentation. The species/habitat distribution maps tend to be too small with consequent difficulties in interpretation (e.g., p.113.)

Despite its shortcomings, the book conveys to the reader in an interesting manner the diversity of bird life on Earth and the complex relationships between birds, man, and their common environment. While its recommended price may be too high for its intended readership, hopefully it will find a place on the library shelves of many schools and public lending libraries—*Walter Boles, Department of Ornithology and John Broadbent, Rainforest Survey Team, The Australian Museum.*

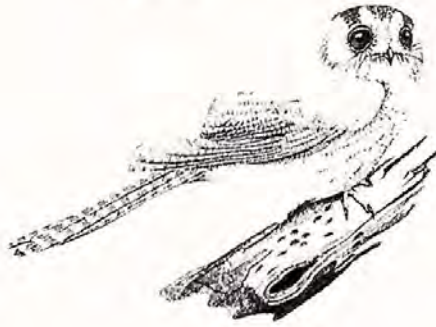


Topknot Pigeon
Lopholaimus antarcticus
43cm

Emu
Dromaius novaehollandiae
1.8m



Owlet Nightjar
Aegotheles cristatus
43 cm



Victoria Crowned Pigeon
Goura victoria
84cm

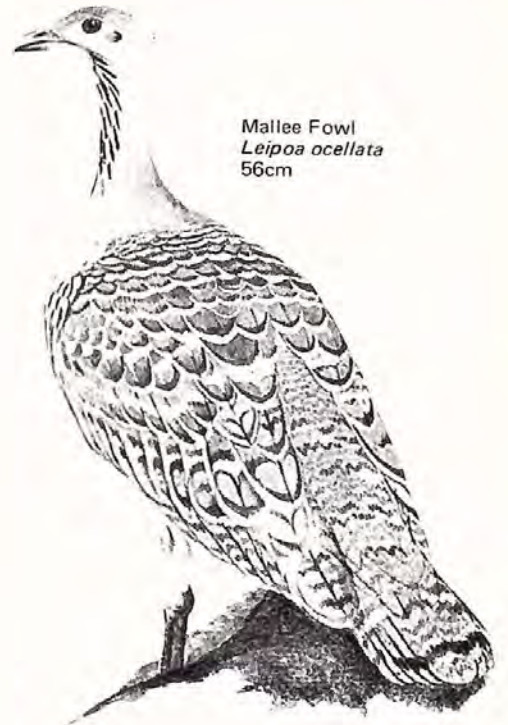


Golden-backed Honeyeater
Melithreptus laetior
15cm



Little Penguin
Eudyptula minor
41cm

Mallee Fowl
Leipoa ocellata
56cm



Black Swan
Cygnus atratus
1.4m



All the bird paintings shown here appear in colour in the books being reviewed and are reproduced in black and white with the kind permission of the publishers.

a way with people

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