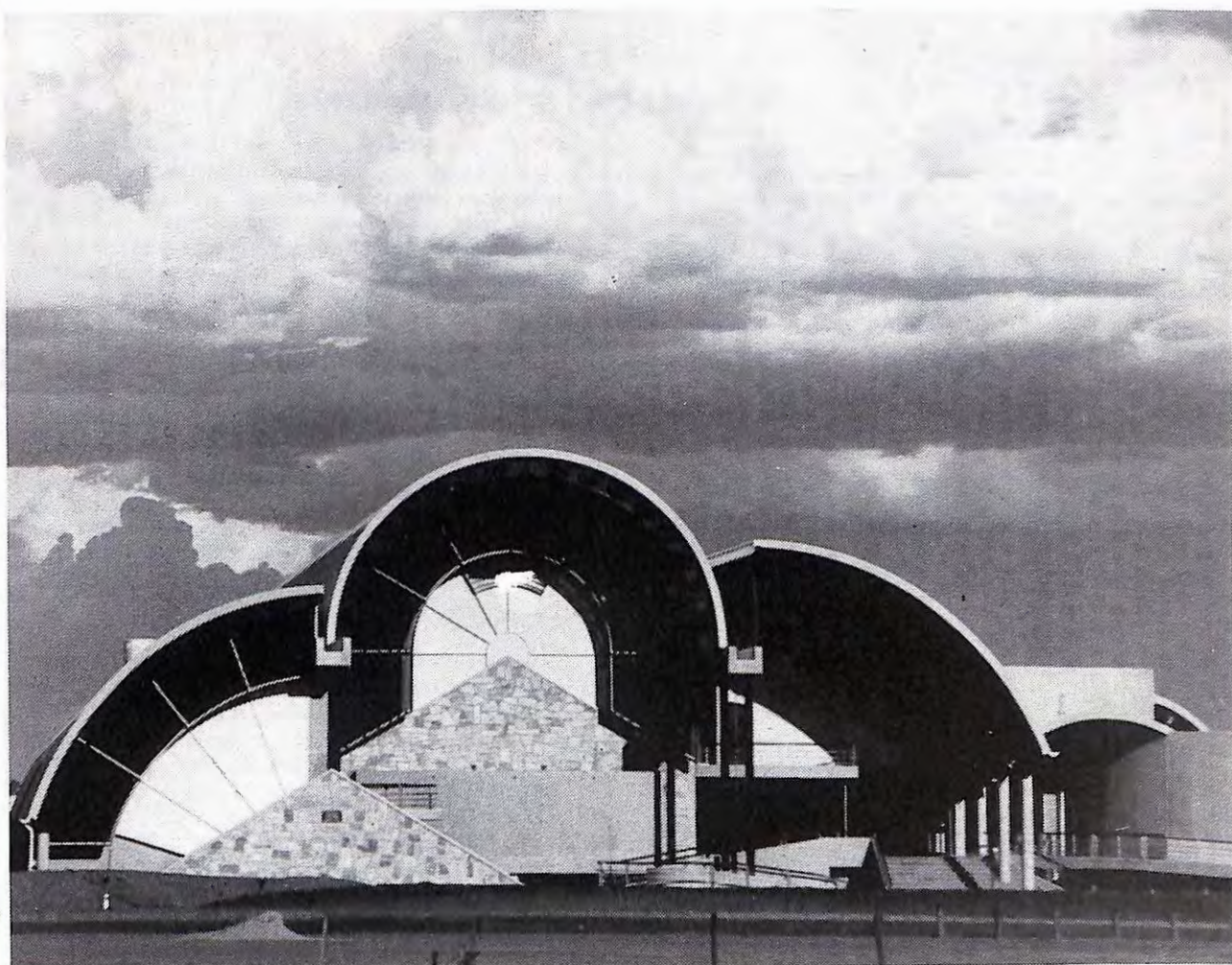


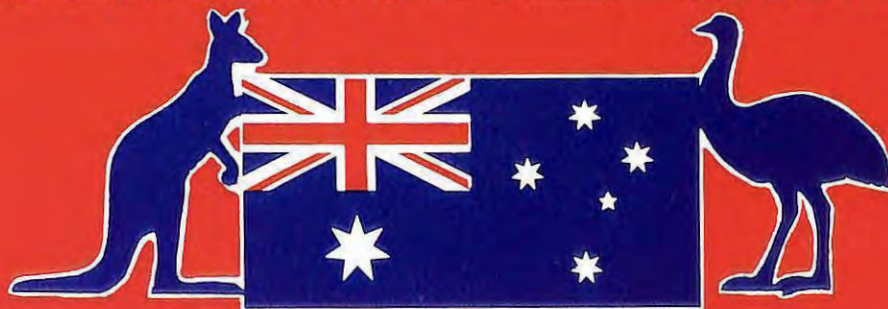
1788-1988
Bicentenary Issue No. 4



THE PIONEERS AND BUILDERS

HERITAGE

LINKING THE PAST WITH THE PRESENT — FOR THE FUTURE



FRONT COVER:
The Stockman's Hall of Fame, Longreach, Queensland.

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The Pioneers

This is the last of the four issues we have produced this year to commemorate our Bicentenary year. Whilst far from being comprehensive, each issue has covered a separate aspect of our heritage and at the same time we have endeavoured to show that all aspects of our heritage are interdependent.

The first issue covered our *Spiritual Heritage* and endeavoured to show the importance of Christianity in shaping our nation. Indeed it can be said that there is no part of our heritage that can be fully understood except in the context of Christianity.

The second and third issues covered *Government and Law* and *Culture*. Again the link with Christianity was stressed as well as the fact that these aspects are a continuation of a stream of history of which Britain is the essential part.

In this fourth issue we look at the achievements of the *Pioneers and Builders*. Their achievements are indeed remarkable for such a small population in such a large land. And yet it has become a popular pastime to denigrate many of their achievements and highlight their mistakes.

They did, of course, make mistakes, as each generation does. However, in an age with little communication, of isolation, vast distances, in a strange and often hostile environment, with often no medical or police help, their very survival is a wonder. Now, with 200 years of experience, with books, manuals and instant communication, with armies of scientists, researchers and conservationists it is very easy to look back and criticize. Perhaps we should examine the record of this generation before we denigrate theirs.

What is obvious is that in the first one hundred and fifty years, as a consequence of the harsh realities of this land, it produced an enormously tough and resourceful people. Life itself, and success depended on one's ability to adapt, improvise and endure. Little wonder that the Australian soldier, in the wars in which he has fought, has gained such a formidable reputation as an opponent.

Consider what was achieved up until the Second World War: The land that was cleared; the trees cut by axe. The countless thousands of miles of fences into the most remote areas of Australia; the posts cut, and the holes dug by hand. The railways the embankments formed by horse and scoop, and the manual labour (many of these we can't afford to maintain let alone replace). The cities and towns; with those many fine buildings that put ours to shame. The harbours, the pipe lines, the dams and the factories.

And yet so much was achieved at a time when the population was only a fraction of what we have today, and without the technology and machinery. Their task was enormous and their achievements were prodigious.

THE AUSTRALIAN HERITAGE SOCIETY

The Australian Heritage Society was launched in Melbourne on September 18th, 1971 at an Australian League of Right's Seminar. It was clear that Australia's heritage is under increasing attack from all sides; spiritual, cultural, political and constitutional. A permanent body was required to ensure that young Australians were not cut off from their true heritage and the Heritage Society assumed that role in a number of ways.

The Australian Heritage Society welcomes people of all ages to join in its programme for the regeneration of the spirit of Australia. To value the great spiritual realities that we have come to know and respect through our heritage, the virtues of patriotism, of integrity and love of truth, the pursuit of goodness and beauty, an unselfish concern for other people — to maintain a love and loyalty for those values.

Young Australians have a very real challenge before them. The Australian Heritage Society, with your support can give them the necessary lead in building a better Australia.

“Our heritage today is the fragments gleaned from past ages; the heritage of tomorrow — good or bad — will be determined by our actions today.”

SIR RAPHAEL CILENTO

First Patron of The Australian Heritage Society

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The views expressed in articles appearing in “HERITAGE” are those of their authors and are not necessarily the view of The Australian Heritage Society.

On the Purpose of Production

by Geoffrey Dobbs

The economic activities of mankind, mainly in the form of production and supply, are now manifestly damaging his environment to the danger of his own life and health and that of many other species with which he shares the planet. We are now repeatedly told that they are threatening the safety of the Earth itself as a home and habitat for living organisms. How far this last is true it is difficult to know since we are so continually subjected to crisis-propaganda as a means of scaring us into further surrender to centralised power. The recuperative and adaptive powers of living things are, in general, underestimated, but the crass scale and wastefulness of human operations are now such that the suggestion must be taken seriously.

How, then, has this come about?

In general, human economic activities may be divided into those of production, supply and consumption. Production may be defined as the application of energy to change materials into a state and form thought to be necessary, useful, or desirable for human use or consumption. The cost, in real terms, of such production is the consumption involved, i.e. the energy and materials used up in it. Supply involves the use of energy to move materials to the consumer, either for purposes of production or as final products for human consumption.

While the energy used in production was that of human muscles, derived, directly or indirectly (via wild animals) from green plants which in turn got it, by photosynthesis, from the Sun, the changes imposed on the environment were strictly local and limited. The breeding of domesticated animals, their widespread grazing and the use of their muscle-energy imposed much greater changes, the use of fire even more, but still mankind was living on the earth's energy income. It was when men started making major use of the planet's capital store of past sunlight in the form of coal and oil to fuel the Industrial Revolution that the growth in production accelerated prodigiously and began to lay waste the landscape.

But this was only the start. Now we have the Electronic Revolution with its inhuman control of automated repetitive production and potentially unlimited demand on energy. We are calling upon the immense forces released by nuclear fission (as in the A-bomb) to provide energy in the form of potentially lethal radiation, only a tiny fraction of which is used in the form of heat. This blindly places us in

the hands of a handful of experts on nuclear physics and engineering who are necessarily ignorant of the widespread, long-term consequences, of a complexity far beyond the capacity of the human brain to grasp. And within a lifetime there is the strong probability of access to the incomparably greater energy released by nuclear fusion, as in the H-bomb.

One vital question is: What do we need all this energy for? In those countries which are spending it most freely it has multiplied our wealth and comfort to a point beyond the dreams of our ancestors — Yes! even of the old, the sick and unemployed unless they are homeless — and has raised the expectations of the poor throughout the world. There is, within the bounds of sanity (and often beyond) virtually nothing we cannot do with the vast resources of science and technology which we have inherited. But we have now had clear signs that this generous earth has its limits.

LIMITS

Who is to decide where to set our own limits, the many, or the few at the top of the pyramid of power? This has been the basic matter of all politics and economics since human society began. Hitherto we have thought of it as primarily concerned with human wealth and freedom, but now we may have to think of it also in terms of human survival.

That the two — freedom and survival — are linked is a matter of instinctive knowledge and commonsense. Neither an individual nor a race or species can survive if not free to adapt to the necessities of the environment. A bound man must soon

die unless fed and tended by others who are free to do so. Every living organism survives through the operation of a property called *homeostasis* whereby action tends to be limited by reaction or negative feedback which restores the equilibrium. Without this we could not walk, or maintain our blood-heat, or, indeed live at all. The *GAI*A hypothesis of J. E. Lovelock who maintains that the Earth itself, through its living biosphere, its life-supporting surface layers of land and water and its atmosphere, possesses this homeostatic property, has obvious truth in it, provided it is not developed into an Earth-Mother cult.

Our danger lies in the exploitation of the damage caused to our environment, now reaching global dimensions, by the very centralised forces mainly responsible for it. Most of the constant propaganda of the mass-media about it carry the implication that it is the incompetent and greedy nature of common humanity which spells doom to the planet unless firmly taken in hand on a global scale by Governments, and ultimately by a World Government. True enough! human nature is far from perfect and is prone to error; but the 'small man' makes his mistakes on a small scale and can learn to correct them after small damage — otherwise the species could not have survived. But the Central Planner makes his blunders on a catastrophic scale, and if allowed to make them on a global scale could cause a global catastrophe. Power corrupts.

The 'Green' Movement in its many manifestations indeed started off as a wholesome reaction, especially the Schumacher element with its stress on 'Small is Beautiful'. But alas! as with most other movements for distributing centralised power to the people, it has taken the party-political road which aims at exploiting the crisis to seek centralised power, first on a national, and ultimately on a global scale — a reversal of its original aims. The idea that the expert in ecology is fit to plan the planet is a conceit which betrays only ignorance of the limitations of the subject and of the human brain.

That people are social beings and

gather into communities, in which any organised project requires centralised planning and leadership is a part of their nature. It is when this happens on a *scale* in which people cease to be persons and become tools, that both their freedom and their survival is threatened. Remote centralised direction which can treat people only as units necessarily ignores their living properties as it must those of all other forms of life and their associations. Far from being homeostatic it is the reverse. It gives rise to *positive feedback*, striving to suppress any reaction against it which might restore equilibrium thus increasing unbalance until the reaction may be catastrophic. Thus, for instance, debt, and bureaucracy, lead to more debt and bureaucracy. In human political affairs 'democracy' stands or falls by the extent to which it permits homeostasis to operate. Despotism seeks always to impose changes that shall be irreversible. 'Reactionary' has become a term of abuse.

CENTRALISED CONTROL

Wherever we see a major human catastrophe, there we almost always find centralised control of humanity either as the main cause, or where it is due to natural causes, very often grossly accentuated by such centralisation. The Libyan Desert was very largely made by the great slave-worked *latifundia* which 'mined' the soil to feed the Roman mob with bread, while the circuses fed their appetite for blood and sensation. The Dust Bowl of the American Middle West was created, not by normal farming methods, but by desperate attempts to grow enough grain to pay the farmers' debts to financial institutions. In India and other hot countries famines occur when the rains fail, but normally by tradition and long experience some food is stored against such emergencies. This is impossible when the peasant is chronically in debt to the money-lender. The disastrous famines in Ethiopia and the Sudan of 1983-84 were due not only to the drought but to civil war in both countries and a Communist military dictatorship in Ethiopia. The terrible floods in Bangladesh are largely due to the gross felling of the forests in the Himalayan foothills. In Brazil (and many other countries) the irreplaceable tropical forest is being destroyed to ranch cattle and get minerals for export to pay the interest on the enormous foreign debt; and so on, all over the world.

When we turn to the 'advanced' countries in which the latest technology is being continually



installed, what we find is the most appalling waste and squandering of energy, of materials, and of human potential. We are so accustomed to this as 'normal' that we cannot grasp its magnitude. Obvious scandals of waste and pollution are but the smallest tip of a monstrous iceberg. What on earth are all those millions of people doing, spending their working lives commuting for hours and miles daily to sit in cells in heated, or air conditioned concrete towers, talking, marking and circulating miles and miles of paper prepared from the pulping of millions of trees? What are they producing?

What is it all *for*?

MONEY AND EMPLOYMENT

Most of it is concerned entirely with *money* and with *employment* as a means of obtaining it. Money used to consist of gold, silver and bronze coins, stamped as a guarantee of their intrinsic value. Now coins are mere tokens, used for petty cash. Money itself has no physical existence, but there is still a hang-over of belief in its reality from the days when it was not created by a book-entry, as a 'credit' (i.e. a debt) to be recovered from others by fair means or foul for repayment with interest. To most of us it is an essential system of numerical

"The computer, which has the potential of liberating men for more human and creative work, is, under the control of money, being used to replace human intelligence, attention, care, thoughtfulness for others, skill, talent, commonsense, and all other human qualities, which are consequently degenerating through lack of use."

accountancy, symbolised in a variety of ways: coins, banknotes, ink-figures on paper, or something electronic in a computer memory.

So long as it is strictly related to something real, accountancy has a very genuine function. It plays a necessary part both in production and consumption: that of *enabling* us to plan ahead and proceed with the necessary knowledge of the resources available, and to keep a regular record of their state.

But loan-credit money is unrelated to anything but itself, while it controls the purpose and direction for which real resources, including men and women, are used. Financiers seldom know anything about real production. They give loans on an estimate of the probable return in *money* — and as a result, our whole economy, our lives, our culture and civilisation, are now controlled by this notional loan-credit (or debt-with-usury) which alone gives

access to our staggering increase in productive capacity, but which itself is entirely unreal and subject to no natural limit.

There is a bitter irony in the fact that, as men are replaced from routine productive labour by mechanical and electronic devices using non-human energy, so their lives are being more and more controlled by money-debt, money-penury due to release from machine-labour, or money-compulsion into essentially useless, witless, or even harmful wage-earning. Much of this work is either wholly concerned with money itself alone, or with 'salesmanship' and advertising — the use of verbal, visual or other psychological means of extracting money from people, often by the use of confidence tricks ('free' gifts, 'magic' numbers, lotteries) quite unrelated to the products or services offered.

Moralists nowadays tend to condemn 'The Consumer Society'; but in fact consumption is increasingly 'supply-led' by fewer and fewer national, or multi-national, financial corporations or groups, controlling more and more of the actually productive concerns in the interests of money alone, either as profits, or as 'pay' for money-getting employment. It should rather be called 'The Producer-for-Money Society'. Here again, our debt-economy has twisted two good and useful things: profit and wages, into bad ones, because unreal, ends-in-

themselves. *Real* gain or profit is surely the only purpose for doing anything. It consists in doing it right for its purpose, which in commerce will bring a gain to the purchaser by supplying *his* wants (not the supplier's) with a *consequent* monetary return for the supplier and producer as a measure of their success in doing so. But where money is the main objective the product becomes anything that can be forced, by monopoly or 'salesmanship', upon the consumer.

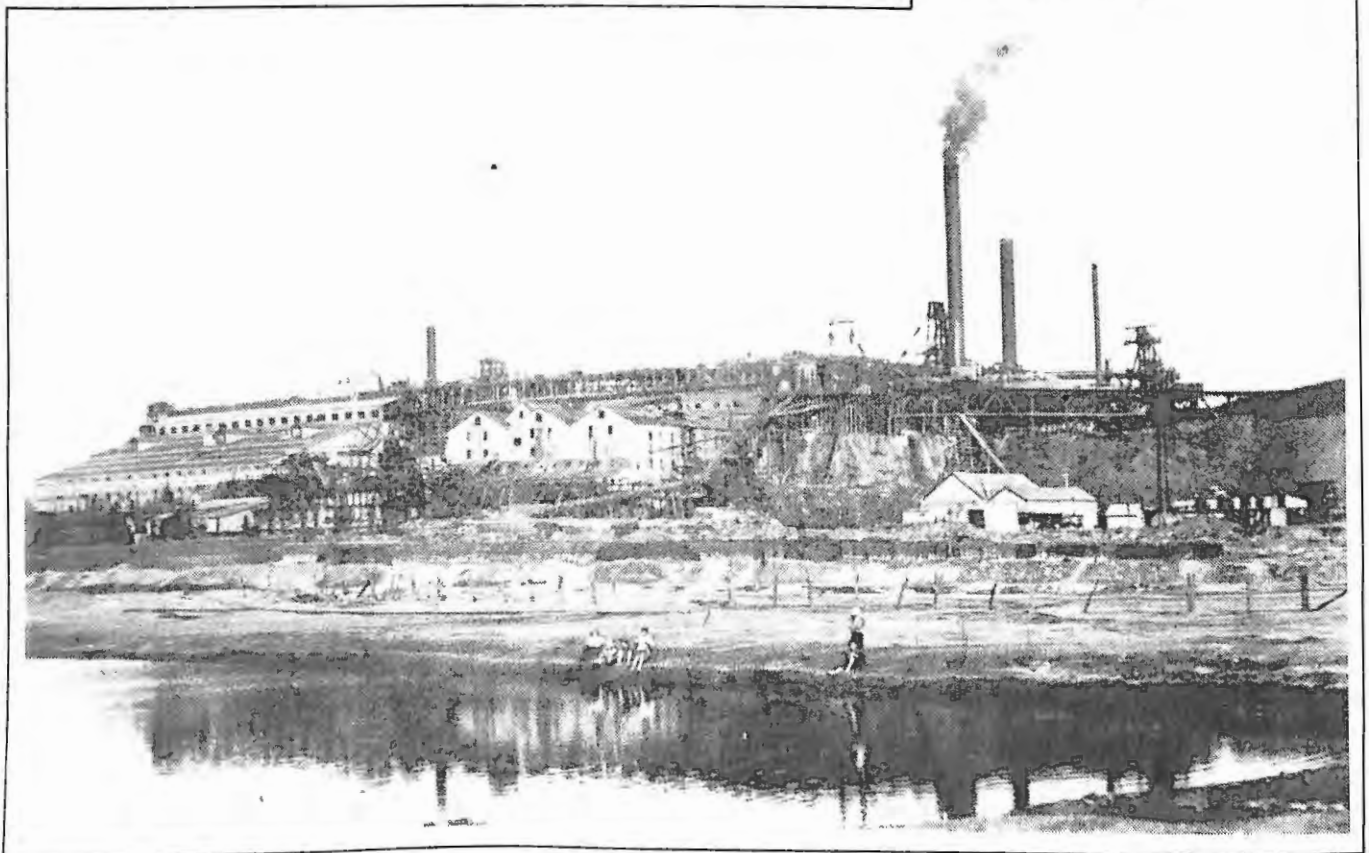
WAGES

Wages are the main form of monetary gain or profit which most people have to seek. A worker is worthy of his pay if he is helping to supply a real need or want, but if the work has to be undertaken solely for the wage he pays a deadly penalty in boredom and resentment and in fact becomes a slave for money. This applies even more to the innumerable women, driven from the potentially varied, skilful and loving work of the home and family into idle, boring, though tiring jobs as machine-minders or operators, or even, like a check-point operator in a supermarket, a mere extension of the cash-register. How comes it that, whereas fifty years ago a family needed one wage-earner, now it needs two, while our productive capacity has multiplied out of all reckoning?

The computer, which has the potential of liberating men for more human and creative work, is, under the control of money, being used to replace human intelligence, attention, care, thoughtfulness for others, skill, talent, commonsense, and all other human qualities, which are consequently degenerating through lack of use. Every one of us can give innumerable examples of the witlessness encountered in dealing with large institutions. Even with those occupations and their products which are traditionally good, useful and beneficial to mankind, the saving of money by dispensing with human skill and attention has meant adapting the product to the machine rather than the consumer, whose values also are progressively corrupted in the name of money-cheapness. Hence this age of throw away products, of shoddy substitutes, of industrial pollution and agri-business with monocrop deserts to feed the surplus grain-mountain, and so on.

While money-getting remains the chief object of production or 'work' of any sort, the main energies of man-

"It was when men started making major use of the planet's capital store of past sunlight in the form of coal and oil to fuel the Industrial Revolution that the growth in production accelerated prodigiously and began to lay waste the landscape."



and-woman-kind must be kept 'employed' spending energy and materials at the behest of their paymasters for the purpose of providing money-wages to purchase a livelihood and money-profits for the money-industry — and so long must endless 'economic growth' be mandatory, regardless of the limits of the planet's capacity.

No-one has ever tried to estimate what proportion of the working lives of the population is spent to any useful purpose, considered in terms of the benefit to actual human beings as distinct from the 'necessities' dictated by money, which must surely amount to much more than half our 'economic activities'. For this requires an answer to the question: What is the purpose of work or production? Which in turn depends upon the answer to another question: What is the purpose or end of Man on this planet? And that can be answered only by religion.

CHRISTIAN ANSWER

The Christian answer to that is given in the two inseparable commandments we have been given; to love God, and our neighbour as ourselves. Work therefore must be done to the glory of God and the satisfaction of our neighbour as well as of ourselves. And who is to judge the satisfaction of our neighbour? Surely he must himself. Who are we to decide that for him? So our job as workers and producers is to *serve* the consumer, not to foist our products or services upon him to get money. In doing so we shall also receive satisfaction in our work as well as a monetary return which will be a measure of the service we have given him. But seek first the Kingdom — and all the rest, including an unplundered planet, will follow!

So long as the Earth is plundered to meet the requirements of a World Debt System we are heading for disaster, but the idea that humanity cannot adapt itself, as it always has, to the resources available, if allowed to do so, is contrary to reason, though it will take us some time to recover from the 'grab-now-pay-later' attitude engendered by debt-living. But that would require the decentralisation of money-power so that the consumer and not the supplier dictates the product. It is not merely the obvious waste that could be saved, but the vast volume of wasteful work, now seeming to be necessary, which has been made so by the money interest: the innumerable journeys, vehicles, buildings, printings, illnesses, drugs, police, exports, armaments etc. — the

reader may like to try to estimate for himself how much could be saved for real economic effort if 'pay' were not the chief motivator of human work.

How then can this decentralisation of money-power to the consumer be effected? There is no insuperable difficulty about it since money is now an entirely notional thing and being based upon faith can be changed — but only when the faith is changed. There is no difficulty in devising means whereby the power of money can be decentralised to the many so that all may have access to the abundant means of living without debt or money-forced employment in destructive and wasteful production which threatens the soul as well as the environment.

The proposals for debt cancellation by means of a precisely calculated price discount and social dividend financed by a debt-free credit, put forward by the late C. H. Douglas, were well known more than half a century ago, especially in Australia. They are, of course, totally unacceptable to all who control or are dependent on the debt-monopoly and to the whole economics of debt, and Douglas is on record as advising that society must first defeat the money-power before the money system can be changed. Many people seem to think that this means we now have to attack and defeat bankers, financiers, economists and the like. But how can we do this when the money-power reigns in our own minds? It is *there* that the power of money has first to be defeated.

THE TASK AHEAD

All this has happened before when the Roman civilisation collapsed, as ours is now collapsing, under the weight of debt, bureaucracy and power-politics; and the Church, especially in the monasteries, discovered the sacrament of work,

from which arose, in due course, the civilisation of Christendom with its mighty cultural inheritance which is now being squandered. But the pace is now more frantic owing to the monstrous centralisation of power provided by the money-control of modern technology, especially the mass-media with their *positive feedback* tending constantly to suppress the homeostatic balance of our behaviour towards the Creation.

We need not fear for our planet; it is ourselves who could prove unfit to live in it in our world of monetary make-belief. It is now the task (the *opus Dei*) mainly of the young to break out of this Never-Never Land into the plenteous but finite real world that God made. It may well take them a generation or two and will demand all their dedication and faith, but who could ask for a greater adventure?

H

Dr. Geoffrey Dobbs is a scholar of broad interests. He was at one time Lecturer in Botany at King's College, Cambridge and later Senior Lecturer in Forest Botany at the University College of North Wales, Bangor. He is now retired.

LET'S KEEP
THEM!



OUR FLAG

OUR HERITAGE

OUR FREEDOM

Back to normal in 1989

This issue completes our Bicentenary series and as from our next issue (March-May 1989) we will be back to normal.

We will retain our new enlarged format; however, each issue will have the normal range of articles. We will also have our letters column running again; please let us have your views, comments and stories.

We have had many letters of encouragement on our issues this year, many more than we have been able to reply to: our sincere thanks.

The Bicentenary ...

The Environment Then and Now

by Harry Butler, C.B.E.

Two hundred years ago 11 sailing ships, called "The First Fleet" made a landfall in Sydney Cove after eight months at sea and this year we are celebrating the Bicentenary of the first European settlement of Australia. (We prefer not to consider the French settlements in Western Australia and Tasmania).

Purists will recognise I'm wrong because Australia didn't begin until Federation of the individual States which was 1901 so, in fact, we are only 87 years old as a nation.

However, other purists will also argue that the history of this continent is at least 700 million years old. During that time the shape and the face have changed, and the animals and plants of this southern land mass which we call Australia evolved to suit the changing conditions. Man was not here and Australia was the Garden of Eden without Adam or Eve.

Less than 100 thousand years ago (probably only 60 thousand years ago), — a split second in terms of geological time — a temporary land bridge was formed between South-East Asia and Australia and animals and plants from both sides of the bridge crossed. Australian species moved into South-East Asia while South-East Asian species invaded the new area south.

These first men spread across the new land to occupy all parts of it; there was no opposition from their own kind and very few ferocious forms of life. It was not a hostile country.

For 60,000 years the land adapted to the presence of these invaders with their firesticks and environmental disruptions, but that history is something you can read about elsewhere. I include it only to indicate that the history of this country is ancient. But our personal history of what we call Australia began only 200 years ago.

You may wonder when I am going to get to the environment. This is the problem that I have with many people who do not recognise that environment includes *all* parts of the surround of man, that is the *natural environment* which is plants and animals and their inter-relationships, the *physical environment* which is water, soil and air and the forms that it takes and the *social environment* which is man and

his works both ancient and modern.

When the first pioneers investigated the newly discovered continent of Australia, prominent among their ranks were biologists, zoologists, botanists and gentlemen naturalists. The immense European interest expressed in the new land manifest itself in shell, plant and other natural history specimen collections. Even today, this type of approach is in some cases still the only fundamental science that has been carried out over much of Australia. The gentlemen naturalists and scientists were prominent among the early settlers but even more prominent and influential were the landusers who proliferated across the empty landscape, which offered little natural barrier except the deserts. These people yearned for the green hills of home, the old country. The stark and subtle landscapes of Australia were alien to them. To make themselves more comfortable, they imported the agricultural techniques and plants and animals that were familiar; wheat, barley, oats, cattle, pigs, poultry, sheep and horses.

NEW SPECIES

They also introduced less functional species to increase the homey atmosphere: rabbits, foxes, blackberries, thistles, and inadvertently

introduced many others, mice, double-gees and a whole range of weeds and pests which were never really intended to be brought into the Australian system. Quarantine for the colonies was in existence even then.

However, they got here. Many species ran wild and today in many parts of arable Australia they have almost exclusively replaced the native faunas. Look around in any farming area at our Europeanised agricultural systems growing European plants while European animals have replaced the native Australian animals. This replacement of original ecosystem has been extremely successful over most of its area of introduction.

The effects of these invasions are multiple. *First*, there is direct competition of the introduced species of animals for particular food resources and water resources. This includes such things as competition for nesting home sites and living space. *Second*, the availability of introduced plant and animal species as food sources favours certain native species and the natural balance of existing ecosystems is further upset.

Third, in the arid zones which occupied the largest part of this continent, cyclic dynamic build ups by invading species such as mice and rabbits following good seasons put enormous pressure on survival resources during bad seasons.

Populations instead of stabilising, reached enormous heights during upswings and then collapsed completely. Because this phenomenon took place in the arid areas the fast breeding exotics outstripped the viability of the native forms. The natives were better adapted to the desert but were out-classed by the faster breeding successful interlopers.

Fourth, the man-use philosophy which dominated the thinking of our pioneers caused unsuitable animals and agricultural practices to be introduced

to desert country. This included agricultural development, fire in the country to promote regrowth and stocking with hard footed animals, all of which further added to the collapse of the natural ecosystems.

Since environment is the sum of its ecosystems, collapse, or change of any ecosystem components means an equal if not increased change in the total environment.

ENVIRONMENTAL EQUILIBRIUM

One hundred and sixty years ago explorers travelling in the Wheatbelt of Western Australia recorded vegetation, arable land, and a plethora of small wildlife such as rat kangaroos and bandicoots. This was because the Aborigines of the time harvested the entire crop of wildlife in such a way as to maintain an environmental equilibrium. Their slow moving life styles were based on stability and the maintenance of existing systems as this was the basis of their religious being. Their creed was simply that as it was in the beginning so it was ordained. To attempt to change this was a greater crime than our crimes of heresy or blasphemy. An Aboriginal individual who stepped outside their land management system in fact died because individual survival was only possible by conforming within their total system.

Let me make it clear that the pre-European Aborigine was in environmental terms no different to any other of the natural wildlife of this continent being an inherent part of it. And, like the other natural wildlife of this continent, where necessary they were driven out or removed efficiently by the newcomers for the best of reasons. At the same time as the snake, the kangaroo, the eagle and anything else which might challenge our newcomers claim to this domain was also removed.

Today, 200 years later, we are the inheritors. Our Australian heritage is a continent which has been changed and modified to its furthest corners. The only places which indicate what we have lost are a few islands which were not attractive enough to warrant development.

The best of these in Western Australia is Barrow Island which presents a relatively unaltered profile with a tremendously rich assemblage of wildlife in balance with itself. The only exotics on Barrow Island are the oilfield workforce, but because understanding of environmental balance existed at the time this development was made possible, those



human species are rigidly controlled and in the quarter of century of occupation independent surveys carried out by government and private individuals have revealed no changes which are not within the normal dynamic framework of change in any arid land ecosystems.

Our changed environment ranges from that which is absolutely changed such as a dam or a highway, or a farm, to those which are hopefully called wilderness in the reserve system.

We still have a way of looking at things which relates to whether the thing is pretty or not. Thus it is very easy to find support for kangaroos or whales, or rainforests, not so easy to find support for bush flies, which are an irritating pest. Nobody likes a bush fly, but its ecological role (for instance, in pollination) is largely unknown and while massive campaigns to eradicate the bush fly continue, we really do not understand what such an effective campaign may achieve.

Exotic species of animals and plants are only one aspect of the changed environment in the last two hundred years. Readers with specialised knowledge would be aware that one hundred and fifty years ago the climate was different, the vegetation was different, and the animals were different. There are even those who say that people were different. I don't believe that because people and human nature remain reasonably constant.

WILDERNESS

Look at the so-called wilderness areas of Australia. To the purist,

"It has become fashionable to look at any area with any sort of original flora as potential wilderness."

wilderness is an area which has none of modern man's effects visible. By this definition there is no wilderness in Australia, so we move back to a position which says that wilderness is that which has minimal man effects. It has become fashionable to look at any area with any sort of original flora as potential wilderness. There is great value in this as the greater the diversity of environment the greater number of species may be contained. Original species are more likely to persist in relatively untouched areas.

Wilderness is currently fashionable and the people who use wilderness wish to see it preserved. Perhaps they are biased because of their vested interests in preserving that wilderness. Who are the users of wilderness? Conservationists, bush walkers, zoologists and scientists, sporting goods manufacturers and camping gear manufacturers and retail stores, television program makers, as well as those people whose interest is ethical or spiritual rather than physical or economical.

The underlying rationale of conservation is to preserve pristine Australian areas, be they animals, plants or land forms. But that underlying rationale usually falls down because each would-be preserver seems to have a different reason and their reasons are not always acceptable to other possible preservers. Let me give

you an illustration: farmers would support the preservation of honeybees and earthworms because these are good animals for agriculture, but environmentalists know that in the wilderness they are not good animals because they interfere with natural balances. On the other hand kangaroos and snakes are bad animals on the farm but in the natural environment they have a place and a purpose and so should be preserved.

THE NEXT 200 YEARS

I suppose our real concern is for the next 200 years rather than history. As public awareness develops, politicians respond; as politicians respond bureaucrats slowly act, and legislation compelling environmental respect is put into place. Such compelling mandates often create a negative backlash and already in some parts of the world which have been down the "preservation-of-the-environment" track, people are wondering which should come first, the world supporting mankind now and in the future, or, the world supporting other life forms in preference to man.

Affluent people can afford environmental preservation but hungry or poor people are concerned with survival. I believe the sorts of question that separate conservation from development should never be asked. To me, conservation and development are the two sides of the coin of human life.

To me, conservation and development are the two sides of the coin of human life.

There are extremists who say that all wildlife should be preserved because the next generation deserves it. To this end they would prevent any further development of any resources whether that development entailed agriculture, mining, timber cutting, or fishing. It's a totally successful emotive argument because nobody would argue against conservation. But if you use the counter-emotive argument that asks "should not our children have the right to a standard of living and quality of life as good as if not better than that which we have?" Again we would say that is so. Now, given the choice between saving wildlife and saving children, obviously you would choose the children because that is the nature, not only of man, but of life itself.

When we came to this country 200



"Our first settlers, the Australian Aborigines, lived in relative harmony with the land..."

years ago, we came to a country that was undeveloped, supporting less than one million people, who had lived for at least 40,000 years with only slow, gradual modification of the environment that supported them. In 200 years we changed all of that. Our people do not only consist of the 12 nationalities of the First Fleet, they have expanded in many ways. The post-war displaced people were the latest addition, predominantly British colonists with the First Fleet were the second, while the Aboriginal people were the first.

Each group has contributed to what today we call the Australian Heritage and this Bicentenary Year really celebrates the recognition and pride we have in the different backgrounds and cultures that live in unity in this political entity of Australia. Our special way of life exists because of those whose work has built this nation into what it is today. However, it includes those who are building it for tomorrow, and, perhaps as importantly, those who will inherit tomorrow and continue with it in the future.

As Australians we have much to be thankful for. As a nation we have a short history, but when we examine the history of our separate ethnic peoples we have direct links back to the earliest records of mankind. Our first settlers, the Australian Aborigines, lived in relative harmony with the land but they left no written record and modern Australians have yet to fully understand the depth of their relationship with land. Most of our modern heritage is derived from the

second and third waves of settlers, who have created a quarry and a granary for the world and a way of life and a standard of living which is as good as any to be found on spaceship Earth.

It is my personal belief that the *standard of living* depends on the developments and modifications that we have made to the original environment of Australia. The *quality of life* depends on the preservation and maintenance of the original ecosystems and the original Australian environment.

Each one of us would have difficulty in enjoying life without those intangible aspects that separate man from the beast. A sense of wonder and curiosity; an awareness of beauty and appreciation of aesthetics; a feel for harmony and music, an understanding of honour and ethics, and a need for solitude at times. These things are not possible in the rat-race of human enterprise in the cities so we seek to find ourselves in quiet reaches of the outback and farmlands of Australia.

I do not share the current Australian guilt which says we should be ashamed of what we have done in our two hundred years even as I recognise some of the great wrongs we have historically demonstrated.

I started out to consider the environment, then and now. The natural environment has changed dramatically. Our animals and plants are derived from all over the world and our ecosystems are adapted by us to suit our needs and wants.

The physical environment has changed significantly; we have moved mountains to extract their ores, to build dams and roads, and cities and houses. We have utilised the physical resources of land and water to our own ends.

The social environment has changed; from the simple hunter and gatherer society of the Aboriginal people with its emphasis on continuity of the group rather than individual freedoms to today's emphasis on individual freedom with a resultant collapse of the basic family. All these changes have been with the best of intentions at the time. Today we look at their collective results with some concern, especially about the sustainability of some productivity and the long term damage to some ecosystems.

Modern Australians have recognised

Continues on page 19

Engineers, Engineering and their contributions to Australia

by D. A. Cumming

The last ten years have seen a rise in concern over, and in many cases excessive reaction to, potential dangers of pollution and environmental degradation. Also, misled by primordial memories of 'dark satanic mills', and by visions of primitive shepherds grazing their sheep on pristine hillsides and of happy and noble savages, there has been an increasing suspicion of new developments particularly in technology. Technocrat is to many, a term of contempt. This has created a significant danger of Australia becoming a Banana Republic, and of recklessly destroying its standard of living, which has been extremely high by world standards almost throughout the last two hundred years.

The quality of civilisation has always been related to the standard of living. The philosophies, art, literature and general culture of primitive societies, whether based on hunting or on husbandry, have always been as primitive as their technologies. Since his creation, Homo Sapiens the person of art, of laughter, and of religion, has also been a user of tools and a builder of structures, tasks which are the proper activities of Engineers.

Countries and Cultures do not exist without Heritage. Its conservation and transmission to succeeding generations is vitally important, for a group of people without a heritage will find it impossible to understand what they possess, and probably even more difficult to make decisions as to the directions in which they wish to proceed.

Modern Australia was created by the arrival of European Settlers, in a process which began two hundred years ago. They over-ran an Aboriginal culture which was certainly old, but which had become very specialised to deal with the environment in which it became established. It had survived because distance and inaccessibility had protected it from the forces of history which had transformed other continents. In Asia, Africa and Europe, many cultures had risen and then decayed under the impact of barbarian invasions.

Some can contemplate reverting to a primitive state of hunter gatherer, but most observers of history realise that the rest of the world will not

readily abandon the food and other resources which Australia possesses or can be made to yield. Others will almost certainly intervene to maintain their interests. Australia has to decide whether it will maintain its links with the outside world voluntarily, or will it wait until it is compelled?

It is almost impossible to reverse history. Paleontologists have shown that more species have become extinct during the course of evolution, than currently exist. History records the rise and fall of civilisations, and nobody knows how or where Neanderthal Man finally died. The north of Africa used to be the granary of Rome, yet it became devastated by invasion and by changes of climate. Many primitive tribes in Asia and in Africa, have been forced into the marginal lands by cleverer and more adaptable invaders whose skins were seldom white.

TECHNOLOGICAL INHERITANCE

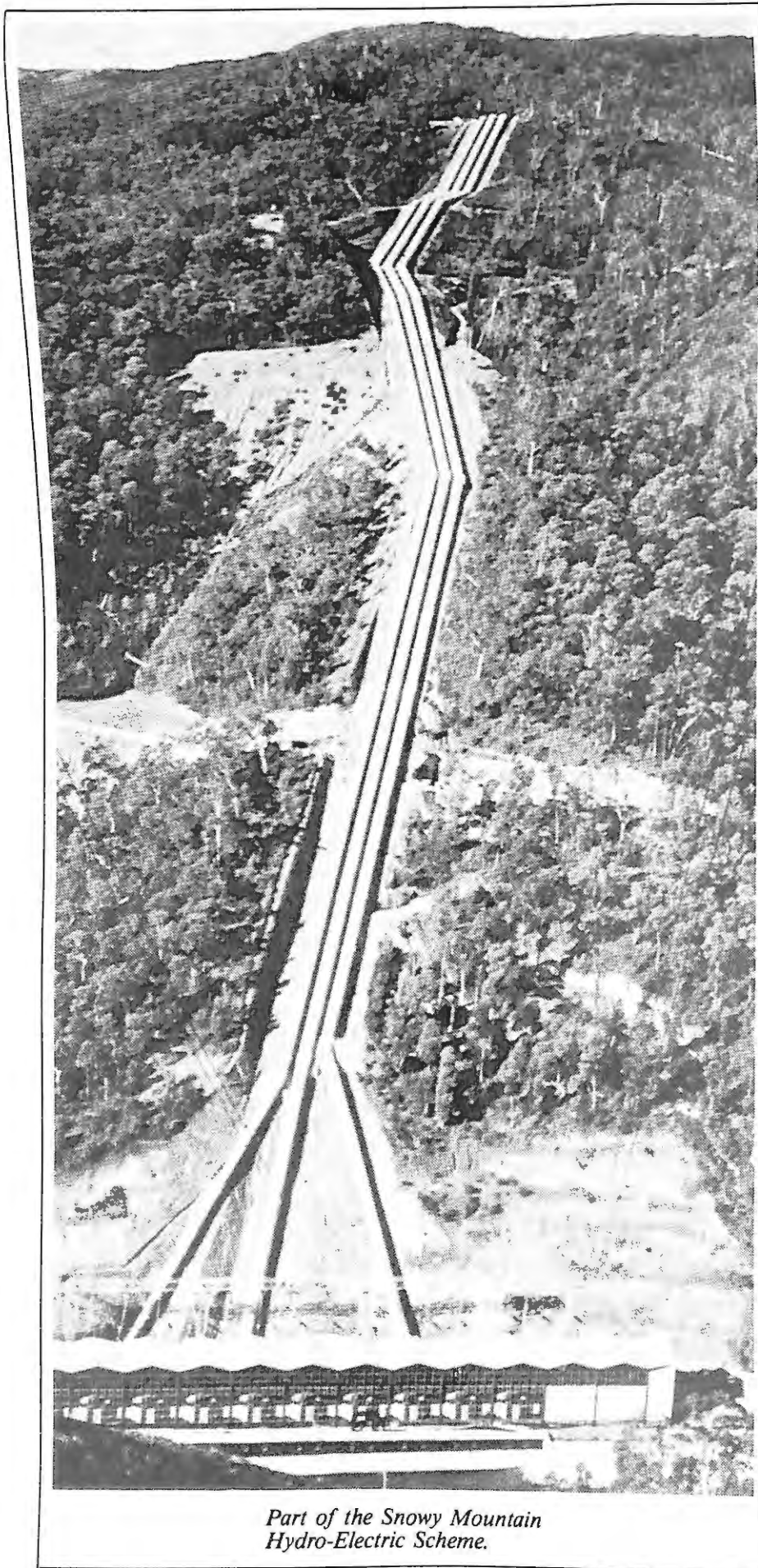
When Europeans first arrived in Australia, technological development was already well advanced. Newcomen designed and built his steam engine in 1712. Canals were already well developed as a means of providing an efficient and comfortable means of communication, as well as for draining lands and for providing water for power and for irrigation. Windmills and horse-powered works were familiar industrial establishments. A. Darby had found a means of smelting iron

with coal, which by reducing the need for charcoal had limited the destruction of the forests of England and indeed of Europe and of America. Iron had replaced brass for making cannon and machined components. The British Society for the Encouragement of Arts and Manufactures was founded in 1754, to take over the work of the Royal Society. This had itself been established eighty years earlier, but had become increasingly concerned with knowledge for its own sake and was ignoring practical use, a phenomenon, which is unfortunately being replicated in Australia currently.

John Smeaton, one of the first Great Engineers, who constructed the third Eddystone Lighthouse, the first two having been destroyed by storm and by fire, also built canals, carried out drainage works, designed water-wheels, and doubled the efficiency of the current designs of steam engines.



Sir George Julius, the first Chairman of C.S.I.R. (later C.S.I.R.O). He developed an automatic machine for recording and tallying votes in 1914.



*Part of the Snowy Mountain
Hydro-Electric Scheme.*

He founded his Society of Civil Engineers in 1776, to encourage the meeting and exchange of experiences among professional men, particularly among those who were required to give evidence to Parliament on the cost and efficiency of their schemes, so that their value in meeting the needs of the community could be assessed. This process has been inherited by Australia and is still a feature of modern political life.

In the century before Captain Cook visited the eastern coast of Australia, J. Harrison developed and began making his chronometers, specifically to enable longitude to be measured with reasonable precision. This facilitated the construction of accurate charts, and also greatly improved the reliability of navigation and the safety of shipping. The only recent development of comparable significance, has been the introduction of inertial and satellite navigational aids.

John Kay patented his flying shuttle in 1737, L. Paul opened his cotton mill in Birmingham in 1741, and Sir Richard Arkwright developed his water powered frame in 1769. These inventions revolutionised the spinning and weaving of wool and cotton. They also transformed a home-based industry with a small output of high priced goods, into a factory based industry with a high output of low priced goods of a quality better than all but the best of the previous products. The first iron bridge, with components manufactured in Darby's foundry at Coalbrookdale, was erected at a locality now known as Ironbridge Gorge.

FIRST TWENTY YEARS

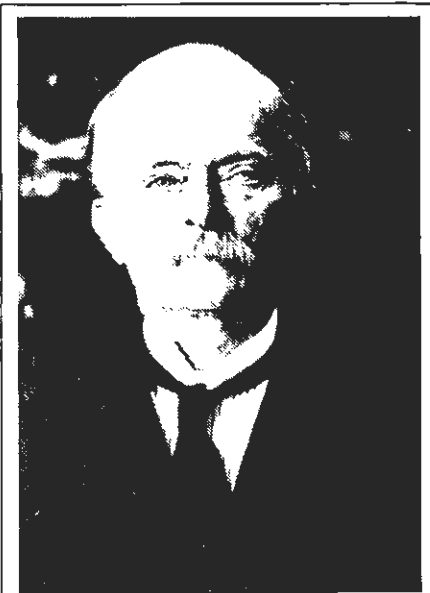
The first twenty years of British settlement in Australia, saw the first steam boat, and also the establishment of the Ordnance Survey to make maps of Great Britain and later of its colonies, for both civilian and military purposes. Roman cement which was stronger and more durable than the earlier hydraulic limes and pozzolanic mortars, was developed just before the year 1800. About the same time, the construction of wet docks began. With their water level controlled by locks, these enabled the more efficient loading and unloading of cargo, and greatly reduced losses by pilfering.

The first effective railways were the Surrey Iron opened in 1802 with horse power, and the Stockton and Darlington opened in 1825 with steam locomotives primarily to carry coal from the mines to the ports. They were followed by the Liverpool and Manchester Railway, opened in 1830 to

carry both passengers and goods between the two cities. This was the first of the modern railways, which have since enabled the development of much land in Australia.

Britain had rivals in many fields of engineering. Marshes had been drained in France and in Italy, and especially in Holland. France had constructed an extensive series of canals to permit the movement of goods from East to West and from North to South. Sweden was the primary producer of good quality iron. Bruges in Belgium was synonymous with lace and Italy with silk, but both were scarce and expensive hand made products.

That colonists were able to move across the world and establish themselves on distant shores, was a tribute to their technology. The early settlers required a safe harbour for loading and unloading ships, a water supply for themselves and their stock, and some reasonable land for their agriculture. Governor King moved the site of the first settlement from Botany Bay to Sydney Cove to remedy the lack of the last two features.



Dr. J. Bradfield, the Chief Engineer for the Sydney Harbour Bridge and later the engineer for the Storey Bridge in Brisbane.

The colonists soon found that many of the tools which they had brought, while adequate for conditions in Europe, were inadequate for Australian conditions, and the manufacture of better tools soon became an industry. The Tank Stream, the sole water supply for the colony, had to be protected against pollution and its flow stored in tanks. The construction of roads to provide access, and mills to grind the grain, became urgent necessities. The Blue Mountains proved a barrier to the

expansion of this settlement. Cox built the first road across this barrier in 1813, and Mitchell improved it subsequently. Tasmania also required roads, and many fine bridges were built across the perennial rivers, including one at Richmond in 1823-5. D. Lennox began building bridges in New South Wales in 1833, and many fine examples of his work are still in use.

Meanwhile steamships began to arrive in the colonies. The 'Sophia Jane' arrived from England in 1831, and was joined by two locally built paddle-steamers, the 'Surprise' and the 'William the Fourth' in the same year. Coal was still scarce, and these vessels used their engines mainly for entering and leaving harbour, and in the absence of winds. Nevertheless, they improved the reliability of coastal transport, and permitted the establishment of regular timetables.

COAL DISCOVERED

Coal was discovered near Wollongong in 1797, and at Newcastle a little later. It was first mined at Newcastle, by convicts sent there in 1804, to supply Sydney with fuel. These deposits were transferred to the Australian Agricultural Company in 1828, which encountered competition from deposits found at Ipswich in Queensland in 1821, and later at St Remo in Victoria and in Tasmania at several sites including one near Port Arthur.

By 1840, Australia had supplies of coal and was able to use steam engines efficiently, although wood remained a major fuel until the end of the century, and in some areas away from coal until the Second World War. By 1845, windmills had become obsolete, and most mills were powered by steam and by water when the latter was plentiful. In the 1830s, produce from the farms and stations was taken to the nearest port by bullock wagon, and the building of roads, bridges when needed, and of jetties at the ports were major activities. In this period settlement extended into the Murray and Murrumbidgee basins and along the coasts of South and Western Australia.

The course of Australian history was dramatically changed by the discovery of gold in 1852, first in New South Wales and a little later in Victoria. The mining of metal had started in a small way in South Australia in 1842 with the discovery of deposits of silver-lead ore. These were followed by the discovery of copper ore at Kapunda, and in 1844 at Burra.

These in turn led to the construction and operation of smelters,

and the export of refined metal to India and to South-East Asia. The population on the goldfields of Victoria created the towns of Ballarat, Bendigo and Castlemaine, which soon rivalled Melbourne for size and wealth, and the resulting increase in settlers permitted the establishment of manufacturing industries.

The production of gas and coke from coal, was begun in Sydney in 1841, in Melbourne in 1856, and in Ballarat and in Hobart in 1857. Coal gas was a premium fuel for lighting buildings and streets, and later for cooking. It was so popular that by 1870, almost every significant town had its gas works.

TRANSPORT DEVELOPMENT

The middle 1850's saw the establishment of the first railways, partly as a result of improved technology in Great Britain and partly because there was not enough activity and population to support them. Melbourne was connected to its port in Hobson's Bay by a steam railway in 1854, and steam trains began running between Sydney and Parramatta, and between Adelaide and Port Adelaide in the next year. These were followed by railways from Newcastle to Maitland, from Geelong to Ballarat, from Melbourne to Castlemaine, and from Adelaide to Kapunda in the next five years.

The river Murray produced a flurry of industrial activity. Following the offer of a reward by South Australia, the 'Mary Ann' built in Sydney and acquired by F. Cadell, both made their inaugural trips from Goolwa to Swan Hill in 1853. Later ships penetrated to Wagga Wagga, Albury, Deniliquin and to Hay in subsequent years. This led to the construction of a fleet of ships at Goolwa, Port Adelaide and at Mannum in South Australia, and, after the railway arrived at Echuca in 1864, near this town and at Moama.

Meanwhile, manufacturing industries were being established in major towns. The Russel Brothers built their works in Sydney in 1842, Langlands and Fulton their Port Phillip Foundry soon afterwards, and P. John began his Melbourne Ironworks in the early 1850's. W. Wright established his Atlas Works in 1860.

THE TELEGRAPH

A significant development of the 1850's, was the introduction of the telegraph. After its initial use in Great Britain in the 1840's, Melbourne's first telegraph was opened in 1854, and South Australia's followed in the next



Sydney Harbour Bridge under construction. It was opened in 1932.

year. By 1857, the wires linked Sydney to both these towns, and permitted a rapid flow of news and commercial information whose time of transmission was measured in minutes rather than in days. From the beginning, Telegraph Engineers envisaged Australia as one country which required compatible equipment and procedures, rather than as a collection of states. While the local networks expanded, a major step in the development of Australia, was its linking to Europe by the Overland Telegraph which C. Todd, later Sir Charles, constructed in 1872. The 1880's saw the introduction of telephones, and in 1912, Australia was one of the first countries to adopt automatic telephone exchanges.

A second major development of the 1850's, was the construction of piped water supplies, which reduced the frequency of death from typhoid and other diseases of poor sanitation. These required large investments of money and skilled Engineers to design and build the dams, pumping stations and reticulation systems.

To improve transport within cities and to reduce pollution by horse droppings, the major cities of Australia installed trams in the 1870's. In the 1880's, Sydney converted its trams to steam power, and Melbourne installed a cable car system similar to that in San Francisco. Initially trams were imported, but their manufacture soon became an important Australian

industry. Electrification of these systems began just after the turn of the century and was completed by the year 1920.

A major improvement in public health resulted from the installation of water-borne deep drainage systems and properly designed sewage treatment works in Sydney and in Adelaide in the early 1880's, and in Melbourne in the 1890's. Melbourne constructed its first major docks between 1879 and 1892, Western Australia built the Fremantle harbour in the 1890's, and South Australia built its Outer Harbour in the early 1900's. These made possible the use of larger, faster and more comfortable passenger ships.

INDUSTRIAL DEVELOPMENT

Major industrial developments in the 1890's included the rise of the silver-lead mining industry at Broken Hill and the development of Gold Mining at Coolgardie and at Kalgoorlie in Western Australia. The first led to a major development of the East-West railway, which soon connected Sydney with Port Augusta although its gauges changed at several points, and also to the rise of the silver and lead smelting industry at Port Pirie. The goldfields of Western Australia stimulated the construction of the goldfield water supply pipeline, and also of the western end of the Transcontinental Railway. Both these

industries, were very innovative and contributed greatly to Australia's prosperity. Broken Hill was the site of the first effective use of the flotation process for separating ores.

Meanwhile, hydro-electric power was being developed in Tasmania, initially at Mount Bischoff in 1883 where it was associated with the mines, and later at Launceston to supply this city with light. The Hydro-Electric Commission was established in 1915, to reduce Tasmania's dependence on imported coal. It also enabled Tasmania to build the Electrolytic Zinc plant to extract zinc from the Broken Hill ores which otherwise would be wasted, or at best exported without processing.

Two little known but significant developments occurred in the early 1900's. The first was the experiments by L. Hargraves with kites near Woolloongong, by which he greatly advanced the knowledge of aerodynamics and the use of control surfaces. The second was the development of the thrust block by A. G. Michell, initially for making larger and more efficient irrigation pumps, but which became a standard fitting on all screw driven ships.

WIRELESS PIONEERS

Few people are aware of the early experiments conducted by Professor Bragg, later Sir William, and Sir Charles Todd on transmitting wireless signals in 1899, initially for communicating with off-shore lighthouses. Two years later the Chief Electrical Engineer in the Post Office constructed his own version of Marconi's wireless apparatus to communicate with ships at sea. After the Commonwealth Government passed the Federal Wireless Telegraph Act to regulate the use of such equipment, wireless stations were built near Sydney and Perth in 1912, and by 1914, nineteen of these stations were operating around Australia's coasts with equipment designed and made in Australia. After the war, E. Fisk, later Sir Edward, realised that this equipment could be developed to transmit and receive signals with Europe. In 1922, Amalgamated Wireless (Australia) achieved regular transmissions over this distance with specially developed aerial systems, and became the major route for telegrams and telephone conversations.

Developments which had a major effect on Australia's war effort included the establishment of a major steel making plant at Newcastle, where iron ore from South Australia met the coal from the Hunter Valley, and in the development of the State Dockyard nearby.

After the First World War, Australia embarked on a major land settlement scheme for returned soldiers and on a large immigration programme. These expanded greatly the irrigation schemes which had begun in the 1890's, and were particularly associated with the work of the Chaffey Brothers at Mildura and at Renmark.

Railways which had become run down during the depression and the requirements of war, were extensively reconstructed and modernised. The advent of the motor truck and car, which had been greatly improved during this war, also led to significant efforts to build roads and to provide bituminised dust free surfaces outside the cities.

The interval between the two world wars, saw the beginnings of work at the Yallourn Coalfield, which turned wet brown coal into hard shiny briquettes which could be used as fuel and burnt to provide Victoria with its own electricity. G. Julius, later Sir George, developed an automatic machine for recording and tallying votes in 1914. He converted this into a totalisator machine in 1916, and

became the first Chairman of the Council for Scientific and Industrial Research in 1926. Dr. Bradfield who had graduated from Sydney University in 1889 and then worked on the design of several dams to supply Sydney with water, became in 1912, the Chief Engineer for Sydney Harbour Bridge, and of the City Railway and Metropolitan Railway Construction Department. His underground railway was opened in stages from 1926 onwards, and his harbour bridge in 1932. Subsequently the Engineer for the Storey Bridge in Brisbane, he also proposed a scheme to turn the coastal rivers inland to irrigate the dry inland plains.

The middle 1930's saw the establishment of the Commonwealth Aircraft Corporation, initially to make the Wirraway Trainer aircraft, but later to make Boomerang fighters and also Beaufort torpedo carrying reconnaissance aircraft. To defend Australia, many workshops including several of the railway workshops, were converted to making aircraft components as well as to making artillery, bren gun carriers, and other devices of war. It is to be regretted that this phase of Australia's engineering development and also the effort which was allocated to making roads, harbours and airfields has been so poorly recorded. Gallantry is necessary to win wars, but good equipment and technology is a great help.

THE HOLDEN CAR

After the Second World War ended, significant developments included the production of the Holden motor car, and the establishment of the Snowy Mountain Authority. The first utilised the developments of industry during the war, to provide Australia with a car specifically designed for its conditions. The second grew from the shortages of coal, largely resulting from industrial unrest

in the coal mines of New South Wales, and led to the construction of a series of dams and tunnels in the Australian Alps around Mount Kosciusko. These turned water from the western side of this range westwards into the head waters of the Murray and Murrumbidgee rivers. In the process, they supplied much needed peak power, water for irrigation, and work for migrants from many countries of the world.

Other large engineering projects included the construction of major airports at the major cities of Australia, and the installation of an air traffic control system.

The remaining programmes of the post war years are too numerous to mention. The challenge of the future is to continue the pace of this development and to use its products wisely. In two hundred years, Australia has changed from a continent with a population of less than one million and no exports to the rest of the world, into a country with a population approaching seventeen million and a significant exporting industry. It is for the current and future population of Australia to justify this good fortune by valuing their own work appropriately.

The Author, D. A. Cumming M.A. (Oxford), is a member of both the Institute of Civil Engineers and Institution of Engineers Australia. He recently retired from the position of Senior Lecturer at the University of Adelaide.

Contributions

ARTICLES and other contributions, together with suggestions for suitable material for "Heritage", will be welcomed by the Editor. However, those requiring unused material to be returned, must enclose a stamped and addressed envelope.

Address written contributions to:

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WESTERN AUSTRALIA, 6510

Thoughts on the Early Days

by Bill Manifold

There is a modern attitude of denigration of our early settlers that Geoffrey Dutton mentions in a review of my book, "The Wished-for Land". (*The Bulletin* October 1984).

"It has become accepted theory," he writes, "that in the fine flood of Australian democracy the squatters were obdurate islands of greed, prejudice, conservatism and cruelty to the Aborigines. The squatters are supposed to have stolen the land from their own people as well as from the Aborigines, from selectors and small farmers; then they despoiled the land by overstocking and indiscriminate clearing..." (He goes on to welcome the book as a "much-needed reassessment...").

Country-born and reared, great-grandson of a pioneer myself, I did not believe him. How could Australians, of all people, think so wrongly of their forbears? How could the truth have been so twisted in such a short time?

But sadly I have grown to realise he was, and is, right: there certainly is this "accepted theory", or attitude, or prejudice in many minds, and saddest of all it has taken root in many of those who would teach our young.

Apparently it does not matter how many "Kings in Grass Castles" or "We of the Never Never" or similar factual books are written. Their minds are made up: pioneers were all "baddies".

So perhaps we of a different persuasion must never stop trying to tell the truths that we have learned, and if people won't read books, it will have to be by articles. Or must it be in comic strips!

My own great-grandfather was 27 years old when he and his younger brother, aged 21, set out to explore the unknown lands West of the last white settlers. Their greatest obstacle was a barrier of volcanic stones, which took them a fortnight to pass, during which they were assisted by friendly Aborigines.

"RIGHT OF STATION"

Upon finding land unoccupied by whites, they hurried back for their flocks so that they could claim "right of station": that is to say, they were

allowed to claim exclusive occupancy of an area appropriate to the number of their sheep and cattle. Naturally, they saw no reason to claim too little in this wide-open land where the natives were apparently friendly and there seemed no end to the land stretching out before them.

The natives, of course, did not realise what they were doing. Like certain people today, they welcomed these strangers of a completely different race in the naive belief that they would all live happily ever after.

It was the sheep that really shattered this hope. In England, and therefore in Van Diemen's Land, whites hanged people for stealing sheep, and thought that this was quite a reasonable practice. The Aborigines, of course, knew nothing of ownership beyond their few cooking utensils and weapons, and, with animals everywhere for the killing, saw no reason why these clumsy but tasty new ones were any different. Furthermore, the whites saw no use at all in the native animals, and, wanting the pasture for their sheep, did their best to destroy all grass-eating native animals — the food of the Aborigines.

The report of a gun, at first, would scare the Aborigines away, but all too soon this was not enough. In some cases there were terrible incidents, and it seems that some settlers did band together to make "reprisal raids" against the Aborigines. When individual men were known to have murdered Aborigines they certainly lost their "right of station" and were

ostracised. One such, a Mr Taylor who managed Strathdownie, is known to have fled the country to avoid arrest.

My great-grandfather was lucky (or clever) enough to shoot a man in the arm just as he was throwing his spear, and it would seem that this incident persuaded the local Aborigines not to try that idea again! On the other hand, the Aborigines soon came to work as stockmen and general hands.

The victim himself eventually came to the homestead baring his bullet-scarred arm. "Me Mr Manifold's man," he announced. "Tea, Flour, Sugar."

The historian, James Bonwick, noting that the brothers were on good terms with the Aborigines, remarks "The Messrs Manifold prefer Blacks to Whites, as being far better acquainted with stock, more active in duty, more ready and willing, and not more expensive, although in addition to 10s a week wages, rations have to be supplied to as many of the race and connections as choose to hang about." (10s per week was the going rate for any station hand).

Perhaps these young men in their early twenties were quick to learn something of the Aboriginal languages. Or perhaps it was their evident practicality; their ability with stock, with horses, with tools and with guns, that impressed the Aborigines. And certainly these two brothers were not the only ones in the district to employ them successfully. In fact Thomas Chirnside claimed to be the first to do so.

LOCAL TRIBE

Sadly, anyway, it didn't last. For whatever reason (and I believe it was mainly alcohol and the new diseases, particularly small-pox) the black station hands gave way to whites not very long after Bonwick's visit in 1857, at about the same time that the fences and stone walls were being built, the drains dug and the dams excavated:

the same time, in fact, that white workmen and contractors (not convicts) followed the pioneers into the hinterland.

It was these people, competing at the same level with the Aborigines, who no doubt saw them as competitors and thus saw compelling reason to claim superiority.

By 1863, the Camperdown tribe numbered only 40 men, women and children. In 1870 the death of one "Dicky" is referred to sadly as having "gone the way of nearly all his countrymen. I suppose he was drinking beforehand." And by the time my grandfather took over his station in 1886 there was only one Aborigine mentioned on the staff: "Black Emily", in the kitchen.

The last member of the local tribe was the chief, Wombeetch Puuyuun (Camperdown George). When he died in 1883 a monument to him was erected by public subscription in the middle of the cemetery, largely at the instigation of James Dawson, the official Protector of the Aborigines in the district.

Dawson was also the author of an authoritative book, "Australian Aborigines", a study of the languages and customs of several district tribes. He was ably assisted in this work by his daughter, Isabella Park, who spoke fluently several dialects and was thus able to gather much of the information at first hand.

These customs were a far cry from the idyllic tales of "dream-time" which fill the writings of today. They were the practical basis of a hard life in a hard country, largely concerned with survival against the predations of neighbouring tribes, and with eliminating in-breeding.

The early settlers and missionaries found some customs most distasteful, but apparently some people would like to see them re-instated in certain areas of our once-great country. Unfortunately, few of these do-gooders seem interested in the words of the Reverend Cedric Jacobs, himself an Aboriginal, who gives thanks for the enlightenment of his people through the Christian religion brought by the whites.

Some of the customs, naturally, were good: that everything left behind must be buried, even a finger-nail: that a man must find his wife from a neighbouring tribe, and live with them long enough to learn her language — to learn, that is, her differences of outlook and custom: that at initiation the young man must face up to each of the girls in his tribe in turn and promise never to take her against her will: that both both parties to adultery were severely punished, sometimes killed.

Many of the early settlers (certainly the great majority of those who replied to Governor Latrobe's request for information) saw much good in the Aborigines, praising their honesty, morality and gentleness. Only a few saw them as treacherous and blood-thirsty.

TRANSFORMATION TOO GREAT

As usual with human affairs, the good was mixed with the bad, and at least some missionaries did their best to preserve the good and add to it. It was fertile ground for the new religion, and in Victoria anyway, the first schools were actually started for Aborigines. Sadly the transformation was too great. What would have happened otherwise is impossible to say, but disease and the already unfavourable climate soon removed most of the Aborigines from the Southern part of the State. In my boyhood, in the twenties, the only Aboriginal I ever met was an old man named Pompey Austin (they often took the name of an employer) who used to call at our homestead once a year selling woven rush baskets and boomerangs. As children, we were fascinated and delighted with these visits. He came from the reserve near Warrnambool.

One of the less recognised causes of pneumonia was said to be the fact that when the Aborigines were given European clothing they went on wearing it, wet or dry, until it wore out: a procedure which would surely, combined with an outdoor life in a cold climate, rapidly lead to the demise of nearly anyone. It may have been mitigated, however, by another curious habit; that in the cold winter winds the new owner could see little use in clothing his down-wind side, so many a suit of clothes was quickly split down the middle to make "windward" protection for two people, presumably being turned inside-out when the wind or the Aborigines changed direction.

It is my understanding that the land was never "owned" in our sense, and even between tribes occupancy was only recognised through a tribe's ability to defend its position — what we would call "de facto" rather than "de jure". This constant tribal war situation (periodically interrupted for inter-tribe meetings) was in fact used by some evil whites who arranged the demise of a whole tribe simply by supplying firearms to its traditional enemies.

Meanwhile the responsible, law-abiding settlers set about building the

same legal/financial/governmental system as the one they had left behind in England and Scotland and Wales. For it was from these places that the early settlers came, very few indeed coming from other countries.

ENGLISH MAGISTRATES

Professor Manning Clarke tells us that when the English magistrates of the 1700s were confronted with laws that required the death penalty for the theft of anything valued at one shilling or more, they soon found an answer. They didn't attack the law or the constitution, but they simply "wrote-down" the value of the stolen goods to less than one shilling, thus having the culprit transported to Australia instead of hung.

This purely book-keeping answer was not only humane in saving lives, but surely it was, by supplying hundreds or thousands more prisoners for transportation, and allowing them to live and breed, possibly the greatest single factor in the formation of Australia.

Yet uninformed "experts" today still think those magistrates harsh and wicked for transporting convicts for so small an offence.

It is time quite a number of "accepted theories" were subjected to the light of true study. H

Bill Manifold is the author of "The Wished-For-Land" (Neptune Press, 1984), the story of the pioneering Manifold family in Western Victoria.

LET'S KEEP
THEM!



OUR FLAG

OUR HERITAGE

OUR FREEDOM



Australia's memorial to her outback pioneers

by Nan Broad

In Australia today, this vast land of extremes in topography, climate, resources and people, we have a national coherence — we are all Australian and proud of it even if reticent to make these sentiments public.

Our people live in grid square blocks of suburban housing within an hour of the work place and two hours of the beach. Every household contains a vehicle and many also contain a caravan, poised on its blocks ready to follow to northern resorts or the red inland, taking advantage of the abundant holidays Australians consider a 'fair thing'.

Getting away from suburbia has become a national tradition. More and more Aussies down to the sixth and seventh generation of living in this great country, are getting out to see the beginnings of it all; the blood-sweat-and-tears districts further out where it all began and where it still continues today. And they remember forebears who swung an axe, drove cattle, shore sheep, went down creaking mines or carried the mail to remote places.

Australians haven't gone in for monuments on the national scene. The War Memorial in Canberra stood as the only one until Her Majesty Queen Elizabeth II opened the Australian Stockman's Hall of Fame and Outback Heritage Centre near Longreach in Central West Queensland, part of our Bicentenary projects, during April of 1988.



The War Memorial was dedicated to those who went 'over there' while the Hall of Fame is dedicated to those who went 'out there' and worked to make Australia viable.

People are still working to produce the great primary commodities of wool, grains, meat and minerals that constitute the gross product of the country and keep all the urban coastal fringe in dependant jobs.

HALL OF FAME — EXPLORERS

Many of these pioneers will be remembered in the Hall. The story of the first explorers will be told, whether men of vision or adventurous gamblers, they were to seek out the unknown and many perished in the harsh, dry interior.

The Gregory brothers didn't perish. One of these was Augustus Charles on whom John Forrest, an illustrious Australian of a later era, modelled himself. Emigrants to the Colony in 1829, Augustus and his four brothers grew up in the Swan Valley near Perth. In 1842 Augustus joined the Survey Office at the Lands Department under the watchful eye of the family's neighbour and friend, Surveyor-General John Septimus Roe. His first duties were to chart areas and building sites around Perth and Rottneest, survey

the Peel Inlet and the Blackwood River and lay out the town of Kojonup. Augustus' brothers Frank or Charles often accompanied him in the position of chainer, and a native guide was usually one of the party, his favourite being a man named Hugall.

Obtaining three months leave of absence in 1846, he persuaded brothers Frank and Henry to join him in an expedition north of Perth on behalf of settlers who urgently needed further grazing lands. The brothers' efficient preparations inspired a government grant of £5 towards equipment and the loan of four horses. On this very successful expedition they accomplished 953 miles (1534kms) in forty seven days and set the pattern for further explorations over the next fifteen years.

Augustus wrote in his journal of the North Australian Exploring Expedition of 1855/6, at the Fitzmaurice River in the Northern Territory: '12th October — During the night the horses were several times disturbed, but it was not until morning that the cause was ascertained, when we found that they had been attacked by the Alligators, and three were severely bitten and scratched.'

Augustus was appointed Queensland's first Surveyor-General in 1859 and elected to the Legislative Council of Queensland in 1882. He was awarded the Order of Saint Michael and Saint George in 1874 and elevated to Knight Commander of the Order in 1903. He died in June, 1905. From the Commonwealth Parliament, Western Australia's John Forrest sent a telegram to the Governor of Queensland: 'To express my great regret at the death of Sir Augustus Gregory, which removed from us one



"We could hear the horse-bells as they were feeding round us."

of the greatest early explorers of Australia.'

SETTLERS

Then came the permanent people, plodding along the blazed pathways driving their flocks and herds before them, looking for the promised land the explorers had spoken of so glowingly. Always moving further out, more room, space to increase and pass on an inheritance. But the terrible cost of human effort to carve out a holding from nothing, absolutely nothing. When it took weeks or months to travel back for stores, when clearing the forest meant attacking giant hardwood trees with an axe and a crosscut saw. Fencing meant walking miles to cut and cart posts, shovelling earth, boring holes with a brace and bit, running wire and straining it with a forked stick. Fencing before that meant cutting tons of scrub and stacking brush fences, mile after mile until wire became available in the 1890's.

Then followed the men who drifted 'further out' seeking jobs on the settlers' holdings. They became expert horsemen and learned to understand the ways of the animals they tended and learned a lot about the wild bush creatures too. But they didn't tell each other or anyone else for that matter, how good they were. "Can you ride?" "Oh, I've done a bit."

Alongside the white men were the Aborigines, working together and coming to depend on each other — the white man learning bush craft for survival and also taking as pleasurable companions the 'black velvet' available. The Aborigines succumbing to white takeover and settling into a feudal lifestyle centered on the homesteads, dependant on food and shelter handouts in return for spasmodic labour. A generation or two later many of the mixture race descendants had become bosses in their own right.

This certificate of stock movement reads: 'This is to certify that I have this day delivered into the charge of my drover C. Scott 6584 wethers for the purpose of walking them into Meekatharra. Signed at Milgun Station this first day of July 1947. W. E. Butcher Milgun Station Meekatharra'. The mob of heavyweight fat wethers in full wool were railed from Meekatharra to Perth, 600 miles, and sold to one butcher, averaging 58 pounds dressed weight. It is possibly one of the largest single consignments of sheep ever delivered for sale in the state.

The man who took charge of these prime, fat wethers in 1947 and delivered them to the Meekatharra railway yards, 120 miles to the south was a 15 stone giant never known to give a horse a sore back, although he spent his life moving cattle and sheep over the Ashburton and Gascoyne River areas of Western Australia.

George Scott, known as Captain, grew up on Landor Station — his father a white man who came to the west from Eucla, lured to Cue in the gold rushes of the '90s, his mother an Aboriginal. From Landor he went to Milgun as a young man at the end of Charlie Smith's time, learning from the old cattle king to handle bullocks. An excellent horseman, Captain spoke seldom and quietly but he controlled a mustering plant of forty five odd horses and half a dozen men. In 1937 Captain married Ethel Reece, of similar racial descent and stature. Ethel became camp cook, heaving up onto the back of an overladen spring cart at which the horse would be suspended above the shafts. She always seemed to have crusty camp oven bread freshly baked and jars of preserves made from melons and berries picked along the way. Clean sheets were in the swags and a white tablecloth spread over the tailgate of the cart for meals and woe betide any musterer who went to cut himself a piece of meat unskated. After rain Ethel, cart and horse would move along draped in long trailers of crimson Sturt Pea creeper like an animated Christmas card.

Around 1960 Captain took up Pingandie Station on the Ashburton River. He built a homestead and gathered a few soft living young relatives from Geraldton to help build a magnificent set of timber cattle yards, then he bought his first bulls out of the sale yards at Geraldton to put with the cows he had purchased from stations nearby. Their one daughter, Marjorie, obtained her pilot's licence to fly light aircraft at the age of nineteen, a great achievement for a part Aboriginal girl in the 50's. Captain is an old man now, only remembering the long journeys over hard stones and soft river flats, flood gum country and jumpup breakaways where he has left his mark and the sure knowledge among men that he personified the best of Aboriginal and European achievement in building this big country.

The bushman's clothing was drab, colourless, almost as if they melded and took on the protective colouring of the bush about them as they rode long distances to far horizons. The old felt hat, bashed and battered from many uses, acquired a personally distinctive shape, so that the sons of the pioneer shaped their hats in similar fashion, followed by their sons in turn and the shape became identified with the dynasty. A man was known by his hat (and still is today), the one concession an Australian makes to individuality in dress.

WOMEN

A few white women went with their men in the beginning but their numbers were sparse. If a man could afford to keep a wife he must needs be the manager or the owner and provide a home of sorts. Women hitched their skirts out of the dust and made bread or puddings in large iron pots suspended over open fires. Kitchen buildings were detached from the main dwellings in case of fire. In 1862 Rachel Henning's brother Biddulph had taken up a new pastoral run in the South Kennedy district of Queensland. He called the property 'Exmoor'. Rachel and her sister Annie journeyed out from Rockhampton to Exmoor in company with Biddulph and his men. Rachel's letter to her sister Etta (Henrietta) in England reads in part: '... Biddulph had our horses waiting on the other side of the river, and by a superhuman effort of packing we crammed our dresses and crinolines into a valise which he carried before him... The whole concern formed quite a cavalcade and looked so picturesque winding through the bush. We had five saddle horses ridden by Annie and myself, Biddulph, Mr Hedgeland and Mr Stewart, five packhorses and six spare horses driven loose...

...We made our first acquaintance with 'camping out' that night, and found it rather pleasant than otherwise... By the time tea was boiled in the quart pots they spread blankets on the grass, and we each had a pint pot into which the hot tea was poured. We had some very good damper, fresh beef, cheese and jam and I was never so hungry in my life, having had nothing since breakfast and ridden twenty miles. When it got dusk we all



The Stockman's Hall of Fame, Longreach, Queensland was opened by Her Majesty the Queen in April 1988.

drew round the fire, and I wished. I could send you a picture of the camp then. Annie and I had a very comfortable sort of sofa made of a railway rug and the packs of the horses to lean against. Biddulph was sitting on a log in his shirt sleeves reading the Home News by the firelight, Mr Hedgeland kneeling on the grass manufacturing a damper for next day's consumption, and Mr Stewart intent on boiling some more tea for the refreshment of the establishment before going to bed. There was a tremendous fire, and it looked so pretty against the background of dark bush. We could hear the horse-bells as they were feeding round us, and the frogs croaking in the creek, else you may fancy it was quiet enough.' ²

HOUSING

The first dwellings were 'knocked up' from whatever handy materials stood about. Timber in forest areas because the men from the woodlands of England knew about working timber and how to fell a tree, saw the great trunk into planks and poles and erect a cottage with morticed joints and not a nail in use. Thatching provided the roof and later, wooden shingles. They also knew about stone, especially the miners of the old country whose people had carried a lamp and their crib³ down the pits for generations. The quickest and easiest construction on a settler's run was pise — rammed earth and stone, built thick and strong with natural insulation. An example of an early settler's cottage, complete with rude furnishings, stands in the Hall of Fame.

Early construction followed the architectural style of the old homes people had come from, with the exception of the verandah. This rather unique addition started life as a lean to, literally leaning off the roof to give some sort of shelter from the harsh sun. The verandah expanded into the spacious surround of a homestead, an outdoor living area containing squatters' chairs and cane lounges among creepers and potted plants.

CRAFTS

The crafts and skills of the people will be presented. They learned to improvise and innovate, they became very good at fashioning bush timber,

PIONEERS

*They never saw themselves as heroes
They were ordinary people.
Simply coping with new hardships every day
With a stubborn kind of courage
That helped create a nation.
And we owe them all a debt we can't repay,
And all of them were heroes in their way,
All of them were heroes every day.*

*There were settlers, drovers, stockmen and explorers.
There were painters, poets, writers and the rest.
Just ordinary people with a stubborn kind of courage
Who never gave an inch less than their best.
And we owe them all a debt we can't repay.
And all of them were heroes every day.
And we owe them all a debt we can't repay.
All of them were heroes every day.*

Nan Broad

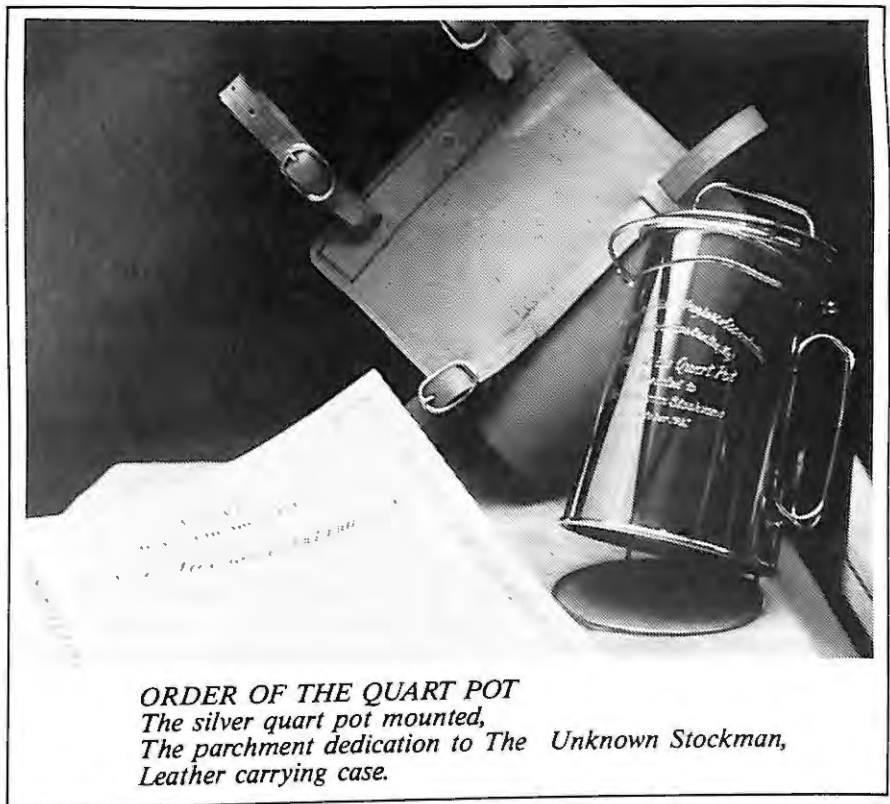
iron and leather to their particular uses. In a stock camp would always be one fellow or another sitting and plaiting leather, the ends tied around his big toe.

Deane Davies grew up in South Australia. He well remembers Gordon Oliffe, a top class timber worker, yard builder, rough rider, drover, blacksmith and whip maker. (Gordon won a first prize for a plaited whip in London around the 1920s). He was known well around Kingoonya, Coward Springs and the Birdsville Track. "I was shown how to cut-out and plait a stockwhip by Gordon Oliffe in 1934 when I was aged 12 and since then I have plaited up to a hundred or two. I have always deplored people who used a stockwhip to excess, but seldom do you see bushmen on stations or droving being cruel to stock, as the whip's main function was a noise factor to hurry the stock up a bit." Deane ran property in the East Gascoyne of W.A. and is now semi retired in Perth. He won five first prizes for plaiting at the Perth Royal Show in 1985 and first prize and a special prize for the best overall exhibit of leathercraft at the Melbourne Art Craft '88 Bicentennial National Exhibition. This was for a nine foot by twenty plait black and tan stockwhip with a twenty four plait handle. Deane has also made a forty four foot six inch (1259cm) plaited whip for a private collector.

THE ORDER OF THE QUART POT

The Pastoralists & Graziers Association of W.A. awards a unique honour to those who contribute more to the industry than normal. Called the Order of the Quart Pot, it is a silver version of a genuine bushman's quart inscribed to The Unknown Stockman. The award has been presented to His Royal Highness Prince Charles on the occasion of his visit to Coodardy Station, Cue in 1979 when the party camped out in the bush. A miniature quart pot has also been presented to Prince Charles during his visit to Australia in 1983 by the Stockman's Hall of Fame. The Order of the Quart Pot was awarded to the Stockman's Hall of Fame at the W.A. Branch's inaugural Bush Bash supper dance in 1981. It now stands in the Hall as a commemoration from the pastoral industry of Western Australia.

The true spirit of mateship will remain strong and binding to all Australians who have gone 'out there' and the Hall of Fame will continue to record their achievements.



*ORDER OF THE QUART POT
The silver quart pot mounted,
The parchment dedication to The Unknown Stockman,
Leather carrying case.*

REFERENCES:

- 1 Term used to describe Aboriginal women who cohabited with white men and often bore their children.
- 2 Adams, David (ED.) The Letters of Rachel Henning, Pen drawings by Norman Lindsay, Angus & Robertson Ltd., 1966 pp91/2/3.
- 3 Welsh term for a packed lunch, still in use in Australia today.

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Continued from page 8

these problems are global as well as national and accepted the challenge to repair the effects. Success of some such works is evident but time will be required for a more general constructive change.

But human nature has not changed at all. Man is still inquisitive, acquisitive, and most importantly, here.

I do not share the current Australian guilt which says we should be ashamed of what we have done in our two hundred years even as I recognise some of the great wrongs we have historically demonstrated. To turn back the clock is impossible and some realists have already taken up the struggle for the future as it is today; not with some nostalgic yearning for what might-have-been.

I am proud to be Australian! You are Australian and you too should be proud, but please don't take it for

granted. Care about this country and its heritage; its way of life which makes it possible for you and your children to be free and to enjoy being free. Children are the hope of tomorrow so make sure that the Australia they inherit is better than the one we live in today. That can only be achieved by each one of us caring enough to actively work towards the unity of this nation, that is one people, Australians, living in one nation, Australia.

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Harry Butler is a conservation consultant and well known for his contributions to naturalist publications and television programmes.

Australia's pioneering achievements are not restricted to the harsh Australian environment. A number of Australians have made outstanding contributions in the even harsher environment of the Antarctic.

That part of this account which deals with Australian contributions up until 1947 has been taken from the book "Antarctic Odyssey" by Phillip Law, published by Heinemann (Aust.) in 1983.

Australians in the Antarctic

Australia has a distinguished record of exploration and scientific research in the Antarctic but few Australians are aware of the extent of the work. Most of them know that Douglas Mawson was one of the early Antarctic explorers and that, today, ships go off each year to take men and supplies to some bases that Australia has established on the coast of Antarctica; but a fog of ignorance obscures the events leading up to Mawson's first expedition (AAE in 1911) and the developments subsequent to his last expedition (Banzare in 1931) that have led to today's activities.

Even less widely known is the fact that Norwegian, United States and Soviet Union explorers have made valuable contributions to knowledge concerning that part of Antarctica that we claim as Australian Antarctic Territory.

Then there are the various contributions that Australia and Australians have made to Antarctic expeditions organized by explorers from other nations.

Australian interest in the Antarctic goes back more than 150 years. The earliest ventures were those of sealers and whalers, who were motivated by visions of quick profits rather than by any sense of geographical curiosity. Amongst the pioneers were Frederick Hasselburgh, who discovered Macquarie Island in 1810, Richard Siddons and D. Taylor, who took sealing expeditions in 1820 from Sydney to the South Shetland Islands, and Samuel Harvey who in 1831 pushed south from Hobart to reach 72½ south latitude in what was later to be called the Ross Sea.

A number of famous Antarctic voyages of various nationalities called at Sydney, Melbourne or Hobart on their way south during the 19th century: Bellingshausen (1819-21), Balleny (1838-39), Dumont d'Urville (1837-40), Wilkes (1838-42), Ross (1839-43) and Nares (1872-76). A sealing venture from Hobart, led by Captain Robertson in the "Offley", operated at Heard Island in 1858.

The first Australian Antarctic Exploration Committee was set up by the Royal Society of Victoria in Melbourne in 1886. It worked for

twenty years trying to stimulate interest in an Antarctic expedition and to raise the necessary funds, but without success.

It was left to a Melbourne resident of Norwegian nationality, Henrik Bull, to solve the financial problem. He persuaded the Norwegian whaling magnate, Svend Foyn, to sponsor a purely whaling expedition to the Antarctic in 1894. A young Norwegian immigrant who had been in Australia since 1888, Carstens Borchgrevink, applied to Bull for a position as scientific observer. Bull took him on as a general hand but, despite this, Borchgrevink devoted a lot of his time on the expedition to scientific observations.

Bull's ship, the "Antarctic", flying the Norwegian flag, reached the Antarctic continent and Bull landed briefly with a party at Cape Adare, at the entrance to the Ross Sea, in January 1895. This was the first recorded landing of a party on the Antarctic mainland, earlier landings in Graham Land having been on islands or ice shelves.

Borchgrevink, his enthusiasm fired by his Antarctic experience, went to England and succeeded in organizing a British expedition in the ship "Southern Cross" with the sponsorship of a publisher, Sir George Newnes. On its way south the ship called at Melbourne, where it took on a young Tasmanian physicist, Louis Bernacci, who had been working on the staff of the Melbourne Observatory. He was to become the first Australian-born person to land and winter on the Antarctic continent.

The Borchgrevink expedition set up and occupied a station at Cape Adare in 1899, the remnants of which can still be seen there. They made valuable observations in zoology, geology, meteorology and terrestrial magnetism. However, the steep terrain behind their base denied them access to the Antarctic hinterland.

FOUR FAMOUS EXPEDITIONS

The years 1900-14 saw great progress in Antarctic exploration through the activities of the famous expeditions of Scott, Amundsen, Shackleton and Mawson. To each of these, except Amundsen's, Australia made important contributions.

Scott's "Discovery" expedition of 1901-3 obtained a grant of £250 from the Australian Antarctic Exploration Committee and £1000 from the Queensland Government. Scott enlisted Louis Bernacci as physicist.

When Shackleton brought the British Antarctic Expedition to Melbourne in the "Nimrod" in 1907 he was in debt and in danger from bailiffs. Professor Edgeworth David, of the University of Sydney, persuaded the Australian Government to donate £5000 to the expedition and, when the New Zealand Government contributed £1000, Shackleton's main financial worries were over.

Shackleton enlisted Douglas Mawson of Adelaide as physicist and B. Armstrong of Melbourne as a general hand. Professor David and one of his geological staff, Leo Cotton, signed up for the round trip on the "Nimrod"; however, when they arrived at McMurdo, Shackleton persuaded David to remain for the whole year as his chief scientist.

The first officer of the "Nimrod", John King Davis, later became master of this ship and of Mawson's "Aurora" and "Discovery". (He also captained the "Aurora" on the relief expedition that rescued Shackleton's Ross Sea

party in 1917).

David and Mawson made notable contributions in geology and geophysics to the achievements of Shackleton's expedition. A six-man party led by David and including Mawson made the first ascent of the Antarctic volcano, Mt Erebus (altitude 12,450 feet). Later, a three-man party of David, Mawson and MacKay man-hauled a sledge to the South Magnetic Pole, a return journey of 1,260 miles in 122 days. This was a major achievement and one that has never been adequately recognized.

Scott's second expedition, in the "Terra Nova" in 1911-13, also obtained a grant from the Australian Government, this time of £2500. Two Australian scientists accompanied Scott — Griffith Taylor and Frank Debenham. (Taylor later established the first Department of Geography in Australia at the University of Sydney, and Debenham became the foundation Director of the Scott Polar Research Institute in Cambridge).

MAWSON

After returning from Shackleton's expedition, Mawson set about organizing one of his own. He obtained financial assistance from numerous private sources in both Australia and England and donations over a two-year period from the Commonwealth Government of Australia (£13,000), the South Australian Government (£5000), the N.S.W. Government (£7000), the Victorian Government (£6000), the Tasmanian Government (£500) and the British Government (£3000), the Royal Geographical Society (£600) and the Australian Association for the Advancement of Science (£1000). His Australasian Antarctic Expedition (AAE) of 1911-13 established three stations: at Macquarie Island, at Commonwealth Bay (George V Land) and on the Shackleton Ice Shelf (Queen Mary Land).

In February, 1912, the "Aurora", commanded by Captain J. K. Davis, sailed along off the coast of Antarctica between 140° east longitude and 90° east longitude, naming Wilkes Land, Queen Mary Land, the Davis Sea and the Shackleton Ice Shelf. Sledging parties from the Western Base mapped the coast of Queen Mary Land, while others from Commonwealth Bay explored 150 miles west, 300 miles south and 300 miles east of their base. The scientific reports of the expedition filled twenty-two volumes.

Shackleton's Imperial Trans-Antarctic Expedition of 1914-17 also included Australians. Shackleton took



Douglas Mawson

"The main accent of Mawson's argument was on the political need to consolidate the Australian territorial claim that had come into effect in 1936 ..."

with him Mawson's photographer, Frank Hurley, and his Ross Sea party included Australians R. W. Richards, A. K. Jack, and C. O. Gaze. Richards was the hero of that party and was awarded the George Cross.

The Australian adventurer, Sir Hubert Wilkins, became famous because of his pioneer flight over the North Pole. In 1921 he joined Cope's British four-man expedition to Graham Land and in 1922 he was with Shackleton's last expedition. He and pilot Eielson made the first flight in

the Antarctic in November, 1928, — 1300 miles over Graham Land. He later accompanied the U.S. explorer, Lincoln Ellsworth, on his 1935-36 and 1939 expeditions.

BETWEEN THE WARS

When Mawson returned from his Australian Antarctic Expedition, the outbreak of war in 1914 precluded any further Australian activity in Antarctica for some years. In the 1920's Mawson led a resurgence of national interest in Antarctic exploration and, following discussions between the British and Australian Governments, it was agreed that Britain would make available the ship "Discovery" for an expedition, to be led by Mawson in the summer of 1929-30, that would strengthen any claim the British might make to Antarctic territory in the so-called Australian sector. Thus arose the British-Australian-New Zealand Antarctic Expedition (Banzare), a private expedition supported by the three governments concerned and private donations.

Two voyages were made in the summers 1929-30 and 1930-31. The "Discovery" visited Macquarie Island, Iles de Kerguelen and Heard Island in the sub-Antarctic and cruised along the coast of Antarctica between Terre Adelie in the east and Enderby Land in the west. A landing was made at

Dr. Phillip Law

A.N.A.R.E., at Mawson Antarctic Station, 1958.





Phillip Law and the camp at Iceberg Gap during a hand-hauled sledge journey to explore the southern end of Prydz Bay, February, 1955.

depression of the 1930s and, second, by the Second World War.

CONSOLIDATING AUSTRALIAN CLAIMS

Proclamation Island (Enderby Land) where Mawson read a statement laying claim on behalf of King George V of Britain to all lands between longitudes 47½ east and 73½ east and south of latitude 65½ S.

Other landings were made at Cape Bruce, Kemp Land (where a copy of the Proclamation was deposited beneath a cairn) and at Scullin Monolith, MacRobertson Land. A number of flights were made in a Moth aeroplane, discovering from the air the Banzare coast and Princess Elizabeth Land and confirming the existence of the Knox coast, but much further south than Wilkes had described it in the 19th century.

Another Australian, John Rymill of Adelaide, made important contributions to Antarctic knowledge, although the expedition he led was a British one. This was the British Graham Land Expedition of 1934-37, which carried out high quality scientific work and cartography in the Antarctic Peninsula region.

Following Mawson's Banzare expedition in 1929-31, further Australian work in Antarctica was precluded, first, by the economic

After the War, Mawson approached the Government and urged that Australia should resume scientific research and exploration in Antarctica. Herbert Evatt, Minister for External Affairs, became enthusiastic about the proposal. Consequently, the Department of External Affairs convened an inter-departmental committee which met, together with Mawson and a representative of the Council for Scientific and Industrial Research (CSIR), on 2nd December, 1946.

The main accent of Mawson's argument was on the political need to consolidate the Australian territorial claim that had come into effect in 1936, particularly in view of Norwegian exploration in the Australian sector during the 1930's and the growing interest of USA in Antarctica during the 1940's. The major part of the Australian Antarctic Territory was still unexplored. But Mawson was primarily a scientist and he continually stressed that any expedition sent to Antarctica for political reasons should take the opportunity to carry out as much

scientific research as the logistical limitations of the expedition would allow, for the Antarctic was an almost virgin field for investigations in a number of scientific disciplines.

The committee of 2nd December, 1946, recommended that the departments concerned should develop concrete plans for an expedition to Australian Antarctic Territory, using a naval ship equipped with a suitable aircraft, with the object of finding an ice-free area on the continent that could be used as the site for a permanent base. Mawson suggested that the ship "Wyatt Earp", owned by the Navy but lying uncommissioned in the Torrens River at Port Adelaide, be refitted for use by the expedition. Cabinet accepted this recommendation on 20th December 1946 and proposed that an executive committee be formed to develop plans and estimates for an expedition in the 1947-48 summer, that Mawson should act as adviser to this committee, and that an executive officer be appointed to organize the expedition.

The first meeting of the Executive Committee on Exploration and Exploitation was held on 4th January, 1947, chaired by the permanent head of the Department of External Affairs, Dr John Burton. Thereafter events moved swiftly. With various personnel and under several different titles a number of committee meetings was

held, and finally the following proposals were put forward to the Department of External Affairs:

- that an Executive Planning Committee be formed under the department;
- that preliminary plans for an expedition be drawn up at an estimated cost of £250,000
- that the “Wyatt Earp” be refitted by the Navy; and
- that Group Captain Stuart Campbell, RAAF, be seconded from his position in the Department of Civil Aviation to act as Executive Officer of the expedition.

The British Government, which had been advised by the Australian Government of the moves being made, asked that any expedition plans should include the occupation of Heard Island, far south in the Indian Ocean. Sir Douglas Mawson also suggested that his old base at Macquarie Island be re-occupied.

In July, 1947, Phillip Law was appointed Senior Scientific Officer of the expedition which, soon afterwards, was given the official title of the Australian National Antarctic Research Expedition (ANARE). The word Expedition was later changed to the plural, Expeditions. Law was asked to draw up a scientific program for consideration by the Executive Planning Committee, whose meetings he was invited to attend.

The outcome of all these deliberations was that the Australian Government approved recommendations that scientific stations should be established at Heard Island and Macquarie Island and be maintained for at least five years and that a reconnaissance of King George V Land should be carried out to seek a suitable site for a permanent Antarctic station. It approved the use of two naval ships – HMAS Wyatt Earp, captained by Commander Carl Oom, R.A.N., for the Antarctic voyage, and HMALST 3501, captained by Lieutenant-Commander George Dixon, R.A.N.V.R., for the two island voyages. The CSIR was to accept responsibility for the financial aspects of the ANARE and the Royal Australian Air Force was to act as purchasing agent. The scientific plans were to include meteorology, and geomagnetism and geology by the Commonwealth Bureau of Mineral Resources.

NEW STATIONS

The stations at Heard Island and Macquarie Island were successfully

established in December, 1947, and March, 1948, respectively, but the *Wyatt Earp* broke down on her first voyage in January, 1948, and her delayed resumption was too late in the season to enable her to reach the Antarctic continent.

In January, 1949, Stuart Campbell relinquished leadership of the ANARE and was succeeded by Phillip Law who continued searching for a ship suitable for use in an assault on the Antarctic Continent. In the meantime he visited Antarctica with the Norwegian-British-Swedish Antarctic Expedition in 1950 to gain first-hand experience of the Antarctic environment.

In 1952 Law learned that the Danish shipping company, J. Lauritzen Lines, had just built an ice-going vessel, the “Kista Dan” that would be suitable for Antarctic work. In February, 1953, the Australian Government approved Law’s plans for setting up an Antarctic station using the “Kista Dan” and this was accomplished on 13th February 1954 when Law named the new station “Mawson”.

Thus, in 1954 and 1955, Australia maintained three stations – Heard Island, Macquarie Island and Mawson. However, scientists of many nations were planning an International Geophysical Year to commence in 1957 with one of its principal objectives being an assault on the Antarctic Continent. Law persuaded the Australian Government to approve the establishment of a second continental station, this one at the Vestfold Hills, Princess Elizabeth Land, which offered one of the best sites in Greater Antarctica for a scientific station. Law led the expedition that set up this station and on January 13, 1957, named the new station “Davis” in honour of Mawson’s captain, John King Davis. Meanwhile, in 1955, the Heard Island station had been closed because of ANARE’s growing responsibilities in Antarctica.

At the end of the IGY, during which the Australian stations had distinguished themselves with scientific work of outstanding quality, the USA found itself overstretched in manning a number of bases. Law was able to persuade the Americans to offer their Wilkes Station to Australia instead of closing it and, on 4th February, 1959, he formally accepted administration of the Station from the U.S. leader of the American relief expedition.

Over the next few years the temporary buildings of the Wilkes Station deteriorated to the point where the establishment had to be replaced. Under Law’s direction a new site was chosen and work commenced in 1965 to build, nearby, the station at present

named Casey. It was opened in 1969.

“LAW ERA”

During the “Law Era” (1949-66) Australia’s greatest Antarctic contributions in exploration and scientific research were achieved. The Antarctic Division was created and built into a vigorous and efficient organization. Law led the expeditions that set up the Mawson and Davis stations and that took over Wilkes Station from the Americans. Patterns for the provision of chartered ships and for logistical and scientific support of the stations were developed.

Year after year the ships relieving the ANARE stations extended their voyages to include coastal exploration along the full extent of Australian Antarctic Territory. ANARE field parties working from Mawson, Wilkes and Davis travelled hundreds of miles inland to extend this exploration to embrace a total area in excess of a million square kilometres. Law himself led eleven voyages of coastal exploration, making 28 new landings. ANARE aircraft, flown by RAAF personnel in the first instance and later by commercial pilots, carried out photo-flights covering vast areas of Australian Antarctic Territory and transported field parties of surveyors, geologists and glaciologists to remote regions.

As a result of Law’s vigour and foresight, Australia was able to secure the three best sites for Antarctic stations that exist over a distance of 4,000 miles of coast and to forestall much of the extensive work that USSR expeditions were to do in this region.

During this era, Australia’s Antarctic scientific programs, in a multitude of disciplines, produced results of a quality that kept Australia’s international reputation at a high level.

It can be said that the “Law Era” established an enduring platform for Australia’s continuing Antarctic endeavours and completed the broad exploration and mapping of all unknown areas of Australian Antarctic Territory. E

AVIATION

Overcoming the Tyranny of Distance

by Paul Buddee

Five years before the first white settlers arrived in Australia, in November 1783 man began his exploration of the space surrounding the earth, when he first ascended into the air in a balloon in France.

In 1844 a correspondent to the "Sydney Morning Herald" brought to public notice the possibility of the balloon as an effective mode of travel and for exploring the continent, in the safest and cheapest manner.

It is possible that this set a remarkable ex-convict and later a statesman, Dr. William Bland in 1851 working on the design of a steam driven hydrogen filled airship which he called "Atmotic Ship". This, would he said "allow us to visit and explore those parts of our globe which are more difficult of access." Though this remarkable man lived until 1868 he failed to win the interest of anyone, though he was anticipating the invention of the Zeppelin by forty nine years.

There is no record of any other developments in aviation until 1st February 1858 when it was reported that W. Dean had ascended in a balloon from Cremorne Gardens in Victoria and travelled over eleven kilometres before descending safely. On that date the history of Australian aviation began.

LAWRENCE HARGRAVE

However it was not till 12th November 1894 that Lawrence Hargrave raised himself from the ground 5 metres, that practical Australian research into heavier than air machines began. Modern research has shown that Hargrave had worked out all the principles of heavier than air flight, but due to the lack of a suitable engine, could not get this machine into the air.

In 1909 G. S. Taylor and Major Charles Rosenthal formed an organisation known as the "Aerial League" and this could be said to be the first group of people who were determined to wake the general public and the Government up to the fact that Australia lagged so far behind the

rest of the world in aviation and that the aeroplane had a future in Australia.

Then on 5th December 1909 G. A. Taylor in a glider made the first free flight in a heavier than air machine in Australia, when he flew from some sandhills near Narrabeen in a machine based on the principles that Hargrave had enunciated, covering 91 metres on the first flight and 237 metres on the second. Five days later C. Defries attempted the first flight in a powered aircraft. One newspaper declared that he left the ground while another denied it. The "Aerial League" refused to recognise it as a flight.

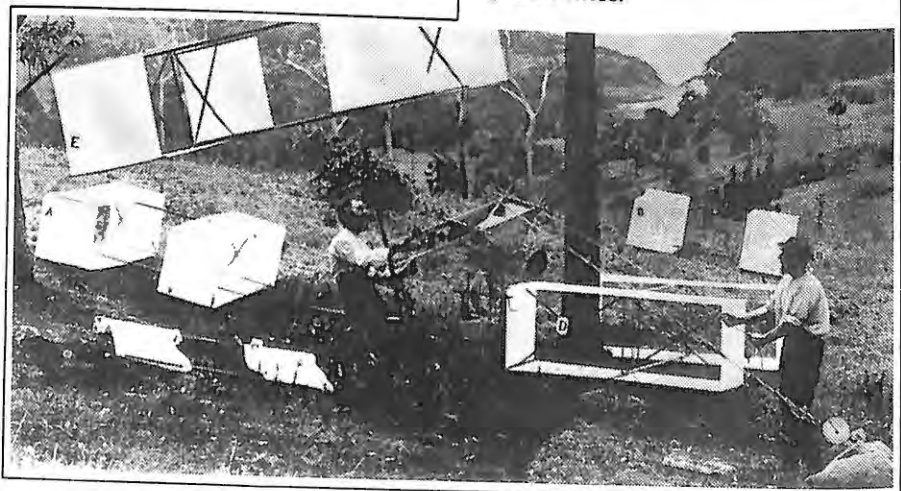
"The Aerial League" declared the first flight to have occurred on 18th March 1910 when Ehrich Weiss ("Harry Houdini" the Escapologist) filled all their requirements for powered flight. There is even some doubt as to if he did deserve this honour. On the morning he took off, the Adelaide papers reported in full, that a young man F. C. Custance

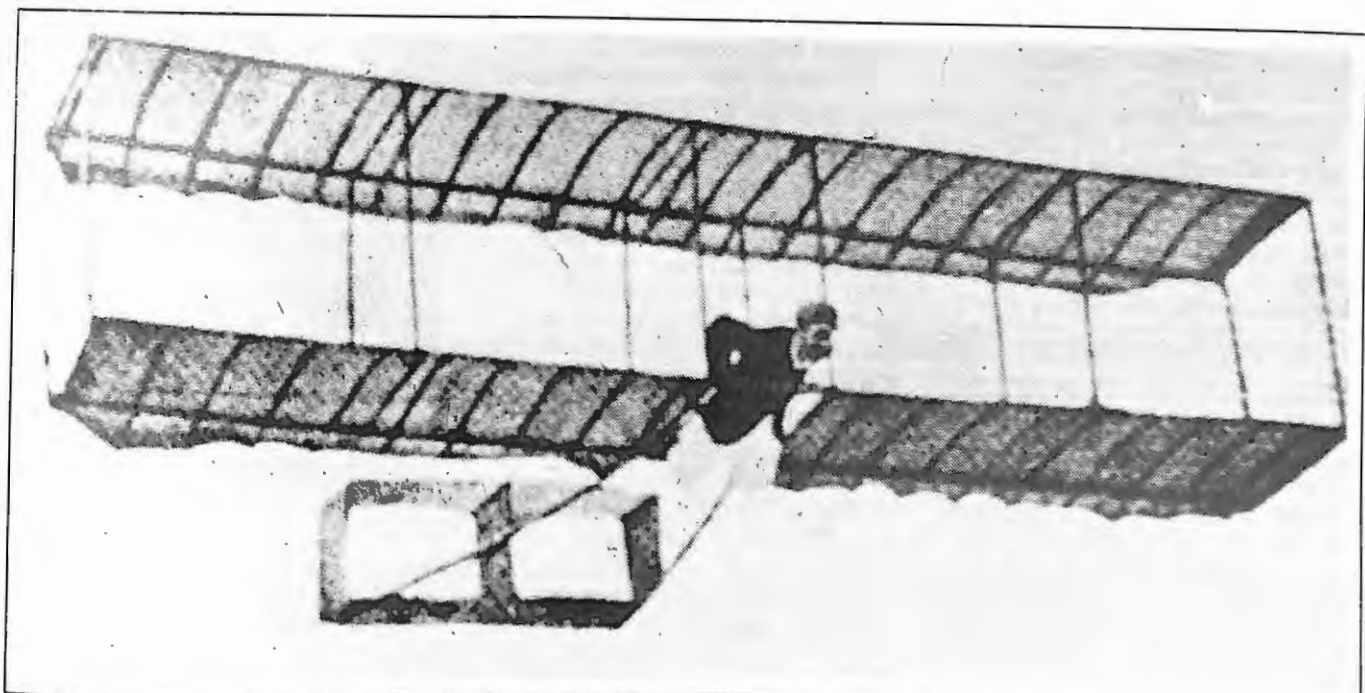
piloted a plane for five minutes over country fields on the morning of the 17th in the presence of reputable witnesses. However the "Aerial League" gave the honour to Ehrich and the matter is still being argued about to the present day.

In this respect it is a sad fact that no definitive history of aviation in Australia has yet been compiled. Many accounts that have appeared in popular encyclopaedia and even in what are claimed to be histories of aviation are, in some cases inaccurate or fail to give credit to the early pioneers when it is due. However, what records do show is that initially, in Australia, we seemed to be singularly lacking in imagination in relation to the early practical conquest of the air.

G. A. Taylor took an active part in prompting the Commonwealth Government into contributing half of an award of £10,000 to the first Australian to build a plane and put it into the air. With only the thought that such a plane could be of military value, this prize offer became useless when the Government stipulated that the plane must be able to hover. It was equivalent at the time to our asking the Concord to fly backwards.

Lawrence Hargrave testing the lift of box kites.





G. A. Taylor and his glider.

FIRST AUSTRALIAN BUILT PLANE

The first Australian built plane took to the air under the control of its builder J. R. Duigan. It was a pusher engined bi-plane and by 1911 was flying a thousand metres on a semi-circular course, but with P. Woodward who also built a plane, Duigan did not become eligible for the £10,000 prize. It is interesting to note that it was not until 1914 that the first Australian made semi-rigid dirigible made its flight over Sydney with its owner A. J. Roberts at the controls.

Within the next two years very considerable development had been made in relation to the civil use of the aircraft, with the first passenger flights, the first interstate flights and the first flights carrying mail. It is possible that civil aviation could well have developed strongly at this time had not the war intervened. During the war years, though the development of the aeroplane was advanced in an astonishing fashion, its use in Australia was subject to military requirements and the training of capable aviators.

With the war over, however, the Government of the day offered a prize of \$10,000 for the first flight by Australians from England to Australia, and many people living today remember the epic flight of Ross and Keith Smith in 1919. These two fine airmen with their flight crew Sgts J. M. Bennett and W. H. Shiers brought to the world's attention the fact that flight was possible to the most remote parts of the earth. They set an example to other Australian and

British airmen and showed that here was a real challenge to the ability of men and the capacity of planes to reduce the month long time by ship very considerably.

Within the next fifteen years there were some magnificent record breaking flights by the air aces of the time, but it was left till 1934 during the Victorian Centenary Celebrations, for the average person to realise the possibility of normal airline travel to England. Scott and Black in their "Comet" won the race travelling the 18,239 kilometres in 70 hours 54 minutes. This was splendid in itself, but more importantly the second and third places were filled by planes from regular airlines in Europe, one carrying mail and passengers and arriving in four days.

CIVIL AVIATION

Fortunately, internally in Australia, in that same fifteen years, the same spirit that drove the Smith brothers to achieve the almost impossible was at work within Australia. In 1920, when the Defence Department created a Civil Aviation Section to establish control of all flying and all aspects of the aviation industry, the stage was set for the beginning of civil airways.

Major Norman Brearley, later to be knighted for his achievements in aviation, developed the first regular air route in Australia, when he established the Geraldton to Derby weekly service. The initial flight on Sunday 4th December 1921 with three planes ended in tragedy, when on the second day one of them crashed and killed the pilot and passenger. Shocked by

the tragedy, Brearley himself, now aware of the dangers on the route, again inspected the facilities available and realised that the situation was so dangerous that the flight might have ended even more tragically if he had continued. He insisted on an investigation of the route by the Civil Aviation authorities with such effect that when the service started again in March 1922 it was able to fly with greater safety from then on.

A year after Brearley's first efforts, two Queensland pilots established a small flying company. They were ex-fighter pilots Wilmot Hudson Fysh DFC and Paul McGinness DFC DFM. Gaining the admiration and support of their first passenger and wealthy grazier Fergus McMasters they widened their efforts and thus the "Queensland and Northern Territory Aerial Services" went on to greater things internally and internationally as "QANTAS".

The third major air service came into operation in mid 1924 when war hero Captain H. J. Larkin, who had already established a small service in 1922, broadened out to form the "Australian Aerial Services Ltd" with interstate flight, from Adelaide to Sydney. By this time Norman Brearley had extended his northern airlines to Perth and was looking forward to creating an air route to the Eastern States.

All this caused the Civil Aviation Department enormous problems. It is interesting to note that it was not until 1924 that it conducted its first aerial circumnavigation of Australia, when its

Controller of Aviation, Colonel Brinsmead, determined to report in full on the inadequacies of landing grounds and equipment in Australia. It is over sixty years since this forceful man endeavoured to bring some order into the chaos of early aviation system and in that time his department has passed from defence control to a number of other organisations and Federal ministries with varying results.

AIR SAFETY

Unfortunately the initial tardiness to provide for the mounting requirements of the airline has extended in various ways to the present day. Late this year a special TV production claimed that some major airports were not up to standard and could be unsafe due to the most modern equipment not being provided. The report claimed dangerous situations were averted more due to the skill and devoted attendance of the

airport control authorities than to the standard of equipment.

In the air itself the early efforts of the original people in the first three civil air lines set a pattern which in the succeeding years resulted in more airlines being established by other men of ability all over Australia. It was a piecemeal development with many failures and many heart breaks but from it came a network of airways covering every small corner of the continent and then extending abroad into world competition.

With our limited ability to produce the great aircraft required for the major air routes and the specialised aircraft for the more remote regions, we have become discriminating users and buyers of the best that the world aircraft industry has to offer. This combined with highly trained and efficient air crews has given us a reputation for air safety which is second to none. Such efficiency needs to be backed up to the full by adequate modern facilities throughout the country.

At this time, when the nation appears to be stocktaking on its 200th anniversary, our transport systems on land, sea and in the air need full review. Of the three systems, aviation

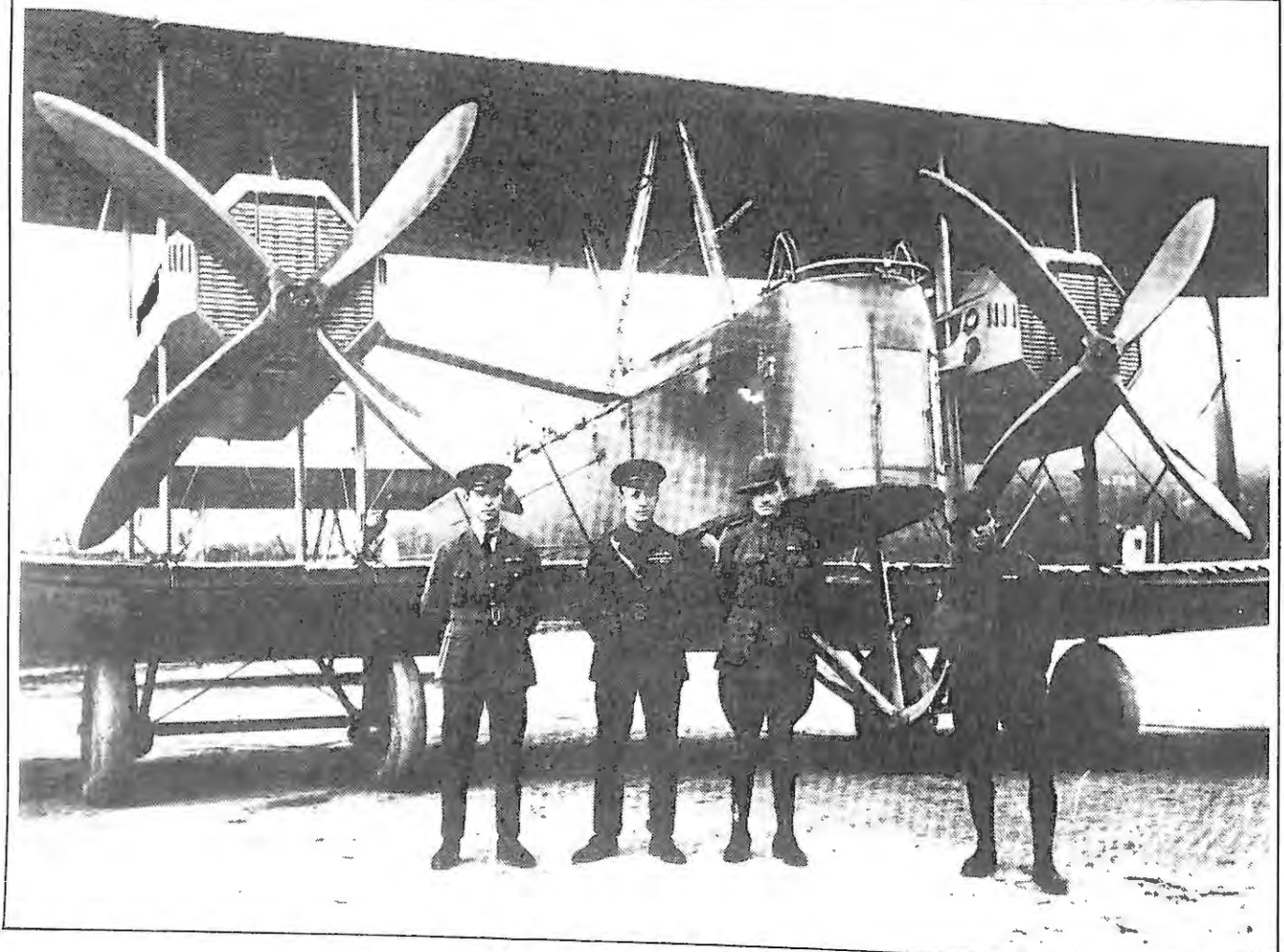
in its very brief period of development since 1920 has been of the greatest value in reducing the "tyranny of distance". Only within the last decade has an all weather tarred road been completed round Australia; only a few years earlier was the first stage in the break of gauges between east and west being partly overcome by the completion of the Indian Pacific Railway line. In aviation we still await the completion of safer landing places, cheaper air travel, and more realistic conditions than the present airline systems permit.

Now is as good a time as any to decide what we are going to do about it.

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Paul Buddee is the author of the well known book *The Call of the Sky*, which is a recognised authority on the establishment of civil aviation in Australia.

The Vickers Vimy and crew (L to R: Lt. Keith Smith, Capt Ross Smith, Sgt J. M. Bennett, Sgt W. H. Shiers) that completed the first flight from England to Australia.





Water Into Steel

by John Brett

On this, the driest continent on earth, few realise the importance of one development to Australia's future. The author of this article describes the importance of the steel tube.

When we state that no other nation in history has been developed as fast as Australia, there is always an outcry from the New Zealanders. Probably with some justification. Certainly both nations started out at the same time, with the same Anglo-Saxon stock, but the raw material each had to work with was vastly different. While New Zealand was a small and fertile land blessed with abundant water, Australia was the driest continent on the globe, which had some areas of annually fertile land, but the rest was dry and of staggering dimensions.

Two hundred years later, with 70% of its population jammed against the Tasman Sea, living a sophisticated life with every need in abundance, not many can recall the start of it all.

When Captain Cook sailed up the eastern coast, he had no idea what lay beyond his gaze. Here was a dry land with no indigenous fruit — vegetables — cereals or grain. It supported only a small population who lived mainly by hunting. No sane man would despatch a fleet of convicts to the other side of the globe, with the instructions to turn the driest continent into one of the granaries of the world, or make it the world's largest supplier of wool. Nor would he instruct them to produce enough food to feed another nation, as well as themselves. But in less than two hundred years all that happened and more besides.

It is easy to look back on our technological progress and list the names of scientists, engineers, medicos, aviators or just ordinary Australians who discovered things, or invented something that was a world's first. It would be hard to find another nation who gave so much to the world as Australians have, and are still doing.

But most of that has happened in the last 100 years. It all started once the steam engine replaced the horse, to power the last important invention called the wheel. The steam engine had hardly reached our shores when its successor, the internal combustion engine, arrived. From then on, more was to happen in 100 years than in the whole of history before. But the first

100 years of Australia's development took place with the same tools as any other nation had, the horse and the wheel. The great difference from all development that preceded it, was the lack of rainfall and water and the calibre of the people who were to overcome the enormous obstacles.

We turn on a tap today with hardly a thought about where that water comes from, or how it got to the tap. As we are celebrating our Bicentenary, reticulated water is celebrating its first centenary. Australia's development has taken place in two equal eras, at two distinct and vastly different paces, and the one single object that separates our historical development, was the invention of the steel pipe (or tube).

FIRST EXPLORERS

When the first explorers set out from the eastern seaboard to find grazing land in the interior, right from the start their pre-occupation was with rivers and creeks. Because some of them never found sufficient water during their expedition, they perished. The settlers that followed the explorers, settled and took up land, first along the rivers, then the creeks, leaving vast areas unoccupied because there was no permanent water.

The sheep flocks expanded rapidly, later cattle herds were to flourish, and with the development of the merino sheep, so suited to dry land, the vast inland areas of low rainfall were stocked. In time the merino was to flourish in the semi arid regions.

Sheep numbers climbed to 50 million, then 80 million. The first great droughts we were to know would wipe them out in tens of millions. Cattle suffered no less. After each drought numbers would climb again slowly till the next drought and the next disaster. Water not only limited sheep numbers, it drove thousands of pioneering families back towards the coast each time, some never to return to the battle. Once the water holes in the creeks and rivers dried up, the only way to get water was to dig wells into the subterranean reservoirs. This was often sufficient to supply a family and a few domestic animals, till the next rain. The only storage tanks they had were the old ships tanks, that held only 400 gallons.

So development reached a peak which rose and fell with the droughts. Even population was limited finally by water. In wet years you could perish from drowning, and in drought years perish from thirst, and likewise your stock. The size of settlements was mainly decided by the quantity of water, and in the arid regions, even the size of a family could be decided by the availability of water. Today a drought is bad enough, but with road and rail transport large numbers of stock can be moved to other places with water, or to the meatworks. Certainly there is a cost and some losses, but the pioneers could only stand and watch their flocks and herds die. A total loss. Sometimes they perished in millions amongst sufficient feed, but with no water everything perishes. The kangaroo numbers were limited by water. Once their water hole dried up they moved to find another, but it may have been 100 miles or more away and they perished on the way. Today the country is dotted with dams and water troughs and bore drains, and the kangaroo population is never diminished like it was before we watered the land.

The vast interior was not fenced for the first 100 years. Until wire came along fences were constructed mainly with timber. What they called 'post and rail' fencing. Along the coast and on the ranges in the better and more consistent rainfall areas, there was abundant timber for fencing, so they had horse and cow paddocks. Inland flocks and herds were kept in an area centered on the water supply. Sheep might graze two or three days out from water, but return to the water, they must. This was the era of the shepherd who had to survive on the same water.

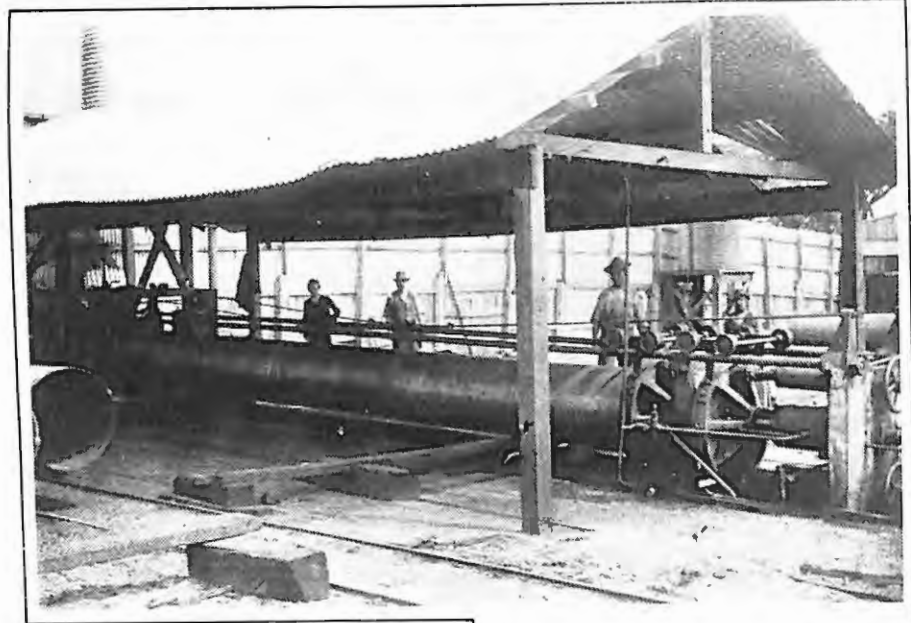
So at the beginning of 1880 the capacity and population of inland Australia was governed by droughts and the duration of surface water. In good years there was abundance and eternal hope – but in drought years hardship and sorrows and despair. The rural potential of Australia had reached a plateau, which was governed by the availability of water.

THE STEEL TUBE

Unknown to the battling pioneers, an event had taken place on the other side of the world, which was going to transform this arid land. Before the turn of the century the pace of development and security of these people was going to send this country hurtling towards a productive capacity that was never dreamt of before.

In 1860 Andrew Stewart began the manufacture of steel tube in Glasgow, Scotland. At the same time Lloyd and Lloyd was founded in Birmingham, England, who also commenced the manufacture of steel tube. Later they amalgamated to become Stewart and Lloyds, who were to supply the world with its first steel piping. In 1882 James Brown opened an office in Sydney and began the importation of steel tube, as the Australian agent for Stewart and Lloyds.

From that time on Australia was transformed. Not in the beginning by pipes carrying water horizontally, as we are accustomed to seeing it today, but by pipes being drilled vertically into the ground. The pioneers already knew that large quantities of water lay beneath the creek and river beds, where they had already sunk their wells. It was a slow process to sink and line the wells, and a laborious job to haul the water up. It was not long before somebody hammered a pipe into the creek sands, and the water entered the pipe. The hand pumps then in existence would pump the water up provided it was no more than 14 feet below the surface. Their joy was short lived though, for the sand soon entered the pipe with water and



choked the flow. No sooner did this happen than someone invented the spear pump. The spear was a spear shaped point on the pipe end, with very narrow fluting that kept the sand out but let the water in. So the first underground water was tapped; they were on the way to total access to all the underground water.

While the spear pumps were adequate for domestic and garden water, and certainly ensured the survival of the settlers, they were not big enough to supply large quantities of water for stock. But it was not long before the next big step forward arrived. Somebody invented the bore-hole pump. This was a pump that could be lowered to the level of the underground water, that rose in the pipe. The suction pumps that were mounted on the surface could only lift water that was less than 14 feet below pump level. The new bore hole pumps were lowered into the water and a vertical shaft inside the pipe and through the rising water reciprocated the pump at the bottom and the water was lifted up. The limitation of these pumps was the amount of power available to lift the weight of water. The first pumps were driven by horse engines, similar to those used before to drive mills and chaff cutters.

But invention and discovery were accelerating, and soon the steam engine was driving the pumps; then later the internal combustion engine. Almost at the same time pipe diameters increased and pipes were pushed to greater depths in the sands, then came the drilling machine. The first drilling machines were percussion drillers, where a sharp steel point was repeatedly dropped to pound a hole through the earth. Percussion drilling allowed holes to be sunk in the ground, and so moved bores and

The construction phase of Australia's most famous steel tube, the Goldfields water pipeline in W.A.

(Photo courtesy Water Authority of W.A.)

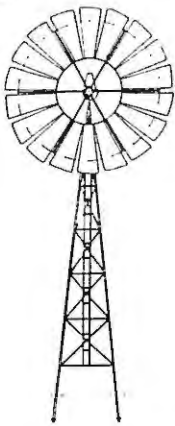
pumps out of the creek and river beds to high ground, away from the destruction of floodwaters. At first the holes were bored beside the creeks and rivers, where they struck the underground aquas of the old creek beds. The drill made a hole slightly larger than the pipe to be used, so the pipe could be lowered down the hole, instead of having to be driven.

SETTLEMENT

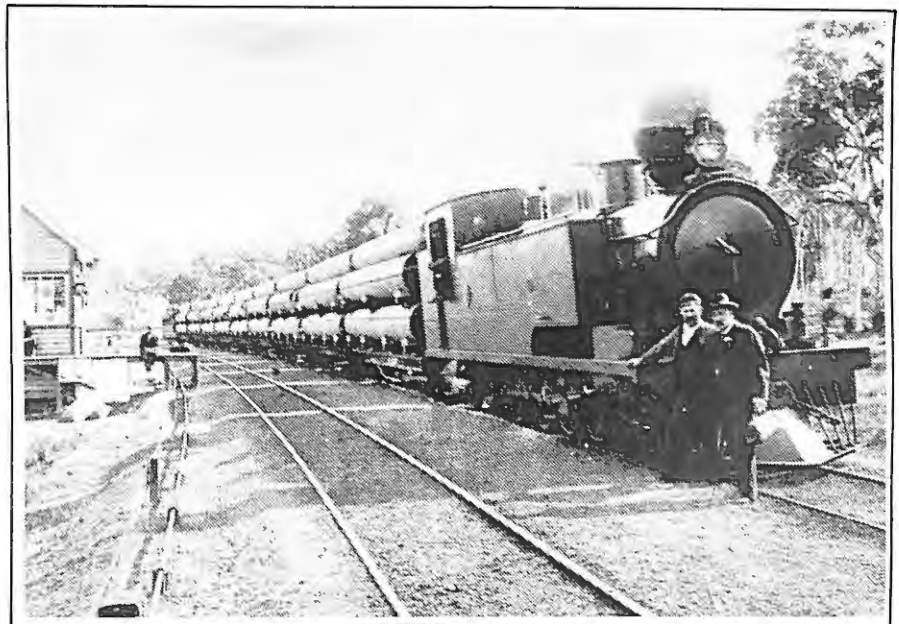
So, along the water course banks, water became available permanently. Settlers stayed and the embryo towns were established. But, in the vast inland areas away from the creeks and rivers, permanent grazing was still impossible. It was not long before somebody drilled a hole through a claypan, miles from any watercourse, and struck water! The vast subterranean water beds of Australia were discovered and down went the pipes into this new found lifeblood. As fast as drilling machines could be made they were hauled into the interior to drill, and seldom was water not discovered. The final and most startling discovery came when drilling for subterranean water, the water gushed out of the hole being drilled and drenched the drillers. After recovering their drill head the water roared out in a non-stop torrent. They had discovered the great Artesian basin which lies under most of western N.S.W., Vic, and Queensland.

This was the water that was to transform Australia. Not only did it lie under the lowest rainfall areas of the continent, no pump was needed to bring it up. It was free! This artesian water was fed into drains, which ran for miles, and so made stock water available over these enormous areas. At first the hole in the ground was used to allow the water to surface, but the bore holes soon caved in. No matter any more, for the new steel pipe was lowered down the holes and with a valve on the surface the flow could be controlled.

Away from the artesian basin, in the enormous areas where the water had to be pumped up, the new engines, having to run unattended, often miles from the station, were not the answer to remote pumping. Breakdowns could leave stock without water and getting fuel to them was not so easy before the motor vehicle. The solution came in an old form with a modern look, in the shape of a windmill. Steel was becoming available in a variety of shapes and soon the steel tower with a steel fan atop began to appear across the land. The first windmills were simple, with the fan shaft having a crank on one end, to which the pump rod was attached and extended down the bore hole to the pump. Not much wind was required to keep the pump going at a steady rate and in no time Australia's skyline was dotted with windmills, carrying aloft on their tails names that are still there. Southern Cross - Comet - Alston and others.



"... in no time Australia's skyline was dotted with windmills ..."



COBB & CO

Part of the 300 mile long Kalgoorlie pipeline.

The windmills and the water not only watered the stock and made human residence permanent, they paved the way for the vast Cobb & Co coach service, which was to criss-cross the whole of the eastern continent. On the flat country, a staging post every 30 miles, was only possible because of the windmill and its water. Even the expansion of the railways into the west was precipitated by the constant availability of water for the steam locomotives.

In the first 50 years of its existence the steel pipe was to transform the driest continent on earth to the capacity it has reached today. It made possible permanent residence for the pioneers, and the full grazing capacity of the land to be used. Today it brings up oil from below the ground or from the sea floor. Plastic pipe is now replacing it in many applications, and irrigation water is brought to the surface in huge quantities through large diameter pipes.

There are many interesting developments associated with the arrival of this new steel pipe. In 1902 just 40 years after its invention, a pipeline 300 miles long, brought water from the coast to the goldfields of

Kalgoorlie. The enormous kangaroo population of today is sustained only because of wide distribution of water, where before the pipe they perished in thousands each drought. The Aborigine 'walk-about' phenomenon came about around the new centres of permanent water. The drying up of their water holes brought them around the homesteads where there was water, and they worked on the station as stockmen. But when the rain came again, they took off, back to their territory to resume their age-old life. A lot of settlers never understood why they came, or left just as suddenly. 'Gone walk-about' was simply returning to their accustomed life.

Australia has cause to celebrate many individual men and women this Bicentenary, who in their different ways made it possible for this nation to be built, and in many ways make the whole world an easier and better place to live. While it has not turned into that sort of celebration, if ever we do acknowledge and celebrate those worthy individuals, perhaps we should acknowledge the enormous contribution Andrew Stewart and the Lloyd's made, not only to Australia but to the whole world.



Christmas Greetings

*We wish our readers a HAPPY and HOLY CHRISTMAS
and a prosperous 1989.*





The Women of the West

by George Essex Evans



They left the vine-wreathed cottage and the
mansion on the hill,
The houses in the busy streets where life is never still,
The pleasures of the city, and the friends they
cherished best:
For love they faced the wilderness — the Women of
the West.

The roar, and rush, and fever of the city died away,
And the old-time joys and faces — they were gone for
many a day;
In their place the lurching coach-wheel, or the
creaking bullock chains,
O'er the everlasting sameness of the never-ending
plains.

In the slab-built, zinc-roofed homestead of some
lately-taken run,
In the tent beside the bankment of a railway just
begun,
In the huts on new selections, in the camps of man's
unrest,
On the frontiers of the Nation, live the Women of the
West.

The red sun robs their beauty, and, in weariness and
pain,
The slow years steal the nameless grace that never
comes again;
And there are hours men cannot soothe, and words
men cannot say —
The nearest woman's face may be a hundred miles
away.

The wide Bush holds the secrets of their longings and
desires,
When the white stars in reverence light their holy
altar-fires,
And silence, like the touch of God, sinks deep into the
breast —
Perchance He hears and understands the Women of
the West.

For them no trumpet sounds the call, no poet plies his
arts —
They only hear the beating of their gallant, loving
hearts,
But they have sung with silent lives the song all songs
above —
The holiness of sacrifice, the dignity of love.

Well have we held our father's creed. No call has
passed us by.
We faced and fought the wilderness, we sent our sons
to die.
And we have hearts to do and dare, and yet, o'er all
the rest,
The hearts that made the Nation were the Women of
the West.

