WHAT IS

AN ENVIRONMENTAL STUDY ?

by

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INTRODUCTORY ADDRESS

THE FIRST AUSTRALIAN WORKSHOP
ON
ENVIRONMENTAL STUDIES

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1. PREAMBLE

There is always a challenge in giving the formal introductory address to a lengthy workshop. It is particularly challenging when the title of the address is the same title, in question form, as that of the Workshop itself; it is even more challenging when the Workshop is the first of its kind to be held in Australia.

If I could satisfactorily answer on this very first day the question, "What is an environmental study?" then the remaining discussions this week, while presumably interesting, would be unnecessary, and mere matters of detail. In fact, of course, this paper must be read in the context of its role, as an opening address and "thought starter".

In this respect I have included a list of questions associated with the topic. At the end of the week, the concluding address by Dr Downes (which will be a summary of the Workshop) can be compared with these introductory comments themselves. Answers of a "before and after" nature can be compared and used as a measure of the success or otherwise of this Workshop.

Questions which cannot be foreseen or anticipated should come from the Workshop itself. Furthermore, while one role of a workshop is to pose questions, to discuss them and answer them, another function, of course, and a very useful one in itself, is the postulation of questions which will remain unanswered when the Workshop concludes.

The questionnaire is therefore intended to be provocative, or at least, evocative. It is not a survey per se, although one group at this Workshop might care to use it to begin a survey. The list of questions is not all-embracing, nor are the alternative answers. The "Yes/No" format of answers is for convenience only, to assist intercomparisons.

2. QUESTIONNAIRE

The questionnaire on the following pages is positioned early in this paper so that it can be partly answered immediately, before I make too many comments of my own. Readers (but not listeners) should therefore begin answering it at once!

One aspect that is clear from the questionnaire itself is the need for the reader (and the participant) to consider very carefully the way he may have answered differently if the word "government" was replaced by "developer". I return to this when discussing who should pay for the environmental studies.

Another aspect is the role which the public[1] should play in environmental studies. It is all very well to talk about "public participation" in decision-making, but ultimately someone has to decide the extent and timing of such participation.

If you have more public participation, then you simply slow down the process of reaching decisions. You may make them more acceptable in the process, but also you may not. So should you build into statutes on environmental issues fixed - yet adjustable! - time intervals, or just have them flexible?

One issue that must be faced is whether you answered the questionnaire as an environmental scientist, a bureaucrat, or "just" as a private individual or citizen.

Unfortunately, but understandably, in an environmental study, even a scientist may find a problem similar to that of Johnson's philosopher. He may find his humanity keeps on breaking through!

That would be acceptable if it was not for the fact that the public and the press media hear not John Q. Citizen of Suburb X speaking, but Doctor or Professor John Q. speaking.

Because environmental issues can so easily - and often so rightly - be mixed up with human emotions, scientists who comment on them bear a heavy burden of responsibility if they join in public participation.

They must use, at all times, their best efforts to make it clear when they are speaking as professionals to their peers, and when they are speaking simply as concerned citizens. I will use the controversy about uranium to illustrate this point later.

In environmental studies, where expertise and baseline data are so often lacking, the decision-maker must know when he is hearing a professional appraisal, and when it is only a personal opinion. The credibility of environmental studies rests heavily on such a clear distinction. How you reach such a clear distinction in the real world is a topic for perennial discussion.

QUESTIONNAIRE

Each question to be answered at four stages --

(1) prior to reading this paper
(2) after reading this paper
(3) at the conclusion of the Workshop per se
(4) after Dr Downes' summary

(mark each answer in ink)

QUESTIONS	STAGE 1	STAGE 2	STAGE 3	STAGE 4
AN ENVIRONMENTAL STUDY SHOULD --				
1. be complete in itself	Yes/No	Yes/No	Yes/No	Yes/No
2. be carried out only by:				
government agencies	Yes/No	Yes/No	Yes/No	Yes/No
or				
consultants	Yes/No	Yes/No	Yes/No	Yes/No
or				
independent researchers	Yes/No	Yes/No	Yes/No	Yes/No
or				
a composite of these	Yes/No	Yes/No	Yes/No	Yes/No
3. be carried out at the expense of:				
government	Yes/No	Yes/No	Yes/No	Yes/No
or				
developer	Yes/No	Yes/No	Yes/No	Yes/No
or				
mixture of these	Yes/No	Yes/No	Yes/No	Yes/No
4. be:				
pure science	Yes/No	Yes/No	Yes/No	Yes/No
or				
applied science	Yes/No	Yes/No	Yes/No	Yes/No
or				
hybrid	Yes/No	Yes/No	Yes/No	Yes/No
5. be subject to public input	Yes/No	Yes/No	Yes/No	Yes/No

QUESTIONS	STAGE 1	STAGE 2	STAGE 3	STAGE 4
6. (if yes to Q. 5) subject to public input				
at the beginning	Yes/No	Yes/No	Yes/No	Yes/No
or				
throughout the Study	Yes/No	Yes/No	Yes/No	Yes/No
or				
on a draft report	Yes/No	Yes/No	Yes/No	Yes/No
or				
before recommendation to government	Yes/No	Yes/No	Yes/No	Yes/No
7. (if no to Q.5) in the form of a draft report be made public before a report is submitted to:				
government	Yes/No	Yes/No	Yes/No	Yes/No
or				
professional readers	Yes/No	Yes/No	Yes/No	Yes/No
or				
decision-maker(s)	Yes/No	Yes/No	Yes/No	Yes/No
or				
public	Yes/No	Yes/No	Yes/No	Yes/No
or				
all of these	Yes/No	Yes/No	Yes/No	Yes/No
8. include as a pre-requisite to a final report a professional seminar	Yes/No	Yes/No	Yes/No	Yes/No
9. provide the opportunity for higher degree research and publication prior to:				
draft report	Yes/No	Yes/No	Yes/No	Yes/No
or				
final report	Yes/No	Yes/No	Yes/No	Yes/No
or				
government decision	Yes/No	Yes/No	Yes/No	Yes/No

QUESTIONS	STAGE 1	STAGE 2	STAGE 3	STAGE 4
0. result in professional scientists being prohibited from professional comment, if they work under contract or are in receipt of specific government support, for this study:				
prior to government decision	Yes/No	Yes/No	Yes/No	Yes/No
or				
subsequent to government decision	Yes/No	Yes/No	Yes/No	Yes/No
or				
both	Yes/No	Yes/No	Yes/No	Yes/No

3. DEFINITIONS OF ENVIRONMENT

Another perennial topic is the definition of the word "environment". It could be a plague on the efficiency of this Workshop unless a position towards a definition is adopted very early.

To illustrate the complexity of the problem one merely has to choose a few definitions and compare them.

A few are listed in Table 1. These have been put into law by various Parliamentary bodies, of States and of a country. One is from a dictionary chosen at random.

In my official capacity as Director of Conservation and Environment in Western Australia I am obliged to follow the first definition in Western Australia.

The differences of Table 1 can pose problems for officers from each State and the Commonwealth in striving to reach agreements bilaterally or for presentation at Ministerial Councils, such as the Australian Environment Council, or the Council of Nature Conservation Ministers.

But at this Workshop I suggest - or challenge, if you wish - participants to develop as professionals - not officials - a definition of "environment" that is (unofficially) generally acceptable, or generally applicable to Australia.

Should the environment be defined at all, or should one take the approach implicit in the New South Wales legislation that it is pollution or an adverse effect that is important?

Should one be physical, as with the Tasmanian legislation?

Or should one be people-oriented, as with the Federal legislation?

Should one be geographically restrictive, as with Ontario?

In posing such questions as a challenge, I feel that I must also recommend discussion of them for "after-hours" sessions for reasons I will now discuss.

TABLE 1

DEFINITIONS OF ENVIRONMENT

1) Environmental Protection Act 1971 (Western Australia)

"Environment" means the physical factors prevailing in the State, including the land, and the coastal waters, sea bed and subsoil adjacent thereto, water, atmosphere, sound, odours, tastes and radiation, the social factor of aesthetics and all factors affecting animal and plant life.

2) Environment Protection (Impact of Proposals) Act 1974 (Commonwealth)

"Environment" includes all aspects of the surroundings of man, whether affecting him as an individual or in his social groupings, and "environmental" has a corresponding meaning.

3) State and Regional Planning and Development, Public Works Organisation and Environmental Control Act 1971 (Queensland)

"Environment" means the conditions and influences to which living matter is sensitive and capable of reacting.

4) Environmental Protection Act 1970 (Victoria)

"Environment" means the physical factors of the surroundings of human beings including the land, water, atmosphere, climate, sound, odours, tastes, the biological factors of animals and plants and the social factor of aesthetics.

5) Environment Protection Act 1973 (Tasmania)

"Environment" means the land, water and atmosphere of the earth.

6) State Pollution Control Commission Act 1970 (New South Wales)

does not define "Environment", although one of the "responsibilities" (Section 11(a)) is to "control .... pollution of the environment". The Act does not define pollution either, but it defines "waste".

7) The Environmental Protection Act 1971 (Ontario, Canada)

"Natural environment" means the air, land and water, or any combination or part thereof, of the Province of Ontario.

8) It is of interest to note that a dictionary definition (selected at random) is:

Chambers Dictionary of Science and Technology

"Generally, the physical surroundings of an object or area, e.g. the temperature, humidity, etc. of the enclosure of a piece of machinery. Specifically refers to the natural surroundings of an organised human society, taking account of the effects of that society, reflected back on to its population in both quantifiable and subjective manners. It is recognised that civilisation implies consideration for all natural objects, living or not, and their interactions."

4. PHILOSOPHIES AND ECONOMICS

Differences in the definitions in Table 1 do not arise just because lawyers like to argue. Differences can arise from the existence of different philosophies and personal attitudes. And because these differences are so intensely personal, and debatable, I recommend that you debate them "after-hours". Some of the reasons for the differences must be probed here, however, so as to explore further just "what is an environmental study?"

Differences of definitions can come, for example, just from differences of philosophy as simple and as fundamental as the differences between a pessimist and an optimist.

Fundamentally, one can choose between a Napoleonic code-of-justice and one of Westminster, in deciding the purpose of an environmental study.

Must an industrialist or developer prove himself innocent, or should he be judged innocent until he is proven guilty?

Just what does the "polluter-pays" principle really mean in this context of a true systems approach to environmental studies and economics?

Must a developer pay for a complete "environmental study" before he does anything, or is the responsibility on the "government" to prove that the developer is (or could be) a polluter? Or is there a middle way?

Should an environmental study find which levels of pollution can be proven harmful, or directed to find those which are proven safe? Or do you allow the first level, and set your goals for the second? And who pays for the environmental studies in either case?

Or instead of judging a proposed developer as necessarily either guilty or innocent perhaps we should think of him as setting a challenge. Since some developments can change the environment for the worse and some for the better, and some to a trivial extent, perhaps the challenge of an environmental study is not so much one of proving guilt or innocence, but one of deciding which natural options are closed, which are left open, or - properly managed - which can be opened that were not open before.

A development need not be just for the enrichment of a developer only. Properly arranged, planned and managed, some developments may enrich mankind. The question must be posed as to how environmental studies can fit into the scheme of things. Must we finish a study before we begin a development? Must we know all the complex atmospheric chemical processes before we permit the Concorde to pass high overhead? Must we benefit a few businessmen the luxury of a speedy airtrip, with hundreds saving a few hours in time, while hundreds of thousands suffer discomfort from fleeting noise underneath. How do you carry out a cost-benefit analysis of these elementary questions?

And so the questions continue to arise. And as the public becomes more conscious and aware of its environment, the cases become more complicated, and costly, and the studies and questions more numerous.

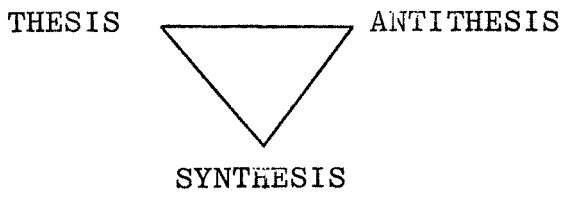
But these are not idle questions. They have to be faced if decisions on the environment are to be made. And decisions have to be made in a climate of political opinion and of public opinion, in times of economic growth and in times of economic depression.[2]

If there is an economic boom, there will be more developments, hence greater threat to the environment (says the pessimist), or greater opportunity for funding of environmental studies (says the optimist). But there are too many studies which need to be done and not enough trained people (responds the pessimist).

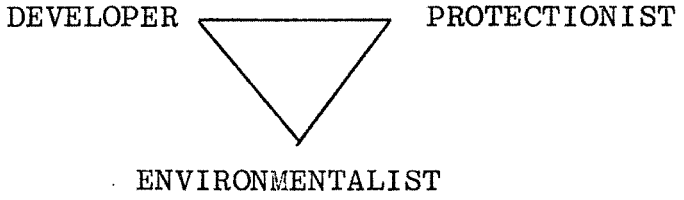
If there is an economic depression, there is less opportunity for funding of environmental studies, (says the pessimist), but less threat from development (says the optimist). But there is less need for them to ever produce final results? (says the optimist).

Environmental studies must be made. But they have to be studies of a quality and calibre that can stand up to intense scrutiny. Therefore they will often be expensive, or appear to be so if one takes a short-term view of the economy. In fact, as I have said often, environmental protection early is generally less-expensive than environmental correction later. Ask the farmer's son about salinity and excessive clearing, ask the fisherman's son about fished-out waters, and ask a petrol-buying commuter whose car has exhaust pollution reduced by add-on gadgets rather than by a redesigned engine.

In philosophy there is a traditional troika --

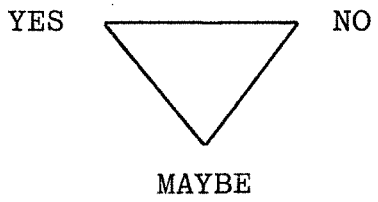


Perhaps in environmental matters one could have --



So, in relating to the economy of any time, I maintain that environmental studies can benefit from development spin-off in a "Push me - Pull you" approach.[3] Another way to phrase this is to support environmental studies by incorporation of the concept of allocation of an "environmental overhead" charge on developments.[2] Experience shows such an "overhead" to be about 1% of capital costs.

To use a "Push me - Pull you" approach, one has to be an environmental optimist (as I am), or else you must confront the possibility that you have just turned the philosophical troika into a --



situation.

If this is the case, then the term "environmental study" may come to be equated with indecision, or time delays, or both.

5. TIME DELAYS

In the real world decisions have to be taken.

Sometimes decisions have to be taken irrespective of the lack of total knowledge about one important feature or another. Sometimes the lack of knowledge is recognisable. For example, some would say that economic decisions relating to revaluation of an economy are dependent upon unknown elements of social responses such as the public's inclination to spend or save. Other decisions have to be made where lack of knowledge is not identified although the basic science or knowledge may be available in other spheres but just not applied to the particular case. One example might be the series of tragic crashes of the Comet airliner subsequently attributed to metal fatigue due to continued pressurisation and depressurisation and stresses near the windows. Metal fatigue was known - but its implications for the Comet were not appreciated until after decisions were made, Comets crashed and people were killed.

Environmental studies are no different in this sense from the examples just quoted. However, they may presently be more evocative of public emotion and emotional reaction in view of the mixture which they generally have of science and sentiment. Economics used to be called the "dismal science". It would be tragic if it came to be that, in many decision-makers' minds the same label was attached to environmental studies. This could happen unless those who carry out the studies live in the "real world".

I therefore recommend that this aspect be included from time to time in this Workshop (see also my questionnaire, and my comments on uranium).

6. PUBLIC PARTICIPATION

Some of the earlier questions involved the desirable role of the public in environmental case studies. I wish to examine this in more detail at this point.

At times of economic stringency such as today it is an unfortunate fact that environmental case studies are rarely carried out for their own intrinsic worth. Rare indeed is the environmental case study that would fulfil the traditional definition of pure science. Instead generally the pure scientist has to "hitch hike" on the coat-tails of the applied scientist who is endeavouring to carry out an environmental case study in response to pressure or requirement from a government instrumentality or a developer or for that matter as a means of earning his living.

Most case studies then will be directed not towards the intricasies of this or that wee beastie but in large part to the effect a proposal may have on the social environment of a particular or general portion of the public or the community, human or other.

Traditionally the role of public participation in decision-making on matters such as town planning has been steadily evolving, although it is in my view still far from satisfactorily resolved in many parts of Australia. However in town planning at least there are set periods for sequence of development of town planning schemes, their display to the public for comments, hearing of objections by appropriate government instrumentalities, for making of subsequent decisions, appeal procedures, ministerial involvement and other often-ponderous bureaucratic processes at work.[4]

Public participation in environmental issues is likely to both arouse more emotion and touch or be based on intangibles such as aesthetics which are generally less easily quantified. It may also involve issues which really require baseline environmental knowledge which is generally lacking.

Public participation in environmental issues is therefore likely to be diffuse, ill-informed, protracted, emotive and vocal but also influential.

But public participation, for better or for worse, is necessary. The environment after all is for people as well as wildlife or as has been said "man is often the forgotten species!"

One problem will remain no matter how good an environmental study may be. Quite simply, for some people, if it proves that a development can (or even should) go ahead, the results of the study will not be accepted. (The converse, unfortunately, can also happen in the real world).

7. EDUCATION AND UNDERSTANDING

Accompanying public participation must be education. I regard it as axiomatic that sensible environmental management has as a necessary (but not sufficient) condition sensible environmental education.

Environmental education in this context is a balanced awareness and understanding by the public, with education of politicians and developers and conservationists. Research activities directed towards solving particular environmental problems or avoiding potential problems are valid environmental studies, of course, but only portion of them.

Ultimately, surely, the need is for an informed public. The public will only be informed or educated if accurate environmental information is disseminated at all levels including primary and secondary schools as well as tertiary colleges and research institutes.

I find it extraordinary that in this entire Workshop devoted to environmental studies there is no specific attention paid to environmental Study - i.e. environmental work at schools. I personally am of the opinion that there is no need to introduce into all school curricula a subject entitled "environment". The preferable approach is for environmental awareness and environmental aspects to be fundamental and interwoven into various other specific subjects such as biology, botany, geology, physics, engineering, etc. (I take[3] the same approach to legislated EISs).

There is a great deal of talk and some useful activity[5] in the field of "environmental education" and it would be remiss of this Workshop to overlook, as its programme appears to overlook, the topic of environmental Study.

8. URANIUM - AN ENVIRONMENTAL STUDY?

The issues associated with uranium, e.g. to mine or not to mine, and with nuclear activities, e.g. to generate electricity by nuclear means or by conventional or other means such as solar, wind power, etc., presently is one of the major issues of public dispute.

It has aroused a degree of political division in the community which has been quoted to be of an extent of thought associated with major issues such as the Vietnam War.

The environmental aspects have been thought by many to be the dominant aspects to the extent, for example, that the report often erroneously referred to as the "Fox Report"[6,7] is regarded as "the" definitive Australian reference on the subject. It would be inappropriate for me here to either criticise or praise the content or conclusions of this report, its format, style or terms of reference or indeed the accuracy of evidence on public Hansard record. However, since in 1973 at the ANZAAS Conference in Perth (and so well before the present "uranium issue" became so public) I commented[8] with particular relation to nuclear tests in the atmosphere,[9,10] it is appropriate at this Workshop for me to make a few general comments relevant to uranium.

I stated in 1973 with regard to the public controversy about upper-atmosphere testing of nuclear devices that in fact many members of the public were confused as to what the issues actually were. The same confusion applies to the present nuclear and uranium controversy. There are really three separate aspects involved --

1. Moral
2. Political, and
3. Environmental.

People wish to assign numbers to issues, i.e. to quantify them. Since you cannot quantify moral and political issues but you can hopefully quantify environmental issues, the word "environmental" has tended to dominate some features of the present dispute.

For those who wish to quantify moral and political issues other than the economics of export and employment, I refer as a "thought starter", to the article by Cohen.[11] Cohen put a value of $250,000 on one human life. He devised a unit called the "mer", being the amount of benefit required to justify an exposure of a human to one rem of radiation. Cohen listed mer equivalents for the USA as his own estimate of $250,000, and others of $100,000, $10,000, $200 and $100. Readers with life insurance policies and those who are worried about uranium and terrorists, or SALT Agreements, can further specify the unspecifiable.

Logically, if one considers time delays of environmental studies of uranium we are left with a penultimate paradox, generally ignored.

If one should go ahead with uranium mining (or its use, etc.) only if the disposal of radioactive waste is solved, then logically one has to be able to show that the problem has been solved.

But to prove this, perhaps one should wait until several cycles or appropriate half-lives have gone by and nothing has "gone wrong". Or one can argue by statistics, genetic mutation times, and so on.

Australia has had a "Fox" report.[6,7] Other countries have had one or more related reports.

How many "Fox reports" constitute an environmental study statistically if only one does not?

To repeat the earlier question, was the Fox report an environmental study as members of this Workshop think of an environmental study? Or, in its attempts to probe the complexities of moral and political issues, of employment and economics, did it somehow stop being an environmental study. According to some of the definitions listed in Table 1, it did. According to some others, it did not. And after the reader has resolved that aspect, he should return to the questionnaire, the topic of public involvement, and the public-debate recommendation of the Fox report.

9. ENVIRONMENTAL STUDIES - VARIOUS VIEWPOINTS

The question posed for this paper is "What is an environmental study?" Therefore, having given some consideration to a few of the relevant aspects, and having personal experience as a scientist, a bureaucrat, a reporter, a citizen, a conservationist and so on, I will offer some different possible viewpoints.

A Scientist's View

A scientist wants to explore and come to understand his environment. He may want to test it, measure it, dissect it, weigh it. He may wish to modify it deliberately and watch the effects to see how - and if - Nature recovers from an impact, small and calculated. He may wish simply to stand aside, and study the environment, in its natural or modified form.[9] But physically, a scientist wants to rejoice in his splendid place, midway between the infinitely large and the infinitely small - between a pulsar and a quark, perhaps. And his environmental study should help him and others know where they stand.

A Bureaucrat's View

A bureaucrat with environmental responsibility has a simple job. To him, an environmental study is whatever is necessary for him to advise his political masters of the environmental consequences of different alternative courses of action. (Preferably, he should have arranged for the study to have been financed, completed and assessed before he is even asked the question!) Sometimes this may involve a crash programme of environmental study. (In space research we defined a "crash program" as one where you got nine women pregnant so as to produce a baby in one month!)

But seriously, a bureaucratic view of environmental studies is that they should produce information that can lead to environmental "position papers". They should do so as quickly as credibility permits. Clearly there is likelihood of difference of opinion with a scientist on either the amount of detail needed or the time necessary for "credibility".

A Politician's View

I will not attempt to pre-empt Hon. Minister Borthwick's forthcoming address. A Minister does not always think only as a politician does - nor does a politician always think like a Minister can!

So, for the word "politician" read "an elected person". This is so as to include local government shires and councils, so vital to environmental management.

A politician can regard an environmental study as being simple "window-dressing" or a cosmetic face-saver.

Or a politician, particularly when in Opposition, can regard an environmental study as being a prerequisite to any action.

But a politician becomes a statesman when he regards an environmental study as an essential and dynamic part of a complex composite, on which a decision has to be taken.

An Environmental Protection Authority View

An environmental study should solve a particular problem. But it should add to a stockpile of reliable information, and thereby assist an Environmental Protection Authority to produce a deliberative policy --

> "firm and reliable enough for adequate forward planning, yet adaptable to changes of circumstances and cogent public attitudes".[12]

An EPA may have to be a bulwark against political storms against the environment. Sometimes, strangely enough, it may do so and yet draw fire and attack from rabid conservationists.

Conversely, an EPA may therefore have to be a bulwark against a temporary surge of emotional conservationists who can produce a backlash which can harm environmental management in the long-term.

So the EPA may have to walk the "middle of the road", between extremes of development and extremes of conservation. And, as the old Chinese saying has it,

> "he who walks in the middle of the road is in danger of being hit by heavy trucks travelling in opposite directions."

To the EPA, then, an environmental study may be the means of marking the line in the middle of the road. And those who carry out environmental studies have to be relied upon to mark out "lines" and also show where they can't be crossed, regardless of which direction you travel.

A Consultant's View

To some consultants - but only to some - an environmental study is but a beginning, not an end.

Those of us with years of cynicism behind us will predict in advance that a contract let to some commercial consultants to carry out an environmental study will generally conclude with a recommendation that "further studies should be carried out along the following lines ..." It is not unusual, in fact, to see such a recommendation accompanied by a cost estimate and a time estimate for these further studies. One may also find in the concluding recommendations that the further studies should be carried out by the same group as those making the recommendation, because of their experience in the field, the fact that they have carried out base-line assessment, they have "skilled and experienced" personnel on hand, and so on.

More realistically, a question which government instrumentalities have to resolve in environmental studies to be carried out by consultants is whether a list or "register" of approved consultants should be prepared, or whether the normal competitions of the market-place and of professional competence are all that are required. Perhaps this Workshop can explore this important aspect.

From a consultant's viewpoint, there have already been allegations[13] that the contents of consultants' proposals were being used without any payment. This is not something that started with environmental studies, of course, but their breadth and scope do make them unusually susceptible to such potential problems. Terms of reference for commercial environmental studies must be specific even in the face of the unknown.

A Citizen's View

A citizen's view of an environmental study can be summarised realistically as being one of two types --

(a) a "selfish" view (where it concerns his immediate or personal environment), and

(b) an "unselfish" view (where it concerns the environment at large).

Those involved in any form of government (local, state, national or international) realise that all too often the cause of the environment is used for selfish personal reasons.

For example everyone appreciates that there is a need for a rubbish dump but each believes it should be in somebody else's backyard. Everyone realises that costs may make it necessary to have overhead (rather than underground) high voltage power lines but each does not want to see the pylons nor the power lines from his house. Everyone would like region open space or a reserve to be adjacent to his own dwelling but will object to provision of car parking facilities for those from afar who wish to visit and take solace in the area.

An environmental study is often triggered by the selfish interests of a few individuals who will be only too eager to use the press media and every political lever they can exercise to safeguard their own immediate environment. This is quite understandable. Indeed in many cases it is very useful for those responsible for environmental management generally to have a group of "aroused" citizens strongly advocating conservation of the environment. Real problems arise, however, from such issues and from associated environmental studies if the studies themselves are specious and used merely as

delaying tactics. Also, unfortunately, perhaps in a form of backlash against specious studies, or because of mistrust of science for what "IT" has done, the more rabid opponents of a development will refuse to accept the findings of a quite valid study if it supports the development. Very often it is a case of "don't confuse me with the facts - I know what is right".

A similar vein of selfishness can dominate those who use environmental issues for political purposes, for agitation, or to get their names in the press.

From an "unselfish" viewpoint, for a citizen an environmental study should provide him with the broad information he needs to be an informed member of the community. The results of the study and its recommendations must be phrased in simple terms and be brief and to the point. The study should also include, however, references or resources from which the deeply concerned invididual citizen can probe in more detail into the issue.

A Reporter's View

An environmental study to be of any use to the press media must be newsworthy (which generally means controversial) set out simply and in a format so that he can paraphrase it and utilise it at very short notice to meet his news deadlines. Whether it has a human interest aspect will depend upon the individual study and its history.

On this aspect of the role of the press media it is to be noted that with few exceptions the Australian media lag significantly behind those of some other countries in the support they give to science writers generally. Whether this is a reflection of an Australian malaise or indolence or to other features is something that requires review at this Workshop.

There is no doubt in my mind that, in the long run, environmental management will occur not through a series of dramatic decisions but through development of an informed public, via the media.

A Developer's View

The various views that a developer can take of an environmental study were treated in discussion of economics of an environmental study. My personal view is that a developer must recognise[2] that the days of the "industrial baron" are numbered and that the community demands that environment be treated as a routine part of the "homework" that a developer will do in much the same way as he will do his economic and engineering homework[3].

A Conservationist's View

An environmental study to a conservationist will always be partly unsatisfactory. An extreme conservationist or protectionist might wish to have nature left undisturbed - in its so-called "natural state" - but as soon as there is an environmental study then the Heisenberg uncertainty principle must apply in that the very effect of observations or studies being made will disturb the environment in itself. A relatively recent article[14] which is entitled "A Value Analysis of Wilderness" is of relevance in this regard.

A Geologist's View

If you prefer a geologist's or miner's viewpoint does exploration imply exploitation? In a Mining Act, should a permit to explore be equated with an implied right to mine if viable? These are vexed legal questions. Should mineral exploration be stopped in an area for environmental reasons because of the damage that exploration might do (e.g. in spread of a disease or disturbance of vegetation and fauna by survey-lines, etc.), or because the exploration might discover mineral riches? If an environmentalist has the right to make an environmental study, (and I deliberately exclude "wilderness areas") then does a miner have the equal right to explore? Or should the Napoleonic code-of-justice be used against the miner?

My View

In the face of the various points of view which I have formulated here for this introductory paper, I must still answer the question which the title poses.

I think that an environmental study should --

(1) be factual

(2) be impartial, i.e. independent of both what the "client" wants to hear, and the scientist wanted to say before he began the study

(3) answer an immediate problem (which need not be of an applied nature)

(4) recognise the frailties of Nature

(5) recognise the frailties of Man

(6) recognise the laws of Nature, and

(7) respect the place of Man in Nature.

10. CONCLUSION

This introductory address and the set of questions are intended only to open this Workshop and to (hopefully) stimulate discussion.

Later the Workshop format and details will be discussed and elaborated.

I wish to congratulate the organisers, and to indicate that they and the Workshop participants carry a great responsibility. I look forward to the outcome.

But while you carry these heavy responsibilities, you should be like Johnson's would-be philosopher and find humour keeps on breaking through, because it is my prediction that in the years to come your memories of this Workshop, and the values gained from it, will not come from the formal papers.

They will come from the discussions and the "bull-sessions". So don't let the programme get too crowded or too formal.

In concluding I was tempted to invoke the Second Law of Thermodynamics, speak about Entropy and how confusion[4] can never decrease, no matter how good an environmental study may be.

Instead, two snippets of Belloc's poetry seem more appropriate.

The first is addressed to consultants and those who seek research funds. The poem relates, as I recollect, to little Henry King, who had been eating bits of string. A study was made of the environment of his tummy, and the final report was along the lines of --

"They answered -- as they took their fees --
There is no cure for this disease."

The second quotation is directed towards the optimists and the pure scientists. It is about --

"The Microbe is so very small
You cannot make him out at all
But many sanguine people hope
To view him through a microscope
...."

The poem goes on to discuss the microbe with its

"... lots and lots
Of lovely pink and purple spots.
All these have never yet been seen.
But scientists -- who ought to know --
Tell us that it must be so.
Oh let us never, never, doubt,
What nobody is sure about."

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