

# Environmental Assessment

A Practical Guide

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1990

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## INTRODUCTION

America and Europe, this control is exercised by means of Environmental Assessments of all new major developments which are likely to cause 'significant effects on the environment', a phrase which is now taken to include such purely human concerns as employment, recreation, shopping and education.

# Chapter 1

## ENVIRONMENTAL ASSESSMENT PAST AND PRESENT

### History and development

Environmental Assessment has always been part of any development process – though not under that name, nor in that form – and it is interesting to look at earlier reports and to see how closely they are related to the present-day practice of environmental study and analysis. The historical assessments are different from modern practice, more because of their simple approach and positive conclusions than because of any great difference in philosophy. The demand for some sort of Environmental Assessment has naturally been made by the sufferers from development rather than by the developers, and among the more publicized contemporary resistances to development are the objections made by the people of south-east England to the Channel Tunnel and the high-speed rail link to London. They may seem unusually well organized, but then they have been there before.

In 1548 a Commission was set up to examine the environmental impacts of the Wealden iron mills and furnaces in Kent and Sussex; this body consisted of four chief assessors and 16 other investigators, and they were required to examine the effect of the proliferating iron mills on the economy of Sussex. Most of their evidence was collected from representatives of the towns and districts, probably much like trade unions and amenity groups today, and the factors they considered were very similar to those that would be studied in a contemporary Environmental Assessment: the number of mills; how much wood they consumed yearly; how much the cost of wood had increased due to shortages; which towns would suffer economically from further development; what trades would suffer from timber shortage; how many jobs

would be lost; and why the price of iron was higher than it was when there were fewer mills. Their findings were also much like those of today's Environmental Assessment: each mill used about 1,500 loads of wood yearly and made no effort to renew the woodland, so that this resource would soon be exhausted; the trades depending on timber for their raw material were in distress (and in the sixteenth century nearly all household goods and gear included wood in their construction); the fishermen had insufficient wood to build boats or for fires to dry themselves after fishing; and more importantly there was not enough large timber for repairing the harbours and houses. The commissioners were as wary as modern assessors in forecasting future effects, but they predicted that job losses and community decay would eventually be enormous if no steps were taken to mitigate the effects of further development. Their recommendations included restrictions on tree felling and a reduction in the number of mills; though whether these were actually carried out is not certain. What makes this early Environmental Assessment startlingly different from a modern study is the fact that the assessment was *completed* between 13 November 1548 and 14 January 1549, in contrast to Sizewell power station which held the record for the longest planning inquiry.

Environmental Assessment, as we know it today, started in the USA when the expansion of industry which began in the Second World War continued to increase and intensify, and the practices of intensive farming became more widespread. The products and wastes of chemical, manufacturing, and agricultural industries had not previously been so dangerously toxic nor produced in so large a volume as to create serious environmental problems, and the atmosphere, soil, rivers and oceans had been able to absorb them without irreversible damage, while any local effects remained local and did not attract more than specialized protests from naturalists and ecologists who understood the dangers. The post-war expansion created a far different situation, both in the USA and in Europe. It is estimated that in the last 200 years Europe and the USA have been responsible for more environmental destruction than all the rest of mankind since written records began, with the possible exception of the Flood. Even that environmental disaster left no legacy of lethal chemicals for the children of Ham, Shem and Japhet. All ecosystems, including human communities, have thresholds of tolerance for pollution and disturbance beyond which the system may suffer anything from temporary upsets to complete destruction, and the industrial and

agricultural practices of post-war industrialists and farmers began to cause environmental damage which crossed these thresholds.

Wide-scale public interest and concern was aroused by Rachel Carson's book *Silent Spring* published first in the USA and then in the UK in 1963. The book set out to show the American people how their land and lives were affected by the large-scale and indiscriminate spraying of crops with powerful insecticides and herbicides. She succeeded in making the public aware of the ecological consequences of introducing toxic chemicals into the natural food chains, and the dire effects of cumulative dosage with apparently small quantities of agricultural poisons. The book is awesome reading even today; accounts of the destruction of nearly all wildlife over hundreds of acres polluted with pesticides are still valuable reminders that environmental effects can never be taken for granted. From this beginning arose *public* concern for the environment (biologists and ecologists had long been aware of the dangers) and, eventually, pressure by the public and environmentalists forced state and federal authorities to exert some control over the release of toxic chemicals into the environment. The control was established by the 1969 National Environment Policy Act, which required Environmental Statements to be prepared for federally-funded or -supported projects which were likely to have impacts on the environment. The exercise of these powers varied from state to state and, in many cases, undesirable developments slipped through the net, interstate impacts being especially hard to control. The US Council for Environmental Quality was charged with the task of developing standard procedures for Environmental Statements, and Europe owes much to the USA for showing the way towards a viable form of environmental control and for pointing out the weaknesses inherent in any system.

This control was much eroded under the Reagan administration, and many environmentally undesirable projects were permitted on economic grounds. It seems hard for Europeans to believe that anyone could seriously suggest pouring millions of gallons of sulphuric acid on to the ground in order to draw off a leachate containing commercial quantities of copper, yet this has been considered to be a viable process in the USA, regardless of the long-term effects on ground water or ecology.

Environmental Assessments can vary enormously in size and scale, depending on the sensitivity of the area and the degree of disruption likely to be caused; the range runs from a manageable disturbance to a village caused by road realignment to the total destruction of irreplaceable fragile ecosystems in the Antarctic caused

by the exploitation of minerals. In developed countries there is usually a strong body of informed opinion to counteract any attempt by a developer to slide out from under Environmental Assessment, but in the Third World, and especially in the Antarctic (where the developer is also the national government in charge), the assessment and its findings may be rather less impartial. We have yet to see the introduction of intercontinental or global Environmental Assessments, but, with the increasing level of far-reaching environmental hazards such as ocean dumping of toxic and nuclear wastes, acid rain, nuclear fall-out, ozone deterioration, rain-forest destruction, overfishing, desertification, and other forms of global damage, it is very possible that Environmental Assessments of major developments will be conducted on a scale well beyond our current experience.

Environmental Assessment may be considered as having been accepted in principle at the United Nations Conference on the Human Environment of 1972 at Stockholm when the framework of modern environmental international and national policies was laid down. The Conference generated a concern for the environment which resulted in the 1980 publication of a World Conservation Strategy by IUCN, UNEP, and WWF, and the subsequent launching of a series of national policies on environmental conservation and control, and the slow, controversial but definite progress of the EEC towards formal European legislation. The EEC initiated environmental action programmes in 1973, 1977, and 1983: the principle behind them is that 'the best environmental policy consists in preventing the creation of pollution or nuisances at source', leading to the need to consider developments *before* construction, and the consequent need to create legislation to enforce such consideration. The UK exposition of environmental policy may be found in the set of studies *Conservation and Development Programme for the United Kingdom*, 1983. While many environmental issues such as the deterioration of water quality, the depletion of fish stocks, and migrant bird trapping, are not subjected to Environmental Assessment unless development takes place, the concern of the general public and (under pressure) the government for environmental issues has been stimulated by the publicity given to these problems. In some cases the existence of such problems has a direct influence on the proposals for a project, especially where the scheme affects scarce natural resources or endangered habitats.

The first intimation of hard legislation in Europe on Environmental Assessment came with the EEC Directive 85/337 which formed the basis for most European national laws on environmental

control over new developments. Each member country is allowed to integrate the requirements of the Directive with its own planning control system, but any major departure from the schedules of assessable development or the range of subjects to be covered must be submitted to the Council of the European Communities for ratification. The need for legislation was far more apparent in Europe than in the UK, mainly because of the closer geographical relationship which European countries have with one another and the consequent effect which they have on each other's environment. This is particularly evident in dealing with environmental impacts such as pollution of the Rhine, the Danube, the Mediterranean, and the Baltic, where heavy chemical industries can discharge waste products which may easily damage their neighbour's environment. Examples are the discharge of dieltrin to the Baltic from timber works, and the increasing discharge of sewage and industrial effluent into the Mediterranean; so critical have these impacts become that there are projects in hand for cleaning up the Rhine and the Mediterranean, though how far international cooperation can be made to work is not yet clear. The Danube in particular is suffering from the effects of rapid industrial expansion in the Eastern Bloc, where unpurified effluents are being discharged into the river in very large amounts, and huge dam projects are changing the ecology of the river and its margins, thus affecting countries beyond their own borders. In Western Europe the EEC has, however, firmly established the principle that 'the polluter pays' - a policy which is naturally unpopular with those countries like Britain who contribute pollution to the air and the sea without being on the receiving end of any other country's pollutants. Britain is, however, the subject of a large number of claims from European countries who have allegedly suffered environmental damage from UK pollution, and it is likely that the case histories of such claims will become the basis of negotiations between countries who are in dispute over international environmental damage. One difficulty is the long time-scale involved in determining such damage, as effects may not be apparent for decades, and possibly not for generations.

It is clear that, with ever-increasing development of more and larger chemical and processing plants, international litigation over pollution claims would reach an uneconomic level of expenditure, both by private firms and national or regional governments. In

1. Unofficial information suggests that this has been stopped. (October 1989)

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order to reduce this litigation, and to prevent the occurrence of irremediable environmental damage, the EEC has therefore established the concept and practice of carrying out Environmental Assessments for major projects *before* they are constructed, rather than relying on international law and public outcry to make good environmental damage, particularly as many types of damage are irreversible. The emphasis on Environmental Assessment in the original EEC Directive is accordingly very strongly directed towards pollution and its consequences, with the impacts of projects on employment, social structure, and economics being given rather less consideration, since these factors are not so likely to produce effects across international boundaries. The EEC Directive gives the main priorities for assessment as human health, the quality of life as it is affected by the environment, the continuing diversity of species, and the maintenance of the whole ecosystem. It is noticeable that these priorities seem to be biased towards the continuance and prosperity of the human race, but since we are still not independent of natural resources the other species of animals and plants should benefit almost equally from Environmental Assessment.

In the UK the problem is not so much that of international impacts, since we tend to hope that no one in Europe will be able to identify the source of any pollution they may suffer, but that of satisfying the voting public and the environmental watchdog organizations that projects are environmentally safe. Some of the potential impacts of a new development are obvious to the lay public - visual intrusion, traffic congestion, severance of land holdings, loss of agricultural land, noise, and changes in property values - whilst others require the services of specialists to measure and assess them - hidden pollution, job losses, economic gains or losses, ecological impacts, and effects on scarce natural resources.

Quite apart from the Environmental Assessment regulations introduced by the Department of the Environment, there are other organizations who regulate environmental matters such as the Nuclear Industry Radioactive Wastes Executive (NIREX) and HM Inspectorate of Pollution (which replaced part of the old Factory Inspectorate), and any Environmental Assessment must satisfy the statutory requirements of these authorities as well as meeting the environmental standards of the local planning authority.

Where the public is aware of possible impacts, the level of opposition to the project depends on the current state of public opinion rather than on a long-term and unbiased appreciation of the environment. In an economy where there is a significant level of unemployment, the effect of a project is usually to increase the

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number of jobs available and to generate 'spin-off' in the form of service and supportive industries, and therefore there is unlikely to be any major opposition from trade unions or the local population. The impacts which usually attract opposition are the impact on the visual quality of the landscape, the pollution and disturbance of the ecology of the area, the land take of houses and agricultural land, and the effect of new infrastructure on human activities.

There have been some attempts in the USA to put a financial tag on each factor in the environment so that environmental impacts can be calculated on a common basis and compared with one another, a method which would also provide a figure which can be used to assess compensation for environmental damage. This has led to such interesting formulae as the rating of a boat at 10 dollars per hour when used for fishing, 5 dollars per hour when used for recreation, and one dollar per hour when moored. Agreement on the value of such activities seems to be almost impossible, and the values would need continual updating, together with seasonal and regional variations to be of any practical use in Environmental Assessment. It is therefore more realistic to deal with each impact in its proper terms, whether these are financial, ecological, social, visual, or political.

The detailed discussion of impacts will be found later in this book, but it should be remembered that each project produces a different range of impacts, both in size, kind, and importance, and consequently a good deal of the emphasis on any one impact depends on current local and political sensitivity. A project which involved the destruction of peat moorland, but provided jobs in return, would meet with approval in northern Scotland, where they have few jobs and much peat, but with strong objections in parts of southern England where full employment and a strong partiality for open landscape are prevalent. Most objections to environmental impacts come from organized groups of people - such as Friends of the Earth, Greenpeace, various conservation societies, and local amenity groups - and it is difficult to know how far they truly represent local or national public opinion. There is thus an obligation to confirm that ideological influences are not distorting the real feeling of the local community.

## Meaning of Environmental Assessment terms

The vocabulary of Environmental Assessment is still in a state of development and consolidation; the current meaning of the most

usual terms is given here, but like most new disciplines, its practitioners tend to give their own meanings to words and phrases. It is as well to check that everyone on an Environmental Assessment team arrives at a common vocabulary before preparing reports and submissions.

#### *Environmental Assessment*

This is the name given to the whole process of gathering information about a project, its possible and probable effects, and the analysis of the data obtained from all sources. As the word implies, it covers much more than the straightforward (or more usually complicated) collection and filing of as much information as can be obtained on all factors relevant to the project. For projects coming under ordinary Town and Country Planning procedures, the developer is responsible for preparing the whole Environmental Assessment, and he is the employer of the Environmental Assessment team. Other Environmental Assessment regulations make the relevant Secretary of State or the developing body responsible for preparing the assessment.

There is no absolute definition of Environmental Assessment as a single concept; it is a compound term embodying ideas and techniques which have developed over many years of increasing concern with the dire consequences of man's interference with the environment. Even the European Communities' legislators have not been able to find a single definition, and descriptions of Environmental Assessment can only be made by listing all the factors which must be considered in connection with a proposed development. Originally the word 'environs' meant the surroundings or neighbourhood of a place; now the word 'environment' has come to be used more in the laboratory sense of the complete set of conditions in which an organism exists, and can cover any situation from the Antarctic perforation of the ozone layer to the local hedgehog's hibernaculum. Up to the middle of this century, the terms commonly used for the environment referred to single aspects of the planet; expressions such as 'Nature', 'the oceans', 'landscape', 'the atmosphere', 'human settlements' are typical of earlier writings. As a wider consciousness of the incredibly complex interactions of all natural and man-made factors has developed, so the use of a single comprehensive term has emerged. 'Environment' is neither elegant nor very explicit, but it has been accepted internationally as being the set of factors in any given situation, their interactions with each other, and with factors outside the

situation. Originally the factors were purely natural ones, but human factors such as 'cultural heritage' are now included in the term. It is encouraging to think that the human race (or at least quite a lot of it) has realized that man does not exist as an isolated predator, but is absolutely dependent on his relationships with the rest of the planet, and even with space.

'Assessment' is a simpler term to define. Perhaps humankind is slightly less arrogant than it was; the assessing of a situation implies that not everything is known and not every effect can be predicted with absolute accuracy - a more sensitive attitude than the Victorian conviction, still occasionally put forward, that everything in the universe is capable of rational and exact analysis and definition.

#### *Environmental effect*

The original US term for the effect of a development on the environment was 'environmental impact', and this is still much used in the literature of the subject, but Her Majesty's government prefers to use the term 'environmental effect', as this presumably conveys a less drastic impression of the results of development. 'Effects' (or impacts) could be classified in several ways - for example, by their magnitude, their severity, by their beneficial or maleficial effect, or even by their time-scale - but the present UK legislation and circulars do not give any guidance on possible classification, except to distinguish between 'significant' and 'non-significant' effects.

#### *Significant effects*

These are effects which disturb or alter the existing environment to a measurable degree. The question as to what is, or is not, a significant effect is one of the most difficult areas of Environmental Assessment to define. The significance of an effect depends very much on the opinion of the assessment team, the local planning authority, the environmental bodies consulted, and the prevailing public sentiment. The best that can be expected is to reach a consensus of opinion amongst those involved in the Environmental Assessment which will reflect current thinking on the importance of environmental factors, but the Regulations imply that the final selection of significant effects lies with the local planning authority (or the Secretary of State).

*Adverse effects*

These comprise those effects which are expected to cause destruction or deterioration of those sectors of the environment which will be affected by the development, either directly or indirectly. Adverse effects are often divided into temporary effects, usually caused by the exploration or construction process, and permanent adverse effects due to the processes used in the development or even merely to its existence. Some adverse effects are irreversible, as occurs in the destruction of a woodland ecology, and some may be reversed to a certain degree over a period of time as the local ecosystem adjusts to the development.

*Mitigation of adverse effects*

This term refers to the methods proposed by the developer for reducing, obviating or otherwise ameliorating the effects of the project which would have some undesirable effect on the environment. Mitigations are related to one or more of the effects described in the Environmental Statement, and may include technical processes designed to reduce the emission of toxic gases, screen planting to conceal intrusive buildings, regulating the amount of natural resources used, replacing lost jobs with other types of employment, or providing some compensation to the local community for the loss of an amenity. It is arguable how far the mitigation proposals should go in reducing adverse effects - some authorities hold that mitigation should be total, while other experts are willing to settle for a reasonably practical level of mitigation - and, in practice, the level required of the developer will probably depend on the policies of the local planning authority.

*Environmental information*

This is defined in the principal Regulations as including both the Environmental Statement and any other representations about the likely environmental effects of the project made by interested parties. More broadly, the term comprises all the data on the project which form the raw material for the Environmental Assessment. There is no legal requirement or Department of the Environment (DOE) restriction on the amount, kind, or source of information which may be gathered on a project, and there is no set format for the way in which it is to be presented, but there are obviously some difficulties in collecting certain types of

information. No sane industrialist is going to reveal details of his manufacturing process which would help his rivals in business, nor is any conservation group going to admit that they themselves never make use of the amenity they are so ardently protecting. This is not to say that the truth about these factors cannot be discovered, or that they are therefore not relevant, but certainly a Sherlock Holmes talent for observation, exploration, and deduction is a great asset to the Environmental Assessor. Although the assessment team is employed by the developer, they naturally have a professional responsibility to collect and present data impartially, and a friendly informal approach to individuals and organizations which stresses this impartiality will often produce helpful information where a more rigid approach may fail.

One responsibility of the Environmental Assessment team is that of classifying the information they obtain as 'hard' (provable data from irreproachable sources which can be cross-checked), 'intermediate' (information which appears to be sound and reliable but is not capable of exact proof), and 'soft' (information containing subjective opinions and estimates which may be very important in assessing effects, but cannot be proved one way or the other). Very often, 'soft' information comprises the most strongly-felt estimates of environmental effects such as visual intrusion, the destruction of landscape ambience, or the disruption of community spirit.

Much, if not most, of the critical information about the potential effects of a development lies in the hands of official and semi-official bodies such as local planning authorities, the Countryside Commission, the Nature Conservancy Council, the Historic Buildings and Monuments Commission, the Forestry Commission, and similar quangos. There is provision in most Environmental Assessment regulations for obtaining information from these organizations although, as it must be paid for, it may prove expensive. (In passing, it should be mentioned that the operation of collecting Environmental Information, carrying out an Environmental Assessment, and preparing the Environmental Statement, is neither cheap nor rapid, and plenty of contingency time and money need to be included in the budget by the developer.)

To the inexperienced Environmental Assessor, the ownership of an impressive collection of multi-megabyte disks, filing cabinets full of print-outs, and an elaborate data base and spreadsheet permitting every possible combination of statistical analysis, would seem to be the desired objective for the preparation of an Environmental Statement. Not so. The skill of the specialist in Environmental Information collection lies in knowing exactly

what data is relevant, and, as far as is scientifically feasible, just how each estimated effect is likely to affect the environment. Once the main data has been collected and examined, it is very often the case that only a small number of effects appear to be really decisive in determining whether or not the project should be given planning permission; it is these significant effects which should be the subject of closer and deeper analysis by the Environmental Assessment team, rather than a wider and shallower coverage of all the projected effects. It must be remembered, though, that each environmental guardian group, political lobby, amenity association, or development group, will have its own priorities, and each will be aggrieved if these are not thoroughly considered in the Environmental Assessment, so that not even minor effects can be omitted from the study, even if they do not need to be subjected to the fullest possible analysis.

#### *Environmental Statement*

This is defined by the principal Regulations as the official document, containing all the information required by Schedule 3 to the Regulations, which is submitted with the planning permission application. This document contains the results of the Environmental Assessment, and the conclusions drawn from it. It forms part of the planning submission documents and cannot legally be treated as a separate consideration. It must be capable of withstanding challenges and could be treated as part of the proof of evidence in a planning appeal or inquiry. Since the Environmental Statement is accessible to the public through the planning register and to objectors in a planning appeal, the main conclusions should be intelligible to lay readers as well as to the expert witness. The Inspector in a normal planning inquiry is competent to judge the value of technical evidence, but in cases where major developments are subjected to the Private Bill procedure rather than to the normal planning process, the Parliamentary Committee is unlikely to consist of experts, though the Members forming the committee are usually knowledgeable in the environmental field. Both the EEC directive and the UK Regulations therefore call for a non-technical summary of the Environmental Assessment to form part of the Environmental Statement; this is an important part of the submission and should be carefully prepared.

## Chapter 2

### LEGISLATION

#### The UK Regulations

Under the European Communities Act 1972, the UK is bound to accept EEC Directive 85/337 as the controlling document which lays down the rules for Environmental Assessment of major development in the UK. The application of these rules is consequently effected by Statutory Instrument, and not, as might be expected, by Act of Parliament. This means that the rules governing the scope and practice of Environmental Assessment are laid down by the Civil Service under the overall conditions of the Directive, and are not debated in either House of Parliament, as they would be if the provisions of the Directive were incorporated in a General Act. When the Directive was first formulated, UK legislators argued that the UK planning system already took into account all the environmental factors listed in the Directive, and that there was no need to adopt further controls. The UK was overruled on this matter, but nevertheless firmly placed the main Environmental Assessment procedures within the Town and Country Planning structure, although the Directive has been implemented by means of Regulations made under the European Communities Act 1972 and not, as might be expected, jointly with an amended Town and Country Planning Act.

The result of this formulation is that an Environmental Statement (the formal conclusions of an Environmental Assessment) forms part of the normal application for planning permission, and cannot be considered separately. Only those projects which would already have been subject to development control are covered by the principal Town and Country Planning (Assessment of Environmental Effects) Regulations; other projects such as Harbours and



## Chapter 5

## THE ENVIRONMENTAL ASSESSMENT PROGRAMME

It is assumed that by now the local planning authority, or the Secretary of State, or the developer as the case may be, has requested an Environmental Assessment and that the need for it has been definitely agreed. The developer will have been notified of the subjects which the authority consider to require assessment, and some agreement as to the necessary level of investigation. (not 'scoping'!) will have been reached. It is also assumed that the negotiation and appeal stages have been passed, and that the developer is now committed to carrying out an Environmental Assessment of his project. There are usually considered to be four main stages in the preparation of an Environmental Assessment and Environmental Statement; these can be subdivided into many other sub-stages but, whatever breakdown of the workload is adopted, it is essential to complete each stage before moving on to the next. Not only does this make the project manager's life less hectic, but, because in the nature of environmental analysis every factor interacts with nearly every other factor, it is unwise to leave any section of analysis to be completed later in case it overturns the previous conclusions. The presentation of the data may well be held over until the final stages, but the basic material of the assessment must be established as completely as possible at each stage. The Regulations require copies of various documents to be sent to all and sundry ('sundry' always gets forgotten) at each stage, and the project manager will go crazy if he has to send out amended documents to every one of the original recipients; it is therefore vital to check that each document is quite complete before being sent out.

### Stage one: setting up the Environmental Assessment team

#### Base

The first man on the scene should ideally be the project manager, or the consultant who is to take that role. At the outset, his main responsibilities are arranging accommodation, site access and transport, communications, and equipment if the team has to work away from their own offices, and setting up a central data bank (if this is required) including computer records and hard copy records. He is also responsible for preparing the budget (it is not really possible to allow too large a contingency sum for an Environmental Assessment) and the programme. The Regulations set specific target dates and list the organizations entitled to copies of the Environmental Statement, so in order to avoid omissions and delays one person should be in charge of checking the submission and committee dates, and ensuring that all material is available from the consultants and sent to the right organizations at the right time.

#### Consultants

The project manager may be in charge of selecting consultants, or at least preparing their briefs and dealing with their contracts and defining their functions in the team. There is no statutory ruling as to who does what in the Assessment team; the division of responsibilities rests with the client, and one or more meetings to agree the provisional scope of the Assessment and the work of each consultant should be held as soon as possible. The range of consultants who might participate in an assessment and their skills has been discussed in Chapter 4. As soon as responsibilities have been agreed (and firmly recorded) the next task is to settle the overall programme and budget with all parties. Each consultant then gets his own team together, working out his own programme and budget, allocating staff to each section of the project and recruiting to fill gaps in his expertise if necessary.

#### Data control

Each consultant is responsible for ensuring that his material can either be fed into a central data bank, or made readily available so that other consultants have rapid access to it. This is one of the weakest aspects of most Assessment teams; all consultants

must be aware, and *stay* aware of the others' work in order to avoid lacunae, anomalies and contradictions which will be the delight of opposing counsel and the media. It is useful to appoint one member of each consultant's team whose additional responsibility is to liaise with his opposite numbers in other teams, and particularly with the project manager. There is much information which can usefully be circulated between team members, and regular information exchange meetings should be held by the liaison staff; these would cover exchange of names and addresses of contacts in various organizations, coordination of interviews to avoid repetition, sharing of hard-to-come-by documents, warnings about uncooperative individuals, and distribution of relevant letters, photographs, and other data.

There are some environmental sectors which will be the responsibility of a single consultant; others will be the joint responsibility of several professionals. Traffic will be dealt with by the traffic engineer; but a lake modified as a result of the development may be assessed as part of an essential water system by the hydrologist, as a recreation amenity by the sociologist, as a visual amenity by the landscape architect, and as a possible pollution factor by the ecologist and the chemical analyst. Such multiple assessments need to be carefully coordinated throughout so that the balance of the environmental effects is agreed between the members of the team. It is very confusing for the local planning authority to be told by one professional that a lake is an amenity for the local community, and by another that it is a potential danger to the ecology, so however true these predictions may be, the conflict of effects should be recognised and reported in the Environmental Statement.

### Stage two: survey of existing environment

The existing physical, social, and financial environment must obviously be established before any assessment of future effects can be made. The work can be divided into two categories; fieldwork which includes surveys, trial holes, photographs, and interviews; and recorded data which includes all information obtained from records held by various organizations. Some staff are better at fieldwork and some at paperwork, and it is worth deploying staff to take advantage of their abilities, since a prediction for surveying the local pubs or losing copies of irreplaceable documents is not helpful to a good Assessment. The depth of

each survey will vary according to the significance of the effects likely to be generated by the development, so that the effort expended and the amount of data collected need not be the same for every survey, although the level agreed with the local planning authority must be kept in mind, and should any departure from this level occur the reasons must be recorded. It is also advisable to notify the local planning authority and to get their agreement to the revised level.

### Fieldwork

Each consultant has his own methods of carrying out his surveys and of recording his information, but as far as possible there should be coordination between consultants as to the format in which data should be presented. If hectares are to be the area unit, all staff should use hectares, not acres; if the limits of many studies are based on local authority boundaries, then all other studies should use the same boundaries, unless there is good reason for divergence. It is essential that all maps should be prepared to the same scale and from the same Ordnance Survey base. In the field itself, there are many opportunities for cooperative working which will save time, money, and aggravation. These include:

- the use of minibuses to transport several survey teams at once;
- exchange of information gathered in passing which benefits another team, or asking another team already on site to check a detail;
- one programme of interviews covering several different subjects - nothing exasperates a hardworking local authority official or busy resident more than a series of earnest young inquirers asking one set of questions after another;
- one or two photographic surveys covering all required views and details;
- trial holes designed to provide all ground information.

These points may seem very obvious, but it is surprising to find how often simple practices like these are not carried out; the hundreds - and even thousands - of pounds which can be spent on duplicated or rechecked surveys could be better used for other assessment work.

## ENVIRONMENTAL ASSESSMENT

### *Recorded data*

The Regulations list the bodies who are statutorily required to provide information for an Environmental Assessment, but they do not lay down any time-scale. It may take some time for an organization - which may be short-staffed - to find, extract and dispatch the required information, and even then it may need to be amplified or explained before it can be included in the Assessment since it is unlikely that the material will be in a suitable form for immediate use. It is therefore advisable to make contact with these bodies as soon as possible, and to specify as clearly as possible what information is needed, and in how much detail. Most of these bodies will have policies on future developments, and possibly research to support the policies, and it may be very helpful to ask for this information in order to assist in the estimation of environmental effects, although these bodies are not legally required to carry out research in order to provide the information needed by the Assessment team. This also applies to those organizations who are not legally obliged to provide information. The date when information was last updated should be checked; some Structure and Local Plans contain obsolete material, and should not be relied on. Even their accuracy should be examined; (one Structure Plan was found to provide water recreation for every single inhabitant of the county, due to a slight error of multiplication by 300 per cent). Useful sources for basic data are:

- rates roll and estate agents for value of property, ownership of land.
- mailing lists (local authorities sometimes sell lists of ratepayers) for postal questionnaires.
- aerial surveys which may have been carried out for other purposes for updating of maps and land uses.
- local history and conservation societies for unrecorded information on rights-of-way, monuments, etc.
- residents' associations and amenity groups for gauging public opinion.
- British Rail, bus companies, local transport user groups for use of public transport.
- schools, parents' groups for school journeys.

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- chamber of commerce, local residents for shopping patterns.
- local residents, commuters for private transport problems.
- Land Use Classification maps (very out-of-date) or local planning authority for land uses.
- Soil Survey of England and Wales for agricultural land classification
- Geological Survey maps for geological and hydrological data.
- Mineral Planning authority for mineral resources.
- water authority for catchment areas, sewage and water supplies.
- River Quality Survey for condition of streams and rivers.
- local planning authority and English Heritage for listed buildings and historic monuments, conservation areas.
- Railway Heritage Trust for conservation of railway structures.
- local planning authority for previous planning studies (such as traffic surveys) in the area which may yield useful information.
- local planning authority for Structure and Local Plans, unitary development plans, local bye-laws, action area plans, and all other designated areas.
- Nature Conservancy Council, Countryside Commission for Nature Reserves, SSSIs, and other designated areas.
- local planning authority for AONBs, areas of special landscape value and other protected rural areas.
- other consultants for previous studies in the area which may be available (at a price) if not confidential.

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- RSPB
  - Forestry Commission
  - British Coal
  - Department of Transport
  - Department of Transport
  - Gas Boards
  - Department of the Environment
  - CEGB, Electricity Boards
  - Her Majesty's Inspectorate of Pollution (Her Majesty's Industrial Pollution Inspectorate in Scotland)
  - Marine Pollution Control Unit
  - Central Unit on the Environment, Department of the Environment
  - Ministry of Agriculture, Food and Fisheries (MAFF)
  - National Radiological Protection Board (NRPB)
  - Nuclear Industry Radiation Waste Executive (NIREX)
  - MAFF
  - Institute of Waste Management
  - Hazardous Waste Inspectorate (in Scotland)
- for bird populations and habitats.
- for tree surveys.
- for construction in coal-mining areas.
- for road policies and programme.
- for aircraft noise preferential routes.
- for gas mains and supplies.
- for checks on pipelines and secret installations (which are not shown on any maps).
- for electricity supplies and transmission lines
- for Presumptive Limits of emissions, air pollution, radiochemical pollution, hazardous waste.
- for offshore pollution control.
- for policies on environmental protection.
- for levels of radioactivity in water and farmland.
- for natural radon levels.
- for disposal of nuclear waste.
- for incineration of waste at sea.
- for waste disposal techniques.
- for waste disposal.

## THE ENVIRONMENTAL ASSESSMENT PROGRAMME

These are only some of the most usually exploited sources of information; there are many more sources of specialized information which may be required by the more esoteric members of the Assessment team - it is here that the universities and research institutes can provide valuable data which may not have been published, or is not easily accessible. The Department of the Environment produces various publications describing the work of official and unofficial environmental bodies.

Environmental Information varies a great deal in its quality and therefore in the reliability of the conclusions drawn from it which are used to predict environmental effects. Information may be classified as:

- 'hard' data from reliable sources which can be verified and which is not subject to short-term change, such as geological records and physical surveys of topography and infrastructure;
- 'intermediate' data which is reliable but not capable of absolute proof such as water quality, land values, vegetation condition, and traffic counts, which have variable values;
- 'soft' data which is a matter of opinion or social values, such as opinion surveys, visual enjoyment of landscape, and numbers of people using amenities, where the responses depend on human attitudes and the climate of public feeling.

### Participation

The Regulations lay down certain bodies who must be consulted during an Environmental Assessment (listed in Chapter 2), and consultation with them should include discussion on possible ways of mitigating adverse environmental effects, as well as collecting information on the existing state of the environment, since any organization caring for the environment is knowledgeable on the problems and possible solutions in its area of responsibility. Certainly the local planning authority officers should be kept fully informed as to environmental effects that appear likely to influence their policies or programmes, since their cooperation is essential for the satisfactory control of such effects as increased traffic, additional housing, compulsory purchase of land, and re-routings of footpaths, and they will, quite rightly, object to their forward planning policies being ignored. The successful Channel Tunnel consortium was noticeable for its careful consultation with planning and other authorities and the consideration given to planning policies in the final submission; whether this was the deciding

factor in the choice of developer is not known, but there is no doubt that neglect of such consultation can seriously damage the health of the developer's Environmental Statement.

Public participation is another matter. This is a difficult problem; local people and professional environmental watchdog organizations will always be aware of the proposed development and its probable consequences, and it seems better to air the project and to discuss its effects openly rather than to try to conceal the Assessment and its findings. At the time of public participation the project is still being assessed, and the public must be reminded that the final design may change from the original outline submitted to the local planning authority when all the environmental effects and their mitigations have been taken into account. A limited number of public meetings where the project can be shown and questioned, and informal meetings with local groups may be sufficient to bring out any serious objections and to remove misconceptions about the project. Most useful are: examples of previous developments of a similar nature which show how environmental effects have been dealt with, and even offers to take delegates round them to 'see for themselves'; bringing along people from the locality of previous projects to talk about their experience; inviting neutral people of some standing to chair the discussions, and allowing plenty of time for individual discussions with selected members of the assessment team. Models are usually preferred by the public as giving the most comprehensible idea of the project, but as a model cannot avoid showing the whole of the project, it is better to use sketches or simple photo-montages, which do not commit the developer to a complete design. Short hand-outs covering a description of the project and its consequences (not too heavily slanted towards the benefits) are useful for those unable or unwilling to attend meetings, and for the local press. Beware of saying too much at this stage; anything drawn, said or written by the team will certainly be recorded and will equally certainly be brought up against the developer at an inquiry or planning committee; most statements about the development should be qualified as being 'provisional' or 'subject to further study'.

#### *Analysis of existing environment*

There is a strong tendency to prolong the information-collecting process as far as possible; it is easier than analysing the information, and there is always the hope that someone else will have to do

the hard thinking. A firm line has to be drawn at the end of the data collection stage for each environmental sector, which should only be changed for serious reasons such as critical new information becoming available - it must be really critical to the assessment, not just interesting. As soon as all the basic data for all sectors has been collected, the analysis and correlation of information can be carried out. Before the data is completely processed, the Assessment team should agree on the depth of analysis, since if one member goes into great detail, the others will be pressurized to follow; the finer the detail, the more the opposition will look for weaknesses. Oddly enough, a broad statement will be accepted where a minutely detailed piece of work will attract criticism. The quality of the data gathered in the collection stage is important; it is 'pointless (and dangerous) to use precise analytical techniques on 'soft' or even on 'intermediate' data as the results will have a false appearance of accuracy which can easily be challenged by the opposition. The use of range calculations is very valuable for Environmental Assessment; it is almost impossible to prove a statement that 15.67 per cent of the population use the local common, but practicable and realistic to determine that between 10 per cent and 20 per cent do so, and this more general statement is accurate enough to enable the local planning authority to make a decision on the value of the common to their constituents. Remember that the local planning authority is entitled to know how results were produced, so keep a careful note of the methods used; it may happen that the staff member who did the work leaves without telling his successors exactly what he did, leading to confusion and embarrassment. The methods of analysis may also have to be explained in open court or inquiry, and therefore they should be kept as simple as possible.

Each consultant has his own methods of presenting survey results, but it is preferable to coordinate the use of graphs, maps, and charts by using the same scales, coordinates, symbols and colours for the same items, thus making it easier for the team and the local planning authority to absorb the information.

#### **Stage three: environmental effects**

A fuller discussion of possible environmental effects and the mitigating measures which may be taken is to be found in Chapter 6. It is not a comprehensive checklist, but an indication of the types of effect that may be expected in an Environmental

Assessment, and it offers a selection of 'thinking points' which may help the Assessment team to construct their own checklist of effects to be assessed. The exact definition of 'significant' will vary from project to project; an effect which is significant to a small village may well be totally insignificant in the context of a city. Probably the most useful way of recording degrees of significance is to place the effects in ranking order of importance; the obviously major significant effects will be at the top of the scale, and the obviously minor, though still significant, effects will be at the bottom. This method is more effective than simply categorizing the effects as major, minor, or intermediate, as it enables the Assessment team to agree on the significance of effects without arguing which category they belong to. On no account should mathematical weightings be given to the comparative significance of effects; this often leads to a rather arbitrary loading of effects which has a spurious appearance of exact calculation. No two consultants will use the same multipliers for their estimates of significance, and they may find it difficult to substantiate their weightings in an inquiry.

#### *Estimation of effects*

Environmental effects can *only* be estimated; not even the most brilliant and far-sighted professional can predict exactly what the final effect of the development will be, and the further the prediction is projected, the less reliable the estimate will be. This obvious fact needs to be reiterated throughout the whole Assessment, both within the team and outwith it. The environment current at the time of the study is the baseline for predicting effects, but it is a basic principle of good Environmental Assessment that the state of the environment in a 'nil' situation should be assessed - that is, the state that the environment would be in if the proposed development did not take place. Only if this is taken into account can a true judgement of the probable effects be achieved. For example, local objectors may maintain that the development will increase the traffic flow to the extent that new roads will be needed, but if the 'nil' situation is studied, it may become evident that other developments already in the pipeline will generate extra traffic even if the project under consideration does not take place, and that new roadworks will become necessary in any case. This 'nil' assessment is very useful when negotiating the level of planning gains with the local planning authority.

A further set of effects may have to be considered if the

development may possibly be abandoned before completion. This event may be due to running out of capital, sudden political or economic changes which make the development unacceptable as it stands, or unforeseen competition from new UK or overseas industries which make the development economically obsolete. If the local planning authority is convinced that such an event is possible, they would probably be entitled to require the developer to provide an assessment of the environmental effects of abandoning the works.

The Department of the Environment warns that if a developer does not give adequate information about possible adverse effects, even after he has been requested to do so, the local planning authority is entitled to assume the 'worst case' for the environmental effect. Even if the effect is really as bad as this it is preferable to submit an adverse effect, together with the suggested mitigating measures, rather than to allow the 'worst case' to be included in the Environmental Statement by default.

The Regulations do not lay down any forecasting time limits for predicting effects, though it seems reasonable to limit the predictions to the life of the project, with the exception of mineral workings where the afterlife of the site is more environmentally important than the operational life of the extraction work. Schedule 1 (Annex D) projects are generally more dominant but not necessarily longer-lived, since changes in policies and technological developments may shorten the life of an installation, while Schedule 2 projects, though less dominant, may have longer lasting effects. This is especially true of projects such as major roadworks or large-scale housing developments which may take years to become fully integrated into the environment, even after they are technically completed. For the majority of developments, it seems reasonable to predict effects for:

- the duration of the construction period, as required by the Regulations;
- five years after completion, which allows time for mitigating landscape works to mature;
- the economic life of the project, amortization period, life of the plant, or lease, since the after-use of the land is an important consideration in suggesting mitigating measures.

The Channel Tunnel is expected to have an engineering life of 100 years, and predictions of effects ought to take that time-scale into account. When long-term forecasts of effects are made it is essential to describe the factors which may upset the predictions,

such as additional housing development, increased unemployment, changes in national or local planning policies, or public attitudes towards the environment, even if these are rather nebulous at the time of the Assessment. Opinions as to what is 'significant' and what is not may change during the progress of the Assessment even though the local planning authority may have agreed a list; it is therefore wise to keep the data and records relevant to all effects available at least until the project has received planning permission.

#### *Estimation of indirect and secondary effects*

Schedule 3 of the Town and Country Planning Environmental Assessment Regulations calls for consideration to be given to indirect and secondary effects; these are even more difficult to predict than direct effects and such estimates should be given with wider ranges and more conditional clauses. The 'specified information' in an Environmental Statement requires that all 'direct and indirect' effects should be assessed, whilst the 'explanation or amplification' of the specified information calls for 'secondary, cumulative, short, medium, and long term, permanent, temporary, positive and negative' effects to be assessed for the use of natural resources, the emission of pollutants, nuisances, and waste disposal, but not for other factors. This difference reflects current concern for degradation of the natural environment rather than for the impact of the development as a whole. Only the significant indirect effects need be assessed, using the same criteria as those used for the direct effects, and there is a similar need to distinguish between beneficial and maleficial indirect effects.

It is not easy to demonstrate the pattern of relationships between the project and its effects on the environment in words alone, and a plain two-way matrix will help to check that no relationship has been missed out and to explain the pattern to the local planning authority and the public. One matrix may be constructed to show the existing pattern of relationships, and a second may show the estimated direct and indirect effects of the project. Complex computer-generated matrices are not difficult to construct, but they serve little purpose except to cheer up the computer specialist on the Environmental Assessment team: therefore, the simpler the demonstration can be made, the better. The easiest way of presenting information is by way of a key matrix indicating the existence of relationships for each sector (human beings, flora, fauna, and so on) and the relationships between the sectors

themselves (water:flora, landscape:cultural heritage). The details of each direct and indirect effect are recorded individually, either on cards or a computerized database. If it is necessary to show short- and long-term effects separately, another matrix will be required. No guidance is given in the Regulations as to the extent to which indirect effects are to be calculated, but the criterion of 'significance' should be used to decide whether or not to include an indirect effect. It is important to make sure that only significant effects are shown, and not every conceivable connection between effects, as this complication would only confuse both the Assessment team and the local planning authority. Demonstration matrices for direct and indirect effects are given in Chapter 7, and these can be adjusted to suit any scale or complexity of development. There is no technical difficulty in constructing practical regional, local, or site scale matrices of effects; the only limits are the team's expertise and the time and money available. A good matrix also acts as a heuristic model, asking questions of the assessor, and tracing the spread of effects throughout the area and beyond.

#### *Proposals for mitigating measures*

The Assessment team is obliged to state what measures will be taken to reduce or ameliorate the predicted effects of the development. There is little point in trying to assert that the project will not have maleficial effects when they are obvious, since the objectors will be well aware of them, but the team should also put forward any beneficial effects at the same time in order to show the proper balance of the project. A beneficial effect may not directly cancel a bad one, but a demonstration of the overall balance of effects may make the project more acceptable; it is also reasonable to offset short-term disadvantages by long-term benefits. The most practical way of dealing with this stage of the work is to note the possible mitigations at the same time as the effects are recorded, since the people who provide information about adverse effects are usually those who are best informed about the control or prevention of them, and they may be willing to put their knowledge at the team's disposal. Close cooperation with the local planning authority and other organizations at this stage will help the team to determine what mitigation measures will be acceptable, and to agree provisionally on their implementation, whether this is to be done directly by the developer or indirectly by the relevant authority. It is not much use deciding how a particular bad effect can be offset unless the authority who

has the statutory responsibility for supervising the mitigating work agrees; this will only delay the Assessment whilst alternatives are found. For example, it may be possible to mitigate noise from traffic by erecting earth bunds between housing and roads, with shrub planting to improve their appearance, but unless the highway authority are satisfied that the work can be carried out without impinging on sight lines, and that it can be maintained safely, they will not agree to the proposal. The Department of the Environment maintains a Central Unit on the Environment which is a good source of information on the latest policies and technology for mitigating adverse effects. Incidentally, the distinction between mitigating works and planning gains must be maintained at all times.

#### Stage four: the Environmental Statement

Schedule 3 of the Regulations sets out the information to be contained in the Environmental Statement as discussed in Chapter 3. No format for the Environmental Statement is given in the Regulations, and presumably a suitable format will evolve from experience and with guidance from the Department of the Environment. Today, all the environmental information will almost certainly be held on computer, and it is essential to check that both hardware and software are compatible amongst team members. Data on incompatible systems can be translated by a computer bureau, but this takes time and breaches confidentiality, and whilst the idea of linking all consultants on a network by modem is attractive, this may lay the team open to hacking, which is a risk for confidential projects. Traditionally each consultant prepares his own section of the Statement covering his survey work, analysis and conclusions on the predicted effects within his field. The advantages in this method are:

- The work is completed more rapidly, as each member of the team can get on without waiting for others;
- A particularly good contribution reflects credit on the authors;
- The responsibility for each item can be easily identified;
- Work can continue until the last moment without delaying other team members.

One disadvantage is that sectors may be left out and contradictions allowed in, due to lack of coordination between consultants, and

this is a more serious risk in the larger and longer assessments. The alternative is for all team members to give their results to a central office to be worked up into a single assessment document; the advantages being:

- complete coordination of all results;
- standard presentation and references;
- little or no repetition of site descriptions and background data;
- good cross-referencing of items;
- consistent writing and draughtsmanship.

This method may take more time than individual working, and any extra time should be allowed for in the program.

Whichever method is chosen probably depends more on the personal relationship between client and consultants than on the nature of the Assessment. Like many other multidisciplinary situations, the best solution may lie in a compromise. Each member of the Environmental Assessment team would be responsible for preparing his own professional statement, but within a framework firmly set by the project manager, and with basic information produced centrally.

Individual work would include:

- a report on the existing environment and summary of findings;
- analysis of data;
- an estimation of environmental effects for each consultant;
- suggested mitigating measures;
- preparing Environmental Statement material to a common formula.

Central office work would include:

- controlling the programme and budget;
- preparing base maps and other base documents for all consultants;
- issuing statutory notifications and documents to all parties;
- writing the introduction to the project;
- collating professional descriptions of the site and the development;
- collating professional proposals for mitigating measures;
- final presentation of Environmental Statement documents.



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Much of this central office work cannot be done by managerial staff alone, and the technical jobs may be carried out by one or more professional staff seconded from the consultants' offices, or by the consultants' staff themselves working in close cooperation. However the work is done, it is important to make sure that there is a named individual who can be held responsible for every piece of information included in the Statement; not for the sake of passing the buck or for claiming personal credit, but so that any queries can be answered rapidly and reliably. A system of text references in the Statement which can be correlated with the original consultant's work is invaluable. Other consultants, statutory consultees, or the local planning authority who are studying the Environmental Statement, are entitled to ask for elucidation of the documents and it is advisable that all queries should initially be sent to the central office so that they can be recorded formally together with the replies made by the consultant, as these may eventually become incorporated in the final planning submission. An unconsidered reply by an imperfectly informed junior can create a misunderstanding which may take a lot of hard work and fast talking to clear up, and it will invariably concern one of the more sensitive points in the Environmental Assessment.

When the Environmental Statement has been completed and all the loose ends have been tied up, copies have to be sent to the statutory consultees, the local planning authority and, if required, to the Secretary of State; copies must also be available for sale to the public, so that the work of reproduction is likely to be substantial unless the team have given some thought to the efficient reproduction of text, maps, diagrams and photographs. It is not so much the cost of producing elaborate documents, which will in any case be a small part of the total budget, but the delays caused by waiting on printshops and photographic laboratories that makes it difficult to run off copies as and when required. One solution is to ensure that all documents are readable in black-and-white so that copies can be quickly produced on the office copier, and to reserve the more expensive and attractive coloured documents for the statutory recipients. The public may also need to be able to buy cheaper copies, since an economic charge for a large Environmental Statement may be in the region of £20-30.

Remember that the planning committee who make the final decision are neither full-time professionals, nor complete laymen, and if in doubt about the best format for the Environmental

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Statement, consult the local planning authority as to the type of presentation which will be most appropriate. The Environmental Statement may be the product of months of hard work for the team, but it is only one of the many important projects that the planning committee have to consider, so some effort should be spent on making it clear, comprehensible, and concise. Very large documents, maps which have to be unfolded on a committee table, or sub-reports which are not clearly related to the master document, are all faults which do not help the submission; they may seem unimportant or even too obvious to mention, but it is surprising to find how many otherwise excellent submissions are physically difficult to handle, and any committee member who has to struggle with recalcitrant paperwork is not in the best mood to consider the project sympathetically. The project manager should make sure that everyone who has to read the Environmental Statement is provided with a good summary which he can carry about with him.