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Social Services

DEPARTMENT OF EDUCATION AND SCIENCE

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FROM THE SECRETARY OF STATE

Prime Minister:
You may like to know of this report.

D J Wright Esq
Private Secretary to the Secretary of
the Cabinet
Cabinet Office
70 Whitehall
London
SW1A 2AS

28 July 1982

Dear David,

The first report of the Genetic Manipulation Advisory Group, which was set up in December 1976, was published as Cmnd 7215 in May 1978 and the second as Cmnd 7785 in December 1979. I now enclose the draft of the third report of the Group which my Secretary of State also wishes to publish as a Command Paper.

The Second Report indicated an increasing tendency on the part of the scientific community to regard some of the fears that had previously been expressed about the potential safety risks from genetic manipulation work as having been exaggerated. This tendency has continued during the period leading up to the present report, to the extent that it is now apparent that the hazards of engaging in genetic manipulation, if they exist at all, are far less than was conjectured when the Group was set up. This change in scientific opinion has enabled two important changes to be made during the period: (i) a new risk assessment scheme for the categorisation of genetic manipulation experiments has been introduced; this has resulted in most work now being carried out under the lower categories of physical containment; (ii) experiments judged by a local Biological Safety Committee to be appropriately conducted either with "good microbiological practice" or under Category 1 (the lowest category of containment) no longer have to be notified in advance to the Group and to the Health and Safety Executive on a case-by-case basis (they are instead notified in arrears, once every twelve months).

The draft report notes with gratification that there have been no recorded ill-effects associated with the practice of genetic manipulation in the 103 centres registered in the UK and the recategorisation of much work to lower levels of containment is in line with trends in the USA and elsewhere. Nevertheless the need for continued monitoring against possible longer-term effects is recognised.

Scientific interest in the subject remains high and much progress is being made in the application of recombinant DNA (deoxyribonucleic acid) technology to the production of health care products and other materials on an industrial scale - a matter of considerable economic importance.

The draft report itself is short and consists of 19 pages only but there are substantial appendices. There will be a foreword by my ... Secretary of State, a draft of which is attached also.

This will not be a politically controversial document and it seems reasonable therefore that it should be published during the summer recess. My Secretary of State would prefer not to wait till Parliament reassembles if that can be avoided.

I should be grateful if you will seek Sir Robert Armstrong's agreement to the publication of the report as a Command Paper during the summer recess.

I am copying this letter and enclosures to the Private Secretaries to the Prime Minister, the Leader of the House of Commons and the Paymaster General and to the Chief Press Secretary at No 10.

Yours ever,
Irene Wilde

MRS I WILDE
Private Secretary

DRAFT FOREWORD TO GMAG'S REPORT

Since the Second Report of the Genetic Manipulation Advisory Group (Cmnd 7785) was published in December 1979, much scientific information on the biological applications of recombinant DNA technology has accumulated. Because the original fears about this work have so far not been substantiated and because of the very responsible attitude of those who carry out the work, this Report explains that the Group were able, in early 1980, to introduce a risk-assessment scheme for the categorisation of experiments, and within a year to advise a further modification of the procedures governing the notification of individual experiments. The Report does however note that there will be a need for continued monitoring to verify that there are no long term health hazards associated with this work.

The Group have also revised their procedures for giving advice on the large scale use of genetically manipulated organisms. The Report records that the Group's advice on that area of work will in future be restricted to the biological properties of the organisms being used; the Health and Safety Executive will, as part of their responsibilities under the Health and Safety at Work Act 1974, continue to be concerned with the physical aspects of safety.

I am grateful to the Group for their most valuable work, in particular for ensuring that both research and the industrial applications of that research can continue under procedures and safeguards which, as far as can ever be the case, are acceptable to all concerned.

Covering letter with PM's 29/7

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GENETIC MANIPULATION ADVISORY GROUP

Third Report of the Genetic Manipulation Advisory Group

Papers

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MEMBERSHIP OF THE GENETIC MANIPULATION ADVISORY GROUP

Membership at 28 February 1982.

Chairman:

Sir Robert Williams, MD, FRCP, FRCPath, FFCM	Formerly Director of the Public Health Laboratory Service, London

Appointed as scientific experts:

B. Atkinson Esq, PhD, FIChem, FEng	Director, Brewing Research Foundation Research Establishment, Redhill, Surrey
E. Hoggarth, Esq, PhD, FRSC	Formerly Deputy Chairman, ICI Pharmaceuticals Division
J. Ingle, Esq, PhD	Scientific Adviser to the Secretary to the Agricultural Research Council
B.W. Langley, Esq. PhD	ICI Corporate Laboratory, Runcorn
R.F. Sellers, Esq, PhD, ScD, MRCVS	Director, Animal Virus Research Institute, Pirbright, Surrey
Professor P.M.B. Walker, CBE, PhD, FRSE	Department of Zoology, University of Edinburgh

Appointed to represent the public interest:

Mrs. Jocelyn Chamberlain, MB, BS, FFCM	Department of Epidemiology, Institute of Cancer Research, Royal Marsden Hospital
Professor M. Kogan, MA	Professor of Government and Social Administration, Brunel University
Mrs. C. Margaret Puxon, MD, FRCOG	Barrister

Appointed to represent the interests of employees:

Professor D.C. Ellwood, PhD, FRSC	Centre for Applied Microbiological Research, Porton Down, Salisbury (ASTMS)
Ms. Donna Haber	Association of Scientific, Technical and Managerial Staffs, London (ASTMS)
R. Owen, Esq, MB, ChB, FFOM, DMJ, DIH, LRSC	Trades Union Congress

Professor R. Williamson, PhD	Department of Biochemistry, St. Mary's Hospital Medical School, London (ASTMS)

Appointed to represent the interests of management:

J.A. Gilby, Esq, BSc, C.Chem, FRSC	Technical Director, Beecham Pharmaceuticals Division (UK), London
Professor M.H. Richmond, PhD, ScD, FRCPath	Vice Chancellor, University of Manchester

Assessors:

R.P. Norton, Esq	Department of Education and Science
T.J.B. Geffen, Esq, MD, FRCP	Department of Health and Social Security
D.O. Haines, Esq, MB, BS, DCP, FRCPath	Health and Safety Executive
W.E.O. Jones, Esq	
E.J. Morris, Esq (alternate)	
C. Wray, Esq, BVMS, PhD, MRCVS	Ministry of Agriculture, Fisheries and Food
A. Bishop, Esq	Scottish Office

Secretariat:

K.I. Gibson, Esq, PhD I.B. Flinn, Esq	At the Medical Research Council 20 Park Crescent, London W1N 4AL

Former members who retired between 1 August 1979 and 28 February 1982:

Sir William Henderson, DSc, FRCVS, FRSE, FRS

J.B. Brooksby, Esq, CBE, DSc, MRCVS, FRS

Sir Frederick Dainton, MA, DSc, FRS

J. Maddox, Esq, MA

Professor J.H. Subak-Sharpe, PhD, FRSE

Professor P. Wildy, MA, MB, BChir, FRSE, FRCPath

The membership of the Group's Technical Subcommittee is given in Appendix II.

TERMS OF REFERENCE

The Genetic Manipulation Advisory Group was set up in December 1976 by the then Secretary of State for Education and Science, in consultation with her colleagues, with the following terms of reference.

1. To advise:

   (a) those undertaking activities in genetic manipulation, including activities related to animals and plants, and

   (b) others concerned

2. To undertake a continuing assessment of risks and precautions (and in particular of any new methods of physical or biological containment) and of any newly developed techniques for genetic manipulation and to advise on appropriate action.

3. To maintain appropriate contacts with relevant government departments, the Health and Safety Executive and the Dangerous Pathogens Advisory Group.*

4. To maintain records of containment facilities and of the qualifications of Biological Safety Officers.

5. To make available advice on general matters connected with the safety of genetic manipulation, including health monitoring and the training of staff.

* Now replaced by the Advisory Committee on Dangerous Pathogens.

DEFINITION

The group have adopted for the purposes of defining their remit the following definition of genetic manipulation; and the same definition serves to define the scope of the Health and Safety (Genetic Manipulation) Regulations introduced in August 1978:

> 'The formation of new combinations of heritable material by the insertion of nucleic acid molecules, produced by whatever means outside the cell, into any virus, bacterial plasmid, or other vector system so as to allow their incorporation into a host organism in which they do not naturally occur but in which they are capable of continued propagation'.

1. Introduction:

Since the Second Report was issued in 1979 (CMND 7785), it has become apparent that the hazards specifically attributable to genetic manipulation of micro-organisms are, if they exist at all, far less than were conjectured when the Group was set up and can be contained by appropriate biological and physical containment. It is also apparent that the pace of fundamental research and industrial application using recombinant DNA technology is much more rapid than was predicted; there are now 103 centres in the U.K. using the technology. We therefore considered it useful to prepare a Third Report, and to indicate how GMAG has revised its procedures in response to the changes in scientific opinion.

Two important changes have been introduced in this period. The first was the introduction of a new risk assessment scheme (GMAG Note 8) to replace the earlier categorization scheme which had been based on that in the 'Williams' Report (Cmnd 6600). The second was the issue of GMAG Note 14, which stipulated that experiments judged by the local Biological Safety Committee to be appropriately conducted simply with 'good microbiological practice' (GMP) or under Category I containment need no longer be notified on a case-by-case basis. These relaxations have been made possible by the responsible way in which local biological safety committees have developed, demonstrating competence to operate the new risk assessment scheme. We continue to place reliance on local safety committees, not only to categorize work but also to maintain surveillance of proper work practices. Our recategorization of much of the work to lower levels of containment is consistent with trends in the United States and other countries.

The present time also seemed appropriate for the production of a Third Report since many of the original objectives set for GMAG by the Secretary of State have been achieved, and in particular satisfactory safety standards for microbiological work for genetic manipulation have been implemented - an important achievement in an area where many of the investigators had not had previous training in microbiological practices. GMAG has also encouraged the development of a wide range of disabled host/vector systems that should enable almost all work to be carried out in a safe manner without very elaborate containtment procedures.

Moreover, some of the anticipated benefits of the recombinant DNA technology and its application for the production of industrial or medical materials, are well on the way to being realised.

It has been very reassuring that no ill-effects associated with the practice of genetic manipulation have been recorded in the 103 centres now registered in the United Kingdom. So far as we are aware, experience has been the same in other industrial countries. Nevertheless continued monitoring is of course needed to verify that there are no longer-term effects.

Developments in this field have raised important questions of what role and responsibilities GMAG should have in connection with the 'use' as opposed to the 'construction' of genetically manipulated micro-organisms. After discussion there was a consensus view that the Group should continue to keep under surveillance the large scale use of genetically manipulated organisms and continue to advise on the biological aspects of scale-up work.

2. Membership

The list on page .... gives the present membership. Since the last report the Secretary of State appointed Sir Robert Williams to succeed Sir William Henderson as Chairman. Dr E Hoggarth was also appointed as a scientific member with experience in industrial scale fermentation techniques to replace Dr R J C Harris; Dr R F Sellers replaced Dr J B Brooksby as a scientific member. Mr J Maddox resigned from the Group when he re-joined the staff of Nature to avoid any 'conflict of interests' - he has not yet been replaced. Professor P Wildy, Professor J H Subak-Sharpe and Sir Frederick Dainton have resigned their membership of the Group. Professor M H Richmond has replaced Sir Frederick Dainton as the nominee of the Committee of Vice-Chancellors and Principals.

In September 1981 Professor B Atkinson, who has special expertise in pilot plant and large scale fermentation, was appointed to the Group as a Scientific member.

We record our great appreciation to Sir William Henderson who guided the Group through a very active period when the risk assessment scheme was implemented and subsequently revised as a result of the rapidly increasing volume of data which became available on disabled host/vector systems. His special knowledge and expertise in the large scale fermentation of micro-organisms proved invaluable when the first industrial applications of genetically manipulated organisms were reviewed by us.

We also acknowledge the important scientific contribution which Professor Wildy, Professor Subak-Sharpe and Sir Frederick Dainton made to our work.

We were saddened by the death of Dr Harris who, following his appointment to the staff of the Health and Safety Executive (HSE), continued to attend some of our meetings as an observer for the Executive.

3. Calendar of Business

The Department of Education and Science continues to sponsor GMAG within central government and the Medical Research Council provides the Secretariat. We usually hold our regular meetings at the Natural Environment Research Council's London Office and we are most grateful to them for providing the necessary facilities and domestic arrangements.

Following our introduction of a risk assessment scheme for the categorisation of experiments in January 1980 together with the announcement in September 1980 that from that date experiments which fall into Category I or GMP do not have to be submitted for case- by-case consideration, the routine business of the Group has dropped sharply. In 1980 the Group met seven times and in 1981 five times. Advice to centres in which genetic manipulation has commenced, and any particular experiments on which local safety committees have asked for specific advice, along with the applications relating to the relatively few Category II or III experiments are now dealt with on a postal basis to avoid delay. No new Category IV containment facilities have been set-up since our last report and only two new category III facilities have been visited since the last report and they have not been put into

operation. A revised code of practice for laboratories was introduced in 1981. The Group has added to the list of exempted organisms, which are set out in the two supplements to Note 8 (included in appendix III). The Subcommittee on Validation of Safe Vectors was disbanded in 1979 and a Technical Subcommittee set-up in its place under the Chairmanship of Professor P M B Walker with a core membership (see Appendix II) and powers to co-opt additional members when considered necessary. The Technical Subcommittee's terms of reference are wide and in addition to advising on disabled host/vector systems it is asked to consider any scientific/technical matter on which specialist advice may be needed.

4. Risk Assessment Scheme for Categorisation of Experiments

The new risk assessment scheme for the categorisation of laboratory experiments involving genetic manipulation was introduced in January 1980 and a further radical revision of our procedures for reviewing work was introduced in July 1980 (GMAG Note 14). The information and data that were accumulating on the expression of eukaryotic genes in prokaryotic organisms and also the information on the behaviour of disabled host/vector systems in the human gut justified us to advise further reduction on the constraints which had been applied to that time.

The initial concern about the possible colonisation of the human gastrointestinal (GI) tract with an organism capable of producing a substance that may have adverse physiological effects, stimulated much work on the survival of E. coli in the human and animal GI tract and it was found that the disabled E. coli strain used in genetic manipulation work did not generally survive in the GI tract for more than a few days.

It was also demonstrated that E. coli K12 is so enfeebled that it was incapable of being converted to a transmissable pathogen by DNA inserts. Dr Brenner developed an E. coli host/vector system the details of which are given in Appendix VII and VIII that could not survive in the GI tract for more than a few days (usually 3-4 days) and could also be readily monitored because of its special properties. When used in conjunction with a non-transmissable plasmid - that is a plasmid which is not readily transferred from one bacterial strain to another - it represented a suitable laboratory system for genetic manipulation work and as such was designated as having an Access factor of 10^{-9} (compared to E. coli K12 which was designated 10^{-3}). A considerable amount of information on the behaviour of DNA inserts in plasmids and the expression in bacterial systems has become available since the technique of genetic manipulation commenced in 1972. The combined information on the behaviour of E. coli in the GI tract, the behaviour of DNA inserted into plasmids and the expression of products from these inserts enabled us to estimate the likely risk factors in a range of disabled systems. Depending on the degree of disablement of the bacterial system, the product (if any) being made and the possible resulting damage in a 'worst case' situation, it was possible to give some guidance on the likely overall risk of an experiment and thus the level of containment required for a particular piece of work. This system also encouraged the use of disabled host/vector systems because the more disabled the system, and the more accurate the information available on the DNA insert and on its expression of the product, the less constraints were required for the work.

The conclusion of the National Institute of Allergy and Infectious Diseases (NIAID) Workshop on Recombinant DNA Risk Assessment held in April 1980 in Pasadena confirmed our views concerning the revision of the risk factors for our categorisation scheme. The NIAID Workshop analysed the 'worst' possible case situation which may occur as a result of genetic manipulation work using E. coli with regard to the possible adverse effects of hormone producing strains of E. coli. It also discussed the possible occurrence of autoantibodies or autoreactive cells due to the production of eukaryotic polypeptides and concluded that the public health risk would appear to be extraordinarily low.

In the USA the National Institutes of Health (NIH) made substantial changes to their guidelines at about the same time as we revised our categorisation procedures. Most other countries follow the NIH guidelines but it was significant that, based on the published scientific data and information accumulating at that time, quite independent national advisory groups were able to reach similar conclusions and recommend an almost universal lowering of constraints on genetic manipulation work as consistent with proper regard to the safety of workers using this technique. The Recombinant DNA Advisory Committee (RAC) of the NIH is presently considering proposals to modify their guidelines radically which if accepted by the Director of NIH will allow a further reduction in the constraints on genetic manipulation work in the USA.

5. Safety Committees

As part of our general policy to place greater responsibility on local safety committees for the surveillance of this work it was agreed with the HSE that all work under Category I containment or work designated good microbiological practice could go ahead without the necessity for case- by- case review by us. Centres were asked to submit a list of the experiments done in Category I or carried out under conditions of good microbiological practice to us and the HSE at the end of every 12 months. This not only removed many of the administrative burdens on the centres and GMAG but also allowed us to discharge our public duty to maintain a watching brief over genetic manipulation work being undertaken in the UK.

We have placed considerable confidence in the local safety committees and we have been impressed by the responsible way in which they have carried out their duties and operated the risk assessment scheme. It is for this reason we place much emphasis on the structure of the local safety committee when a new centre is established. We consider it important to include a broad representation as well as members with the appropriate expertise to advise on the categorisation of experiments. Whenever there is any local difficulty in reaching a decision or where it is felt that a second opinion should be sought then we are always prepared to give advice. However, our experience during the last year indicates that local safety committees are competent to operate the scheme and only on relatively few occasions has our advice been sought on specific proposals. In all we have been asked to give advice on or confirm the local safety committee's categorisation in six cases involving Category I or GMP work in the past year (1 March 1981 to 28 February 1982).

An important area of uncertainty that remains is in some aspects of work involving viruses infecting eukaryotic organisms; we still wish to keep under case by case review experiments involving non-defective virus vectors (GMAG Note 14 supplement 1).

6. Scale-up work - involving the 'use' of a genetically manipulated organism

Although work involving the 'use' of a genetically manipulated organism is not covered by the genetic manipulation regulations we consider our present terms of reference sufficiently wide to include this activity in our overall surveillance of the field and that the public still requires reassurance about the safety standards required for large scale work involving the use of genetically manipulated organisms. We have therefore reviewed all such work to ensure that due consideration has been given to carrying out the work safely. GMAG's contribution in this connection clearly relates to the possible biological hazards; the safety of the plant used is more appropriately considered by the HSE Inspectorate. We recently met the Confederation of British Industry (CBI) genetic engineering working party to discuss and review procedures for advising on large scale work, and have recognised that it is possible to give some further guidance to industry and also to simplify the procedures so far adopted for receiving requests for advice. The details have been agreed by us, and by the HSE, and a revised GMAG Note 12 has now been published which explains that the Group no longer require a site visit before it gives its advice on scale- up proposals and work with exempted organisms or those made under conditions of good microbiological practice can proceed after notification to GMAG and the HSE. For work involving organisms constructed under Category I

containment or above then applicants would have to await for GMAG and HSE to give their advice before proceeding. The GMAG Note 12 (revised) is reproduced in full in Appendix III.

7. Commercial Proposals

The Health and Safety (Genetic Manipulation) Regulations do not distinguish where the genetic manipulation work is being done; industrial centres are required - like academic institutions - to notify GMAG and HSE of genetic manipulation activities. The Group recognises the potential importance of the industrial use of genetically manipulated organisms and has maintained its policy of giving every encouragement to the progression of laboratory developments to industrial application where this is consistent with good manufacturing practice. It is particularly gratifying to note that the first ever industrial large scale use of genetically manipulated organisms took place in the UK. The necessary confidentiality scheme instituted some time ago (see our First Report, 1978, Cmnd 7215) is still being operated.

8. International Relations

We have continued to maintain as close a liaison as possible with relevant governmental and non-governmental organisations abroad.

The Chairman and Secretary represented the Group at the European Science Foundation (ESF) Liaison Committee for Recombinant DNA Research. The Liaison Committee met for the last time in January 1981 following a decision by the ESF Council to disband it; since most countries had

accepted the guidelines promulgated by the National Institutes of Health (NIH - USA) there was little value in continuing the Liaison Committee. The ESF also accepted the Liaison Committee's recommendation that 'large scale' work involving the 'use' of a genetically manipulated organism did not involve any novel or unknown hazard. The ESF secretariat will however, continue to circulate information published by the national advisory groups to the member organisations.

As mentioned in Section 4 the results of the NIH risk assessment programme and their workshop to discuss risk assessment of work involving E. coli were particularly helpful to us in finalising our July 1980 risk assessment procedures (GMAG Note 14).

The Commission of the European Communities have revised their earlier proposal for a 'Directive' to control genetic manipulation activities and instead have submitted a 'Recommendation' to the European Parliament for their consideration. However,the Economic and Social Committee (ECOSOC) which held a colloquy in May 1981 to discuss the safety aspects of recombinant DNA work have reiterated their view that a 'Directive' should be promulgated; the exact scope of such a Directive however, remains unclear. The European Science Foundation agreed that a 'Recommendation' was an adequate legal instrument. The European Parliament approved the 'Recommendation' proposed by the Commission on 22 February 1982. The Council of the European Community have now to consider the 'Recommendation'.

The Council of Europe have also discussed the possible impact of recombinent DNA technology in relation to man and his environment. A draft Council of Europe Recommendation 'Genetic Engineering' has

recently been submitted to the Parliamentary Assembly for their consideration.

9. Difference Between the NIH and GMAG Procedures

During the short history of recombinant DNA technology two main sets of guidelines have emerged; those developed by the GMAG (UK), and those by the NIH (USA). The social and statutory pressures have been quite different in the two countries and these have had a major influence on the development of the guidelines, but although their respective evolutionary courses have been quite different the final outcome has been very similar.

One of the important similarities between the UK and the USA is the shift in emphasis from central advisory bodies to local biological safety committees for advice on individual experiments. The requirements for physical and biological containment are now very similar indeed in the UK and the USA. However, there are some important differences in procedures between the countries -

a) The UK has, unlike the USA, specific legislation which places a statutory requirement on all centres to notify to the HSE and GMAG their intention to do work involving genetic manipulation. However it should be emphasised that the notification procedure is relatively simple and once initial notification has been given the details required for experiments in Category I or GMP are minimal and retrospective.

b) The UK, GMAG has agreed that it would wish to be notified of all large scale work and in certain cases to continue to advise on individual proposals.

Both of the above procedures have been retained to ensure that we properly discharge our responsibilities to keep the whole field under review. We consider that it is an important aspect of our duty to the public to maintain a general awareness of development in work involving genetic manipulation and its location.

10. Medical Monitoring

We reviewed our Health Monitoring note and issued, on the advice of our Medical Monitoring Subcommittee (Chairman: Professor P Wildy), a revised note (GMAG Note 6) in January 1980. Although the categorisation of experiments was being reviewed at that time (GMAG Note 11) and some work designated 'good microbiological practice' thus removing the necessity of a physical containment facility - it was agreed that medical surveillance should be extended to cover all concerned with genetic manipulation. The extent of the health review was left very much to the discretion of the local Supervisory Medical Officer (SMO). What was considered important was that all those involved in genetic manipulation should have easy access to the local SMO and that there should be adequate health records kept of every worker and of the experiments undertaken. No accidents or reports of any untoward effects on health as a result of this work have been notified to us.

We have recently reconsidered our advice on the need for epidemiological monitoring of workers involved in genetic manipulation. The diversity of genetic manipulation work does not suggest that any particular health risks would be common to all workers using this technique. It was therefore agreed that there was no immediate case for setting up a prospective epidemiological study. But it was noted that the HSE continued to maintain a national Register of all those named on notifications submitted, which could be used as a basis for retrospectively determining the incidence of specific diseases if indicated. We feel it is very important that a proper record of all workers involved in genetic manipulation is maintained and made available should there be a need to mount a study at an appropriate time in the future. The HSE have already acknowledged the importance of the need to maintain adequate records of workers and we advise that the matter should be kept under review to determine whether there is a case for implementing an epidemiological study in the future.

11. Technical Subcommittee

The Technical Subcommittee under the Chairmanship of Professor P M B Walker has had four meetings. Its major task to date has been the revision of the risk assessment scheme for the categorisation of experiments. The Subcommittee has had considerable help from many scientists who were coopted for their expertise in various aspects of genetic manipulation work. We are most grateful to all regular members and coopted members of our Technical Committee for their willingness and time they have given and without whom much important progress would not have been made. The Committee have also revised the Code of Practice (GMAG Note 15 and its supplement), which had remained unchanged since first published in the 1979 Williams Report.

12. Good Microbiological Practice (GMP)

Following the introduction of the GMAG risk assessment scheme and the inclusion in the scheme of experiments designated 'good microbiological practice' the Joint Co-ordinating Committee for the Implementation of Safe Practices in Microbiology issued broad Guidelines for Microbiological Safety which we accepted as appropriate for work designated 'good microbiological practice'. The guidelines are reproduced in full in Appendix VI. The joint Co-ordinating Committee and GMAG are at present co-operating on the production of fuller guidelines for the benefit of those working in the field.

13. Genetic Manipulation in Plants

Since the second GMAG report we have issued a Guidance Note on Genetic Manipulation of Plants and Plant Pests - GMAG Note 13 issued in January 1980 and reprinted in the appendix. The Note was prepared by a Subcommittee which was initially chaired by Professor K Mather and following his retirement, from 1.1.1979, by Dr J Ingle. Work which involves plant pests requires a licence from the Ministry of Agriculture Fisheries and Food (MAFF) or Department of Agriculture and Fisheries for Scotland (DAFS) or Forestry Commission Secretariat (FCS) following advice from GMAG. Plant experiments which do not involve plant pests may, where appropriate, be started once GMAG and HSE have been notified.

14. Environmental Implications

Many of the potentially exciting applications of genetic manipulation, particularly in relation to agriculture, will ultimately necessitate the

deliberate release of the genetically manipulated organism or plant into the environment. In anticipation of requests for advice concerning the deliberate release of such organisms the Group has had preliminary discussions with representatives of MAFF and the Natural Environment Research Council (NERC) to decide whether it is possible or advisable to issue guidance notes on such matters. While it has been decided, in view of the complexity of the issues, not to offer specific guidance the Group would wish to be kept informed at the earliest possible stage in the development of any work in which the objective is to deliberately release the genetically manipulated organism or plant into the environment. It is strongly recommended that during the developmental stages special care is taken to keep full and accurate records of laboratory experiments and field trials using, initially, non-manipulated organisms. The records can then be used as background information when the local safety committees or GMAG are asked to advise on the use of the genetically manipulated organism. For the present each case will be examined on a case-by-case basis.

Some consideration has also been given to the possibility of any environmental impact that may result from the accidental release of a genetically manipulated organism. The risk assessment procedure require that some preliminary consideration be given to the likely damage (if any) that may be caused by a particular organism should it 'escape' from the laboratory environment. Until more information is available on the behaviour of a particular genetically manipulated organism in the environment and in competition with other natural organisms it is difficult to give any general advice. However, the Group consider that it is important to keep close liaison with NERC and MAFF to ensure that such matters are kept under close surveillance.

15. Future

The Group has considered its future work. The majority view was that the Group should, at least for the foreseable future, continue to keep the field of genetic manipulation under review and continue to be available for advice to local biological safety committeess and others concerned.