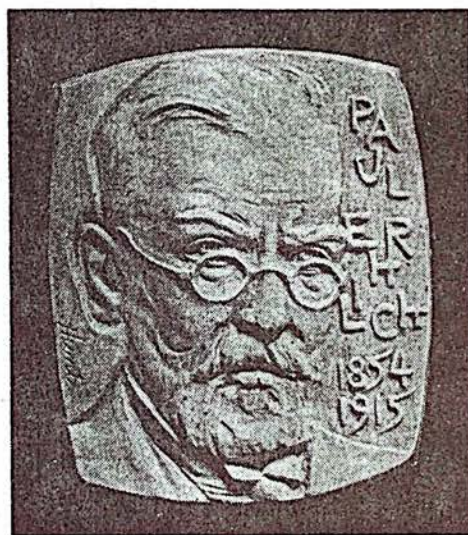


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*for*  
**IMMUNOLOGY**



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		J. Gordon
		J. Levy
		N.R. Sinclair.

\*\*\*\*\*

*Paul Ehrlich medal, on the cover, by Dora de Pedery Hunt.*

\*\*\*\*\*

Editor: S. Dubiski, Institute of Immunology, University of Toronto,  
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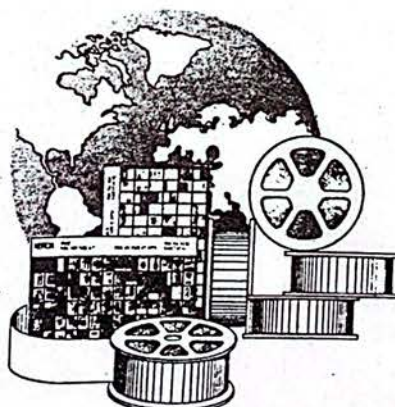
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## BULLETIN

OF THE CANADIAN SOCIETY  
FOR IMMUNOLOGYDE LA SOCIÉTÉ CANADIENNE  
D'IMMUNOLOGIE

Vol. 10, No. 1 (14)

November 1977.

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## CANADIAN SOCIETY FOR IMMUNOLOGY

### Results of elections for the new executive and council members.

President: F. Paraskevas  
Vice-President: B. Cinader  
Secretary-Treasurer: A. Froese  
Councillors: J. Levy  
N. Sinclair.

### New Members.

Twenty new members, four associate members and one corresponding member were accepted into the Society.

### Members:

M. Baines	- Queen's University, Kingston.
W.D. Biggar	- Hospital for Sick Children, Toronto.
D. Bundle	- NRC, Ottawa.
A.M. Greenberg	- University of Manitoba, Winnipeg.
S. Gupta	- Memorial Sloan-Kettering, New York.
P.F. Halloran	- University of Toronto, Toronto.
J. Krupey	- Ayerst Res. Lab., St. Laurent, P.Q.
M. Laverdiere	- Université de Montréal, Montreal.
W.Y. Lee	- University of Manitoba, Winnipeg.
P. Lewis, Jr.	- University of Mississippi, Jackson, Miss.
S.K. Liao	- OCI, Hamilton.
H.R. MacDonald	- Victoria Hospital, London.
L. Pilarski	- University of Alberta, Edmonton.
A.F. Rahman	- Henderson General Hospital, Hamilton.
M. Rola-Pleszczynski	- Centre Hospital, Université de Sherbrooke.
E. Szewczuk	- Cornell University, New York.
H.M. Vijay	- National Health & Welfare, Ottawa.
M.A. Wainberg	- Jewish General Hospital, Montreal.
T.G. Wegman	- University of Alberta, Edmonton.

### Associate members:

A. Al-Adra	- University of Alberta, Edmonton.
A.S.D. Pang	- Queen's University, Kingston.
S. Remy-Prince	- Inst. Armand-Frappier, Laval, P.Q.
M.L. Salkie	- University of Alberta, Edmonton.

### Corresponding member:

F. Leyva-Covian	- Inst. Armand-Frappier, Laval, P.Q. (Now moved to Spain).
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### First Annual Perey Award.

This year the first annual Perey Award of \$50.00 was given by the CSI to a student, Mr. Vernon Stringer, who in the Society's judgement presented the best research project in immunology for the 16th Annual Canada-Wide Science Fair which was held May 15 - 22, 1977, at the University of Victoria by the Youth Science Foundation. The title of Mr. Stringer's project: "Comparative Sensitivity of Normal and Malignant Cells to Diphtheria Toxin".

### I.C.S.U.

With the recent admission of I.U.I.S. into I.C.S.U. (see also the section on I.C.S.U.), Dr. Gold has been negotiating with Dr. Gauvreau at NRC (the adhering body to I.C.S.U.) for the foundation of a Canadian National Committee of the CSI on the I.U.I.S. Doctors Freedman, Ingram, Delage and Gold have been proposed for one year and Doctors Cinader, Paraskevas, Levy and Sehon for a two year term. The members were chosen with regard to familiarity with the functioning of the Society and geographical distribution. Dr. Dubiski and Dr. Cinader represented Canada on the I.U.I.S. Council at the International Congress of Immunology in Sydney, Australia (July 3 - 8, 1977).

### Relation of CSI to other Societies.

During the CSI Council Meeting in Calgary, Dr. Gold pointed to the several societies in Canada concerned wholly, or in part, with aspects of immunology. A large country like Canada with a relatively small population can ill afford the costs of multiple societies serving the same purpose but meeting at separate locations at different times of the year. The need to consolidate efforts, the changing role of the Canadian Federation of Biological Societies into science policy, the recent separation of the Canadian Society of Microbiologists from the C.F.B.S. (except for participation in the Science Policy and Biohazards Committee), have all led to proposals of amalgamation of CSI activities with those of other societies such as the Canadian Society for Clinical Investigation, Royal College and the Canadian Society for Clinical Immunology and Allergy (C.S.C.I.A.). International Symposia, which are felt to be vital to the health of the CSI, have declined greatly since joining the C.F.B.S. Rather than having a separate meeting, it is better for the CSI to meet within the framework of one of the larger meetings such as the C.F.B.S. or C.S.C.I. Separation from the C.F.B.S. is not the answer; in science policy and biohazards the C.F.B.S. can best represent our interests. Moreover our Society has disciplinary links to other than just medical schools so that the amalgamation with the C.S.C.I. alone would be also unsatisfactory. Academic responsibilities, for example, made it difficult for biochemists or graduate students to attend January meetings of C.S.C.I. Joint meetings on alternate years with C.S.C.I. and C.F.B.S. were suggested on a trial basis, before any formal attempts to amalgamate. Dr. Dolovitch has indicated



the interest of the C.S.C.I.A. to amalgamate with the CSI, and will discuss the proposal with his board. A proposal will go forth for a trial joint meeting of the CSI with the C.S.C.I.A. and the C.S.C.I. next January, or the CSI could invite the C.S.C.I.A. to meet with us in the context of the C.F.B.S. in London in 1978. Our present program organization would be maintained with the addition of extra symposia and a reduction of 10 minute papers.

Since the meeting in Calgary, further negotiations have been carried out with the C.S.C.I.A. Although this Society is, in general, favourably inclined towards future joint meetings with the C.S.I., such a meeting will, most likely, not be possible in January of 1978, primarily because the C.S.C.I.A. is currently negotiating its first joint meeting with the C.S.C.I. Discussions on a joint meeting of the C.S.I. and the C.S.C.I.A. in London, under the umbrella of the C.F.B.S., are still in progress.

Discussions are also under way at various levels with regard to the possibility of holding annual meetings of the C.F.B.S., the C.S.C.I. and the Royal College at about the same time in the same city. This would be an ideal solution, since it would provide a forum for the exchange of ideas between basic and clinical medical scientists in Canada.

Before any decisions on these matters are made, the membership will be polled for views and opinions.

#### Reorganization of CSI Executive.

In the past it has been suggested that councillors should be assigned a larger role in Society affairs, in addition to advising the executive and reviewing membership applications. Dr. Potworowski will serve as membership chairman to supervise a revision and improvement in recruiting procedures. Dr. Julius Gordon, being geographically reasonably close to Ottawa, will be added as a Councillor to serve as the CSI's representative to the C.F.B.S. Science Policy Committee. Dr. Paraskevas will serve as alternate. The new executive will send letters of thanks to the previous representative, Dr. Sehon, and his alternate, Dr. Bienenstock. Dr. Gold will serve as a liaison with other organizations.

The possibility of establishing a permanent secretariat has been discussed. The feasibility of such an arrangement will be explored during the next few months and a report will be presented at the next annual meeting. Should such a secretariat be established, Dr. Goodfriend has agreed to assist the secretary-treasurer in dealing with the secretariat.

#### C.F.B.S. Biohazards Committee.

The CSI representative on this Committee is Dr. W. Rawls.



### International Symposium.

Since no International Symposium was held in 1977, the new executive will attempt to plan one for 1978.

### I.U.I.S. Summer School in Czechoslovakia in 1978.

The CSI Council, at its meeting in Calgary, agreed in principle to provide a Canadian Immunologist with travel money to the Czechoslovakian border (approx. \$1,000.00) to participate in their summer school, planned for 1978, provided most of the money can be raised through donations. The school will provide education for Czechoslovakians to establish and up-grade clinical immunology in their hospitals.

### A Canadian Policy on Blood Product Supply.

The C.S.I. has recently been invited by the Department of National Health and Welfare to present a brief on "A Canadian Policy on Blood Product Supply". The Society's views and recommendations are to be sent to a Federal-Provincial Ad Hoc Committee on Plasma Fractionation.

The following are excerpts from the letter of Pierre Gravelle, Assistant Deputy Minister: ".... the Ad Hoc Committee has been established to:

1. review a Canadian Red Cross Society proposal to construct and operate plasma fractionation facilities as an integral part of the Blood Transfusion Service including possible methods of financing;
2. examine all other possible options for meeting Canada's blood product requirements in the future;
3. develop interim and contingency arrangements to ensure continuity of supply over the short term;
4. on the basis of the above findings, to recommend to the Conference of Deputy Ministers of Health measures to ensure a continuous and adequate supply of blood product requirements in the future.

### Basic Policy Guidelines.

In the conduct of its work, the Committee will be guided by the following principles approved by the federal and provincial Ministers of Health:

1. to protect the voluntary donor system by enhancing the opportunities of Canadians to voluntarily donate a gift for society's general benefit and by responsibly managing that resource;



2. to ensure self-sufficiency of blood products by reducing Canada's dependence on foreign sources of blood product supply, particularly those that rely on purchased plasma for raw material;
3. to ensure gratuity of blood products by reinforcing the Canadian tradition whereby no payment is made for a donation of blood and/or plasma and no specific charge is made to recipients of blood and blood products.

So that all aspects of the issue are explored and the implications of possible options fully examined, the Deputy Ministers requested that the Committee consult with all interested consumer, supplier and professional groups. Hence this invitation is being extended to your organization to submit a written brief on the matter.

#### Definition of Blood Products.

Diagnostic and therapeutic blood products are defined as any product derived from the cellular or plasma components of human blood which are used in the diagnosis, treatment or prevention of disease, illness or injury. Blood products include: red cells, cryoprecipitate, fresh frozen plasma, platelets, white cells, frozen red cells, albumin, fibrinogen, gamma globulin, Factor VIII concentrate, Factor IX concentrate, RH immune globulin, tetanus and other immune globulins, grouping and typing sera, control cells and panel cells .....

#### Guidelines on Preparation of Briefs.

Content: Briefs can address themselves to any aspect pertaining to the acquisition of raw material, the processing, distribution and availability of blood products in Canada including the policy guidelines on blood product supply.

Suggestions and opinions are being sought on possible arrangements for meeting these objectives. Groups may wish to comment on the feasibility, desirability or cost-benefit on not only the Red Cross proposal but any other possible alternatives or options they wish to advance, including the socio-economic implications of these options.

All documents brought forward as part of the submission to the committee are deemed public documents and therefore will be made available upon request to any individual, organization or government.

The deadline for the submission is December 31, 1977. Any member of the C.S.I. who feels that he can provide some input on this subject, should submit his views in writing to:

Dr. A. Froese  
Secretary-Treasurer, C.S.I.  
Department of Immunology,  
University of Manitoba,  
Winnipeg, Man., R3E 0W3.



Should further information be required, this can be obtained from Dr. Froese.

In addition to providing an analysis of the current situation it should be the Society's task to make projections into the future and to anticipate the need for additional (see excerpt above) human blood products for treatment, diagnosis and research.

\*\*\*\*\*

## BIOHAZARDS

Report of the Interim Biohazards Committee of the Canadian Federation of Biological Societies.

### Preamble

The report of the Interim Biohazards Committee of the Canadian Federation of Biological Societies which is contained in the following pages was compared in the spirit of the forward to the "Guidelines for Handling Recombinant DNA Molecules and Animal Viruses and Cells", published by the Medical Research Council in February, 1977. In the forward it states that the MRC will welcome further discussion on the Guidelines "and if it appears that the Guidelines could with benefit be changed, they will be changed".

Overall the Interim Committee is in favor of the Guidelines and wish to express their satisfaction with the majority of the standards and containment levels for the protection of personnel. The suggestions in our report for modification of the Guidelines maintains strictly the principle of protection of personnel working with recombinant DNA and animal viruses and cells.

We hope that the Federation Board will see fit to transmit our recommendations to the Medical Research Council.

We wish to stress the urgency for consideration of our recommendations by the still-to-be-formed Medical Research Committee on Biohazards in that expenditure of valuable research funds on containment facilities can be minimized if the recommendations are accepted by the Medical Research Council.

### Introduction

The Interim Biohazards Committee of the Canadian Federation of Biological Societies was set up at the beginning of April, 1977, with the following membership:

M.E. Blackstein, Department of Anatomy, University of Toronto.  
Bruce J. Holoub, Department of Nutrition, University of Guelph.  
Jordan Ingram, Department of Microbiology, Macdonald Campus,  
McGill University.



D.L. McLeod, Division of Histology, Department of Anatomy,  
University of Toronto.  
William E. Rawls, Department of Pathology, McMaster University.  
Amar Sen, Department of Pharmacology, University of Toronto.  
John H. Spencer, Department of Biochemistry, McGill University.  
(Chairman)  
Arthur M. Zimmerman, Department of Zoology, University of Toronto.

The mandate of the Committee was to examine the "Guidelines for the Handling of Recombinant DNA Molecules and Animal Viruses and Cells" published by the Medical Research Council and to prepare a draft report for consideration by the Federation Board at the Calgary meetings in June, 1977.

The members of the Committee contacted various scientists throughout the country for their views on the Guidelines and a total of 20 letters and submissions were made to the Committee concerning various aspects of the Guidelines. These were circulated to all members of the Committee, and a meeting convened in Toronto on June 7th, 1977.

The report and recommendations which follow are the result of the Toronto meeting. The report was circulated to all members of the Committee for verification before submission to the Federation Board.

The report is divided into four sections:

SECTION I: Recommendations for consideration by the Medical Research Council Biohazard Committee.

SECTION II: Recommendation to the Federation Board.

SECTION III: Report of Topics considered by the Committee which did not result in recommendations.

SECTION IV: Suggested topics for consideration in the future.

#### SECTION I.

Recommendations for modification of the MRC Guidelines for the Handling of Recombinant DNA Molecules and Animal Viruses and Cells for consideration by the Medical Research Council Biohazard Committee.

The first recommendation concerns the lack of detail in Chapter III of the MRC Guidelines with respect to the handling of recombinant DNA once it has been cloned in a level D facility, reisolated and is readied for further biochemical experimentation. There is no clear statement in the Guidelines changing the level of containment of the purified cloned DNA at this stage. Thus it must be inferred that the cloned and purified DNA must be kept at the D level of containment for all further manipulations.



Recommendation 1: We recommend that cloned DNA after isolation from the vector and *deproteinization* be classified at the A level of containment.

This recommendation is made on the basis of the known very low transformation properties of deproteinized DNA in both microbial and mammalian systems, and presumes that the deproteinized DNA can be considered to be biologically inactive.

The second recommendation also concerns the guidelines on handling recombinant DNA. The first paragraph on page 58 of the MRC Guidelines states "Table 3 defines the physical and biological containment levels recommended for experiments with recombinant DNA that use purified DNA preparations which *have been shown by published experiments to have less than 1% contaminating DNA*". We submit that published experimental proof is not realistic in this statement since it may not be possible to publish this sort of information. Publication, even if possible, would result in a time lag of up to six months in the experiment.

Recommendation 2: The statement be modified to "*have shown by published procedures to have less than 1% contaminating DNA*".

The third recommendation concerns the containment levels required for oncogenic viruses listed in Tables 5 and 6 of the Guidelines pages 66 (67) and 68 (69). The Committee received numerous letters on the subject of the level C containment requirements for the RNA oncornaviruses.

Recommendation 3: We recommend that the containment levels required for the murine and avian oncornaviruses be changed from level C to level B.

The basis for this recommendation is that man has been exposed extensively during historical time to murine and avian oncornaviruses without any known deleterious effects. Documentation with respect to this statement is available in "Biohazards in Biological Research", a publication of a conference held at Asilomar, Pacific Grove, California, January, 1973, Cold Spring Harbor Laboratory Press, Editors A Helman, M.N. Oxman and R. Pollock. In this publication a number of experiments are described which were deliberate attempts to demonstrate horizontal spread of murine oncornaviruses. We also note that Federal specifications exist for the amount of fecal mouse material acceptable in flour and grain used in our cereals and bread.

Recommendation 4: In requesting the reclassification of the murine and avian oncornaviruses we recommend that experiments with these viruses involving genetic crosses with other viruses and cells which cross species barriers should remain at containment level C.



Recommendation 5: We recommend that the containment level required for the feline oncornaviruses be changed from level C to level B.

As with the murine and avian oncornaviruses, man has been exposed extensively to feline viruses, at least from the times of the ancient Egyptians without any known deleterious effects. However, we note that the feline oncogenic RNA viruses infect human cells. Since there has been no demonstration of pathenogenicity by feline viruses despite repeated attempts to show it, level B containment should be satisfactory for personal protection. The limitation in recommendation 4 should also apply to the feline oncornaviruses.

The third type of virus we wish to recommend change in containment level requirement is vesicular stomatitis virus.

Recommendation 6: We recommend the reclassification of vesicular stomatitis virus to a requirement for containment level B. Exceptions to the B level containment requirement should be made for experiments in which vesicular stomatitis virus is used to form pseudo types with viruses classified at higher containment levels. The level of containment should coincide with the highest level of containment for the two viruses.

The basis for this recommendation is the many years of laboratory experience working with the virus without any major problems, its known low virulence to man, and that only mild illness occurs upon infection.

The seventh recommendation concerns an inconsistency in the classification of cell culture procedures according to containment level in Table 8, page 78 of the Guidelines. In Section A, Human Tissues and Cells, subsection 1c, we note that cocultivation or fusion of normal human cells with normal cells from non-primate mammals is set at level A, whereas on page 81, section C Non-primate Mammalian Tissues and Cells, subsection 1c, cocultivation or fusion of normal cells from non-primate mammals with normal cells from human beings is set at level B. While those people aware of the inconsistency could always choose the first alternative at level A, for those unaware of the choice it would involve additional expenditure for a Biohazard hood in order to undertake their experiments in a level B facility.

Recommendation 7: We recommend a change in the containment level requirement described in Table 8, C, 1c (human beings) from level B to level A.

Procedures for decontamination of glassware were the subject of a number of submissions to the Committee.

The Guidelines are very definitive with respect to procedures for level C and level D facilities, page 32, Section V, page 34, section VII.



"Laboratory glassware contaminated by the agent must be sterilized by autoclaving before being washed or otherwise cleaned, and sole reliance for sterilization should not be placed on chemical sterilization methods alone". "All contaminated liquid waste must be rendered innocuous before entering normal sewage disposal systems. All contaminated solid waste must be autoclaved or incinerated".

Recommendation 8: We recommend that where chemical decontamination can be shown to be as effective as autoclaving this should be allowed at all levels of containment.

The basis for this recommendation is that a majority of the experimental procedures which will be undertaken in level B, level C and level D facilities will partially involve tissue culture procedures. Autoclaving of all glassware would result in the baking of precipitated protein onto the glassware. This will drastically alter the surface properties of the glassware making it essentially unusable for further tissue culture work unless chromic acid cleaning is instituted which in itself causes problems and requires a second step in processing of the glassware prior to reutilization. The alternative is to dispose of the glassware after autoclaving.

A second problem in many laboratories is that experimental procedures call for placement of used glassware in hypochlorite or formalin solutions to provide a level of decontamination immediately <sup>after the</sup> use of the glassware is finished and to avoid contamination during the experimental procedures. If these solutions must be autoclaved the destruction rate of autoclaves will be enormous. It is unlikely that the Medical Research Council will be amenable to replacement of autoclaves in periods of as short a time as two years.

An additional problem of autoclaving all materials is when radioactive materials are involved. We have no means of assessing at present how wide spread this possible contamination of autoclaves and their emissions by volatile radioisotopically labeled material would be. The MRC Guidelines recognize the possibility of using liquid disinfectants for some situations, page 21, section ii, but they are superceded by the descriptions for levels C and D, on pages 32 and 34.

The next recommendation is aimed at the training aspect of Biohazard containment, page 87, section c, parts 2 and 3.

Recommendation 9: We recommend the development of a manual of procedures similar to parts of the "NIH Biohazards Safety Guide", published in 1974.

The proposed publication would be a guideline to the containment requirements for Biohazard equipment such as hoods, clean air stations, etc. It would describe the correct loading of hoods, their proper utilization to avoid interference with air flow patterns, the correct utilization of various other types of equipment, decontamination procedures, sterilization procedures and extend as far as growth and handling of various viruses and



cells. An expanded version of the description of major factors contributing to hazards on page 18, of the Guidelines, should be included. The manual could be prepared by requesting various investigators across the country to write individual sections, according to their areas of expertise.

The Guidelines, page 24 and Chapter 5, define levels of responsibility for the training of personnel in the handling of biohazardous material.

Recommendation 10: We recommend that the MRC set up a library of resource material in the form of manuals, books, film clips, etc., on methods of biohazard containment which could be made available to local biohazard committees for use in safety training courses in their institutions.

The final recommendation concerns the legal aspects of a Biohazard accident.

Recommendation 11: We request a better clarification of the legal aspects of an accident to the investigator, or a technician or graduate student, under the investigator's direction, particularly with regard to the responsibility of the investigator, and the university.

The requirement in the Guidelines for the maintenance of health records etc. places a certain legal onus on the investigator. The investigator is not usually considered to be the employer of technicians and graduate students, even when they are paid from the investigator's research funds, the institution being the employer. Will the Guidelines alter the current status of the investigator and his responsibility to persons in this laboratory?

## SECTION II.

Recommendation to the Federation Board.

Whilst the majority of the Committee's deliberations concerned the MRC Guidelines for the Handling of Recombinant DNA Molecules and Animal Viruses and Cells, several letters queried the inconsistency of clinical and teaching laboratories which as yet do not come under the Guidelines. This led to the following:

The Committee recommends that the Board of the Canadian Federation of Biological Societies have the appropriate Federation Committee make representation to the Federal and Provincial Governments with regard to the inconsistency of research laboratories which come under the Guidelines being located next to clinical laboratories in hospitals and to teaching laboratories in universities which currently do not come under the Guidelines for the handling of recombinant DNA molecules in animals and cells. This representation should include requests for implementation of the Guidelines in the clinical laboratories and teaching laboratories and provision of the appropriate funding for the implementation.

The basis for this recommendation is that the acceptance by the Federal Government of the possibility of biohazards from experimentation



with recombinant DNA molecules, animal viruses and cells should result in protection for the total population of Canada not for a select group of research workers alone.

### SECTION III.

This section describes topics considered by the Committee during its deliberations which did not result in any recommendations.

The Committee discussed the fact that a number of animal viruses are listed for containment at level B which have no known pathogenicity towards humans. Representations to the Committee requested that these viruses be reassigned to a containment at level A. Discussion concerned the containment which would insure that viruses pathogenic to animals would not be released and possibly infect animal stocks.

In studies with recombinant DNA it was noted that the Guidelines make no distinction between primates and non-primates, mammals and birds, and are classified as warm-blooded animals for the purpose of containment for cloning DNA. Representations were made that this would hinder the shot-gun type of experiment. However, recent experimental procedures have been developed which reduce the necessity for shot-gun experiments and make this argument somewhat redundant. Recommendations to define distinctions between the various types of warm blooded animals was considered unnecessary at this time.

### SECTION IV.

Topics for consideration at future meetings.

Representations were made to the Committee with regard to the level D containment required for injection of human tumor cells into nude mice. This experimental procedure is a very useful clinical tool but level D facilities are expensive to set up and are unavailable at the present time in a number of institutions.

The Guidelines make recommendations with regard to the availability of medical records of personnel, collection of blood samples, etc. In a brief discussion, no general problems were apparent in the implementation of these regulations but it was recognized that there may be local administrative problems which may arise when the procedure is instituted. It was suggested that the involvement of the local Biohazard Committees in organizing and assisting investigators in this aspect of the Guidelines be investigated.

The Committee has recommended better clarification of the legal aspects of an accident in the case of a lack of Biohazard containment. However, the no fault insurance aspect of the workman's compensation



laws current in some provinces should be investigated. This may require legal council. The Federation Board should rule whether this aspect comes under the mandate of the Biohazard Committee.

Respectfully submitted,

John H. Spencer  
M.E. Blackstein  
Bruce J. Holoub

Jordan Ingram  
D.L. McLeod  
William E. Rawls

Amar Sen  
Arthur M. Zimmerman.

The Report of the Biohazards Committee was accepted by the Board of the Canadian Federation of Biological Societies at its meeting in Calgary on June 19, 1977.

\*\*\*\*\*

#### CANADIAN FEDERATION OF BIOLOGICAL SOCIETIES.

##### Officers of the Canadian Federation of Biological Societies, 1977-78.

Chairman of the Board: N.B. Madsen.  
Vice-Chairman of the Board: S. Fedoroff.  
Past Chairman of the Board: B. Cinader.  
Honorary Secretary-Treasurer of the Federation: J.T. Hamilton.  
Chairman of CFBS Science Policy Committee: J.S. Cowan.  
Vice-Chairman of CFBS Science Policy Committee: G. MacLachlan.

##### Canadian Society of Microbiologists withdraws from the CFBS.

A referendum held by the CSM indicated that a majority (270/132), with 53.3% responding, voted in favour of a withdrawal from the CFBS.

##### Future Annual Meetings of the CFBS.

1978 - London; June 20 - 23  
1979 - Vancouver: June 19 - 22.  
1980 - St. John's: June 10 - 13.

Suggested for 1981: New Brunswick, Guelph, Quebec or Ottawa.  
1982: Edmonton or Simon Fraser.

Canadian Association for Research on Toxicology granted an "observer status for 1978".

CART was formed in 1964 and has at present approximately 180 members.

Political Prisoners of Conscience.

The following motion, prepared by the Canadian Biochemical Society, was adopted by the Board of the CFBS:

Whereas: The U.N. Declaration on Human Rights upholds the right to freedom of thought and conscience, of opinion, and expression for all, declaring that no one shall be subjected to arbitrary arrest, detention or exile;

Whereas: Amnesty International has documented that scientists are among individuals in many countries who are held prisoners of conscience in violation of the U.N. Declaration;

Whereas: The U.S. National Academy of Science has recently adopted the cases of eight scientists suffering political oppression for their beliefs (2 in USSR, 1 in Uruguay, and 5 in Argentina);

BE IT RESOLVED THAT the Canadian Federation of Biological Societies applauds the actions of the N.A.S. in regard to its stand on human rights; deplores the deprivation of human rights of SERGEI A. KOVALEV, YURY ORLOV, JOSE LUIS MASSERA, FEDERICO ALUAREZ ROJAS, GABRIELA CARABELLI, JUAN CARLOS GALLARDO, ANTONIO MISETICH and EDUARDO PASQUINI, and declares its support for these and other prisoners of conscience.

It was agreed that the Chairman should contact the appropriate Embassy, relating the motion in a general form.

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DISSIDENT SCIENTISTS NEED COLLEAGUES' SUPPORT

Amnesty International is a world wide organization concerned with human rights. It acts independently of any government or political faction, ideology, economic interest or religious creed. It seeks the release of prisoners of conscience (meaning those people imprisoned due to their political or religious beliefs, ethnic origin or color) provided they have neither advocated nor used violence.

With national sections in 35 countries, the organization's membership has grown in Africa, Asia, Europe, North and South America to 180,000 members.



Amnesty advocates fair and early trials for all political prisoners and works on behalf of those persons detained without charge or without trial, and those detained after expiry of their sentences. It opposes torture in all cases, pressing for full observance of the U.N. declaration on torture. The Canadian monthly Bulletin carries regular pages on the incidence of torture around the world and on major events contributing to its abolition. Appeals are made on behalf of specific victims and they receive considerable response from all parts of the world. 1977 has been declared "Prisoner of Conscience Year" by the organization to bring full attention to the plight of all prisoners of conscience.

Many Canadian scientists have become aware of the fate of prisoners of conscience in various countries - Argentina, the U.S.S.R., Uruguay or where several of the prisoners of conscience have been scientists of repute. In more than 14 years' work on human rights violations throughout the world, Amnesty accumulated a vast documentation on treatment and conditions of P.O.C.'s in the U.S.S.R. and published a report "Prisoners of Conscience In The U.S.S.R.: Their Treatment and Conditions". It presents an analytical account of those conditions in prisons and corrective labour colonies and of the legal and medical treatment of P.O.C.'s who are detained in psychiatric institutions.

It is said that Russian intellectuals have traditionally taken responsibility for the well-being of their society to a degree not as common in the west. Scientists everywhere can be proud of the extent to which scientists play this role in the U.S.S.R. at such tremendous risk to themselves and their families.

Anatoly Shcharansky is such a man. He was openly active for years with Sakharov's Civil Rights Committee and a founding member of the small Public Group to Promote Observance of the Helsinki Agreements in the U.S.S.R. For exercising rights which are actually guaranteed by the U.S.S.R. Constitution and formally recognized by the Helsinki Act, he and most members of the Group were arrested (and individually adopted as Prisoners of Conscience by Amnesty) early this spring. It is believed he is to be charged with treason. The International Committee of Mathematicians regards his case as of prime importance and is seeking world-wide support on his behalf\*. At the present time, along with Dr. Yuri Orlov, well-known and highly regarded physicist, he is being held incommunicado. World-wide support of their professional colleagues is essential if these men are to be saved.

Typical of other scientists in the same country who have become Amnesty adopted prisoners of conscience are Dr. Sergei Kovalyov, Dr. Semyon Gluzman, Dr. Andrei Tverdokhlebov, and Dr. Grigory Gimpv\*\*.

In this short article, only the case of Dr. Kovalyov will be discussed, but details of the cases of others mentioned are available and all are very worthy of support.

Dr. Kovalyov (born 1932), graduate of Moscow University and a candidate of biological science, is a specialist in electrophysiology.



His many articles were published in Biofizika. His work was achieved despite his removal as Senior Research Officer for criticizing the Soviet invasion of Czechoslovakia. He was a founding member of the Initiative Group for the Defense of Human Rights in the U.S.S.R., and a founding member of the Moscow Group of Amnesty International, legally established there in 1974. He signed letters and appeals on behalf of Leonid Plyusich (the cybernetist detained for two years in a special psychiatric hospital but released due to tremendous public pressure; expelled from the U.S.S.R. in early 1976). He appealed in defence of Vladimir Bukovsky, (Bukovsky received a very harsh sentence for revealing to the west the misuse of psychiatry in the treatment of dissidents. Due to intense public pressure, he was released and expelled from the U.S.S.R. in December, 1976). Kovalyov appealed in connection with the exile of Solzhenitsyn and concerning the harsh treatment of the Crimean Tatars. He, with Tverdokhlebv, regards the freedom to move about and live where one wishes as a basic human right and they did what they could to support Jewish colleagues who lost their science appointments and were otherwise harassed as a result of applying to emigrate. As a reprisal for these human rights activities, none of them illegal under any plausible interpretation of Soviet law, he was sentenced to a savage prison term on December 12, 1975 of seven years "strict regime" (see page 45 of Amnesty International report Prisoners of Conscience in the U.S.S.R.), followed by three years internal exile.

One final point should be made emphatically, Amnesty International is not anti-Soviet, but it is against deprivation of human rights in whatever country they occur. At the present time, scientists seemingly form the core of the dissident group in the U.S.S.R. They bravely demand that the Soviet government give to the Soviet people rights and freedoms which are so basic that we in the west have almost forgotten that we enjoy them. For this, many are completely deprived of their scientific appointments, and in dire straits and continually harassed or imprisoned in jails, labor camps and lunatic asylums.

We ask Canadian scientists to be aware of these problems of the scientist prisoners of conscience in whatever country they are held, and to act with Amnesty International on their behalf.

\* To assist Scharansky, contact Prof. L. Schwartz, International Committee of Mathematicians, 37 rue Pierre Nicole, Paris 5, France.

\*\* Contact M.J. Beattie, Amnesty International, 2101 Algonquin Avenue for details concerning the cases of any or all of the scientists mentioned, and of Amnesty's effort on their behalf.

Mary J. Beattie  
Executive President,  
Amnesty International,  
Canada.

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O B I T U A R I E S

*Robert Paul ORANGE 1921 - 1977*

It is difficult for me to write a tribute in memory of Bob Orange-- the tribute part is easy; but it seems unreasonable that Bob should have died and that this tribute is in memoriam.

Our association goes back to medical school where we were both members of the class of '65 at the U. of T. Those of us who came from Toronto found it beyond belief that Sudbury could have provided the outstanding student in our class, outstanding both academically and also personally. Bob always appeared calm and commanding. We always suspected that he was a work addict but since he also had the time and patience for many other campus activities, we were not sure how he was doing it all. In those days examination marks were posted and it was apparent very early that the answer to the question "How did Orange do?" established the standard for good grades.

Later we interned together at Toronto General and spent the evening hours in the Gynecology call room, reading immunology. We nearly developed the subspecialty of immunogynecology. Following internship, Bob joined Frank Austen's laboratory and to no one's amazement quickly became a recognized authority within his field of interest. In fact, I remember quite vividly that in 1970 he addressed the plenary session of the American Academy of Allergy in Chicago and several of the post-doctoral fellows at National Jewish in Denver returned talking about how cool and collected he was. They even remembered how he paused to light a cigarillo. He was a superb lecturer with a presence that held an audience's attention even when he was discussing very complex material.

I was pleased when he offered me a position in his department. I knew that he believed in research and retained his enthusiasm for it. We were colleagues for five years in the Department of Immunology that he formed and guided at The Hospital for Sick Children. We were friends for eighteen years.

B. Zimmerman.

*Raymond CÔTÉ 1923 - 1977*

Le décès du Dr. Raymond Côté survenu il y a quelques mois nous a bien attristés.

Le Dr. Côté était avant tout un éducateur merveilleux, dévoué à ses étudiants et anxieux de leur transmettre une formation scientifique de premier ordre. C'est donc avec regret que ses élèves, anciens et nouveaux l'ont vu partir mais il nous restera toujours cette connaissance de base qu'il nous a acquise et ce dynamisme qu'il savait nous communiquer.



Le Dr. Côté était aussi un excellent chercheur, soucieux à l'extrême de la qualité et de l'exactitude de ses travaux. Ses études sur la caractérisation des glycoprotéines des groupes sanguins constituent un excellent apport à la recherche dans ce domaine.

Le Dr. Côté est né à Québec le 25 juin 1923 et fit ses études à l'Université Laval. Il passa ensuite deux ans à Paris à l'Institut Pasteur avec M. les Professeurs P. Grabar et A. Bussard et puis quatre ans au Lister Institute de Londres avec le Professeur W.T.J. Morgan. Il revint ensuite à Laval en 1958 et enseigna d'abord cinq ans au département de Microbiologie de la Faculté de Médecine et puis joignit le département de Biochimie de la Faculté des Sciences. Il était Professeur Titulaire depuis 1967.

Malheureusement son ardeur soutenue au travail fut responsable de sa mort soudaine. A sa femme éprouvée et à ses enfants, nous offrons toutes nos sympathies.

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It is with sadness that we heard of the death of Dr. R.H. Côté a few months ago.

Dr. Côté was above all an excellent teacher, totally devoted to students and anxious to give them first class scientific education. Having had the privilege of being an undergraduate student of Dr. Côté for 3 years and having communicated with him ever since, I feel very sorry that he is no longer with us; my only consolation is to know that the knowledge and dynamism he had transmitted to his students will always remain with us.

Dr. Côté was also an excellent scientist, exact and rigorous. His studies on the characterization of blood group glycoproteins represent an excellent contribution to this area of research.

Dr. Côté was born in Quebec City on June 25, 1923. He studied at Laval University. He then spent two years in Paris at the Institut Pasteur with Professors P. Grabar and A. Bussard, and four years at the Lister Institute, London, with Professor W.T.J. Morgan. He returned to Laval University in 1958 and after 5 years in the Department of Microbiology, at the Faculty of Medicine, he moved to the Biochemistry Department of the Faculty of Science. He was "Professeur Titulaire" since 1967.

He loved his work and was extremely conscientious, and it is extremely sad that he exhausted himself. To his devoted wife and children, we offer our sincere condolence.

Michelle Letarte.



John Richardson MARRACK, DSO, M.C. 1885 - 1976

John Richardson Marrack, DSO, MC, Emeritus Professor of Chemical Pathology in the University of London, died in the USA on June 13, 1976. He was born on November 26, 1886 at Clevedon, Somerset, but soon moved to Tiverton, where he attended Blundell's School, to which he remained greatly attached, and of whose Old Boy's association he later became Vice-President. He went to St. John's College, Cambridge and then to the London Hospital Medical College, graduating in 1908.

His first research was on rheumatoid arthritis as a John Lucas Wasker student, and later Beit Memorial Fellow at the laboratories of the Cambridge Research Hospital (which has become the Strangeways Laboratory). After the First World War, when he served in the RAMC, he went to the London Hospital as lecturer in Chemical Pathology. He became interested in the properties of colloids, initially from studying the binding of calcium by serum proteins, and came to the conclusion that colloid interactions were caused by definable and verifiable physical and chemical forces, acting between distinct protein entities. As an example he chose antibodies, whose nature was quite unknown and whose very existence as separate entities was doubted. In 1930 he showed that diphtheria antitoxin behaved as a distinct protein whose interaction with diphtheria toxin could be measured quantitatively. In a monograph published in 1934 (*The Chemistry of Antigens and Antibodies*) he proposed that the specific affinity of antibodies for antigens is determined by the same factors which determine the specific binding of molecules to form crystals, that is, the shape of the molecules and the spatial distribution and strength of polar forces. The monograph contains a clear diagram elaborating the theoretical studies of Heidelberger and Kendall to illustrate what has now become accepted as the 'lattice hypothesis' of antigen-antibody interactions.

Revised in 1938 this work has had a lasting influence, and convinced many chemists and biochemists that immunology was a fit subject for scientific study by themselves as well as by bacteriologists and serologists. Marrack was also the first to use methods which are now commonplace: equilibrium dialysis, whereby he indicated that anti-hapten antibodies were probably bivalent, and the attachment of coloured dyes to anti-bacterial antibodies, which inspired Albert Coons later to develop the technique of immunofluorescence. Marrack wrote few papers, by present day standards, and his encyclopaedic knowledge of immunochemistry appeared mostly in review articles.

John Marrack was a colourful character. Behind a shyness and apparent abruptness lay kindness and intellectual integrity. He always wanted to be an athlete and was by temperament a fighter--for seven years he was welterweight champion in the London University boxing tournaments. Throughout the whole of his adult life he was a keen walker (he knew Dartmoor intimately) and he never drove where he could go by bicycle. On more than one occasion when roused to righteous anger he took the law into his own hands and used his fists: once to apprehend a thief in the laboratory and again to despatch a gang of hoodlums who misguidedly attacked him on Whitechapel Station. His war record in the RAMC--DSO as a line medical officer and MC for investigations on the poison gas used against the British Army in 1917--illustrates this



aspect of his character. So also does his consistent championship of the underdog.

During the Civil War in Spain, he was an active member of the Spanish Medical Aid Committee, and visited the International Brigade and the Spanish Republican army. About this time he became deeply concerned about the nutrition of children in Britain influenced by L.J. Harris and Jack Drummond, and spent much time and effort campaigning for the Children's Nutrition Council--to such good effect that he was adviser to the Ministry of Food during the Second World War and wrote in 1942 a book (*Food and Planning*) which influenced the post-war planning of nutrition.

These activities were regarded by many of his contemporaries as indicating that he was finished with research, but were entirely consistent with his character. When he returned to the laboratory in the Department of Pathology at Cambridge in 1952, his main work had, in fact, been completed, but he began to exploit the growing knowledge of the structure of antibodies while devoting most of his energy to editing, for its first ten years, virtually single handed, the new journal *Immunology*. By now the importance of his earlier work had become widely understood and recognised and at the age of 76 he was made Visiting Professor at the University of Texas. At the First International Congress of Immunology in 1971 he was one of five to receive the Distinguished Service Award "For revolutionary ideas that have become commonplace in his lifetime, and for pioneering work in the physicochemical interpretation of antigen-antibody interactions".

J.H. HUMPHREY.

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## MEMORIAL FUND ESTABLISHED - CRÉATION D'UN FONDS COMMÉMORATIF

As a tribute to the late Dr. Brown, a group of his family and friends have established the *G. Malcolm Brown Memorial Fund*, the income from which will be used for the advancement of research in the health sciences in Canada. In recognition of Dr. Brown's own conviction that every encouragement should be given to increasing Canadian awareness of Canadian contributions to science, and following consultation with senior officers of the Canadian Society for Clinical Investigation, the Canadian Federation of Biological Societies and the Royal College of Physicians and Surgeons of Canada, awards will likely take the form of annual lectureships bearing Dr. Brown's name, in conjunction with meetings of these major national organizations.

The Fund, to be registered with Revenue Canada as a charitable organization, will be administered by a small group of Trustees including Mrs. Brown, Mr. J. Robert Beattie, former Deputy Governor of the Bank of Canada, and Dr. Pierre Bois, Dean of Medicine, Université de Montréal. Recipients of awards from the Fund will be chosen by a selection committee drawn from the scientific community specifically to advise the Trustees.

Those wishing to contribute to the Fund may send their donations, made payable to the *G. Malcolm Brown Memorial Fund*, to

The Secretary,  
Medical Research Council,  
Ottawa, K1A 0W9

Official receipts will be provided for income tax purposes.

En souvenir du docteur Brown, la famille et un groupe d'amis viennent de créer le *Fonds Commémoratif de G. Malcolm Brown* dont les revenus serviront à l'avancement de la recherche en sciences de la santé au Canada. Reconnaissant la ferme conviction du Dr. Brown d'augmenter, par tous les moyens au Canada, les communications concernant les contributions canadiennes à la science, et en conséquence des conseils des officiers supérieurs de la Société canadienne de recherches cliniques, de la Fédération canadienne des sociétés de Biologie et du Collège Royal des Médecins et Chirurgiens du Canada, on donnera des prix probablement sous forme de conférences du Dr. Brown à l'occasion des réunions annuelles de ces grandes associations nationales.

Le Fonds, enregistré à Revenu Canada Impôt comme oeuvre de charité, sera administré par un petit nombre de fiduciaires dont Madame Brown, Monsieur J. Robert Beattie, l'ancien Député Gouverneur de la Banque du Canada, et le docteur Pierre Bois, Doyen de la Faculté de médecine, Université de Montréal. Un comité formé de membres de la communauté scientifique sera chargé spécifiquement de recommander aux fiduciaires du Fonds le choix des lauréats.

Toutes les donations au *Fonds Commémoratif de G. Malcolm Brown* peuvent être envoyées au:

Secrétaire  
Conseil de recherches médicales  
Ottawa K1A 0W9

Un reçu officiel à l'appui des déductions d'impôt sera émis sur réception de toute donation.

## NEWS

### 1977 Gairdner Foundation Awards.

The 1977 Gairdner Foundation International Awards have been given to five distinguished medical scientists. This year's list includes three well-known immunologists: K. Frank Austen from the Harvard Medical School, Boston, Mass., U.S.A.; Sir Cyril A. Clarke from the Nuffield Unit of Medical Genetics, Liverpool, England; and Jean Dausset from the Institut de Recherches sur les Maladies du Sang, Paris, France.

Dr. Austen's award was given *"For his contributions to our understanding of the factors involved in the initiation, amplification and control of the inflammatory response"*.

Dr. Clarke was awarded *"In recognition of his original and far-reaching contribution to the prevention of haemolytic disease of the newborn"*.

Dr. Dausset received his award *"For recognition of the effects of histocompatibility antigens in humans, and his continuing leadership in the application of this knowledge to such diverse fields as transplantation immunology and the study of genetically determined diseases"*.



As it has been a custom for several years, the winners of the awards gave public lectures in Toronto. Below are summaries of the research activities of the above three awardees:

Dr. K. Frank Austen.

The focus of Dr. Austen's research has been on the cellular and molecular basis of the inflammatory response initiated by immunologic or other stimuli. This work has been prolific and resulted in a number of original contributions relating to chemical mediators and regulatory mechanisms of the mast cell, the neutrophil, the eosinophil and the complement and kinin systems. Among the many accomplishments, his group described the eosinophil chemotactic factor of anaphylaxis, purified it, determined its structure and synthesized it. His laboratory has contributed more than any other to our knowledge about the structure of the slow reacting substance of anaphylaxis and its inactivation by an enzyme contained by eosinophils. His and several other laboratories have greatly clarified the mechanism by which mediators are released from mast cells in the anaphylactic reaction. Other contributions have included the recognition of the Hageman factor fragments, the neutrophil immobilizing factor and components of the alternative complement sequence such as factor D and the regulatory protein beta-1-H.

Dr. Austen also has made major contributions at other levels since he has trained a large number of other scientists, he is a member of many national and international advisory and editorial committees and he has edited numerous text books and reviews.

Professor Sir Cyril A. Clarke.

Professor Clarke's work has been in the fields of insect and human genetics and with respect to the latter the relation of blood groups to disease in man. His outstanding contribution was in the area of Rh disease of the newborn. He, with his Liverpool team, was the first, in 1961, to produce evidence that anti-Rh injected into Rh- negative women

early in the post partum period would protect against sensitization by Rh positive fetal red blood cells. The impact of this discovery on clinical medicine is tremendous with a rapid fall in the incidence of Rh disease of the newborn.

Professor Jean Dausset.

Professor Jean Dausset has been a pioneer in the discovery and analysis of human leukocyte alloantigens and in the determination of their role in the rejection of organ transplants and in various immunological and disease processes. Early studies of blood groups and blood transfusions led him to the demonstration of an antibody, the original anti-HLA, causing the agglutination of leukocytes. A complex genetic system was soon revealed, and Dausset suggested homology between this human HLA system and the murine major histocompatibility complex. He postulated and contributed to the proof of a histocompatibility effect of HLA and led in the application of this information to improving the success of kidney transplants. He and his group have remained in the forefront in work which has shown that the major histocompatibility



complex of man and other mammals plays a unique role in many of the immune processes mediated by lymphocytes. He has also had a major involvement in HLA population genetics and in the rapidly developing studies of the influence of HLA on a variety of diseases probably autoimmune in nature. Prof. Dausset is a prime mover in the organization of the International HLA Workshops which have provided a model of international co-operation in research.

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#### Dr. Peter Moloney Honoured.

On September 30 of this year, friends and associates of Dr. Peter Moloney gathered at the Connaught Laboratories to congratulate him for his past scientific achievements and to wish him many more productive years to come. Dr. Moloney was presented with a leather-bound volume of his papers published since 1919, eighty-four in all, and it was announced that a new production building at Connaught Laboratories Ltd. would be named after him. His reply to the speeches in his praise was typically self-deprecating and humorous, as he recalled briefly the small Ontario towns in which he was born and received his early education.

Peter Joseph Moloney was born in 1891 in Penetang, Ontario and educated at Powassan Public School and at St. Michael's College School, Toronto. He took a Bachelor of Arts degree in Philosophy at the University of Toronto in 1912 but later switched to chemistry and received his PhD in 1924. He joined the Connaught Medical Research Laboratories in 1919 and was also appointed to the School of Hygiene, University of Toronto, in 1925. He was Assistant Director of the Connaught Laboratories from 1925 to his "retirement" in 1961 and has continued his active research career as Consultant to the Laboratories to the present day.

The areas of research covered by his numerous papers are varied, ranging from the measurement of the physical properties of proteins by use of a quick-acting pH electrode of his own design, to the development of the Moloney test for the detection of potential allergic reactions to diphtheria toxoid, and to his present interest in the immunology of insulin which has resulted in a new product, sulphated insulin, for the treatment of highly resistant diabetics.

For these and other contributions to scientific knowledge, Dr. Moloney has received many honours, including the Order of the British Empire (1946), the Banting Medal (1964), the Gairdner Award (1967), and the Charles H. Best Prize (1971).

I am sure that all members of the Canadian Society for Immunology will join me in wishing him many more active and productive years doing the work he loves.

M.A.



Dr. R.R.A. Coombs Visits Ontario.

Professor R.R.A. Coombs of the Immunology Section, Department of Pathology, Cambridge University was the invited lecturer for the Schofield Memorial Lecture at the Ontario Veterinary College, University of Guelph on October 6, 1977. While at Guelph he took the opportunity to visit the nearby medical schools.

On Friday, September 30 Dr. Coombs visited the Institute of Immunology of the University of Toronto and discussed immunological research with several of the scholars at the Institute. In the afternoon he presented a seminar "Crib Death - The Modified Anaphylaxis Hypothesis" which presented the idea that crib death is due to hypersensitivity to cows milk and an anaphylatic reaction which is modified by the deep sleep of the infant so that a non-violent reaction occurs.

The same evening Dr. Coombs was the speaker at a meeting of the Ontario Antibody Club. Dr. Coombs is an honorary member of the Club. His topic for the talk was cryptically entitled "MARR, DARR and MrPAH". This was expanded during the talk to the Mixed Antiglobulin Rosetting Reaction, the Direct Antiglobulin Rosetting Reaction and Mixed Reverse Passive Antiglobulin Hemagglutination. The mechanisms, advantages and disadvantages of each of these reactions were described along with the potential usefulness of each technique.

On Monday, October 3 the Department of Microbiology and Immunology of Queen's University in Kingston was visited. Again Dr. Coombs discussed immunological research with research workers at the hospital and in the afternoon presented a lecture "Human Lymphocytes Characterized by Receptors, Markers and Activities".

On Tuesday it was a visit to the McMaster Medical School in Hamilton. The lecture at McMaster was "Experimental Serum Sickness and Rheumatoid-Like Lesions in Rabbits". In this presentation evidence was presented for rheumatic-like lesions in the joints of rabbits which had been subjected to a single large parenteral injection of protein. The lesions occurred only in a small percentage of the animals challenge and the factors which led to the development of the lesions in these few were not known. However, this may be an appropriate model for further investigations of the disease.

The topic of the Schofield Memorial Lecture, which was the prime reason for Dr. Coombs' trip to Canada, was "Immunology - A Personal View". The lecture began with a history of immunology and reminiscence of some of the earlier giants of the science. The present status of immunology followed and some predictions for the future immunology research and applications were outlined by Dr. Coombs to conclude the lecture.

Dr. Coombs has spent his research career at the University of Cambridge, England and has assisted and guided many graduate students into a career in medical and veterinary research. Usually the group in his laboratory is composed of graduates of biology, of veterinary medicine and of medicine, and recently also a graduate in dental medicine. Dr. Coombs was introduced to immunology as a graduate student during the Second World War when he was asked to investigate serological tests for the detection of glanders infection. The test developed was the



Conglutinating Complement Absorption Test which led into his research on conglutinin and immunoconglutinin. It was during this same period that he discovered or rediscovered the antiglobulin test which now commonly carries his name. Dr. Coombs' contributions of ideas and techniques for immunology have continued and it is a stimulating experience to discuss research with him. Those who were fortunate enough to hear and meet Dr. Coombs during his visit greatly appreciated the opportunity to see and hear him.

D.G.I.

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## INTERNATIONAL UNION OF IMMUNOLOGICAL SOCIETIES

During the Third International Congress of Immunology in Sydney, Australia, several business meetings of various IUIS bodies took place. Among others, there was a meeting of the General Assembly, 12th and 13th meetings of the IUIS Council and meetings of many of the committees. A short summary of these activities, with special emphasis on those which might interest the CSI members is given below.

### President's Report to the International Union of Immunological Societies - (Sydney 1977).

J. Humphrey, Department of Immunology, Royal Postgraduate Medical School, Hammersmith Hospital, London W12 OHS, England.

The three years since Professor Cinader's Presidential Report, on the occasion of the Second International Congress of Immunology in Brighton 1974, have seen immunology continue to expand as a scientific discipline and as a source of useful concepts in clinical and veterinary medicine. There are now at least nineteen international journals and six review series wholly or almost wholly devoted to immunology in one or other of its aspects; the number of National Immunological Societies accepted for membership of the International Union of Immunological Societies stands at 26, while 6 more societies which have not formally been accepted have observer status; and the IUIS has been admitted as a full member of the International Council of Scientific Unions (ICSU). The implications of this last step are considerable, since membership of ICSU not only entitles the IUIS to have a voice when appropriate in the conduct of the numerous international coordinating Committees which the ICSU sponsors, but it also entitles National Societies to form National Committees for Immunology in conjunction with their country's National Member of ICSU, which is commonly the main Scientific Academy or Society recognized by the Government concerned. This means that each National Society belonging to the IUIS can request its National Academy (or whatever body is the National Member of ICSU) to adhere to the IUIS and may expect help from its National Academy in promoting immunology in its own country. Where a National Society is already strong, such help may not be needed, but where it is not already strong the prospect of formal recognition should help considerably. Such formal recognition does not, of course, imply that all problems of organization and finance will promptly disappear! The development and impact of immunology will always depend upon the enthusiasm and effectiveness of those who practice it, but some unnecessary obstacles should be removed.

The financial consequences of becoming a full member of ICSU are somewhat complicated. The IUIS contributes to ICSU 2.5 per cent of its own income from dues paid by National Societies. Additionally, each National Member contributes in respect of each International Union to which it adheres at a rate agreed between the National Member and ICSU.



Consequently, if and when the National Member adheres to the IUIS its contribution to ICSU is increased. It is the practice of most, if not all National Members to obtain the funds needed from their respective governments, and no additional payment should be required from the National Society or from the IUIS. The benefit to the IUIS and its members is that grants may be made (on a modest scale) to the IUIS for particular scientific activities, and that participation by representatives of the IUIS in the activities of ICSU is assisted. At the present time IUIS has agreed, through its President and Secretary General to take part in the work of the Committee on Genetic Engineering (COGENE) and of the Scientific Committee on Problems of the Environment (SCOPE).

It is possible that the IUIS may wish in future to take part in the other ICSU activities, such as the Committee on Science and Technology in Developing Countries (COSTED). However, through the close relationship which IUIS enjoys with WHO, it is already involved in international projects in the fields of education and standardization, and our further involvement with ICSU should probably be allowed to take an opportunistic course.

The boundaries of immunology have both enlarged and become somewhat less defined than they were three years ago. As exciting new discoveries have been made in relation to the functionally different subclasses of lymphocytes and their products, and to the genetic control of immune responses, it has become apparent that regulation of immune responses is extremely subtle and complex. At the same time, as immunologists have increasingly concerned themselves with problems of infectious diseases, of parasitology, and of immunopathology, they have turned more attention to the functions and properties of mononuclear phagocytic cells and granulocytes, and to the role of complement and other serum factors. Interaction with microbiology, parasitology, pathology and haematology has increased and many workers in these disciplines, as well as in medicine and surgery, nowadays wish to learn the basic concepts of immunology. To meet this need there has been a considerable increase in the number of departments of immunology, and of courses and books on different aspects of the subject. As immunology itself becomes more complex, the scope and importance of the IUIS Committees in helping to coordinate has increased also.

The various Committees which were formed during the earlier years of the IUIS seem to me to have been the right ones - i.e., those whose activities were useful and necessary. As is evident from their reports in the IUIS Blue Book (1976) and will be evident from their reports at this meeting, they have been working effectively, and we must record our gratitude to the Chairmen, Secretaries and Committee members who have put much effort into bringing this about. I shall not enlarge on these reports except to congratulate the Standardization Committee on having its first standard (for fluorescein labelled anti-human Ig) accepted as an official WHO standard preparation, and Dr. Pondman, Secretary of the Education Committee, on having succeeded in getting the International Institute for Immunology Training and Research (ITS) at Amsterdam off the ground (with the financial backing of the Dutch government) and in having completed one course of training. As members of the Council well know, the WHO Special Programme for Research and



Training in Tropical Diseases was launched during the past year. This is an exciting and imaginative programme, in which immunology has a large part to play, and to which the work of all our Committees is directly relevant.

My predecessor as President emphasized in his Report the fact that all the activities of the IUIS cost money, as well as time and effort. The budget for expenditure prepared by our Treasurer last year amounted to some \$90,000 (this includes \$77,000 for the special budget of the Standardization Committee), whereas membership dues were estimated at \$13,000. The gap was to be filled by ad hoc grants for individual items of work by the Standardization Committee, by grants from various governments (Canada, Federal German Republic, Israel, Norway, Switzerland, U.K.), and by income from money held by the IUIS derived from profits of the 1974 International Congress. Although it is possible to obtain ad hoc grants from government and other bodies for specific projects of the IUIS Committees, it is very difficult to raise money for general and unspecific expenses of running an international organization (e.g. attendance of delegates at Council Meetings, the Standardization Committee Secretariat). Partly for this reason, and partly to take account of inflation, it was proposed last year to increase the dues from National Societies from \$1 per member to \$1.50. Because of inflation, this will not go very far. On the occasion of this Third International Congress, because it is organized and financed through the Australian Academy of Science, there can be no profit to the IUIS. However, it was proposed last year that a levy should be made of \$2.50 per participant, specifically indicated for IUIS administrative costs. I hope that this will not be grudged and that it will be agreed that the activities of the IUIS are of sufficient benefit to immunologists as a whole to warrant the National Societies and their members giving sufficient financial support to keep these activities going. If they cannot do this by direct subscriptions, I would urge the National Society representatives to seek, as some have already done successfully, grants (however small) from their national governments or ministries of health towards one or other of the activities of the IUIS.

This is a problem which the present Officers must leave with their successors, to whom my best wishes, I will close my Report by saying that I think that the IUIS is in good shape, and that its activities and effectiveness have been viewed with admiration by the General Secretary of at least one other Union. This is in large measure due to the efforts of Professor Alain de Weck, our Secretary General, and to him I would like, on behalf of us all, to address our special thanks.

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#### General Assembly of the International Union of Immunological Societies.

The Meeting took place in Sydney on July 3rd, 1977. The Canadian delegates to this meeting were: B. Cinader and S. Dubiski<sup>\*)</sup>. The

<sup>\*)</sup> The trip of S. Dubiski was made possible through the support of The National Research Council of Canada, as the National Member of ICSU.



President, Dr. J. Humphrey, gave his report; the delegates were also brought up to date with regard to the activities of the IUIS and its various committees. This was followed by the election of officers and Council. Those elected were:

### IUIS COUNCIL 1977 - 1980

#### OFFICERS:

President:	M. Sela
Vice-President:	B. Benaceraff
General-Secretary:	J.B. Natvig
Treasurer:	A.L. de Weck
Past-President:	J. Humphrey.

#### COUNCIL:

N. Allegretti	Yugoslavia
R. Arnon	Israel
J.-C. Cerottini	Switzerland
J. Dausset	France
S. Dubiski	Canada
T.L.W. Feltkamp	Netherlands.
J. Gergely	Hungary
L. Jager	German Democratic Republic
I. Lepow	United States
O. Makela	Scandinavia.
J. McLennan	United Kingdom
J.F.A.P. Miller	Australia
D.M.V. Parrott	United Kingdom
K. Rother	West Germany
T. Tada	Japan
M. Zembala	Poland.

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#### National Societies.

The Secretary General was able to maintain reasonable contact with the national societies. except for those of Argentina, Brazil, Chile and Portugal. The Italian society has been activated. Singapore applied for membership in the IUIS. Spain formed a society, but never formally applied to the IUIS. Mexico and Iran recently formed immunological societies. The Czechoslovak society has not been formed yet. The Immunology branch of the Soviet Society for Microbiology may be approved soon by the Government. No news has been received about formation of a Society in Lebanon, although, according to earlier reports, the Society was to be formed shortly.

#### IUIS Finances.

An increase of dues from \$1.00 to \$1.50 per member was proposed. This proposal would require approval by the General Assembly. It will



be done by postal ballot. Before the ballot, the national societies will receive a simplified statement of IUIS income and expenditures.

#### Standardization Committee.

This Committee is one of the most active ones. Its report, together with the reports of its various subcommittees, amounts to more than 100 pages. These detailed reports are available on request, but are not circulated for economical reasons. The Standardization Committee chalked up several successful projects, among others rabbit allotype standards and the anti-human IgG standard.

#### Education Committee.

The Institute for Training and Research under the directorship of Dr. K. Pondman was created. It is sponsored by the IUIS and the Dutch Government. The first 14 students, mostly from the Caribbean area, completed the theoretical part of the course. Two courses are being organized, one in Greece on applied immunology, the other on clinical immunology, in Czechoslovakia, both are planned for 1978.

#### IUIS Symposia.

A very successful symposium was organized by the Japanese Society last fall, in Kyoto. A surplus of money from this Symposium was given to the Symposium Committee. There were no concrete plans for any symposia in 1978.

#### IUIS European Federation of Immunological Societies (E.F.I.S.).

##### Report 1977.

##### Council of E.F.I.S.:

A.E. Bussard, President (France).  
J. Lisowski, Vice-President (Poland).  
O. Mäkelä, Vice-President (Finland).  
B.D. Janković, Secretary-General (Yugoslavia).

##### 1. Forthcoming European Immunology Meetings.

The Fourth European Immunology Meeting will be held in Budapest, 1978.

Spanish immunologists will take the initiative in organizing the Fifth European Immunology Meeting in Spain, 1979.

Because of the 4th International Congress of Immunology in Paris, 1980, the European immunologists will not organize a meeting in 1980.

The Sixth European Immunology Meeting will probably take place in Greece, 1981.



2. The Fourth European Immunology Meeting, Budapest, April 12-14, 1978.

This will be organized by the Hungarian Society for Immunology under the auspices of E.F.I.S.

The Secretary-General of the Meeting is Dr. J. Gergely, member of the IUIS Council.

The Meeting will include a plenary session, symposia, small group workshops, poster-workshops and free poster-sessions. A few survey lectures will be held and arrangements for informal discussion will be made.

Provisional list of symposia:

1. Ontogeny of the immune system.
2. Histocompatibility markers and receptors; their role in immune phenomena.
3. Regulation of immunity.
4. Steric structures and biological activities of antibodies.
5. Interaction between cytotoxic effector cells and target cells.
6. Cell wall antigens and lipopolysaccharides.
7. Biology of complement system.
8. Monitoring of immune phenomena in disease.
9. In vivo significance of immune complexes.

Registration:

The Meeting is open to immunologists (and para-immunologists) from all countries. The second announcement and registration forms will be sent to immunological societies and to anyone who returned the "Meeting Post-Card".

There will be a registration fee equivalent to 70US\$, if remitted by 31st October, 1977. The registration will cover basic expenses, administration and the cost of quick lunches on the three days of the Meeting.

The registration fee of 70 US\$ may be considered fairly high for young immunologists, but one must remember that it includes some meals and the receptions.

The choice of Budapest appears very favourable for bringing together immunologists from East and West. At the end of April 1977, 800 registrations has already been received.

3. "Immunology Letters".

It is considered that a journal "Immunology Letters" ("Immunological Letters" or "Immunoscience Letters"), as a means of rapidly disseminating short and original communications of good quality (3 pages in offsett) would be highly desirable, especially if it could cover all Europe, including Eastern countries. The



over-riding criteria for publication would be novelty and interest to a multidisciplinary audience. In fact, "Immunology Letters" would be an international multidisciplinary journal devoted to the rapid publication of basic research in immunosciences.

A Hungarian printer has been approached and there is hope that a definite proposal could be made to the Council of the E.F.I.S. in the near future.

#### Fourth International Congress of Immunology.

The French Society has been officially designated to organize the next International Congress. Dr. J. Dausset will serve as Secretary-General, IUIS will be represented on the Organizing Committee by Drs. Gergely, de Weck and Sela.

Dr. Dausset revealed plans for the Fourth Congress. The Congress will take place in Paris, 21-26 July, 1980. He expects 5,000 - 6,000 participants. The new Palais de Congrès will be ideally suited for the Congress. The main auditorium has 3,700 seats, a smaller one 750 seats, and space for 10 simultaneous meetings of 115 to 385 participants can also be arranged. A preliminary list of 18 topics to constitute the programme of the Congress was presented. It is envisaged that these topics will be discussed during 9 symposia in a large auditorium and 9 in the smaller one. Each symposium (large or small) will include three formal lectures (30 min. each), three round table discussions on the same topic (30 min. each) and a maximum of eight colloquia in smaller rooms.

Each speaker invited to lecture during a symposium will be asked to summarize the current knowledge on the topic of his lecture. Each workshop session will have a corresponding poster session before the discussion at the workshop. There will be no publication of the proceedings.

The total budget will be approximately \$ 500,000, 20% of which will come as support from the French Government, 20% from the commercial exhibits and 60% from the registration fees.

The projected expenses were given as rental fee for the Palais (\$ 50,000), bursaries for the young participants (\$ 200,000); 10% is the commission charged by the commercial firm organizing the Congress. The rest will be spent on publicity, printing, Congress Secretariat and social events. The organizers were given a \$ 10,000 "starter loan" from the IUIS.

The list of topics will probably undergo some changes. It is heavily weighted in favour of genetics with chemical and biochemical aspects of immunology missing. The omission of transplantation and allergy was deliberate and will probably be upheld.



Topics for the 1980 Congress:

1. Variability of the recognition structures.
2. Positive cellular cooperation.
3. Negative cellular cooperation.
4. Genetic regulation of the immune response.
5. Regulation of viral immunity.
6. Mechanisms of the autoimmune phenomena.
7. Mechanisms of suppressor or facilitation phenomena in tumoral growth.
8. Escape of parasite from immune response.
9. Genetics and immunology of resistance to viruses, bacteria and parasites.
10. Biology of complement and complement receptors.
11. Ontogeny and differentiation of T lymphocyte.
12. Antigen recognition receptors.
13. Non antigen-specific receptors.
14. Local immunity (IgA etc.).
15. Immunopharmacology.
16. the MHC in defence of the organism.
17. Resistance against normal and malignant haematopoietic cells.
18. Immune genes organization. Its expression at the cellular and molecular level.

Fifth International Congress of Immunology, 1983.

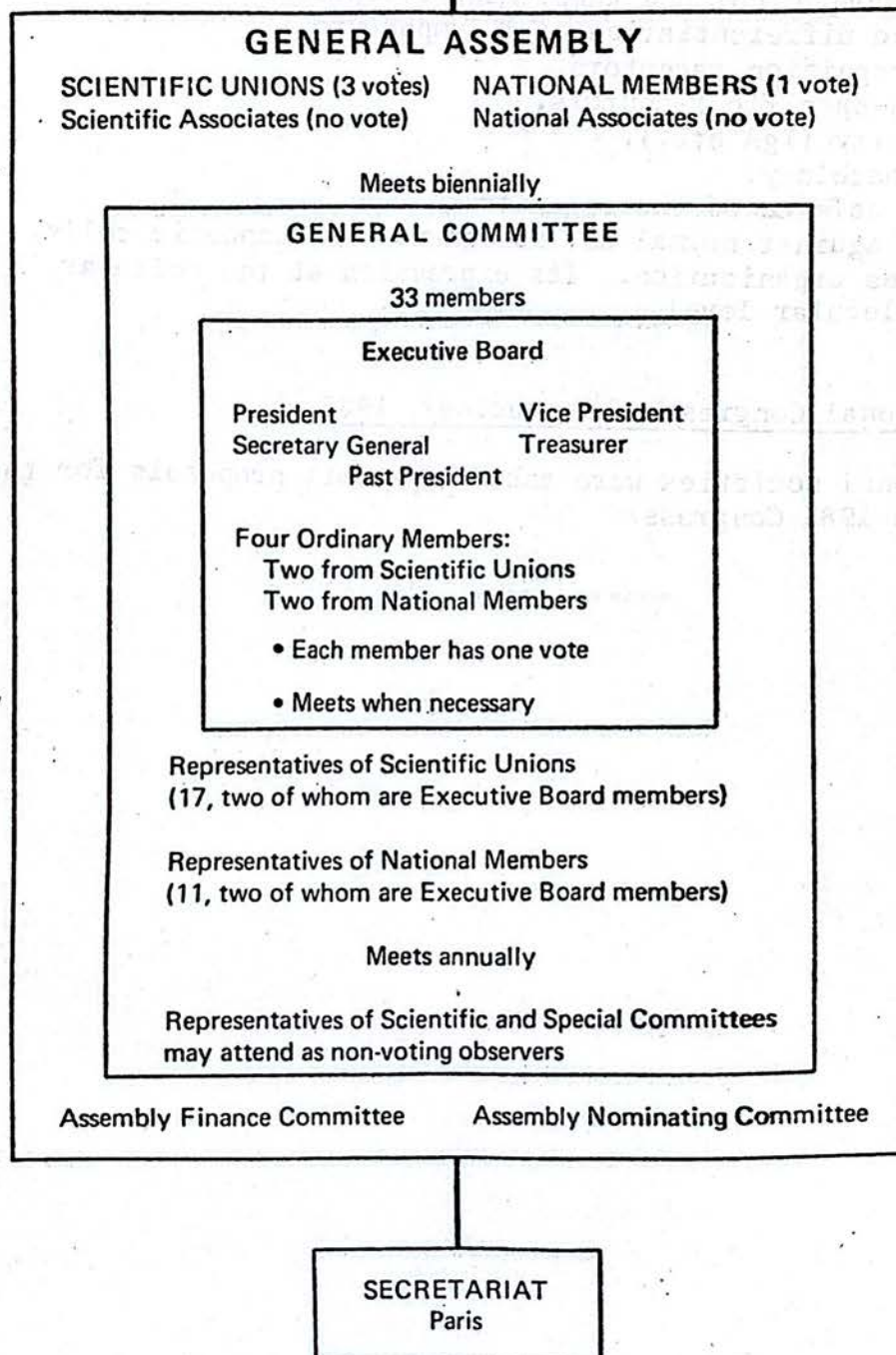
The national societies were asked to submit proposals for the location of the 1983 Congress.

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# INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

## ICSU





# INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

## ICSU

Recent admission of the International Union of Immunological Societies (IUIS) to the International Council of Scientific Unions (ICSU) places Immunology among other well-recognized and long-established scientific disciplines and the societies representing these disciplines. On the preceding page, there is a diagram illustrating ICSU's organizational structure, reproduced from the brochure "International Council of Scientific Unions, Organization and Activities", published in October 1976, by ICSU. This is followed by some articles reprinted from the same brochure, which summarize ICSU's activities.

### ICSU's Standing Committees:

Finance Committee (1963)  
Free Circulation of Scientists (1963)  
Admission (1966).

### SCIENTIFIC UNION MEMBERS:

IAU	International Astronomical Union (1919)
IUGG	International Union of Geodesy and Geophysics (1919)
IUPAC	International Union of Pure and Applied Chemistry (1919)
URSI	International Union of Radio Science (1919)
IUPAP	International Union of Pure and Applied Physics (1922)
IUBS	International Union of Biological Sciences (1923)
IGU	International Geographical Union (1923)
IUCr	International Union of Crystallography (1947).
IUTAM	International Union of Theoretical and Applied Mechanics (1947).
IUHPS	International Union of the History and Philosophy of Science (1947).
IMU	International Mathematical Union (1952).
IUPS	International Union of Physiological Sciences (1955).
IUB	International Union of Biochemistry (1955).
IUGS	International Union of Geological Sciences (1961).
IUPAB	International Union for Pure and Applied Biophysics (1966).
IUNS	International Union of Nutritional Sciences (1968).
IUPhar	International Union of Pharmacology (1972).

### SCIENTIFIC ASSOCIATES:

FID	International Federation for Documentation (1970).
IFIP	International Federation for Information Processing (1970).
PSA	Pacific Science Association (1970).
ISSS	International Society for Soil Science (1972).
ISI	International Statistical Institute (1972).
IFLA	International Federation of Library Associations (1974).
IAWPR	International Association for Water Pollution Research (1974).
INQUA	International Union for Quaternary Research (1974).



# NATIONAL MEMBERS:

## Academies and Research Councils \*

Argentina	Hungary	Portugal
Australia	India	Romania
Austria	Indonesia	Singapore
Belgium	Iran	South Africa
Brazil	Israel	Spain
Bulgaria	Italy	Sri Lanka
Canada	Japan	Sudan, Democratic
Chile	Korea (Democratic	Republic of
Colombia	People's Republic of)	Sweden
Cuba	Korea (Republic of)	Switzerland
Czechoslovakia	Lebanon	Taiwan
Denmark	Madagascar	Thailand
East Africa (Kenya, Uganda, Tanzania)	Mexico	Tunisia
Egypt, Arab Republic	Monaco	Turkey
Finland	Morocco	U.S.S.R.
France	Netherlands	United Kingdom
German Democratic	New Zealand	U.S.A.
Republic	Nigeria	Uruguay
Germany, Federal	Norway	Vatican City State
Republic of	Pakistan	Venezuela
Ghana	Peru	Vietnam
Greece	Philippines	Yugoslavia
	Poland	

## NATIONAL ASSOCIATE:

Jamaica.

## PROGRAMS AND SERVICES:

SCOR	Scientific Committee on Oceanic Research (1957).
SCAR	Scientific Committee on Antarctic Research (1958).
COSPAR	Committee on Space Research (1958) (Scientific Committee).
COWAR	Scientific Committee on Water Research (1964).
COSTED	Committee on Science and Technology in Developing Countries (1966)
CODATA	Committee on Data for Science and Technology (1966)
CTS	Committee on Teaching of Science (1968).
SCOPE	Scientific Committee on Problems of the Environment (1969).
SCOSTEP	Special Committee on Solar Terrestrial Physics (1966).
ICSU AB	ICSU Abstracting Board (1953).
FAGS	Federation of Astronomical and Geophysical Services (1956).
IUCAF	Inter-Union Commission on Frequency Allocations for Radio Astronomy and Space Science (1960).

\* ICSU's "National Members" in fact are *institutions* representing scientifically separate geographic areas. Country names are used for the sake of brevity and common usage and are not intended to carry political or diplomatic implications.



IUCRM Inter-Union Commission on Radio Meteorology (1959).  
IUCS Inter-Union Commission on Spectroscopy (1966).  
ICG Inter-Union Commission on Geodynamics (1959).  
WDC World Data Centres (Geophysical and Solar) (1957)  
(ICSU Panel).  
International Biological Program Publications Committee.  
ICSU Policy Group on Science Information (1975).  
ICSU ad hoc Committee on Recombinant DNA Molecules (1975).

#### INTER-ORGANIZATIONAL RELATIONS:

ICSU, a *non-governmental* organization, has established relations with various intergovernmental organizations.

UNITED NATIONS EDUCATIONAL SCIENTIFIC AND CULTURAL ORGANIZATION (Unesco): Consultative and Associate Status (Category A) since 1961: ICSU-Unesco Coordinating Committee to implement scientific programs. Special role in the implementation of the UNISIST program for the establishment of a world scientific information system and in the Man and Biosphere Program (MAB).

UNITED NATIONS ECONOMIC AND SOCIAL COUNCIL (ECOSOC): ICSU cooperates particularly in the work of the Committee on Science and Technology for Development (CSTD) and the Advisory Committee on the Application of Science and Technology to Development (ACAST).

UNITED NATIONS ENVIRONMENT PROGRAM (UNEP): Present cooperation is on an informal basis.

WORLD METEOROLOGICAL ORGANIZATION (WMO): Working arrangement since 1960. ICSU-WMO joint project: Global Atmospheric Research Program (GARP) in existence since 1967.

FOOD AND AGRICULTURE ORGANIZATION (FAO): Specialized Consultative status (1963).

WORLD HEALTH ORGANIZATION (WHO): Official Relations (1964).

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA): Consultative Status (1960).

INTERNATIONAL TELECOMMUNICATION UNION (ITU): Working Agreement (through IUCAF).

The International Council of Scientific Unions (ICSU) is an international non-governmental scientific organization composed of seventeen autonomous international Scientific Unions and more than sixty National Members, i.e., academics of science, research councils or similar scientific institutions. The main purpose of ICSU is "to encourage international scientific activity for the benefit of mankind" (Statute 3a). The primary means by which ICSU fulfills this objective is to initiate, design and coordinate international scientific



research programs, as, for example, the International Geophysical Year (IGY) and the International Biological Program (IBP). In addition, ICSU acts as a focus for the exchange of ideas, the communication of scientific information, and the development of standards in methodology, nomenclature and units. The various members of the ICSU family organize international conferences, congresses, symposia, summer schools, and meetings of experts in many parts of the world, as well as general assemblies and other meetings to decide policies and programs.

The ICSU family issues a wide range of publications including newsletters, handbooks, proceedings of meetings, congresses and symposia, professional scientific journals, data compilations and standards references. Each of the entries from the Scientific Unions and the ICSU Committees and Commissions provides more specific information on individual titles. Publications available from the central ICSU office include the Year Book, an organizational listing of the ICSU membership, with the names and addresses of the principal officers, the ICSU *Statutes and Rules of Procedure - Statuts et Règlement intérieur*, the ICSU *Bulletin* which appears approximately four times a year (No. 1 May 1964 through No. 36-37 March-June 1975), and a brochure on the Free Circulation of Scientists.

Committees and Commissions of ICSU are created to facilitate and coordinate collaborative research programs in interdisciplinary areas which are not completely under the aegis of one of the Scientific Unions, such as Antarctic, Oceanic, Space and Water Research, Problems of the Environment, etc. Activities in areas common to all the Unions, such as teaching of science, numerical data, science and technology in developing countries, etc., are also coordinated by Committees.

The General Assembly, the highest authority of the Council, is composed of representatives of the Scientific Unions, the National Members and the Scientific and National Associates. At its biennial meetings, the General Assembly elects officers, ratifies the nominations of the Scientific Unions to the General Committee, elects the representatives of the National Members, approves the creation or dissolution of Committees and Commissions, and determines the general policy of the Council.

The ICSU General Committee meets annually to review the international scientific scene, to study scientific problems, to encourage and coordinate cooperative activities between the Unions and other parts of the Council, and to determine priorities among the scientific activities of the Council. The General Committee consists of the Officers, a single representative from each of the Member Unions (currently 17) and representatives (currently 11) of the National Members.

The Executive Board, consisting of the President, the Vice-President, the Secretary-General, the Treasurer, the Past President, and four ordinary members, directs the affairs of the Council between sessions of the General Assembly. The four ordinary members are elected to serve by the General Committee from its own membership with two members coming from among the Union representatives and two from the National Member representatives.



The Council has a Secretariat located in Paris which assists the Secretary-General, and the other Officers as necessary, in the administration of the Council. The Secretariat serves as a focus for exchanges between all the Members of the ICSU family and with other international governmental and non-governmental organizations. The office is located in a building made available by the French Ministry of Education through the Académie des Sciences.

In the main, however, the predominant work of ICSU is done by hundreds of devoted scientists throughout the world who contribute their efforts without compensation in the pursuit of scientific knowledge and the enrichment of the human experience.

ICSU Secretariat: 51 Boulevard de Montmorency  
75016 PARIS, France.

### ICSU and Humanity.

The transformation of the International Research Council into the International Council of Scientific Unions in 1931 reflected a recognition of the significant role of the International Scientific Unions in promoting world scientific cooperation and the desirability of having full representation by qualified national scientific institutions. Thus, from beginning, ICSU's most important single principle has been that of universality. Scientists, no matter where they live in the world, are privileged and encouraged to participate in ICSU activities. On occasion they are prevented by their governments from joining with their fellow scientists in cooperative projects. Nevertheless, all scientific communities are welcome to join the ICSU family, no matter what the relationships of their governments to other governments might be. ICSU is a non-governmental international organization dedicated to the concepts that scientific activity is universal in scope, that the findings of science belong to all mankind, and that the freedom to exchange scientific information should not be hindered by the existence of national boundaries or differing political ideologies.

From the time of ICSU's birth, political and military conflict in the world has never ceased. This has made it very difficult to assure the Principle of Universality, and its corollary the Principle of Free Circulation of Scientists. The record abounds with refusals of permission to enter countries and refusals of permission to leave countries. The record, unfortunately, also includes refusals of governments, presumably on the basis of political considerations, to permit their scientific communities to join the ICSU family. In spite of these problems, however, the record has on the whole been a good one, thanks in large measure to the strenuous activities of scientific communities in virtually all parts of the world. As President of ICSU, I look forward to the time, hopefully in the near future, when all scientific communities will belong to ICSU and when no scientist will be prevented from either leaving or entering a country to exchange scientific information or to engage in collaborative scientific endeavors.



ICSU was created for the purpose of furthering science and scientific activity on a global basis. At the same time, most scientists perceive a responsibility to humanity which transcends the pursuit of knowledge for its own sake. They recognize that the condition of humanity today is in substantial measure the consequence of profound scientific and technological change, which is accelerating with each passing year. Accordingly, the world scientific community has felt an obligation to examine in depth both the positive and negative effects upon human welfare of the application of scientific knowledge. It is for this reason that ICSU has created such important committees as the Scientific Committee on Problems of the Environment (SCOPE) and the Committee on Science and Technology in Developing Countries (COSTED). Looking to the future, ICSU will undoubtedly be increasingly involved in global problems which have substantial interfaces with science and technology. To illustrate, preliminary discussions are underway in two significant areas, namely, Recombinant DNA, where the discovery of this important biological technique has resulted in a focus on the need to establish guidelines for the safe conduct of research, and the scientific basis of agricultural processes, with a view to increasing production.

ICSU recognizes the critical importance to the human future of intergovernmental organizations such as the specialized agencies of the United Nations. Since its inception ICSU has had mutually useful relationships with UNESCO. The Global Atmospheric Research Program (GARP) was created jointly with WMO. In addition to other agencies, such as the IAEA, FAO, and WHO, ICSU is working closely with the committees of the United Nations concerned with the role of science and technology in development.

In the years ahead, ICSU will find itself increasingly in the position of advising the leaders of the scientific programs in the United Nations family. In doing so, it will make available to the United Nations the considered judgment of the world scientific community divorced from the political considerations which may dominate the decisions of intergovernmental organizations. The evolving working relationships between intergovernmental organizations, such as UNESCO and WMO, and a responsible nongovernmental international organization such as ICSU, could well turn out to be a development of critical importance in the scheme of international organizations. Again, looking to the future, the symbiotic relationships which have evolved thus far between ICSU on the one hand and members of the United Nations family on the other may result in one of the more important technical-social-political inventions of our time.

Harrison Brown,      President,  
California Institute of Technology.



## The Origin and History of ICSU.

The first effective attempts to create a forum to facilitate cooperation between scientists from different countries began in the middle of the 19th century with international groupings of astronomers, geodesists and geomagneticians. There followed, in 1900, an International Association of Academies which brought together a number of the Academies then existing in the Northern Hemisphere.

The first truly global association of scientists of many disciplines was the International Research Council, founded in Brussels in 1919 at an Assembly which brought together representatives of 12 Academies and 12 International Scientific Unions. Of the 12 Unions three (Astronomy, Geodesy and Geophysics, Chemistry) had been created at the Paris Conference in November 1918, and their Statutes were adopted at the first Assembly of the International Research Council. Of the others (Mathematics, Physics, Scientific Radiotelegraphy, Geology, Biological Sciences, Geography, Bibliography and Documentation, Technology), most joined the International Research Council at later dates, while the last two adopted different structures.

The original Statutes of the International Research Council restricted membership to the Allied Powers and to certain neutral countries, and it was not until 1931, when the Council was dissolved and the International Council of Scientific Unions (ICSU) was created in its place, that an organisation existed that was open to representatives of scientists from throughout the world. The new Council gave complete autonomy to the original eight Union members. The structure of ICSU, with its dual membership of national Academies (or Research Councils) and International Scientific Unions is unique, and provides an effective mechanism for ensuring international cooperation in science.

Since its inception ICSU has been concerned with the need to ensure the participation of scientists from all parts of the world. This endeavour culminated in the adoption in 1972 of the following Statute: "..... the Council shall observe the basic policy of non-discrimination and affirm the rights of scientists throughout the world to adhere to or to associate with international scientific activity without regard to race, religion, political philosophy, ethnic origin, citizenship, language or sex." The ICSU Standing Committee on the Free Circulation of Scientists does all it can to support the efforts of the Unions and other bodies to carry out their activities in the spirit of this Statute.

John Kendrew, FRS, Secretary-General,  
European Molecular Biology Laboratory.

## Pattern of ICSU Finances.

By way of introducing this brief statement on ICSU finances, it is necessary to explain the distinction made within the ICSU organization between the operation of ICSU in the limited sense, that is, ICSU



itself separate from its member organisations, and the whole ICSU family, that is, ICSU plus its member Unions, committees and commissions. The former is referred to as "ICSU proper" and operates at a financial level of about U.S. \$650,000 and the second larger family has a total income in the area of U.S. \$4 million. Furthermore, obtaining an accurate picture of the financial operations of the International Council of Scientific Unions (ICSU) involves taking into account three basic facets of its pattern of finances: (1) the actual cash flow through the ICSU office represented by its audited accounting statements, (2) the expenditure of sums by national members participating in ICSU-sponsored programmes and (3) recognition of the value of the uncompensated services of the many scientists all over the world who contribute voluntarily to the effective functioning of the Council.

The main sources of income for ICSU proper are the following:

- a) annual dues contributions;
- b) subventions, donations, and legacies accepted by the Executive Board on behalf of the Council;
- c) revenue from capital investment; and
- d) special contributions made by National Members.

The scientific members of ICSU, that is, the Member Unions, contribute 2.5 percent of their own dues income and the National Members, that is, adhering academies of science or research councils, contribute dues according to a pre-determined schedule of rates. The range of annual dues for National Members is determined by the General Assembly for each succeeding two-year period after receiving and examining reports on the accounts for the preceding period and the budget estimates for the ensuing period. Presently there are six categories of adherence ranging from a unit subscription of U.S. dollars 79 to 2528. Each National Member selects its own category and its dues are determined by multiplying the corresponding unit subscription by the number of Unions to which the Member adheres. There is a minimum subscription of U.S. \$200. For 1975, ICSU received slightly more than U.S. \$300,000 from its National Members; this figure represents about 50 percent of the total income of ICSU proper.

ICSU receives a subvention from Unesco on a year to year basis and in accordance with Unesco's basic objectives. Donations are received on an ad hoc basis in response to special requests and appeals from ICSU. More than 55 percent of the Unesco subvention to ICSU is immediately allocated to the member Unions and the remaining amount is distributed among the various Committees and Commissions of ICSU.

Special contributions of a voluntary nature have been made from time to time by National Members to support specific projects. A recent example of an ICSU programme to which National Members made such a contribution is the Implementation Fund for the Global Atmospheric Research Programme (GARP), which ICSU sponsors jointly with the World Meteorological Organization (WHO).

ICSU expenditures may be grouped under three main headings:

- (a) Scientific Activities - This includes the full distribution of the Unesco subvention; ICSU grants to the members of the ICSU family; the organisation of conferences; and the publication of reports and special documents.



- (b) Activities concerned with cooperation in the organisation of science, such as regular meetings of ICSU, including the biennial General Assembly, the annual General Committee and the biennial Executive Board. This item also includes ICSU representation at meetings of other scientific organisations.
- (c) General and Administrative Functions - This item includes expenses encountered in the operation of the ICSU Secretariat in Paris, publication of the ICSU Year Book and the ICSU Bulletin, and various banking and auditing fees.

The approximate distribution of expenditure among these three categories is 60-65 percent, 10 percent and 20-30 percent, respectively. More and more, a greater proportion of money is necessarily spent on general and administrative expenses due not only to the world-wide inflationary tendency, as often assumed, but also to the increasing complexity of organising world science activity.

The whole subvention received from Unesco is distributed for strictly scientific purposes and contains no contract-servicing or administrative elements. The allocations to the Unions currently form between 6 percent and 18 percent (average 13 percent) of the total income for the individual Unions. Each Union also receives a subvention from ICSU's own funds as well as income from other sources.

In the financing of the ICSU programmes as represented by the activities of the ICSU Committees and Commissions, the contributions from the participating National Members average about 80 percent of the funds. In addition, the various ICSU programmes stimulate the formulation and execution of individual national programmes as a contributory portion to the international effort. These national programmes involve the expenditure of millions of dollars in such diverse areas as antarctic research, geodynamics, the environment, scientific and technical information, problems of developing countries and science teaching, to name but a few.

Thus, in the larger view, the finances of ICSU are the lesser, yet necessary part of the income and output of the ICSU family. In addition, the financial support accorded ICSU provide the organisational infrastructure which enables countless thousands of scientists throughout the world to contribute their collective knowledge, experience and time on a volunteer basis. If the financial value of this contribution could be included in the finances of the ICSU complex, the true budget would be many times larger than it is now. The value of the voluntary services supplied by scientists to the work governing of ICSU far exceeds actual financial contributions received to support its widely ranging activities. And, in the final analysis, science and service cannot be measured by funds alone.

D.A. Bekoe, Treasurer.

University of Ghana.



### ICSU Relations with International Organizations.

As early as 1934, ICSU established relations with the Organization for Intellectual Cooperation of the League of Nations, but these connections were interrupted by the war in 1939. A formal agreement was reached as early as 1947 with UNESCO, which had been created in 1946; as a result, the two organizations have cooperated for 30 years. UNESCO influence and the intellectual resources of the Unions have assured success in studies of numerous problems of mutual interest, such as the International Indian Ocean Expedition, Hydrological Decade, UNISIST, Geological Correlation, etc. Since 1948 ICSU has participated in the Conferences of nongovernmental international organizations, with A or B Consultative Status with UNESCO and is now a member of the NGO Standing Committee, and of the Bureau.

In more specific areas, ICSU relations are too numerous to cite in their entirety, so we shall confine ourselves to two examples. The Second International Polar Year 1932-33 has profited from relations between the International Association of Meteorology, a member association of the International Union of Geodesy and Geophysics (IUGG), and the International Organization of Meteorology. Ties also developed during the International Geophysical Year 1957-58 between the Association and the World Meteorological Organization, which was created in 1947. A more recent example is the Global Atmospheric Research Program, a major joint project endeavoring to improve meteorological forecasting and to lead to a better understanding of climate, for which an agreement was signed in 1967 between ICSU and WMO.

Finally, the establishment of SCOPE in 1969 has led to closer cooperation between ICSU and some members of the United Nations family such as FAO, UNEP, WHO, as well as with nongovernmental organizations such as the International Council of Social Sciences and the International Union for the Conservation of Nature and Resources.

J. Coulomb, Past President  
Académie des Sciences.

### International Unions Fulfill a Need of the 20th Century.

Exchange of information and the confrontation of new and old ideas are essential growth factors in the progress of science. We cannot afford any more that basic discoveries remain unnoticed for lack of inter-communication between scientists, e.g., as those of Mendel on genetics had been buried for the last third of the 19th century.

International Scientific Unions have arisen and are still coming to life to fulfill with different emphasis similar roles, according to the specific needs of the particular fields of science. Gathering of data and their evaluation, the establishment of the common language of nomenclature, save us from misunderstandings and unnecessary duplication of effort. These are prerequisites of efficient scientific activity. Organization of international scientific meetings in the fast-expanding scientific field, where experts working on similar subjects are scattered all over the world, are appropriate means to disseminate new ideas and



to discuss their merits. Congresses, symposia, training courses and other forms of meetings on an international level, especially outside of the most developed areas, are one of the best forms of help that can be given to developing regions. More recently, International Unions are becoming parties to planning and advancing research programmes (e.g., in geophysics, meteorology, biology, space research) to tackle some very important problems which can be solved only by worldwide participation of scientists.

As science develops, Unions behave as living organisms, new Unions are arising, some are expanding more than others, all of them are in constant change. Moreover, increasing specialisation calls for more efforts to ensure the interdisciplinary nature of the attack on a given general problem. This leads to the increasing importance of some Inter-Union Committees in such problem areas as science teaching, developing countries, environment, etc.

Scientists, especially those active in science organizations, are fully aware of their social responsibilities. We are participating in national, regional and worldwide scientific activities, to which our governments are induced by the command of their constituents. However, we realize that the development of science is due to two main driving forces, not always acting in the same direction: (a) the demands of contemporary society and (b) the inner logic of the advance of knowledge. As (b) is sometimes neglected when we respond to (a), scientists believe that the nongovernmental international Unions are called upon to ensure the best balance between these two different factors. This is the main underlying reason for the insistence on the nongovernmental nature of the Unions, embodied in the ICSU principles.

F.B. Straub, Vice-President.

Institute of Biochemistry of the  
Hungarian Academy of Sciences.

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## SCIENCE POLICY

Following are excerpts from an article by W.L. Melnick, D. Melnick and H.H. Fudenberg, which was originally published in Federation Proceedings (vol. 35, pp. 1957-1963, 1976). Although the entire article is very interesting, we could not publish it in its entirety because of its length. The parts which we decided to omit deal more specifically with the science policy in the United States, the U.S. Congress etc. We would like to thank the authors, especially Dr. H.H. Fudenberg, for their kind permission to use the article. Dr. Fudenberg is quite active in this field; his article on cost-effectiveness has been published in the CSI Bulletin in 1971 (vol. 5, No. 1, p. 15).

### Participation of Biologists in the Formulation of National Science Policy.

*... not only will men of science have to grapple with the sciences that deal with man, but ... and this is a far more difficult matter ... they will have to persuade the world to listen to what they have discovered. If they cannot succeed in this difficult enterprise, man will destroy himself by his halfway cleverness. — A warning issued to scientists more than half a century ago by BERTRAND RUSSELL.*

In recent years the number of issues addressed by Congress which involve biological science has grown almost as rapidly as the participation of the federal government in the support of biomedical research. However, the professional congressional staff includes few, if any, individuals with biomedical research backgrounds (although some physicians are included). Clearly, biologists who understand public policy formulation can contribute to national debates on health, environment, nutrition, drug safety, and related areas by working for decisions consonant with the current state of scientific knowledge; yet, such biologists are rare and reticent. To date, activity by biologists (independently or through their societies) has with rare exception been limited to situations in which government officials have requested help, or in which biologists have become aware of cuts in their own program budgets or regulations that would limit their research. Furthermore, almost all such "crisis-induced" activity has been uncoordinated and ineffective.

### VIEWS OF THE ROLE OF BIOLOGY.

The strength of our nation and the welfare of its people are widely viewed as being enhanced by the work of biologists. Potentially, biologists constitute a part of the "guidance sector" of society which can help to anticipate the results of technological change and to direct change to the benefit of all. Unfortunately, though, few biologists approach government decisions about biomedical policy from the broad perspective of the public welfare, i.e., with active concern for regulations that protect public safety and health care delivery, and for controls placed on research, the use of new drugs, and other medical procedures, as well as for direct support of science.

We have found that the attention of the research biologist is focused almost exclusively on issues that affect research support, leaving the initiative to legislators and administrators whose legal



background has led them to a public orientation. The divergent views held by scientists, administrators, and legislators emanate from their different views of the purpose of biological science. Bench scientists have a deep sense of the internal logic of the scientific process and see progress in terms of understanding life processes. Administrators, in contrast, must justify and support their activities in terms of "practical" results and must convince their publics that support for science will benefit society. They are judged by the applicability of results. Finally, legislators, who live in a world where the ability to articulate a position that will build a constituency is a key skill, in general see science as a secondary concern. The origin of these different points of view can be traced to the institutions within which scientist, administrator, and politician must work. The remedy does not lie merely in making a better case for one position or another. The key is to define the constituency of biological science to include the entire public.

#### *THE NEED FOR A NEW CONSTITUENCY.*

A good example of the effect of biologists' failure to take the lead in building a constituency is the 1971 National Cancer Act and its 1974 renewal. Many viewed the 1971 Act as the revival of a trend to support research into basic disease mechanisms. Practically every nonscientist who testified at those hearings called for increased basic research. However, the administrators, politicians, lobbyists, and clinicians who are for basic research are also for many other aspects of the program. Because of the structure of the institutions, they (not the laboratory scientists or academics) are the ones who have to face parents of children with leukemia. In contrast, when the records of hearings on the cancer program (or a host of other health research or delivery issues) are examined, it is difficult to find a single instance in which a research biologist made a plea for increased delivery of health care. This is *not* to say that many biologists do not recognize the need; they just do not define this as their area of interest. And yet these issues have immediate relevance to basic research. For example, Berger has indicated that plans for a National Health Insurance scheme may well include increased support for research. Thus, by increasing their area of responsibility to include *all* measures that will improve health research, care, and delivery, research biologists will increase the size of the constituency that can be called on to support their work.

#### *INFORMING THE PUBLIC: FISCAL RETURNS OF BIOMEDICAL RESEARCH.*

An important aspect of basic research in biomedical sciences, and a point that must be brought to the attention of the public and its representatives, is that public money invested in biological research produces long-term *fiscal* benefits, a claim documented by a fiscal benefit-cost analysis of research within the National Institute of Allergy and Infectious Diseases (NIAID). Only 5% of the total NIH budget is devoted to NIAID, which supports research in virologic, bacteriologic, parasitic, fungal, allergic, and autoimmune disease, plus all of the basic research in immunology. (An estimated 15% of all hospitalized patients suffer from one or another immunologic deficiency or aberration; over 30 million Americans have significant allergies, and more than 8 million of these are asthmatics.)



The achievement of a new therapeutic modality is almost never a "breakthrough." In historic perspective, new advances clearly depend on observations that preceded the final triumph by 5 to 20 years. This point is essential if we encourage support for studies that do not appear relevant to major health problems today. Dr. Lewis Thomas has classified biomedical research into two types, one that asks "what if" and one that asks "how to." (These terms are perhaps preferable to the common designations of "basic" versus "applied" or "targeted" research.) If dollar benefits are to be a major criterion of expenditures for "what if" research, several guidelines can be used: 1) past performance in terms of dollar savings, 2) probable dollar savings in the near future as a result of recent research advances now ready for clinical application, and 3) the magnitude of the problems still existing in terms of a) mortality, b) morbidity, c) loss of earnings, d) institutionalization, and e) quality of life.

*What have been the fiscal savings in past years?*

Research in the areas of infectious, allergic, and immunologic diseases has resulted in the following: 1) Polio has been eradicated, with a dollar savings of approximately \$6 billion yearly (Table 1).

2) a rubella vaccine has been developed, resulting in prevention of congenital deformations that might have required lifelong institutionalization, with estimated savings of about \$180 million yearly. 3) Basic immunologic studies on the mechanism of antibody feedback control produced data that were applied to the eradication of Rh hemolytic disease of the newborn. Administration of anti-Rh antibody to Rh-negative mothers eliminates this serious illness, which in the past caused mental impairment and lifelong institutionalization for a significant percentage of its victims. Estimated savings are about \$60 million yearly in the United States, and at least 10-fold that throughout the world. 4) By immunologic means, the antigen associated with transfusion hepatitis has been identified. Symptom-free carriers of this virus can now be screened and their blood not used for transfusion purposes, eliminating

TABLE 1. Estimated losses avoided in the United States through the prevention of paralytic poliomyelitis during the period 1955-1961, and estimated cost of avoidance

Estimate	Millions of dollars
Losses avoided	
Medical care costs	326.8
Gross lifetime income lost	6,389.7
<b>TOTAL</b>	<b>6,716.5</b>
Cost of avoidance	
Vaccine purchase	129.8
Physicians' vaccination fees	468.6
Vaccine administration	13.3
Government-funded research and field trials	41.3
<b>TOTAL</b>	<b>653.0</b>
<b>Net gain</b>	<b>6,063.5</b>

enough cases of chronic hepatitis to produce dollar savings of approximately \$100 million yearly. Further antibodies to the antigen have been isolated, leading to a vaccine that can now be used to prevent additional cases. Recent evidence suggests that another form of hepatitis due to a different hepatitis agent, so-called "infectious hepatitis," has now also been made amenable to eradication by a vaccine due to isolation of the virus by immunologic means from stools of patients with the disease. Production of a vaccine thereto is currently in progress. 5) In the field of transplantation immunology, as a result of research in genetically



determined antigens on immunologic cells and fundamental research on anti-tumor drugs in mice, the genetic differences responsible for rejection of kidney transplants have been delineated. Through close matching of donors and recipients and administration of immunosuppressive drugs, transplantation is replacing dialysis. Estimated savings are approximately \$100 million yearly.

All these immunologic advances, saving the country billions of dollars a year, have been supported by one arm, representing perhaps one-sixth of the total activity, of one Institute of the NIH. The amount of the NIAID budget directed to immunology is about \$33 million per year, and cost savings from past research total about \$3.3 billion per year, for a dollar benefit-cost ratio of 100 to 1.

*What are the prospects for fiscal savings in the near future?*

In the past 10 years, "basic" immunologic studies of carbohydrate antigens have led to the isolation of the different sugar components that form the capsules of such bacteria as meningococcus, pneumococcus, and *Hemophilus influenzae*. Infections with the latter two organisms during the first 3 years of life account for 90% of all cases of deafness in infants. During the first 6 years of life, the average child has three attacks of middle ear infection (otitis media), about 75% due to pneumococcus or *H. Influenzae*. Cost for routine treatment is about \$40 per attack--that is, \$300 million yearly. Further, 5 to 10% of these infants (those severely affected) develop hearing disability; others, because of the hearing defects, have a learning disability. (In certain population groups the incidence of learning disability is much higher. Among Navajo Indians it appears to be 30 to 35%). Estimated loss to this country in terms of institutionalization of the mentally deficient and loss of earnings of the slow learners, often not recognized as to cause, is approximately \$700 million yearly. Vaccines for the *H. influenzae* polysaccharide are currently being tested in adults, and preliminary results appear promising. In the case of pneumococcus, which accounts for 50% of the cases of otitis media in infants, vaccines for 13 pneumococcal serotypes (specific sugars) have been developed. These have been extremely effective for preventing pneumonia in adults, but reductions in the NIH budget that have been proposed by the Ford Administration, if not overridden by Congress, will eliminate the studies in infants that were planned for next year. Meningococcal polysaccharide vaccines have already been applied with great success in preventing epidemics of meningitis in our military. Tests in infants have been scheduled and should eventually prove successful.

In the United States 15,000 cases of acute meningitis occur yearly, one-third due to meningococcus and pneumococcus and two-thirds to *H. influenzae*. About half the children affected develop severe defects in I.Q. and severe learning disabilities. Others develop behavioral disorders, seizures, and the like. Thus, meningitis is a leading cause of acquired mental retardation in the country. In addition to long-term dollar losses from institutionalization and decreased earning capacities, acute cases require hospitalization for an average of approximately 15 days, at a cost (assuming \$100 per day, without physicians' fees and other costs) of \$15 million yearly. The NIH budget for development of vaccines is no more than \$250,000 per year; yet, advances in the eradication of meningitis, based on fundamental research programs, have



the potential to provide dollar savings comparable with or greater than those made possible by the eradication of polio. The "what if" research for vaccines against pneumococcus, *H. influenzae*, and meningococcus in adults has been done. For use in children, most "what if" questions are still unresolved--e.g., the optimal age of administration, the duration of protection, whether the polysaccharides should be modified to give longer-lasting immunity or to be effective at earlier stages, and so on; but without continued funding support from Congress, the next step, the "how to" research, will be impossible.

*What are the prospects for fiscal savings 5 to 10 years from now?*

1) About 10 years ago it was shown that two types of lymphocytes are involved in the immune response, one that makes serum proteins (antibodies) which specifically attack foreign substances (antigens), and the other--called "T cells" because they are derived from or influenced by the thymus--that does not synthesize such substances. Nonetheless, T cells (and various subpopulations thereof) are responsible for protection against cancer, against the so-called "auto-immune diseases" (where immune processes attack the body's own tissues), for kidney graft rejection, for protection against parasites (parasitic diseases such as schistosomiasis and leishmaniasis are still the world's most prevalent diseases), and for a whole variety of known and probably an even greater number of unknown biologic functions.

During the past 5 years it has become apparent that the interaction of T cells with antigen results in the liberation of a whole host of factors (about three dozen are known at present) with various biologic activities. None of these factors, collectively termed "mediators of cellular immunity," has thus far been purified, so that their exact function within the body still is unclear, but by extrapolation from cell culture experiments it appears that some may prevent proliferation of cancer cells or of parasites or certain viruses; others may kill tumor cells; still others may attract scavenger cells to the area of the foreign antigen. These in turn break the foreign antigen, whether it be a mutant cell, parasite, fungus, or the like, into smaller fragments that can be digested and destroyed. Purification of these substances will demand relatively small funds (perhaps \$6 to 10 million), but once purified, at least some of them will undoubtedly become useful adjuncts in the treatment of various infectious and parasitic disorders, autoimmune disease, malignancies, and so forth.

2) Another recent development is the discovery of the existence of "immune response genes," which appear to be linked to the ability of the body to defend itself against certain diseases. Research in this field may provide information useful for identifying individuals or groups genetically susceptible to various diseases, or for early diagnoses when symptoms are inconclusive, so that appropriate treatment can be started when it is most effective, in the early stages of disease.

*What will be the effects on the quality of life?*

Much attention has focused in the past several years on cancer, heart diseases, and stroke. Although mortality from those diseases far exceeds that from all others, it is of interest that if one considers morbidity,



the total number of hospital days due to just one constellation of infectious diseases alone (namely, respiratory infections) is far greater (about three-fold) than that for cancer, heart disease, and stroke combined. Furthermore, the population affected in terms of loss of days from usual productive work (or from school)-- and thus in terms of the financial implications of the still unconquered respiratory diseases--is far younger than those of the cancer and heart disease category, where a significant majority are in the retired group. Thus, continued support for the research programs of NIAID should provide, as it has in the past, substantial fiscal savings by reducing the future costs of health care delivery in the United States.

If biomedical scientists and administrators could bring this and similar analyses to the attention of the general public, the willingness to support basic as well as applied research in biology should increase. It would also be valuable to distinguish NIH funds allocated for health care delivery as separate from NIH research funding, since the general population apparently regards the NIH budget as totally devoted to biomedical research. Research in health care delivery, which is indeed necessary for upgrading of health care, should be continued or expanded, but the cost thereof should not be balanced against biomedical research training costs. Indeed, each should perhaps be balanced against other forms of government-sponsored research; for example, what is the research or dollar value of sending a man to the moon for yet another time, or of research on an SST? *Had funds been awarded in the late 1940's in an attempt to conquer polio according to the criteria now being proposed by the Office of Management and Budget, we would probably have the world's best respirator and polio would still be with us.*

#### CONCLUSION

*Biologists should endeavor to create a format for frequent and regular informal meetings between themselves, selected members of appropriate congressional committees and their aides, and officials of the executive branch. These meetings should focus on specific areas of concern to the national interest and should not be used merely to encourage the respective political leaders to support research. Rather, their aim should be to engender an understanding of the complexity of the new biology so that officials who are in a position to make decisions would have the opportunity to interact with scientists in a forum that does not require anyone to adopt a public stance.*

*Biologists should take advantage of disciplines such as law, economics, sociology, and political science which are focused on the analysis of the impact of science on society. A multidisciplinary perspective and collaborative approach will enhance the possibility of succeeding in efforts to build a broad constituency and to inform the public as to how basic biomedical science works.*

Scientists must direct more of their efforts toward policy innovations that will benefit the public; they must take responsibility for bringing to the attention of the public and its representatives the tangible fiscal benefits that emanate from progress in biomedical research, and they must concentrate on mobilizing support for long-



term and continuing efforts at unearthing knowledge that will benefit mankind. The day is long gone when congressional or administrative patrons (such as James Shannon, Emilio Daddario, Lister Hill, or John Fogarty) could look after the interests of scientists. Rather, the time has arrived when scientists must fully acknowledge that there is no essential distinction between their interests and the public interest.

Vijaya L. Melnick,  
Daniel Melnick,  
H. Hugh Fudenberg.

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*MEETINGS*

Midwinter Conference of Immunologists - Asilomar Conference Grounds, Pacific Grove, CA, January 21-24, 1978 - Co-chairmen of the meeting: Norman Talal and E. Benjamini.

Theme: Normal and Abnormal Aspects of Immunologic Regulation.

Session Titles:

Immunologic Regulation  
Immunoregulatory Effects of the HLA System.  
Autoimmunity.  
Macrophage Regulation.  
Manipulation of Immunoregulation.

Programs are available from Arthur Malley, Oregon Regional Primate Research Center, 505 N.W. 185th Avenue, Beaverton, Oregon 97005.

12th International Leukocyte Culture Conference - June 25-30. 1978, Beer Sheva, Israel, will take place back to back with the annual meeting of the Reticulo-Endothelial Society, to be held the following week in Jerusalem.

Subject matter will include mechanisms of lymphocyte activation, cytoplasmic control of membrane activity, leukocyte membrane receptors, chemotaxis, intracellular regulation of leukocyte effector function, action of thymus hormones at the cellular level, viruses and lymphocytes, cellular recognition, cooperation and cytotoxic mechanisms, radiation effects and other subjects.

For information write: Michael R. Quastel, Conference Chairman, 12th International Leukocyte Culture Conference, P.O. Box 16271, Tel Aviv, Israel.

VIth International Conference on Immunofluorescence and Related Staining Techniques. Vienna, April 6-8, 1978. The program will include symposia, workshops, poster sessions and a scientific exhibition with special emphasis on practical demonstrations. The number of participants is limited to 300. For further information, write: Dr. W. Knapp, Wiener Medicinische Akademie, Alser Strasse 4, Wien, Austria.



POSITIONS

Postdoctoral Research Associateship Naval Medical Research Institute,  
Bethesda, Maryland 20014, U.S.A.

Administered By: The National Research Council under the auspices of the Naval Medical Research and Development Command and the Naval Medical Research Institute.

Fields of Interest:

1. Cellular Immunology: (a) T-B cell interaction; b) Immunoregulation; c) functional role of surface antigens (include MHC); (d) subsets of T and B cells.
2. Immunogenetics: (a) genetic control of immunity in mice and man; (b) HLA-D typing in mice and man.
3. Clinical Immunology and Immunopathology: (a) slow virus diseases; (b) graft-versus-host disease; (c) bone marrow transplantation.
4. Immunochemistry: (a) chemical isolation, purification and characterization of cell surface antigens.
5. Immunoparasitology: (a) mechanisms of protective immunity in schistosomiasis and malaria.

Eligibility: All those candidates within 5 years of their doctorate (M.D., Ph.D., D.V.M., or Sc.D.), either U.S. or Foreign Nationals.

Salary: All selected candidates receive a yearly stipend according to the Civil Service Commission grade scale GS-11, which is currently \$17,056/year, and is subject to both state and federal taxes.

Research Advisors: Drs. Wilton E. Vannier, Richard Wistar, Jr., Irwin Scher, Aftab Ahmed, K. Darwin Murrell, Richard Beaudoin, James N. Woody, Douglas M. Strong, and Robert J. Hartzman.

Deadline for Submission of Application: Complete application, along research proposal, must be submitted by 15 January 1978 for fellowships starting between October and December 1978.

Duration of Fellowship: One year with the option of continuation for an additional year at the discretion of the Research Advisor and the Institute.

Address Inquiry to: Dr. A. Ahmed, Chairman  
Postdoctoral Research Committee,  
Naval Medical Research Institute,  
Bethesda, Maryland 20014, U.S.A.