The Physiological Society Newsletter

March 1992

Contents

1 Physiological Sciences at Newcastle
   Adrian Allen

1 Change of Editor

2 Launch of Research for Health Charities Group

3 Committee News
   3 New Members
   Scientific Meetings
   4 Grants - new Support Fund and Bursaries
   5 Education and Information
      Back numbers of Journal of Physiology from CUP
      Experimental Physiology - Experimental Papers
      Congratulations

6 Views

6 Better Bibliographies? - Ann Silver
   University Funding - Tim Biscoe

9 Articles

9 Physiology of Cytokines - Nancy Rothwell
10 Auditory space maps - Debbie Withington

12 Notices

12 Grants
13 Personal Accident Insurance
   Back Issues of Journal of Physiology
   Miscellaneous
The Department of Physiological Sciences at Newcastle

The Department of Physiological Sciences in Newcastle is situated in modern laboratories in the new Medical School opened in 1984. There are seventeen academic staff, nineteen secretarial and technical support and over forty research staff in the Department. The Department has a young age profile and ten academic staff have been appointed since 1980, four in the last two years. There has been a strong Physiology presence in Newcastle for over one hundred years and holders of the Chair of Physiology have been T. Oliver (1889-1911), F.A. Bainbridge (1911-14), J.A. Menzies (1915-20), D. Burns (1921-49), A.A. Harper (1949-72) and E.L. Blair (1973-88). The present Head of Department is Adrian Allen, Professor of Physiological Biochemistry.

The Department has a large and varied teaching commitment. Every year between twelve and twenty single honours Physiological students graduate. In their first year, Honours Physiologists participate in a modular course taking six subjects from a choice of subjects in Biological and Physical Sciences, including the popular (over 140 students) first year Physiology and Cell Function courses run by the Department. Single honours undergraduates in Physiological Sciences study this subject full-time in their second and third years. The Department plays a pivotal role in teaching the integrated medical and dental two-year pre-clinical curriculum and also mounts a full first year Physiology course for Speech Science students. Each year over 700 different undergraduates in the University attend courses run by the Department. Recently the Department has set up a multidisciplinary computer teaching unit of thirty computers.

The Department is active in research in a number of areas of Physiology and has a most healthy outside research income that supports at present nineteen post-doctoral workers and twenty-three postgraduates. Many of the research interests come under the umbrella of the two broadly based research groupings in the Department, namely, in Epithelia and Sensory Physiology.

The Department has a good reputation in gastrointestinal physiology and continues to have considerable strength in this area. Over the last ten years there has been a substantial shift from whole animal gastrointestinal physiology towards cellular and molecular physiology of a variety of epithelia. Expertise has been built up in patch clamping, imaging techniques for quantitation of intracellular ions, cultured "tight" epithelia monolayers, maintenance in vitro of micro-dissected individual pancreatic ducts and kidney tubules, isolated membrane vesicles, together with associated biochemistry, particularly for studying macromolecular secretions. The Department houses the Gastrointestinal Drug Delivery Unit, directed by Barry Hirst and Nick Simmons and funded by a SERC/DTI/MRC/Industrial Link grant for a core of six post-doctoral workers and two technical staff.

The hearing/vision group has developed a multi-disciplinary approach with the major theme of its work being the characterisation of signal processing capabilities of the non-linear neural mechanisms in sensory systems. The use of computers in stimulus generation and data collection has been used to coordinate psychophysical, and computational approaches. In the last two years there has been a substantial investment in developing research in neural networks, particularly in collaboration with the Department of Chemical Engineering.

Change of Editor

With the first Newsletter of the year comes a change of editor and an experiment with an expansion of the scope of the Newsletter. After two years in the editor's seat, Alison Brading is stepping down and I am sure everyone would like to thank Alison for the excellent job she has done.

This edition comes to you with the programme for the Newcastle meeting and my hope is that the programmes for subsequent meetings will all be accompanied by Newsletters. This issue contains a summary of the main items dealt with by the Committee since October of last year (Committee News), an address from the chairperson of the department hosting the Scientific Meeting (Adrian Allen), an article on an issue of general interest (Tim Biscoe on University Funding), and reviews of different aspects of Physiology (Nancy Rothwell on Physiology of Cytokines and Debbie Withington on Auditory Space Maps). The hope is that future editions of the Newsletter will contain a similar broad mix of articles. As usual, the editor would be more than pleased to receive any feedback on any aspect of the Newsletter.

Kwabena Appenteng
Current research interests of staff in the Department include

<table>
<thead>
<tr>
<th>Research Interest</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membrane ion channels and epithelial secretions</td>
<td>Dr B.E. Argent &amp; M.A. Gray</td>
</tr>
<tr>
<td>Structure and function of mucus secretions and other glycoconjugates, particularly in relation to peptic ulceration, inflammatory bowel disease and glue ear (otis media)</td>
<td>Prof. A. Allen &amp; Dr J.P. Pearson</td>
</tr>
<tr>
<td>Vectorial membrane solute, protein and particle transport in epithelia</td>
<td>Drs C.D.A. Brown, B.H. Hirst &amp; N.L. Simmons</td>
</tr>
<tr>
<td>Optical techniques in intracellular ion measurement, spatial and temporal modulation of Ca in single cells</td>
<td>Drs J.I. Gillespie &amp; J.R. Greenwell</td>
</tr>
<tr>
<td>Ion channels in mammalian heart</td>
<td>Dr G.C. Rodrigo</td>
</tr>
<tr>
<td>Cardiopulmonary and metabolic function in health and disease</td>
<td>Dr J.W. Reed</td>
</tr>
<tr>
<td>Mineral metabolism and bone disease</td>
<td>Dr C.J. Robinson</td>
</tr>
<tr>
<td>Coding of retinal velocity/contribution of parvocellular neurones to motion analysis</td>
<td>Dr A.M. Derrington</td>
</tr>
<tr>
<td>Computational vision and visual psychophysics</td>
<td>Dr A.C. Hurlbert</td>
</tr>
<tr>
<td>Neural computation, biophysics and networks</td>
<td>Drs G.G.R. Green &amp; D.J. Sanders</td>
</tr>
<tr>
<td>Neurophysiology of hearing</td>
<td>Dr A. Rees</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Newcastle is famous for its friendliness and hospitality and participants at the last Society meeting held here in April 1987 may remember this. The meeting in April 1992 has a full scientific programme with a symposium on Sensory Computation and a teaching symposium on Membrane Transport Proteins in Health and Disease. We all look forward to welcoming you to Newcastle again.</td>
<td></td>
</tr>
</tbody>
</table>

---

Launch of Research for Health Charities Group

Research for Health Charities group, representing eight major medical research charities, was officially launched on November 11 of last year 1991. The main aim of the group is to increase public understanding of charity-funded research and the vital role of animal experimentation as "the link between the test tube and the patient".

The charities involved are Action Research, Cancer Research Campaign, Cystic Fibrosis Research Trust, Multiple Sclerosis Society, Muscular Dystrophy Group, British Heart Foundation, Imperial Cancer Research Fund and the Wellcome Trust. Other medical charities are known to be interested in joining. The group is chaired by Bridget Ogilvie, Director of the Wellcome Trust.

Between them, the RHCG member charities spend about £200 million per annum, of which £10 million goes to fund animal studies. As in most areas of medical research, the major part of this spending is on cell and tissue culture, epidemiological studies, and clinical research. At the press conference to launch the group, Professor Nick Wright, ICRF’s Director of Clinical Research stressed that animal research underpins these "so called alternatives". Dr Ogilvie emphasised that "to make advances in our understanding of treatment and disease, there are no alternatives to responsible medical research, and all responsible medical research involves animals at some stage".

Professor Desmond Julian, Consultant Medical Director of the British Heart Foundation, said “we are still largely ignorant of the causes of coronary heart disease, and we cannot prevent congenital heart defects in young children. It is obvious that further work needs to be done to improve the treatment of many diseases. Great advances have been made in simulating biological processes by computer modelling. However, no computer model or cell culture can possibly substitute for the whole organism”.

It is the myths about animal research spread by the animal rights groups which most concern the Research for Health Charities Group. “Much of the information about medical research is at best ill-informed and at worst misleading” said Dr Ogilvie. The charities are concerned to correct these myths, both because they have a responsibility to account for the way in which money is spent, and because they are concerned that young people are becoming reluctant to enter medical research.

Animal rights attacks on the medical research charities are not new, but have become more hostile and violent since the BUAV targeted specific charities in the “Faith Hope and Charity” campaign launched at the end of 1990. Anti-charity campaigns may well turn out to be a significant own-goal for the animal rights movement.

Barbara Davies (Research Defence Society).
Committee News

Membership sub-committee

(Members: David Cotterrell, Ronan O'Regan and John Kemp)
The Society extends a warm welcome to the candidates below who were elected to membership, in the categories stated, at the Semi-Annual General Meeting held in Manchester in January 1992:

Honorary Members:
H B Barlow

Horace Barlow has for many years been interested in vision - from the physiological properties of retinal ganglion cells to the constraints on signal detection imposed by the quantum nature of light and from mechanisms of binocular vision in the visual cortex to theories of learning in neural networks. Most of his scientific life has been spent in Cambridge, with a lengthy intermission at the University of California at Berkeley. He retired recently from his Royal Society Professorship, but continues to be very active in research into neural networks.

J S Gillespie

J S Gillespie qualified in Medicine in the University of Glasgow. Following national service, he worked with R C Garry for his PhD, with G L Brown at UCL, returning after a period at the Rockefeller Institute to Glasgow first on a Royal Society Fellowship and then becoming foundation Chairholder of Pharmacology. After two years as an Ordinary member of the Committee, he served as Honorary Secretary of the Society from 1966 to 1972 and has been a member of the Editorial Board for Monographs since 1987. His scientific achievements include seminal research on the autonomic nervous system, reciprocal innervation of gut (with R C Garry), release of neurotransmitters (with G L Brown), uptake of catecholamine (1960s) and NANC transmission (1970s and 80s).

A Silver

The Society has recognized the many ways in which Ann Silver has contributed to its activities. As a scientist at Babraham Ann was an authority on cholinesterases. She is an outstanding Press Editor of Experimental Physiology and is largely responsible for the excellence in quality of the new venture. Those who have been "silvered" after submitting a manuscript will recognize the impact of her meticulous attention to detail and will have a deeper understanding of their own frailties, particularly in relation to their references! She always has the Society's interests at heart and above all the assistance she gives young physiologists is well known.


Meetings Secretary's sub-committee

(Members: Jim Gillespie, Graham Dockray, David Eisner, Kwabena Appenteng and John Atherton)

Scientific Meetings

The introduction of Special Interest Groups and Designated Sessions at Scientific Meetings has been a great success. Members with similar interests have been able to choose which Meetings they wished to attend and to organise themselves such that groups of communications are given to a critical but constructive audience. The standard of the communications presented is high, the discussions which follow are lively and the sessions are well attended. The Designated Sessions are accompanied by Poster Communication sessions which add to the interchange of scientific information. It is obvious that the activities of the Special Interest Groups should be supported and encouraged to develop.

The Committee has recommended that Special Interest Groups should receive financial support from the Society as a way of further stimulating activity. The Special Interest Groups may now apply for support of up to £500. Applications should be made to the Meetings Secretary and, like applications for support for research and teaching symposia, will be considered by the Committee for approval. It is envisaged that this support would be used in various ways. It could provide the expenses for a speaker who might give a plenary lecture or chair a general discussion or workshop. For example, at the Manchester Meeting of the Society, the Renal Physiology Group invited Rainer Greger to give a plenary lecture on "Ion channels of the Nephrone". The combination of oral communications coupled with a lecture from an internationally renowned speaker proved a great success. This is only one model and any appropriate and justifiable activity might be supported as long as it was "within the spirit of the Society".

Currently there are 23 Special Interest Groups. The majority of these are active and work well but there are some Special Interest Groups which are now inactive or only meet infrequently, and some which have a considerable overlap with others. There is therefore an argument for rationalizing and revitalizing the internal organisation and, perhaps, numbers of Special Interest Groups, particularly if we are to make more financial resources available. The Meetings Secretary's Advisory Sub-Committee has been considering a series of proposals to promote this change.

The proposals for 1993 and beyond are:

1. That at the end of 1992 the present Special Interest Groups are disbanded and reformed at the beginning of 1993. For many this will represent no change or discontinuity but will begin the process of rationalisation.
2. That the number of Special Interest Groups be limited. No more than the present number, fewer if possible. Groups with overlapping areas of scientific interests will be encouraged to amalgamate.

3. That the organisers of the groups have a limited term of office. The recommendation is that no Special Interest Group organiser should serve for more than three consecutive years. Committee members should not normally be organiser of Special Interest Groups.

4. That the organiser of a Special Interest Group be elected by the members of the group. This could be done by inviting the Special Interest Group to hold an election at one of their Meetings each year.

5. That each organiser be asked by the Meetings Secretary for the plans for Designated Sessions and activities of the Special Interest Group. Any group not meeting would be encouraged to be more active, or amalgamate with another, but might eventually be removed from the list of Special Interest Groups.

6. That applications to form new Special Interest Groups be made in writing to the Meetings Secretary who would consult with the main Committee. Based on such re-organization, further financial support will hopefully be available to enable Special Interest Groups to operate in the most appropriate and efficient way.

Administrative help to organise Designated Sessions, or send out information, will be made available from the Society’s Administration and Publications office in Oxford. This can be discussed with the Meetings Secretary. If any Members of the Society are not yet involved or associated with at least one Special Interest Group, you are encouraged to do so now.

The re-organisation of Special Interest Groups is part of a wider review of Scientific Meetings. As everyone is aware, some of the general scientific sessions are not well attended and can be dreary. The move away from Saturday Meetings has helped but not entirely eliminated the problem. Views expressed by Heads of Departments, and repeatedly by Members in informal consultations, are that there are simply “too many Meetings in any one year ... it is too expensive to attend more than a couple of Meetings a year ... Meetings during term-time clash with teaching ... Meetings clash with those of other societies”.

Several options are open and the following seem to be the most commonly voiced solutions.

a) Reduce the number of Scientific Meetings in each year and hold them out of term time where possible.

b) Expand each domestic Meeting to 2 or 3 full days of communications, posters, demonstrations, lectures, research and teaching symposia.

c) Extend the Young Physiologist Guest Scheme such that young physiologists can attend more than one Scientific Meeting per year.

d) Organise joint Meetings with other British Societies in the UK as part of our domestic programme.

If we go down this route, one consequence would be that the Society would visit fewer departments in the course of time. This problem has to be addressed, as hosting a Scientific Meeting of the Society is often an occasion when a department can promote itself within its institution. One solution may be to support departments to organise smaller Designated Meetings, particularly involving Special Interest Groups which may run in term time and be in addition to the larger Meetings.

The Meetings of the Society are set for change. The precise pattern into which they evolve depends upon many factors, financial, time constraints, etc, but, most important, they must reflect what the Membership want. What is outlined above is only a series of provisional proposals. The Meetings Secretary’s Advisory Sub-Committee would now like to actively encourage Members to contribute their views. Please write to:

Dr J. I. Gillespie
The Meetings Secretary
The Physiological Society
Dept of Physiological Sciences
Medical School
Framlington Place
Newcastle NE2 4HH

Grants sub-committee

(Members: Graham Dockray, Peter McNaughton, Chris Fry and Annette C. Dolphin).

The Committee has approved two new awards aimed at the support of postgraduates:

Postgraduate Support Fund

A sum of £10,000 has been allocated to provide support for postgraduates in exceptional circumstances to assist in the completion of their research projects, and to bridge the period between graduation and the availability of full-time posts. The funds cannot be used to initiate a programme of research nor be used for a purpose normally supported by the Dale/Rushoton Funds.

Precise criteria for eligibility have not yet been determined so please do not seek to apply yet - but WATCH THIS SPACE.

Physiological Society Bursary

The Society is to allocate a sum of £10,000 for the support of graduates who wish to enrol in MSc courses in Physiology (including human and applied physiology, neurophysiology etc)

Award: The maximum allowable will be £2,000 and not more than a single award can be made to an individual.

Applications: can be made twice a year (May and November) and applicants must provide a completed application form via the physiological Society’s Administrative Office, together with a letter of recommendation from the Head of the Department in which they graduated, and a letter of acceptance from the Course Director or Head of Department in which they seek to study. Their application will contain a question relating to their career objectives.

Evaluation: Completed applications will be circulated to all members of the Grants Committee. Where more than one candidate is an applicant for the same course, the Course Organiser will also be asked to rank those applicants, although that information will count only as a reference point and will not be binding on the Committee.

A sum of £10,000 has been allocated to provide support for postgraduates:
Education and Information Sub-Committee

(Members: John Atherton, Alison Brading, Simon Howell, Janice Marshall and John Patterson).

The Sub-Committee is keen to receive proposals for Teaching Symposia and other activities aimed at popularising Physiology with a wider audience. Examples of the latter include a one day teaching symposium for school teachers held at Sheffield University in September and a similar symposium to be held at Leicester University in May. The Sheffield symposium was held on a Saturday and proved very successful, with many of the participants writing in to ask when the next such symposium would be held. Symposia such as these can be held independently of the scientific Meetings of the Society. Teaching Symposia held in association with meetings of the Society have two main functions:

1. To give a comprehensive review of developments in physiological topics of interest to a wide audience, including postgraduate students, post doctoral research fellows and clinicians.

2. To provide a forum for expert and non-expert teachers of science and medical and dental undergraduates in a defined subject area to bring themselves up to date in all aspects of the topic and to exchange ideas.

It is anticipated that all teaching symposia will lead to publication of a study guide for teachers, researchers and students in the series Studies in Physiology to be published by Portland Press. For the series to be successful the topics chosen should form attractive publications which bridge the gap between standard texts and dedicated research monographs and reviews. Anyone interested in organising a Teaching Symposium should write to the Education and Information Sub-Committee chairman (John Atherton), Department of Physiological Sciences, Stopford Building, University of Manchester, M13 9PT (061 275 5390) for an application form well in advance of the meeting. The current maximum grants are £2000 for a full day symposium and £1000 for a half day symposium.

Publications Sub-committee


Back numbers of the Journal of Physiology

CUP will soon be disposing of their stock of back volumes of the Journal for the years 1976 to 1986. Until the end of August, these will be available to Society Members either for their personal use or to be passed on to Third World and other developing countries, provided the expenses of doing so are met by the Member or another sponsor (bodies such as the British Council, foreign government agencies, charitable distributors etc are sometimes prepared to help - the onus is on the Member to secure the finance, but the Administration Office may be able to provide some useful addresses and telephone numbers). There will be no charge for the journals themselves, other than the cost of carriage and a small handling charge. Members interested in this offer should complete the tear-out form at the back of this Newsletter and send it to Richard Ziemacki at Cambridge University Press, who will provide a quote for the carriage cost.

Experimental Physiology

Theoretical papers

From time to time authors ask about the possibility of publishing theoretical papers in Experimental Physiology. At its meeting in November the Editorial Board decided that theoretical papers could be considered where they met certain criteria: the paper must be clearly based on experimentally derived data and the hypothesis advanced must be directly amenable to experimental testing. Esoteric mathematical treatments without practical content or implication are not appropriate.

Congratulations

- to Erwin Neher and Bert Sakmann on their Nobel Prize for Physiology or Medicine.
- to Graham Collingridge on the award of the Pfizer Prize in Biology for 1991.
- to Victoria Penrice, Administrative Assistant to the Treasurer, for being awarded the prize for best paper in Management Accounting in her final ICSA exams this summer.
- to Rodney Levick, of St. George's Hospital Medical School, for having his textbook on "An Introduction to Cardiovascular Physiology" short-listed for the Glaxo Prize for Medical Writing in 1991.
Better bibliographies - a vain hope?

In the Society's Newsletter for May 1990 I groused about the accuracy - or lack of it - in reference lists of both full-length papers and Rapid Communications. My homily seems to have had little effect. Of some 200 Rapid Communications received to date only one has included a completely correct reference list. The authors, D.R. Tivey, K.J. Hilton and M.J. Dauncey, of the Institute of Animal Physiology and Genetics Research, Babraham, were awarded a specially designed certificate recording their unique attainment. Another certificate awaits the next author or authors of a Rapid Communication to emulate this feat. Obviously, the accuracy of bibliographic details is the vital aspect but authors are also urged to follow journal style and so reduce work in our Press Offices - it's worth pointing out that changes made in editing are not immune from error! Asking for correct references is not simply editorial pedantry: readers fruitlessly pursuing a wrongly cited paper can waste a lot of their own time and, quite often, the time and resources of a chain of librarians. The increasing use of computer databases confounds the problem. The GIGO hazard (garbage in, garbage out) applies particularly to references but authors are reluctant to recognise this, robustly defend a wrong citation with "But it's on my database, it must be right". Likewise, the ability conferred by word processors to "cut and paste" the bibliography from one paper into that of another is convenient for the author but not for the reader enticed by references such as DALE, H.H. (1914). The action of certain esters and ethers of choline on endothelin levels in lunar astronauts. Experimental Physiology 78, 12-26. While computers are good at creating bibliographic problems they are not equally good at solving them. A computer running something like Reference Update, or scanning a library catalogue, doesn't know (as I do from hard-won experience) that when authors write Journal of Cell Biology they may mean Journal of Cellular Physiology and that S.C. Sherington is likely to be C.S. Sherrington. Some programmer may take up the challenge and produce the necessary conversion software but, in the meantime, I would remind all would-be contributors of that waiting certificate. Finally, a note of encouragement to the abject authors who, in response to the referee, added four references three of which were faulty - if we awarded a Booby Prize you would be well beaten by several other contenders.

Ann Silver

University Funding - a simple guide to the terminology

After dinner the other night I was "instructed" by the editor to write an article on University Funding for the trade journal otherwise known as the Newsletter of the Physiological Society. I hope that what follows will be helpful to some and that the experts will write in to correct it where it is wrong.

Indirect Costs of Research

We all have to pay attention to the nature and amount of the Indirect Costs of research, and indeed of our other activities. This has aroused misunderstanding and sometimes even outrage. The reasons for needing to understand indirect costs are in the first place for Contract Research where the University worker does some research for an outside body. The white Paper on "Civil Research and Development" (Cmn 185, July 1987) says that "Institutions should not subsidise the clients......Clients should normally pay not only the direct costs involved, but also an appropriate share of general overheads." It is only right that the university should know the true COST of the research undertaken in order that the University may then set a PRICE. The PRICE may of course be:-

i) less than the true COST if that is judged to be in the interest of the University.

ii) equal to the true COST if the University is happy to break even and wants to do the research.

iii) greater than the true COST if a profit is wanted and can be achieved in the market.

Understanding the nature of indirect costs now has to extend into all branches of our research funding and most especially into our dealings with the Research Councils. Anyone who has worked in the United States is familiar with the whole area though many were protected from confronting it by working in large institutions without ever applying for grant support themselves.

There have been a number of definitions of INDIRECT COSTS which are described below. The one generally accepted now in the UK is enshrined in the Hanham Report.

The Hanham Report


This report should be read by anyone interested in understanding the background to the discussion of Indirect Costs.

Page 17

Recurrent Expenditure covers all operating costs of the University including staff costs, building and equipment maintenance, consumables, heating, lighting, telephones, periodicals for libraries, etc.

Capital expenditure covers investment in buildings, plant and other major items of expenditure.

Recurrent expenditure can be divided into two categories:-
A) Direct Costs
which comprises
i) Direct payroll costs are direct payroll costs of all research and support staff engaged in the project which includes those presently employed by the University and those specially hired for the contract.
ii) Other direct costs are those additional non-payroll costs incurred directly by the work...including travel, consultants fees, consumable materials, new equipment and services purchased specifically for the activity, and the costs of existing specialised equipment, space and services, computer time and other facilities....

B) Indirect Costs are
the contribution to full costs incurred by all shared services in support of the teaching and research activities but not included within the direct costs... They include for example staff not directly involved in the work, incidental use of institutional or departmental facilities (equipment, space and services, secretarial assistance), administration, and all departmental and central facilities and services which indirectly support the activity, including libraries.

Full Costs are
the whole of A plus B. The recommended practice is to judge the Indirect Costs in a particular case on the basis of the Direct Payroll Costs (A i) above). These indirect costs it turns out range between 75 and 150% of Payroll Costs and may typically be taken as around 100%. There will be variations between Universities and departments particularly between science based and non-science based, between capital intensive and staff intensive activities. Another way to look at the problem is to say that the Indirect Costs are equivalent to 60% of the TOTAL cost of the grant which includes salaries and recurrent expenditure but probably not equipment.

Another view is from:-

European Commission
EC Research Funding 2nd. Edition, A Guide To Applicants Pages 29-30. You should consult the most up-to-date literature you can find on the EC but what follows is a guide.

Direct Costs are
Scientific personnel, technical support, experts/specialists engaged in the project.
Travel
Durable Equipment, written off at 20% per year Consumables
Custom and Excise duties
Third Party contracts
Computer Costs
Other Costs

Indirect Costs are
Administration, secretarial help, management, depreciation of buildings and general equipment, accommodation, maintenance, telephones, heating, electricity, postal services, stationary, staff training, insurance. Universities may charge 20% of direct costs, which are also called additional costs, as indirect costs. (My italics).

It should be clear that the limit of charging is 20% of direct costs even if indirect costs actually add up to more than 20%. It seems that the direct costs can include "experts engaged in the project" in their words or in "Third party contracts". If you get involved in applying for EC funds which more and more we must then it is vital that you consult with your local University experts. There are other ways of charging Indirect Costs against EC Grants and the problem is more complex than I have outlined; it is certainly time consuming to apply for these funds.

However, the 20% indirect cost or overhead is the first problem here. This is so because in France and Germany the indirect costs are matched by the Federal or Local Government, ours are not. The DES have dismissed this problem and are not prepared to address it. It could be remedied by the DES or the DTI supplying the 20% matching funds. Without them we are all seriously disadvantaged compared to our immediate European competitors. Secondly the Treasury has the practice of removing from the Research Council vote sums equivalent to those gained from the EC.
Supported by the Royal Society and the Fellowship of Engineering. A number of reports have been produced, but see in the context of Indirect Costs, Policy Study No. 4, September 1990, "The Structure of Research Expenditure".

Definitions of UFC Research Support

How are the elements of the UFC grant made up? The UFC Resource is made up of three elements: - T for Teaching; R for Research; S for Special Factors.

Subdivision of Research Resource (R)

Before 1984 the total resource was subdivided according to subject head. Since 1984 the subdivision is between 37 cost centres based on the actual departmental expenditure of Universities. Sub-committees then decide how much of the total is to be allocated on Teaching based criteria and how much on Research based criteria. For example many Physiology departments are placed in cost centre 4 which combine Anatomy/Physiology. For Cost Centre 4 the allocation to T is 55%, to R is 45%, similarly for Pharmacology (Cost Centre 5). Biochemistry (Cost Centre 9) and other Biological Sciences (Cost Centre 11) are split 60/40.

R comprises four elements: CR, DR, SR, and JR.

Contract Research (CR)

Subdivided on a pro-rata base for all income earned under Research Contracts. For 1991-92 the UFC have used the income earned in 1989-90 as the basis for the distribution.

Dual-funded Research (DR)

The UFC recognise through this resource the dual funding idea by distributing resources relating to the income of universities from research councils and U.K. charities. This resource factor received less than 5% increase in 1991-92, and now represents 20% of the total grant income that qualified. That is the income averaged over the years 1988-89 and 1989-90. This is the amount that will transfer to the Research Councils. Remember that the UFC said that the indirect costs should amount to 50% of the TOTAL cost and that was set low since most people agree it should be 60% of TOTAL (Not Payroll only) costs. Furthermore the UFC this year pay only 20% which of course is far short of the funds needed.

Staff Research (SR)

This is intended to cover the provision of basic research facilities. In logic it should be calculated partly in proportion to planned academic staff numbers and partly in proportion to planned research student numbers. However there is no such thing as planned academic staff numbers so the UFC estimate the staff numbers from planned, therefore funded, student numbers. Overseas student numbers are included along with planned (funded) student numbers. The home and EC planned (funded) student numbers for taught and research post-graduates used in this calculation are given a higher weighting than are undergraduate numbers. For example in Anatomy/Physiology the weightings are UG:PG taught:PG research = 1 : 1.5 : 3. Pharmacology is the same. Other Biological Sciences and Biochemistry are 1 : 1 : 4.

Judgemental Research (JR)

This resource is selectively distributed on the basis of the research ratings awarded as a result of the UFC Research Selectivity Exercise. Account is taken of the relative size of the cost centre. So JR is calculated as a multiple of SR which is based on student numbers.

Ratio of JR TO SR

The UFC intends to increase the degree of selectivity in distributing funds on research based criteria in favour of JR, see below. Special Factors (S) are subdivided into:-

1. Non Departmental Special Factors (NDS)

for example London Allowance.

2. Departmental Special Factors (DS)

for example Egyptology, Archaeology. The intention is to protect those academic areas that are not justified on purely conventional financial criteria. Your university may have its own peculiarities that do not fit the general conventions. The Department of Education and Science has tried to pretend that there is no intention, nor has there been, to meet the full indirect costs; that what an institution does with its money is its affair. However the only dual funding is from DR. Moreover the White Paper on Higher Education, A New Framework, (1991), CMN. 1541, Para. 35 on page 17 says there is no dual funding in the Humanities. Now the Humanities are given all the other funding elements like science. It follows that DR must be given for science only since it is the only exception. Therefore there is dual funding for science and technology. But of course it is inadequate by the criteria adopted by the DES. The question is then, where does the DES expect the remainder of the indirect costs to come from? No answer to that.

The DES is now requiring Universities to account in detail for their spending on Teaching and Research. This implies that some form of dual funding must exist since otherwise all the funds for research would come from elsewhere and would be no business of the UFC or the DES.

Amounts and How they are apportioned

The amount for CR in 1990-91 is £15M or 2.2% of total R; the amount for DR in 1990-91 is £110M or 16.17% of total R. This £110M level has been capped from the start. These two are deducted from total R and each sub-committee determines the division of the remaining R between SR and JR for each cost centre. The SR is being gradually reduced towards zero. For example the JR:SR ratio for the Anatomy/Physiology cost centre 4 shows: 1989-90, 67:33; 1991-92, 69:31; 1994-95, 75:25. This progressive relative increase in JR compared with SR may well be accelerated.

What should you do?

Write to your M.P. about the issues raised here. Write to the Secretaries of State in the DES, the DTI, the DHS. Join Save British Science by writing to Dr. John Mulvey, The Save British Science Society, Box 241, Oxford, OX1 3QQ. IF YOU DO NONE OF THESE THINGS THEN DO NOT COMPLAIN.

As the Learned Judge said to Council “I am no wiser after all that”, to which Council replied “Hardly to be expected my Lord, but no doubt better informed”. I hope so.

Tim Biscoe
Physiology of Cytokines

The cytokines are a large group of polypeptides comprising of the interleukins, interferons, tumour necrosis factors and various growth and cell stimulating factors, which are most widely recognised for their actions on the immune system and as mediators of host defense responses to disease and injury. However, a number of cytokines have important physiological actions, which were discussed at a recent Physiological Society Research Symposium (University of Manchester, January, 1992). Actions of cytokines on behaviour (R. Danter, Bordeaux), neuroendocrine and endocrine function (F. Berkenbosch, Amsterdam), fever and the stress response (M. Kluger, Michigan), haemopoiesis (A. Whetton, Manchester) and whole body immune function (S. Durum, Frederick) were described. S. Poole (Potters Bar) summarized recent tools and technologies available for measuring cytokines and studying their actions in vivo, and G. Duff (Sheffield) discussed cytokines in disease.

The family of cytokines is large and rapidly expanding. However, three in particular have been implicated in control of physiological processes, interleukin-1 (IL-1), interleukin-6 (IL-6) and tumour necrosis factor α (TNF α), and of these IL-1 is the most extensively studied. All of these cytokines are synthesized in response to infection, inflammation or injury, and elicit many components of the acute phase response. Their actions include synthesis of acute phase proteins, stimulation of immune function and synthesis of local mediators of inflammation such as prostaglandins. The acute phase response also comprises important changes in physiological processes in which these cytokines are of fundamental importance.

Development of fever, stimulation of the hypothalamic pituitary adrenal axis, induction of "sickness behaviour", sleep, loss of appetite, mobilization of fuels and changes in metabolism all occur in response to disease, and are activated by IL-1, IL-6 and TNF in experimental animals and in humans. Many of these processes are considered to offer advantages to the host. For example, fever is a phenomenon which is widely observed in the animal kingdom, even in invertebrate species, appears to inhibit survival of invading pathogens. Activation of the hypothalamic pituitary adrenal axis results in release of glucocorticoids which exert potent antiinflammatory actions, and mobilization of fuels provide substrates for acute phase protein synthesis and for the increased metabolism required to raise body temperature.

Recent research has indicated that all of these actions of cytokines are mediated by the central nervous system. A number of cytokines including IL-1, IL-6 and TNF are present within the brain, and IL-1 is synthesized in neurones and glial cells in response to local and systemic stimuli. The most detailed studies on cytokine actions in the brain relate to their action on fever and there is now considerable evidence that IL-1 acts as an endogenous pyrogen within the CNS via induction of prostaglandins. IL-6 and TNF also induce fever, but it has been proposed that low doses of TNF may be antipyretic. Central injections of low doses of these cytokines in experimental animals also elicit changes in behaviour, neuroendocrine function and even alterations in immune function which were previously ascribed to peripheral sites of action. It is often difficult to distinguish physiological from pharmacological effects of injected recombinant cytokines, but some progress has been made in determining the importance of endogenous cytokines in fever. It has been demonstrated that administration of neutralising antibodies to IL-1 or IL-6 markedly attenuates fever in experimental animals.

Actions of cytokines on the brain provide an important example of the rapidly expanding field of neuroimmunology. The previous view that the brain is an immune privileged site has now been significantly modified with the realization that signals produced by the immune system (eg cytokines) directly act on the CNS, that many aspects of immune function are under central control, and that molecules and processes normally associated with peripheral immune cells are present within the brain (eg acute phase proteins, complement, phagocytic cells). These observations have important implications not only for our understanding of neuroimmune interactions, but also in unravelling the underlying processes of systemic and CNS disorders. Cytokines are known to play a role in brain infections, immune disease and injury (although their precise functions and mechanisms of action are not well understood) but have also recently been implemented in ischaemic and excitotoxic neuronal damage and in chronic neurodegenerative conditions such as Alzheimer's disease.

The relationships between "stress", psychological state and disease, were for many years based on apocryphal stories and observations under made under poorly controlled conditions. Interactions between the brain and immune system has started to provide a scientific basis for some of these phenomena. For example, corticotrophin releasing factor (CRF) is an important mediator of host responses to physical or psychological stress. CRF stimulates the pituitary adrenal axis, but also acts within the brain to induce many of the classical stress responses such as changes in behaviour, metabolism, cardiovascular function and immune activation. Several cytokines, particularly IL-1 and IL-6, are potent stimulators of the synthesis and release of CRF and many of their actions on the brain are dependent on CRF. Subsequent release of glucocorticoids following activation of the hypothalamic pituitary adrenal axis inhibits both the synthesis and effects of cytokines thus providing a negative feedback.

Although the major focus of research on cytokines has been directed towards their role in pathology, there is some evidence that they may also be important under normal physiological conditions. Psychological stress achieved by placing rats in an "open-field" situation causes a significant rise in circulating IL-6 concentrations and it has been suggested that stress-induced hyperthermia may be dependent on cytokines. Severe exercise also elicits a rise in circulating IL-1, and a marked increase in synthesis of this cytokine occurs in the exercising muscles which may be responsible for local damage to muscle fibres. Concentrations of IL-1 in amniotic fluid rise markedly during the terminal stages of pregnancy and this observation, together with the potent effects of IL-1 on prostaglandin release have led to the proposal that IL-1 may act as a signal for parturition and could contribute to the high rate of miscarriage and premature birth during infection.

Advances in our understanding of the importance of cytokines in normal physiological processes is hindered by their low concentrations in circulation and technical problems of meas-
Measurement. Assessment by bio- or immuno-assays often yield discordant results due to the presence of immuno-reactive, but biologically inactive precursors and fragments of cytokines and circulating inhibitors. These inhibitors include binding proteins, soluble receptors and, for interleukin-1 an endogenous receptor antagonist protein (IL-1ra). This antagonist shows significant sequence homology with IL-1 itself and is produced by common cell types such as macrophages in response to similar stimuli (eg endotoxin). The IL-1ra is also present in the brain in hippocampal cells where IL-1 is synthesized and IL-1 receptors are present in high density. The IL-1ra appears to act as a pure competitive receptor antagonist and is probably the first such endogenous molecule identified. There is considerable normal variation in basal circulating concentrations of some cytokines such as IL-1 in the normal population which may be due to observed polymorphism in promoter regions in the IL-1 gene. Even under pathological conditions such as infection or injury, circulatory concentrations of IL-1 and TNF alpha often remain low, which questions their ability to act at distant sites such as the central nervous system. However, both molecules are produced locally at sites of injury or inflammation and may elicit distant actions via intermediary humoral or neural signals. A possible candidate for this intermediate signal is IL-6, which is released into circulation in response to a number of stimuli. Circulating concentrations of IL-6 during infection or endotoxin treatment frequently increase by more than three orders of magnitude. The question remains as to whether IL-6 in circulation is able to enter the central nervous system or whether brain mechanisms are activated by an alternate mechanism. It has been suggested that IL-6 should be considered as hormone since it is synthesized by and acts on endocrine organs, it appears in circulation and acts at sites distant to its synthesis.

Cytokine research is currently one of the most rapidly expanding areas of biology, and a number of eminent groups within the UK are investigating their synthesis and actions. However, study of the physiological actions of cytokines and of neuroimmune interactions is still relatively new. Several groups in this country are actively engaged in such research, for example on neuroendocrine actions of cytokines (Bart's Medical College, London), central affects of cytokines on fever, metabolism and neurodegeneration (Manchester) and fever (Aberdeen). A book on the central actions of IL-1 will shortly be published by Manchester University Press.

References

Nancy J. Rothwell

Auditory Space Maps

The aim of the following text is to introduce the subject of mammalian auditory space maps to the non-specialist. I should like to emphasise that auditory space maps are not confined to the mammalian CNS and much of the pioneering work was done on another higher vertebrate, the barn owl. Due to the restricted length of this article it is not possible to cover the owl work and for the same reason the elegant data from the highly specialised bats will also not be included. Furthermore, the article intends to cover only the British contribution to the field of auditory space maps.

A map can formally be described as an ordered representation of a variable across a dimension of the neural tissue. A useful characteristic of maps is that, if probed electrophysiologically, in acute experiments under amnesia, they are predictable and consistent from animal to animal. These maps are representations of a variety of parameters which may be sensory or motor and even the peripheral distribution of an autonomic nerve such as the vagus nerve. The maps within the brain maps differ in a number of ways and not least in the way they are constructed. One distinction between different types of sensory maps is whether they are receptive or computational. An example of a receptive map is that of visual space. In the visual system the subset of peripheral receptors, located in the retina, that are activated by a stimulus is a direct function of the spatial position of the stimulus. In other words visual space maps directly onto the two dimensional surface of the retina. The representation of visual space within the brain thus merely requires an ordered transfer of this spatial information to the appropriate site to give us a map. A strict topographic order in the arrangement of axons from the retina maintains the basis of the visual map and a similar orderly distribution of the axon terminals gives rise to the well-established two dimensional maps of visual space.

In contrast, the maps of auditory space within the brain require more complicated processing for their construction. Although the ear, like the eye, is adapted for detecting objects at a distance i.e. in extra personal space, the inner hair cells, the principle elements in auditory transduction do not encode the spatial position of the stimulus. The sensory periphery of the auditory system codes the amplitude and frequency of the components of an auditory stimulus, not its spatial position. Thus, the ordered systems of neuronal connections which characterize primary sensory pathways, and are responsible for the transfer of visual space maps, in the auditory system produce tonotopic representations of the stimulus. The generation of a topographic map of auditory space must thus involve transformations and processing that are not required in the generation of a monocular visual space map. It is generally agreed that the coding of auditory spatial position utilizes cues such as the binaural differences in stimulus intensity and time, and monaural cues which arise as a result of the spectral transformation of sound by the pinnae. Since a map of auditory space must involve the extraction and encoding of numerous parameters, it has been called a 'computational' map to contrast it with those spatial maps which are passive reflections of the sensory periphery, such as the receptive topographic visual map.

Virtually all of the work on mammalian auditory space maps has been published in the last decade, and in the UK the work was until recently carried out almost exclusively in two laboratories; the National Institute for Medical Research (NIMR) in Mill Hill and at the University Laboratory of Physiology in Oxford. The first description of an auditory space map in the mammalian Superior Colliculus (SC) was provided by Andy King and Alan Palmer in 1983 working at NIMR. Further work showed that as well as a map at above threshold intensities, which can utilize...
binaural cues, there was also a map present at threshold intensities and therefore presumably of monaural origin. This early work was confined to the azimuthal plane and restricted to the guinea-pig. The representation of elevation in the mammalian SC was described in a different species, the ferret. Following the description of an auditory space map in the SC much of the following work concentrated on the development of the SC space map and the role of sensory experience in the initial construction and maintenance of the map. The first description of the developmental emergence of the SC map was from the NIMR group (Mike Keating, Ester Binns and myself) working on the guinea-pig. The guinea-pig is a precocial animal which is born with its eyes open and which can hear even in utero. Yet even in this precocial species the map of auditory space shows a protracted developmental emergence. Auditory neurones in the SC are responsive to sound within a day after birth, but are very broadly tuned initially for sound location. The spatial tuning improves with age until a map can be demonstrated by 32 DAB (days after birth). The map continues to be refined as the animal matures. A similar pattern of SC space map emergence has recently been shown in the ferret, a rather altricial species with hearing and eye-opening delayed until about 30 DAB. In the ferret the auditory map emerges over a period of a few weeks starting from the onset of hearing. So, in both species thus far studied, there is a delay in the initial expression of the SC space map. The cues both monaural and binaural that are utilized for sound localization depend on the size and shape of the head and pinnae. Studies that have measured head growth in the guinea-pig and the effect of pinnae growth on the monaural spectral transformation of sound, point to the fact that about 90% of growth is complete at the time of space map emergence in the SC. The growth of the head and ears alters the relationship between both monaural and binaural cues and positions in space. It is plausible that the auditory map is not plastic enough to cope with the changing localization cues that accompany the rapid initial growth of head and pinnae. The delayed emergence of the auditory map leaves open the possibility of a role for sensory experience during development. Particularly when you consider that the auditory map in the SC is spatially aligned with the retinotopic visual map, thus requiring the CNS to establish and maintain the registration of different modality maps which are constructed using entirely different rules. The dependence on auditory information has been assessed in two quite different ways. Firstly, in Oxford, ferrets were reared with abnormal binaural cues, this was achieved by occluding one ear early in development. This abnormal auditory experience is compensated for by the developing map and a topographically ordered map is still demonstrable in the SC of adult animals reared with a plug and, furthermore, the auditory map is still aligned with the SC visual map. A different approach to the study of the role of auditory experience in space map construction was provided by our group at NIMR. The aim of our study was to raise animals without directional auditory cues. Ideally, this would have meant rearing the animals in a sound proof environment, but in reality this is virtually impossible to achieve, due to internal noise generated by animal movement, eating, drinking etc. A lateral approach to the problem generated a rearing environment with continuous noise which was at a level aimed to mask directional cues without damaging the sensitive auditory periphery. The results from these experiments were quite conclusive in that they demonstrated a developmental requirement for auditory experience for the normal maturation of both the SC and ICX space maps of guinea-pigs. These experiments were later extended to demonstrate a crucial period for auditory experience in the normal chronological appearance of the SC map. The auditory deprivation, as affected by noise rearing, when confined to just a four day period (between 26 to 30 DAB) prevents the normal emergence of the SC map, and conversely auditory experience just provided during this same 4 day period is sufficient to generate the normal map. The susceptibility of both maps to auditory deprivation, although very marked in early development is not confined to the time before the first expression of the map but continues, albeit to a lesser extent, for many weeks after map emergence. Therefore, auditory experience is required for the continued maintenance of the space maps. Eventually the guinea-pig map loses its dependence on auditory experience (at least of the type denied by noise rearing) and older animals (100 DAB) are unaffected by deprivation of directional cues. Thus regardless of the method of investigation, i.e. ear plugging or noise rearing, the role of auditory experience in the initial construction and later maintenance of the midbrain auditory space maps is now well established.

A more surprising finding, however, is the role of visual experience in the construction of auditory maps. The investigations on mammals have again utilized two different methods of investigation: visual experience has either been manipulated in such a way as to alter the spatial coordinates of the SC visual map or visual experience has been withheld altogether. The first demonstration that visual experience may play a role in the mammalian SC map was provided by the Oxford group (Andy King, David Moore, Simon Carlile and Mary Hutchings). Ferrets were reared with a deviation of their visual world, induced by either surgical eye rotation or a surgical squint, which, due to the passive properties of the visual space map, resulted in the representation of visual space in the SC deviated to the same extent as the degree of eye rotation or severity of the squint. In ferrets reared in this way the spatial properties of auditory responses are similarly affected even though the auditory experience they receive is perfectly normal. In other words the auditory space map is aligned with the deviated map of visual space. These data indicate that visual experience might play a role in the orientation of the auditory receptive fields. Still further evidence on the importance of vision for the developing auditory map is given by the experiments on guinea-pigs. In these recent experiments, guinea-pigs were dark reared and in this situation no semblance of an SC map is demonstrable. Furthermore, in the guinea-pig the same timing is found for the crucial period for visual experience as the timing for the auditory crucial period. Visual deprivation, by dark rearing, for just the period 26 -30 DAB prevents the normal emergence of the guinea-pig SC map and exposure to normal visual experience confined to the 26-30 DAB period is sufficient to allow the normal chronological expression of the map. As was the case with auditory experience, visual experience is similarly required during the early stages of map maintenance and surprisingly seems to be required for even longer than auditory experience (up to 200 DAB). Interestingly, the ICX map has no developmental requirement for visual experience and is thus unaffected in dark reared animals. So to sum up. Auditory space maps involve considerably more neural processing than do retinotopic maps typified by the monocular map of visual space. In both species of mammal thus far studied the computational auditory space maps emerge over a protracted time period. The space maps are susceptible not just to auditory deprivation but also to deprivation of experience from a different sensory modality, namely vision. Auditory space maps are probably unique in that they require bimodality
sensory experience, not just for the initial construction of the map but also for the subsequent maintenance of the established map.

Finally this article would be incomplete without an acknowledgement. Throughout this paper I have referred to the British work which was, until I moved to Leeds, generated from two laboratories, those of NIMR and Oxford. It is fair to say that many of the ideas for the investigations into auditory space maps stem from one man namely Mike Keating. There is no doubt that, but for his dogged persistence, the initial venture into the SC in the search of a mammalian auditory space map would have been much delayed. And for myself, I confess to being captivated by his enthusiasm and drive as I made my first tentative foray into the world of auditory experiments. On behalf of the British contingent of auditory map investigators I should like to thank Mike for his contribution over the past decade and to hope for continued rewarding discussion in the future.

Suggested References:

I should like to take this opportunity of calling on any auditory physiologists who would be willing to form a special interest group of the Physiological Society, if there are any of you out there please contact me and we’ll take it from there!

Debbie Withington

Notices

Grants

Research to reduce the number and severity of experiments on living animals

Applications from suitably qualified persons or groups working in the United Kingdom are invited for Home Office grants to support research which could lead to the reduction, refinement or replacement of the use of living animals for experiment or other scientific purposes. Grants, which will be available from April 1992, may be awarded for periods of up to three years. The research scheme is administered by the Animal Procedures Committee, which advises the Home Secretary on the priorities for research and assists in the selection and evaluation of proposals.

While the areas to be given preference have yet to be finally decided, they are likely to include work aimed at developing methods of assessing distress in laboratory animals; improving the housing and care of laboratory animals; and reducing the number of animals used and the severity of procedures involved in the production and testing of vaccines.

However, proposals in other areas will also be considered if they are likely to contribute significantly to the reduction, refinement or replacement of the use of living animals in research. Proposals will be considered by the Animal Procedures Committee and may also be evaluated by independent expert assessors.

Successful applicants will be required to give undertakings that the results of their research will be published or will otherwise be made generally available, and to provide periodic progress reports to the Committee.

Further details may be obtained from the Animal Procedures Committee (071 273 2029), c/o E Division, Home Office, Room 971, 50 Queen Anne’s Gate, London, SW1H 9AT, quoting reference IA/12.

History of Science Grants from the Royal Society

Grants for Events

The Council of the Royal Society has recommended that from 1991 a sum of £10,000 be set aside, annually, and made available on a case-by-case basis to the History of Science Grants Committee to enable it to mount, on the Society’s behalf, a meeting, exhibition, or other comparable event in the history of science. Further details are available from Sheila Edwards, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG.

Research Grants

In 1990 the Royal Society set up a new History of Science Grants Committee to adjudicate on applications for grants for research in the history of science, medicine and technology. The grants are awarded annually; completed application forms are required by the end of September, the Committee meets in early November and the results are made known in December. The sums awarded are normally between £100 and £5,000.

Applications will be considered from researchers overseas if the project is connected with a UK historian or organization. For further information contact Sheila Edwards, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG.

Dale and Rushton Funds

The Manager of these Funds is now Prof. P.A. McNaughton: Physiology Subject Group, Biomedical Sciences, King’s College London, Strand, London WC2R 2LS. Tel: (071) 873 2473 or 873 2475.

Details of the Funds are on page 189 of the 1990 - 92 Grey Book: application forms and information can be obtained from Professor McNaughton at the above address.
**Low Cost Personal Accident Insurance**

The Society recently negotiated a group Personal Accident Scheme, through Wind-rush Insurance Brokers, which can be taken out on an individual basis by UK residents.

Although this cover has been arranged by the Physiological Society, it is not restricted to Society Members. Therefore this scheme may be appropriate for providing cover to your family, colleagues, or even your entire department.

The scheme allows for two separate levels of cover costing £30 or £55 per annum, the level to be chosen by the proposer. The premium is payable annually by the insured, or by a department on behalf of its staff.

These rates and benefits are highly competitive and we are sure that they will be of interest to you. The cover is on a 24 hours basis worldwide, and includes accidents of occupation.

Application forms are available from the Administration and Publications Office in Oxford.

Further details are available from Nigel Cox and Maggie Foster at Windrush Insurance Brokers, tel: (0865) 722832.

---

**Back Issues of the Journal of Physiology**

**Volumes requested**

Volumes after 321: A request for these volumes has been received from the Acting President of the An-Najah National University on the West Bank of Palestine. Members wishing to help should contact Reg Chapman, Department of Physiology, School of Veterinary Science, Park Row, Bristol BS1 5LJ. The cost of shipment is likely to be covered by the British Council.


**Volumes on offer**

Volumes 298-394 (Jan 1980 - Dec 1987): contact Prof T.W. Stone, Dept of Pharmacology, University of Glasgow, Glasgow G12 8QQ.

---

**Miscellaneous**

**Reprints on Offer**

A collection of 500 reprints/photocopies of papers related to the physiology and pharmacology of central control of the cardiorespiratory system in rabbit and other mammals, mostly between 1970-1985. Also available are about 100 reprints related to animal venoms and the toxins from marine organisms. Those interested should contact Martin H. Evans, 111 High Street, Linton, Cambridge CB1 6JT.

**Fancy writing a textbook?**

Anyone interested in writing an introductory monograph on renal, respiratory, endocrine etc should contact Geoffrey Smaldon, the Managing Editor of Butterworths on Oxford 310366.

**Getting rid of old equipment?**

Jan Galik would like to hear from anyone trying to get rid of any old electrophysiological equipment, microscopes, stereotaxic apparatus, computer hardware (A/D and D/A converters), equipment for tissue culture experiments, spectrophotometers and gas analysis apparatus. Contact Dr Jan Galik, Inst. of Neurobiology, Srobarova 57, 04001 Kosice, Czechoslovakia. Fax: 0042-95-273 96. Phone: 0042-95-428 071.

---

**Missing Physiologist**

The Administration Office is trying to trace the whereabouts of Barbara Sakitt, author of *Counting every quantum* (*J Physiol.* 223, 1972). At that time, she was working in the Physiology & Anatomy department of the University of California at Berkeley. From there, it is believed she moved on to Stanford, then to MIT and was last known to be at the University of Bridgeport, Connecticut, possibly doing research in Robotics, though it is not known in which department. If anyone knows her current (or a more recent) address or her phone or fax number, please could they contact the Administration Office (tel 0865 798498, fax 0865 798092).

---

**Newsletter Editor**

Kwabena Appenteng

Department of Physiology

The University

Leeds LS2 9JT

Fax: 0532 334381
THE PHYSIOLOGICAL SOCIETY

Member's application for free back volumes of
The Journal of Physiology

Member's Name and Address: ..............................................................

...........................................................................................................

...........................................................................................................

Volumes of The Journal of Physiology required:
(NB Applies only to volumes dated 1976 to 1986)

<table>
<thead>
<tr>
<th>Year</th>
<th>Volume Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Address to which volumes should be sent:
(Please tick 'a' or complete 'b')
(a) as above □
(b) .................................................................
...........................................................................................................
...........................................................................................................

On completion of this top section, please send this form to: Richard Ziemacki, Cambridge University Press, The Edinburgh Building, Shaftesbury Road, CAMBRIDGE CB2 2RU (UK)
CUP will then return it to you stating the cost of carriage so that you can decide whether or not to proceed with your order

QUOTE FOR COST OF CARRIAGE TO ABOVE DESTINATION:

If the above is acceptable to you, please complete the next section and return the entire form to Richard Ziemacki. The journals will be despatched on receipt of your payment.

Please tick 'a' or complete 'b' as appropriate:
(a) I enclose a cheque/postal order/draft for the above amount □
(cheques should be made payable to "Cambridge University Press" and drawn on a UK bank)
(b) Please charge the above amount to my credit card (Visa, Mastercard or American Express only) □

Credit card no. ............................................................. (Exp date) ..................

Signed ................................................................. Dated ..................

Address registered with credit card company if different from above:
.............................................................................................................