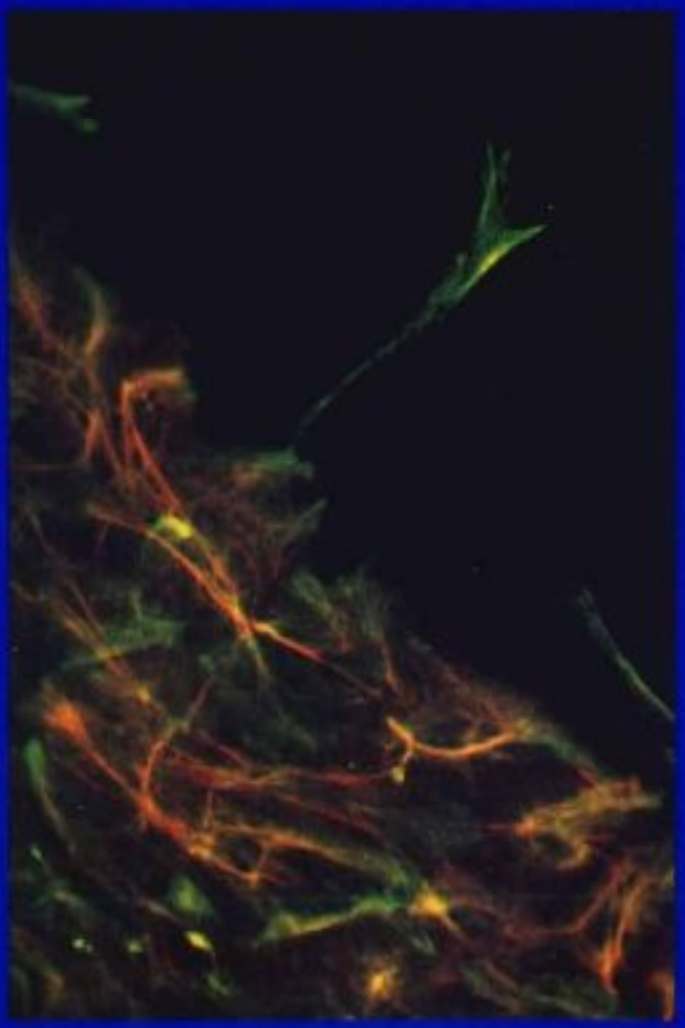
The Physiological Society Magazine



Autumn 1995
No 20

At the designation of the Cellular Physiology Research Unit as the "Wellcome Trust Cellular Physiology Research Unit" November 1994, Cork

Left to right: Valerie Urbach (CF Assoc Post Doc), John Cuffe (Wellcome Trust Prize Studentship), Bridget Ogilvie (Director of the Wellcome Trust), Brian Harvey (Director CPRU), Brian MacNamara (Wellcome Trust Post Doc) and Mary Phillips (Wellcome Trust, Physiology Programme Manager)

Brian Harvey and some of the staff of the Cellular Physiology Research Unit, Cork

The Emperors in front of the Sheldonian Theatre, Oxford

Denis Noble delivering the after dinner speech at the Oxford Meeting

Worlds apart from the high table but sparks were obviously flying at The Physiological Society Dinner, Oxford

Sherry reception at St Catherines College, Oxford

Front Cover

Immunofluorescence photomicrograph of cytoskeletal filaments in precardiac cells from a chick embryo.

M Osmond, Wellcome Centre Medical Photographic Library

Left to right: Kwabena Appenteng, Leeds, Prof Reg Chapman, Bristol, Ms Jill Bailey of the Wellcome Centre Medical Photographic Library and Prof Cecil Kidd, Aberdeen, discussing modern biomedical images in front of the Wellcome Centre Medical Photographic Library stand at the Oxford Meeting in July

Contents

Opinions expressed in articles and letters submitted by or commissioned from Members, Affiliates or outside bodies are not necessarily those of the Society.

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☞ Action Points

☞ **Affiliation Renewal Fees** Payment of fees for the renewal of Affiliation for the academic year 1995-96 should reach the Administration Office by 30 September *(See Committee News)*

☞ **Affiliate Travel Grant Scheme** Next deadline for receipt of grant applications: 30 September

☞ **Bristol Meeting** Abstracts should be submitted to the new Meetings Secretary, Chris Fry, between 23 October and 2 November

☞ **G L Brown Prize Lecture** Departments wishing to host a lecture in 1996 should notify the Committee Secretary, Richard Boyd, by 1 September

☞ **Eastern European & Third World Grants** The next deadline for receipt of grant applications is 30 September

☞ **King's College London Meeting** Abstracts should be submitted to the new Meetings Secretary, Chris Fry, between 18 and 28 September

☞ **New Lecturers Support Scheme** Next deadline for receipt of grant applications: 30 September

☞ **Student Associateship** Members proposing undergraduates in their second year and above for Student Associateship are encouraged to do so at the beginning of the academic year *(See Committee News and form on page 45)*

Magazine Editorial Group

Saffron Whitehead ..... *News from Abroad, Letters*
Phil Harrison ..... *Science News & Views*
Malcolm Segal ..... *Teaching & Technology*
Laurence Smaje ..... *Policies & Politics*
Tilli Tansey ..... *Traces of the Past*
Susan Wray ..... *Special Features*
Valerie Cox ..... *Young Physiologists*
Heather Dalitz ..... *Committee News, Special Interest Group Forum, Notices & Advertising*

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GUIDELINES FOR CONTRIBUTORS

These guidelines are intended to assist authors in writing their contributions and to reduce the subsequent editing process. The *Magazine* Editorial Group is trying to ensure that all articles are written in a journalistic style so that they will have an immediate interest value for a wide readership and will be readable and comprehensible to non-experts. In particular, scientific articles should give a good overview of a field rather than focus on the authors' own research.

Format of articles

The main message or question posed should be introduced in the first paragraph. The background for the topic should then be established, leading up to the final *dénouement* or conclusion.

Length of articles

This will be determined by the subject matter and agreed between the contributor and the commissioning editor. Articles will vary in length from 200 words to a maximum of 800 words.

Submission of articles

Authors should submit text in the form of a disk accompanied by a printout wherever possible. Use of disks reduces the risk of introduction of errors during re-typing. It is helpful to give brief details of the computer, operating system and software package(s) used (DOS formatted Wordperfect 5.1 files preferred, but not essential).

Deadlines for submission

See Notable Dates (inside covers of 1995 edition of the *Grey Book*) or contact the Editorial & Production Office. Late submissions will not be accepted or publication will be deferred to a later issue.

Illustrations

Authors are encouraged to submit diagrams, drawings, photographs or other artwork to illustrate their articles or, if they cannot provide these themselves, to suggest what artwork might be appropriate. Photographs may be colour or black & white, prints or transparencies.

Author photographs

The *Magazine* normally includes photographs of the authors of articles. These may be colour or black & white; prints are preferable if cropping is required.

References

Authors are requested to keep the number of references to a minimum (preferably no more than two or three).

Suggestions for articles

These should be made (in writing, by phone, or in person at Scientific Meetings) either to the Editor, to the Editorial Assistant or to the relevant member of the *Magazine* Editorial Group (see left).

THE MEETING AT CORK

It is 22 years since The Physiological Society last met at University College Cork and we are delighted, in the year of the 150th Anniversary of the founding of the College, to welcome the Society for its September Meeting. University College Cork with University College Galway and Queen's College Belfast were founded as the Queen's Colleges in 1845. Galway and Cork now are constituent Colleges of the National University of Ireland.

The Medical School received its first students in 1849. Until the appointment of the first full professor in 1907, physiology was taught in conjunction with anatomy. Prof D T Barry, a pupil of Starling in London, held the first chair. Barry's work at UCC in the field of cardiology and the digestion and absorption of polysaccharides was extensively published. He collaborated with colleagues in France, and in 1929 was awarded the title of Chevalier de la Legion d'Honneur in recognition of his work. The present Head of Dept is Prof W J Hall, who is currently Dean of the Medical Faculty. Prof Hall took over the headship from Prof J D Sheenan, who held the post from 1956 until 1986.

Physiological Society delegates at the first Cork Symposium on "Ion Transport in Health & Disease" 1993.

The modern Dept of Physiology is located in the original Clarendon building on the main campus and has an academic staff of six. The Dept teaches 90 medical students and 35 dental students *per annum*. In recent years physiology students from the Science Faculty Biological Sciences Stream have accounted for an increasing number of our students. In 1996 we will have 18 fourth year Honours and six PhD students pursuing a degree in Physiology.

Research interests of the staff fall broadly into two general areas, whole animal physiology and cellular physiology. In the areas of whole animal physiology, current projects include examining, in both humans and minipigs, the changes in water, sodium and potassium excretion which result from changes in the luminal contents of the gut. A project on the effects of anaesthetics on survival following haemorrhage in the minipig is also underway. In the area of cellular physiology, the arrival from France of Brian Harvey in 1993, and the subsequent establishment of the Cellular Physiology Research Unit has led to rapid growth in this area of research and teaching at UCC. The Cellular Physiology Research Unit was opened by Her Excellency Mary Robinson, President of Ireland, in June 1993 and was designated a Wellcome Trust research unit by the Director of the Wellcome Trust, Dr Bridget Ogilvie, on 14 October 1994.

The major theme of research at the CPRU is "Epithelial Cross-talk". With the arrival of five MD researchers, new projects have been initiated with a distinctive clinical bias. These projects include steroid hormone signal transduction in human colon and neurohumoral regulation of ion transport and calcium signalling in human ocular ciliary body, human lung and human chondrocytes. Along with the Clinical Research Laboratories in Cork University Hospital, the CPRU was nominated by the Health Research Board of Ireland as a National Research Unit in Immunophysiology of the Gastrointestinal Tract for 1995 until the year 2000.

The Society Meeting will be preceded by a Symposium on Ion Transport in Health and Disease and will have Designated Sessions in the area of Human Physiology, Cardiovascular /Respiratory Control, Ion Channels, Epithelial Membrane Transport and Renal Physiology.

Lest Members feel that the Meeting might be all work and no play, we hope to be able to demonstrate some traditional Irish hospitality and to make the Meeting enjoyable for all.

Elizabeth Gebruers
Physiology Dept, University College Cork

Left to right: Brian Harvey, Elizabeth Gebruers, John Hall, Gerry O'Regan

JOURNAL SUBSCRIPTIONS: SPECIAL RATES FOR MEMBERS, AFFILIATES AND DEPARTMENTS

The Journal of Physiology

The *Journal* is again being offered to eligible departments of Physiology in the UK and Eire on extremely generous terms: only £120 for the full set of 1996 volumes (12% of the commercial subscription rate). See Standing Order H2 in the *Grey Book* for details of the requirements for eligibility.

The special subscription rates offered to Foreign Members have been held at last year's rate. Foreign Members who qualify can therefore obtain the 1996 volumes of the *Journal* for only £95 ($190 for those resident in North America) compared with the 1996 commercial subscription rate of £996/$1,864. Renewal forms will be sent in the autumn to all Foreign Members currently receiving the *Journal*; other Foreign Members interested in subscribing should contact Jane Ault at the Administration Office.

Experimental Physiology

The price at which *Experimental Physiology* will be offered to Members, Affiliates and eligible departments for the 1996 issues is £40 (less than a quarter of the 1996 commercial subscription rate of £168/$306). This is less than the cost to the Society of providing the copies. Renewal notices will be sent to all current subscribers in the autumn. Others wishing to start subscribing should contact Jane Ault at the Administration Office.

ANIMAL WELFARE SUB-COMMITTEE

Booklets for Undergraduates: Using Animals in Biomedical Research

The Animal Welfare Sub-Committee's new booklet for first year undergraduates will be available, free of charge, from the Administration Office with effect from the beginning of September.

The 12-page booklet deals with animal research issues relevant to new students in Physiology, other biomedically related science courses, medicine, dentistry and other medical professions, and provides answers to the kinds of questions they most commonly ask.

The Sub-Committee hopes that university departments will wish to include it in any introductory information pack that they provide for first year undergraduates. It may also be helpful when prospective students are interviewed later in the year.

There is clearly a great demand for this kind of material. The Society's departmental contacts for Animal Welfare and Education & Information Sub-Committee business were asked how many copies they would need - to date, 77 departments have responded positively, requesting a total of 13,240 copies. The Sub-Committee plans to have copies distributed by about the beginning of September.

MEMBERSHIP SUB-COMMITTEE

Student Associateship

This new form of association with the Society has been introduced to take effect from the beginning of the coming (1995/96) academic year. Members can now propose students registered for a first degree in Physiology or a cognate science for approval as Student Associates. Such students will then receive copies of Meetings Programmes and the *Magazine*, at a cost of £5 per academic year.

Full details of Student Associateship, including the criteria for eligibility and method of proposal, can be found on the back of the tear-out proposal form on page 45 of this issue of the *Magazine*. Details, notices, application forms and information sheets for potential Student Associates are also being circulated to departments of Physiology and related sciences.

Prior to introduction of this new form of association with the Society, selected undergraduate students were surveyed to determine what kind of assistance Student Associates would find most useful. The survey responses clearly showed that the most sought-after information would be on postgraduate opportunities, particularly advice on how to go on to a PhD.

Phil Harrison, the Student Associate Liaison Officer, has therefore offered to make himself available to answer Student Associates' questions and give them friendly, helpful advice on matters connected with the Society and its activities, postgraduate research opportunities *etc.* To assist him in performing this role, the Education & Information and Membership Sub-Committees are currently producing a publication for Student Associates, to include:

- General guidelines on how to identify a PhD project and where to do it
- Contacts by research interest
- Contacts by university
- How PhDs are funded, with details of major funding bodies
- Postgraduate Physiology careers (including non-research careers)

Students seeking advice will be asked to contact the Administration Office in the first instance.

Affiliation Renewal

Affiliates are reminded that payment of their fees to renewal their Affiliation for the academic year 1995-96 should reach the Society's Administration Office by 30 September, or their Affiliation will lapse.

The Committee has agreed that, since so few Affiliates in the British Isles wished to forgo receipt of precirculated Abstracts, this option will be withdrawn for Affiliates resident in the UK and Eire, all of whom will now receive Abstracts automatically. The fee for the academic year 1995/96 for such Affiliates is £10 (roughly half the cost of providing them with the literature they receive).

There has been no change in the Affiliation fees payable by Affiliates resident overseas, who may still opt not to receive Abstracts, if they so wish. *(See reverse of Affiliation form at the back of this Magazine for details of fees payable, depending on location and publications required.)*

Membership Numbers

Members will notice that a new item of information has appeared in their *Grey Book* entries: their Membership number. Members are asked to quote this number in any correspondence with the Society, to ensure that it appears on grant application forms, Affiliate and Student Associate proposal forms *etc.* As the number of Members of the Society continues its steady increase, this will help prevent confusion between the growing number of Members sharing the same surname. Use of Membership numbers has been found particularly helpful by members of the Grants and Membership Sub-Committees, as well as the Society's administrative staff.

MEETINGS SECRETARY'S ADVISORY SUB-COMMITTEE

More Meetings in 1996

Members present at the AGM were informed that, in addition to the precirculated venues and dates, a further Meeting would also take place (Manchester, March 1996). Since that time, yet another Meeting has been added to the calendar for 1996 (Bristol, 9-10 February), bringing the total to six. Of these, two (Manchester and Newcastle, 20-21 November) are Designated Meetings, in contrast with the Bristol Meeting, which will consist of open sessions only.

Details of all the Scientific Meetings in 1996, including abstract submission periods, appear on the Meetings Card which is being circulated to Members, Affiliates and heads of departments with this issue of the *Magazine*.

Demonstrated Communications: a New Category of Abstract

At the 1995 Annual General Meeting, Members voted to amend the Domestic Rules to allow a new category of Communication to be introduced: the Demonstrated Communication. For those who were not present at the AGM, this article explains the background to the proposal and the nature and purpose of this new type of Communication.

At the 1994 Annual General Meeting there had been a number of resolutions re-affirming the importance that the Society places on Demonstrations. Members felt strongly that Demonstrations are a unique opportunity, exclusive to The Physiological Society, to demonstrate apparatus and work in physiological laboratories. There was, however, a different debate concerning the actual definition of a Demonstration. As clearly stated in Domestic Rule A6 "A Demonstration shall be taken to mean an exhibition of experiments, apparatus or specimens, needing special facilities for their proper performance or display, or showing of a cinematography or view file". Some Members had argued strongly that many recent Demonstrations had not been Demonstrations in the sense of Domestic Rule A6. No experiment was being shown and the abstracts were more like those of Communications, containing considerable amounts of data. Many of the Demonstrations were simply Members opening their labs and using the opportunity to illustrate their work in poster form. Such practice suggested that the situation regarding Demonstrations should be reconsidered.

On reflection, the needs of the Members fell into two categories. Firstly, those who want to give true Demonstrations of new apparatus, techniques or preparations, applying Domestic Rule A6 to the letter. The text of such Demonstrations would be published in the Proceedings and contain only a minimal amount of data. Secondly, many Members wish to open their laboratories during a Scientific Meeting to allow visiting Members and guests to see how they do experiments. Under such circum-stances the approach, apparatus or preparations may not be unique and therefore this is not a true Demonstration. It is, however, particularly valuable to see how other people work and to get feedback from visitors about possible improvements. This kind of Demonstration is usually backed up by data and results obtained within the laboratory. The abstract of such a Demonstration is therefore more like that of an Oral or Poster Communication.

In order to accommodate purists concerning Demonstrations and those who want to open their labs, the Meetings Secretary's Advisory Sub-Committee proposed that Demonstrations at Scientific Meetings be defined in two ways:

Demonstrations: these must conform with the requirements of Domestic Rule A6 and are allowed one full page of the *Proceedings* of The Physiological Society, applying Domestic Rule A7, to illustrate the Demonstration.

Demonstrated Communication: this is a new category of Communication (in addition to Oral and Poster Communications). Demonstrated Communications will be given during the time set aside at a Meeting for Demonstrations and Poster Communications. These Communications will take place in the laboratories of Members of host departments who wish to illustrate experimental techniques. It is expected that new data will be associated with the Demonstration, and that this and the background to the work will be precirculated in abstract form in the same way as Oral and Poster abstracts. The length of a Demonstrated Communication abstract will be 3,000 characters (the same as an Oral or Poster Communication). Demonstrated Communications will be discussed and approved in the same way as Demonstrations and Poster Communications. Members wishing to have a Demonstrated Communication but not include data will have the option of opening their laboratory and having this recorded by Title Only at the Meeting.

PRIZES & PRIZE LECTURES SUB-COMMITTEE

Joan Mott Prize Lecture

Earlier this year the Society received a bequest from Joan Mott. The Committee has agreed to use the money to fund a biennial lecture, concerned with any area of physiology, to be given at a Scientific Meeting in alternate years with the Wellcome Prize Lecture. The Lecturer, preferably a woman, will be asked to attempt to make the contents of the lecture particularly relevant to young physiologists and also aim to enhance the profile and significance of women within the discipline of physiology. These Lectures will be published in *Experimental Physiology*, subject to the approval of its Editorial Board.

The first Joan Mott Prize Lecture will be given at the Edinburgh Meeting in July 1996 by Maria Fitzgerald, who will take as her title "Pain and the Developing Sensory Nervous System - a short and long term view".

G L Brown Prize Lecture

The 1996 G L Brown Prize Lecture, entitled "Glutamate Channels and Synaptic Transmission", will be given by Stuart Cull-Candy. The purpose of the G L Brown Lectures is to stimulate an interest in Physiology. Unlike most of the other Society Prize Lectures, they are not given in conjunction with a Scientific Meeting; instead, the Lecturer embarks on a tour of those departments whose bids to host the Lecture were successful. Heads of departments wishing to host a Lecture should contact the Dr C A R Boyd, Committee Secretary, by 1 September 1995 at The Physiological Society, PO Box 506, Oxford OX1 3XE, tel (01865) 798498, fax (01865) 798092, Email carboyd@vax.ox.ac.uk.

EDUCATION & INFORMATION SUB-COMMITTEE

Workshops of The Physiological Society

Last year, the Committee allocated £10,000 to provide grants for Workshops and a further £5,000 to the Foreign Secretary to support attendance at Society Workshops by physiologists from Eastern European and Third World countries. A number of Workshops are now being planned, most of which will take place in conjunction with Scientific Meetings *(see Table)*.

The Education & Information Sub-Committee is keen for further Workshops to be held and Clive Orchard in Leeds is acting as the member of the Sub-Committee responsible for stimulating the organisation of Workshops. He would be very glad to hear from any Member of the Society who would like to organise a Workshop or who can identify a suitable topic for a Workshop. Anyone interested should contact either Clive Orchard, Dept of Physiology, University of Leeds, Worsley Medical & Dental Building, Leeds LS2 9NQ, tel (0113) 233 4244, fax (0113) 233 4248, or Noel McHale, Chairman of the Sub-Committee.

FORTHCOMING WORKSHOPS

Location	Date	Organiser(s)	Topic
Cork	14-18	B Harvey	Computer Modelling and
Sept '95			Thermodynamics of Ion Transport
King's College, London	Dec '95	R Clarke	Techniques in Somatosensory Physiology
Leeds	9-10 Sept '96	C Orchard P Evennett	Electrophysiology & Microscopy
Liverpool	Sept '96	O Petersen	Ca^{2+}, pH and Signal Transduction

There may also be a Workshop on Modelling Neural Networks in Edinburgh or Glasgow in 1996.

Physiological Society Workshop: Thermodynamics and Computer Modelling of Solute Transport

This is an intensive hands-on course suitable for undergraduates and postgraduates pursuing degree and research programmes in transport physiology. The course is also aimed at teachers of Physiology wishing to strengthen their basic understanding of the thermodynamics and computer modelling of solute transport.

The Workshop takes place over four days. On Thursday and Friday (14-15 September), there will be thermodynamics lectures in the mornings, intended to provide a solid understanding of the various flux equations, their uses and their limitations; the principle of coupling between fluxes across a membrane; the differences among facilitated transport, active transport and secondary active transport. These lectures will be followed on both days by computer modelling workshops in the afternoon, with an advanced computer modelling workshop on Saturday morning. The Workshop continues on Monday 18 September with demonstrations and hands-on discovery sessions throughout the day.

The Physiological Society

GUIDELINES FOR WORKSHOP ORGANISERS

1 Workshops are intended to provide a forum for the exchange of information about techniques relevant to Physiology. This exchange may either be: (i) between those experienced in the use of a particular technique and relative newcomers to the area, or (ii) between experienced researchers in an area who wish to exchange information or to discuss areas of common concern or difficulty.

2 The format of a workshop is not fixed but is left to the organiser(s). It is expected, however, that workshops will be practically-based with the ability for "hands-on" experience of the technique under discussion, particularly for workshops which fall into category (i) in paragraph 1 above.

3 In order to maximise discussion and the ability to obtain "hands-on" experience, it is expected that a workshop would have no more than 20-25 participants.

4 The workshop should last no longer than two days and may be held either independently of or in conjunction with a Scientific Meeting of The Physiological Society.

5 Workshops can be organised by or through any Member of The Physiological Society.

6 Anybody who would like to organise such a workshop should submit a written proposal, not exceeding one side of A4, to the Chairman of the Education & Information Sub-Committee. This proposal should outline the subject of the proposed meeting, its purpose, the main contributors, an estimate of costs, the venue and date(s).

7 The workshop must be open to all interested Members and Affiliates of the Society. Non-Members may also attend if their attendance is formally recommended by a Member of the Society. Applicants not falling within these categories may not attend. Preference is to be given to (i) Affiliates and (ii) Members, if demand exceeds the places available. No charge can be made to those attending the workshop, except for domestic arrangements (meals and accommodation). Individuals from Third World and Eastern European countries wishing to attend a workshop may apply to the Foreign Secretary for financial assistance.

8 Organisers are responsible for ensuring that all Members of the Society receive notice of the Workshop. This can be done by placing a notice in the programme of a Scientific Meeting and/or in the Society *Magazine* and should be in time for Members to be able to respond to the notice.

9 The amount allocated to each workshop or symposium will depend on need and on demand but would not normally be expected to exceed £2,000 per workshop. This money can be used to cover administrative costs and to contribute to reasonable travelling expenses for key contributors to the workshop; honoraria may not be paid to such contributors. All financial commitments and arrangements by the organisers must be agreed with the Chairman of the Education & Information Sub-Committee in advance and the Treasurer must be notified of the financial details before the workshop. If other funding is obtained for a workshop, which then makes a profit, the Physiological Society will expect as much as possible of its contribution to the Workshop to be repaid. Workshop funding is not available for "internal" meetings between members of a single institution.

10 A short report (not more than two sides of A4) on the workshop must be sent to the Chairman of the Education & Information Sub-Committee within the two months following the workshop.

The hands-on workshops will teach computer modelling of epithelial ion transport using PSpice for modelling in the kidney proximal tubule and the EpiModel for volume regulation in epithelial cells. The teachers will be Dr A G Butt, Prof B J Harvey and Dr S R Thomas.

Course Organiser: Prof B J Harvey, Director, The Wellcome Trust Cellular Physiology Research Unit, Dept of Physiology, University College, Cork, Ireland, Tel (00 353) 21 902235/ 902236, Fax (00 353) 21 272121, Email Harvey@iruccvax.ucc.ie

Workshop on Techniques in Somatosensory Physiology

The Somatosensory Physiology Special Interest Group is organising this research oriented workshop at the King's College Meeting in December. Traditionally the field has been the domain of electrophysiologists, who still form the bulk of the membership of the Group. However, man cannot live by microelectrodes alone and more and more somatosensory research is carried out using techniques of molecular identification. The workshop will cover molecular and electrophysiological approaches to the study of somatosensory systems and is intended to provide encouragement and advice for workers who are thinking of extending their range of techniques.

Probably the most popular of the molecular methods in current use is the immunocytochemical localisation of the c-fos protein product, as a marker for neuronal activity. Like all methods, it needs to be applied with care and with a full knowledge of what expression of the c-fos protein actually means. Steve Hunt, of the MRC Laboratory of Molecular Biology in Cambridge, introduced the technique to somatosensory physiology and will open the workshop with a talk on "The uses and abuses of c-fos immunocytochemistry".

A great attraction of c-fos is that it can provide a snapshot of the anatomical basis of functional events and allows the activity of populations of neurones. *In situ* hybridisation for mRNAs coding for transmitters (and other signalling molecules) can be used to the same effect, provided that one possesses the appropriate oligomers. Our speaker on this subject will be Sue Fleetwood-Walker, from the Dept of Preclinical Veterinary Sciences, Edinburgh, who made her name as an electrophysiologist but has recently successfully taken up *in situ* hybridisation in her investigations into the development of central changes following peripheral inflammation.

Correlation of the functional properties of a neurone with its chemical identity has been a goal of somatosensory physiologists for many years. Sally Lawson, of the Dept of Physiology at Bristol has made great progress towards this goal and will talk about her work on the immunochemical identification of functionally characterised dorsal root ganglion neurones. Molecular biology has provided a number of new tools for investigating signalling mechanisms in sensory systems, including ultra-specific antibodies and antisense DNA probes for obstructing the normal expression of specific genes.

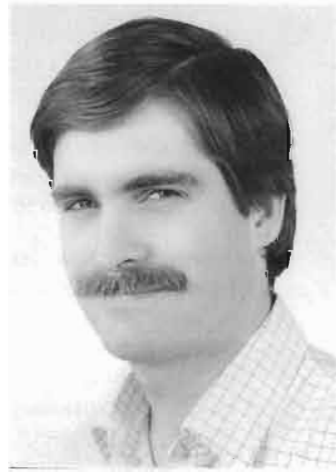
Sally Lawson

Jose-Ramon Naranjo, of the Cajal Institute, Madrid, has investigated the effects of antisense probes in models of inflammation. He will cover the theoretical basis of the technique and its practical application.

The remainder of the workshop will be given over to electrophysiological techniques. Recording from isolated parts of the CNS maintained *in vitro* has been a powerful tool for the functional dissection of physiological events in multineuronal systems. One of the problems with this approach is the loss of connections between the CNS and the outside world. The speaker on this topic will be Anne King, of the Dept of Physiology at Leeds, who has made her reputation by developing an isolated spinal cord preparation which overcomes some of these difficulties: she will be telling us about the latest refinements to her methods.

Recent years have seen the development of many animal models for human chronic pain states. This topic will be covered by Hans-Georg Schaible, of the University of Wuerzburg, who has for many years been at the forefront of research into the changes in sensory processing which occur as a result of inflammation.

Duncan Banks



The ultimate in physiological recording conditions must be found in conscious animals. This will be covered by Duncan Banks, of the Dept of Physiology at St Thomas's. Duncan has developed methods for recording the activity of presumed sensory neurones in the trigeminal nuclei of awake animals.

The Group is fortunate to have such a strong line-up for this workshop. I hope it will add to the attractions of London in the Christmas season!

Rob Clarke

CARDIOVASCULAR/ RESPIRATORY CONTROL

Mike Gilbey

If you had not realised Mike Gilbey has handed over to me the convenorship of the Cardiovascular/Respiratory Control Special Interest Group (Cv/Re SIG). I know we would all agree that Mike has done a first class job and since this is my first opportunity I would like to thank him sincerely for his efforts over the last three years.

From the 1994 Annual Report of The Physiological Society I notice that our SIG presented a total of 102 Communications and Posters. This constitutes the second highest output of the 23 Special Interest Groups. Of these 102 presentations, 61 were presented at the two Meetings held at Aberdeen and Birmingham, leaving approximately 40% given at other Meetings. It strikes me that this percentage is quite high and may reflect the closeness of the two Designated Sessions (September & December). Alternatively, two Designated Sessions per year may not be enough to accommodate the research of our Group. I would appreciate any suggestions you have regarding the number of future Designated Sessions per year as well as any other ideas regarding the running of our Group. In addition, please let me have your nominations for future Designated Lecturers. My email address is: julian.f.r.paton@bris.ac.uk

During the recent Oxford Meeting (11-14 July) the Group contributed 20 Oral Communications and five Posters. All presentations were well attended and induced interesting and useful discussion. We now look forward to the next Designated Session, which will be in Cork (20-22 September) where Prof Orville Smith from the Dept of Physiology and Biophysics, University of Washington, Seattle, USA, will give the Designated Lecture entitled "Neural Behavioural Regulation of Cardiovascular Responses in Social Groups of Baboons".

Following the Cork Meeting the next Designated Session will be held during the UCL Meeting. Please note the change in the dates of this Meeting, which are now 16-18 April 1996. On Friday 19 April we will be staging the first **Cardiovascular/Respiratory Control Symposium**. Further details will follow once the programme firms up but the intention is to have two speakers for each of three sessions on peripheral afferents, central modulation and motor control. In addition, Prof Michael de Burgh Daly has agreed to give the Designated Lecture to our Group during the Scientific Meeting.

See you in Cork.

Julian Paton

COMPARATIVE & INVERTEBRATE NEUROSCIENCE

Future Meeting: Designated Session at King's College London

There will be a Designated Session of the Comparative & Invertebrate Neuroscience Special Interest Group, consisting of both Oral and Poster Communications, at the King's College London Meeting on 19-21 December 1995. A Designated Lecture will be given by Dr R Williamson (MBA, Plymouth) entitled "Cephalopod Brain & Behaviour: Recent Advances". Members and non-Members are encouraged to submit abstracts on any topic.

If you require further information about this meeting or submission of abstracts, please contact me.

Cathy McCrohan

COMPARATIVE PHYSIOLOGY

There will be a Designated Session at the King's College London Meeting (18-20 December 1995). The abstract submission period is 18-28 September 1995.

Ted Taylor

HISTORY OF PHYSIOLOGY

The Special Interest Group in History held its first Designated Session and a Workshop during the Oxford Meeting. One Poster and four Oral Communications were presented during the morning: Kevin Breathnach illustrated the life of D T Barry, the first Professor of Physiology at Cork, and his work on respiratory afferents; John Widdicombe spoke on 19th century respiratory reflexes and the particular influence of pupils of Eweld Hering (one half of the eponymous reflex); whilst Bob Torrance continued the respiratory theme by discussing the "oxygen secretion" controversy with respect to ideas on carbon monoxide excretion. Peter Clarke emphasised that research on cell death during development has a longer history than currently credited and described the advances made by morphologists, especially German scientists, during the 19th century; and Tilli Tansey described of the role of The Physiological Society in encouraging the widespread adoption in Britain of the word adrenaline, when it was the trade name of an American pharmaceutical company. The afternoon Workshop, organised by Tim Horder and Tilli Tansey, heard, in addition to the organisers, from John West on the historical projects supported by the American

Physiological Society; from Cecil Kidd on the Paton Prize; and from Jeff Aronson, who re-examined the 1970s retrospective study by Comroe and Dripps of cardiovascular research. The Sessions were encouragingly well attended and lively, and a further Designated Session is therefore being arranged for the University College Meeting in April 1996.

Tilli Tansey

HUMAN PHYSIOLOGY

It seems that the decision to hold a second Designated Session this year has been justified, with a large number (n=38) of abstracts submitted for the Cork Meeting. This is unlikely to detract from the Christmas Meeting, which features a symposium on tissue blood flow and metabolism and has already attracted international interest. *(See box for preliminary programme.)*

These Christmas Meeting symposia are growing in popularity and we should perhaps already be thinking about possible topics for next year. Suggestions are welcome and there will be an opportunity at the Kings College Meeting to discuss proposals.

Members of the History of Physiology Studies Special Interest Group listening to Cecil Kidd (above), Jeff Aronson (top left) and Tim Horder (left).

Photographs courtesy of Martin Rosenberg

Following the success of the Human Physiology practical workshop on blood sampling and analysis techniques, it is proposed to hold a similar course during the Easter 1996 vacation. The suggested topic for this course would be Cardiovascular and Respiratory Measurements in Human Physiology, and it is anticipated that it will follow a similar format with three days of laboratory practical work. Further details will follow shortly.

Ron Maughan

HUMAN PHYSIOLOGY SPECIAL INTEREST GROUP

Provisional symposium programme

CONTROL OF TISSUE BLOOD FLOW AND METABOLISM

King's College, London

Date to be confirmed

Blood Flow and Metabolism in Cardiac and Skeletal Muscle	Dr J Bulow, Copenhagen
Blood Flow and Metabolism in the Splanchnic Region	Dr T Brundin, Stockholm
Blood Flow and Metabolism in Adipose Tissue	Dr K Frayn, Oxford
Blood Flow and Metabolism in the Brain	Prof P Morris, Nottingham
Does blood flow regulate metabolism	Prof MJ Rennie
Blood flow and Metabolism in Obesity & Diabetes	Prof IA Macdonald
Regional Blood Flow and Metabolism in Hypertension	to be confirmed
Regional Blood Flow and the Metabolic Response to Exercise	Prof B Saltin, Copenhagen

MICROVASCULAR & ENDOTHELIAL PHYSIOLOGY

The next Designated Session will be a joint session with the Smooth Muscle Special Interest Group and is scheduled for the Meeting at King's College London (18-21 December 1995). As outlined in the announcement *(see box)*, we would like to include relevant Oral Communications in the programme of the joint symposium entitled "Impaired Endothelial and Smooth Muscle Cell Function in Oxidative Stress". In addition, we have scheduled a working Poster Communication lunch for 18 December.

As is now customary, a number of Pfizer Prizes will be available for postgraduate students presenting Oral Communications in the Designated Sessions. Nomination forms have been sent to all those Members, Affiliates and others who have registered their interest in this Group with the Society's Administration Office.

The King's College Meeting will be extremely interesting and I encourage you to submit abstracts. If you are not a Member of The Physiological Society, my colleagues and I would be delighted to introduce your Oral or Poster Communication. If you require further details, please feel free to contact me or the Oxford Office of The Physiological Society, tel (01865) 798498.

The period for submission of abstracts is 18-28 September 1995.

Any suggestions for future venues for Designated Sesssions in Microvascular & Endothelial Physiology are most welcome. I shall arrange a Business Meeting for our Group during the King's College Meeting.

I look forward to seeing you at King's College in December

Giovanni E Mann

MOLECULAR PHYSIOLOGY

The first meeting of the Molecular Physiology Special Interest Group was held at the recent Oxford Meeting. A number of presentations were made which reflected the great diversity of the subject and its application to physiological research. These ranged from examination of ion channels to the identification of a novel adenylyl cyclase. The presentations also encompassed the variety of techniques available to the molecular biologist which complement those already used extensively by physiologists. Thus, presentations dealt with approaches such as site-directed mutagenesis to alter individual amino acids and examine the effect on the function of the protein, evaluation of messenger RNA species and reconstitution of channel characteristics using recombinant receptors, defining novel proteins by identifying novel messenger RNAs using reverse transcription PCR and evaluating factors influencing expression of a receptor using the gene promoter elements.

A second meeting is planned at the King's College London Meeting in December 1995 and it is hoped that the progress made in Molecular Physiology will be highlighted by two Designated Lectures.

Janet Allen

SYMPOSIUM
IMPAIRED ENDOTHELIAL AND SMOOTH MUSCLE CELL FUNCTION IN OXIDATIVE STRESS
The Physiological Society Meeting

King's College London, 18-21 December 1995

The 'Microvascular and Endothelial' and 'Smooth Muscle' Special Interest Groups of The Physiological Society are coordinating this symposium, which intends to review the effects of reactive oxygen intermediates on cell signalling in endothelial and smooth muscle cells *in vitro* and *in vivo*. The symposium is scheduled for one and a half days (18-19 December), and the programme is as follows:

Prof Dr H Sies	Oxidative Stress: Oxidants and Antioxidants
Prof Dr PA Baeuerie	Hypoxia and Reoxygenation Induced Gene Expression
Dr V Darley-Usmar	Nitric Oxide and Oxygen Dependent Disruption of Signalling Pathways in Cardiovascular Disease
Dr R Plevin	Hypoxia and Endothelial Cell Signalling Pathways
Prof R Bucala	Advanced Glycosylation End Products in Diabetic and Non Diabetic Vascular Disease
Prof P Weissberg	Smooth Muscle Cell Proliferation
Prof P Kubes	A Delicate Balance Between Nitric Oxide and Oxidants Regulates Leucocyte Endothelial Cell Interactions *n vivo*

We aim to integrate these invited lectures (30-40 min) with free communications and poster communications. Hopefully, poster communications will be scheduled for lunchtime on 18 December. If members of the above Special Interest Groups or The Physiological Society require any further information, please telephone either Dr Giovanni Mann (0171) 333 4450, Prof Lucilla Poston (0171) 928 9292 Ext 8328, or Dr Jeremy Ward (0171) 928 9292 Ext 8008.

MUSCLE CONTRACTION

I hope that Members will support the next Designated Session of the Muscle Contraction Special Interest Group at the King's College Meeting on 18-20 December.

K W Ranatunga

RESPIRATORY PHYSIOLOGY

Symposium on Control of the Pulmonary Circulation

Eight distinguished speakers from Korea, the USA and Britain presented 35 minute talks that covered two important aspects of pulmonary vascular smooth muscle. These are the basic studies of the mechanism responsible for hypoxic pulmonary vasoconstriction and the application of ideas derived from these to the clinical description and treatment of pulmonary hypertension. The lecture theatre, seating 100, had standing room only for most of the day. This is testimony both to the eminence of our speakers and to the recent upsurge in interest in pulmonary vascular smooth muscle which has until now lagged behind the carotid body as the focus of those interested in discovering how hypoxia can result in the excitation of cells.

Five speakers addressed mechanism. However, although all agreed that hypoxia closes potassium channels (thereby depolarising the smooth muscle cells, opening voltage gated calcium channels and raising intracellular calcium to trigger the contractile process), there was no widespread agreement about the species of potassium channel that is responsible. Is it a calcium activated potassium channel or a calcium-insensitive one? A democratic vote among the speakers gave roughly equal credibility to both, with one speaker, Yung Earm, voting both ways. There was more widespread agreement that reduction in the redox state of smooth muscle cells links a hypoxically-induced metabolic change to the closure of potassium channels.

Jeremy Ward presented work that gave a role to the endothelium as essential for the full expression of hypoxic pulmonary vasoconstriction and he hopes soon to be telling us about the chemical nature of this link. Roland Kozlowski provided evidence that the opening of chloride channels (the chloride equilibrium potential being more positive than the resting membrane potential) may reinforce the effects of hypoxia on potassium channels.

Three speakers pointed to clinically relevant aspects of pulmonary hypertension. Sheila Haworth told us in enlightening detail about remodelling of the "rapidly moving target" of the perinatal pulmonary vasculature. Tim Higenbottam described and explained the value of using inspired nitric oxide as therapy for pulmonary hypertension which, in contrast to other treatments, does not result in systemic hypotension. Richard Leach gave a lucid and enthusiastic talk which emphasised just how widespread pulmonary hypertension is (*ca* 30,000 deaths per year in the UK) and how little understood it is by clinicians. The "clinical" talks reminded us that studies on isolated lungs, or on short stretches of blood vessel, taken from the rat or rabbit can quickly result in changes in clinical practice. This has been especially true of nitric oxide, but it also applies to the use of nifedipine for the treatment of high altitude pulmonary oedema.

The symposium broke new ground for the Society in that the speakers were invited to submit short reviews, covering the material presented in their talks, for publication in *Experimental Physiology*. These should appear in the September issue of the journal only twelve weeks after submission of the typescripts. If this extraordinarily rapid turnaround is achieved it will have been only because of the pzazz of the editorial staff, especially Miranda Benson and Ann Silver. At one point, a sleep-deprived Ann rushed proofs from the Isis pub (off the road on a footpath by the river) to the Science Area in order to catch the foreign authors before they left Oxford, thereby saving the time required for overseas mail.

We thank The Physiological Society, the Wellcome Trust, Glaxo Research and Development Ltd, Morgan Harris Burrows and Oxford Molecular Group plc for their generous support.

Designated Session at the Oxford Meeting

The turnout for Respiration-proper was better for this Meeting than it has been for some time. We attracted a broad range of topics. These included Communications on muco-ciliary clearance, one showing how the autonomic outflow to the blood vessels of the nasal passage considerately flip-flops from one side to the other, thus ensuring that only one nostril tends to be blocked at a time. Lewis Adams showed us that Benchretit's asters reveal significant differences between pneumotachograms from isopnoeic exercising and CO_2-driven ventilation. These results are remarkably similar to those previously described, using very different methods, by Painter and Cunningham.

Howell and Cross described how the initial, abrupt ventilatory response to exercise occurs only when the start of exercise is anticipated *ie* when it is preceded by a countdown. Collier *et al* showed that the enhancement of the drive from the carotid body that occurs during acclimatisation to high altitude is reflected by an increase in the rate at which ventilation responds to exercise and also to CO_2.

Liang showed that the ventilatory on and off responses to hypoxia are not symmetrical and that they are therefore best modelled by an asymmetrical function. Barer showed that the first phase of the response of isolated pulmonary blood vessels to hypoxia gives a stimulus-response relation to increasing intensities of hypoxia which is not unlike that of the intact lung. I found this awkward because only the day before I had announced that I considered this phase to be unphysiological. However, it is not clear whether the response was caused by changes in steady state or rate of change because all intensities of hypoxia were approached from the same control level. Emery and Vugler asked whether the blunting of hypoxic pulmonary vasoconstriction seen after 48 hours hypoxia involved an increased release of or an increased responsiveness to endothelium-derived dilators. The former does not appear to occur and the latter cannot explain all of the blunting.

Davies and Pirie presented two Communications showing that it is possible to obtain useful results on the discharge of vagal afferents and pattern of breathing in the rat - an animal that costs about 1/50th as much as a cat and which arouses less public anxiety. Aiton *et al* reported a 60% increase in exhaled nitric oxide in babies during the first two days of postnatal life. This correlates well with the estimated decline in pulmonary arterial pressure. Finally Snetkov *et al* showed that BKCa currents recorded from cell-attached patches of pulmonary vascular smooth muscle exhibit marked inward rectification, whereas those from excised patches show no rectification at all. This results from an as yet unidentified form of intracellular modulation.

The Respiratory Session attracted four posters. Liu, Emery and Barer showed that two drugs that have been associated with pulmonary hypertension and/or oedema in clinical situations interfere with endothelial-dependent relaxation of the pulmonary circulation. Xia and Nye showed that a non-selective blocker of endothelin receptors behaves in unexpected ways. Howell and Cross showed how two pneumotachographs can be better than one. Park *et al* complemented their work on ionic channels (Symposium on the Pulmonary Circulation) by showing that pulmonary vessels are less susceptible to metabolic inhibition than are ear vessels.

At one point during the Meeting the convener announced his resignation and called a meeting to elect a successor. However, before any election could be organised he had thought better of it and therefore re-elected himself. He was persuaded that for a proper election to take place proper warning should be given. I therefore use this opportunity to invite contributors to the Designated Respiratory Sessions to put forward candidates for the position of convener. The election will happen in conjunction with the Designated Session at the King's College London Meeting in December.

Piers Nye

PS I wonder if conveners should be confined to a five year term?

SMOOTH MUSCLE

Designated Session at the Oxford Meeting

The Oxford Meeting was extremely large. Most of the delegates seemed to have a great interest in smooth muscle, as the lecture theatre on the Thursday morning was filled to overflowing throughout. However, this did not reflect the number of Communications, so please all make an effort for the December Meeting at King's College London, where the free Communications will form part of the joint symposium with the Microvascular & Endothelial Special Interest Group. The relatively low number of Communications may, however, reflect the fact that there was a considerable amount of smooth muscle in other parts of the Meeting; for example, the Respiratory and Ion Channels sections.

The first three Oral Communications revolved around pulmonary artery smooth muscle, which interfaced well with the previous day's Symposium on the Pulmonary Circulation, and kicked off with Dr Ward's ancient Chinese remedy for hypoxic pulmonary vasoconstriction. After a stunned silence, the remaining two papers on ion channels in the pulmonary vasculature stimulated considerable interest. Dr Wilson, who was responsible for reorganising the schedule of the entire morning so that he could present papers at the British Pharmacological Society, gave two excellent papers, one of which convinced us that beta-receptor mediated vasodilation has little to do with cAMP. The Cameron & Cotter team demonstrated the importance of free radicals in mediating neurovascular dysfunction in diabetes. The groups of Prof Poston and Dr Phil Aaronson related various observations about smooth muscle in pregnancy, and Sue Wray's laboratory once more produced an interesting combination of work on ureter and, in the Poster session, on myometrial contractility. The Poster session had 17 contributions, and was again very well attended.

Myometrial Research Group

We were very pleased to welcome to the Session a large number of people interested in myometrial contractility. We met over lunch with a view to forming a myometrial research group affiliated to The Physiological Society,

for which much enthusiasm was expressed. The idea arose from the geographical dispersion of several small groups nationwide, with a potential for useful collaborations. It was decided that we should not delay, but have our first meeting in December at the King's College London Meeting of the Society. This will be on 20 December, probably at the Campden Hill site, but watch this space. We hope to have a guest lecturer and 20 minute presentations. Abstract forms will be sent out to those on the mailing list from the meeting. We would be very interested to hear of anyone else who would like to come, Member of The Physiological Society or not. Please send names and addresses to either Lucilla Poston at St Thomas's (Dept of Obstetrics & Gynaecology), or Jim Gillespie at Newcastle.

Symposium on the Pulmonary Circulation

Although this symposium was not specifically related to the Smooth Muscle Special Interest Group, it contained much that was relevant to those of us with an interest in pulmonary smooth muscle, and was a great success, with about 130 attending. It also promoted a considerable number of pulmonary related Communications elsewhere in the Meeting, both in our section and others.

Next Designated Session

The next Designated Session will be at the King's College London Meeting in December, in combination with a symposium on Impaired Endothelial and Smooth Muscle Cell Function in Oxidative Stress, on 18-19 December 1995. We hope to have another Designated Session in Edinburgh in July 1996. Details will follow.

Lucilla Poston & Jeremy Ward

SOMATOSENSORY PHYSIOLOGY

Oxford Meeting

The Group convened on the last afternoon of the Meeting to hold what was a small, but perfectly formed, session. There were six Oral Communications and four Posters, amongst which UCL was well represented. The paper from Gee, Lynn & Cotsell showed what should be a very useful correlation between receptor modality and slowing of axonal conduction velocity on repetitive activation of C-fibres, while Miller and Woolf described how single stimuli exciting C-fibres can induce synaptic currents with durations of minutes in dorsal horn neurones in slices of adult mouse spinal cord. Discussion was lively and the whole session very enjoyable. Oxford is a fine place to be on a warm afternoon in July.

Our next meeting will be at King's College London on 18-20 December 1995. There will be a Workshop on "Techniques in Somatosensory Physiology" (see elsewhere for more details) on the Monday of that Meeting, followed by a regular Group Session on the Tuesday. The final submission date for abstracts for this Meeting is 28 September. I hope to see you there.

Rob Clarke

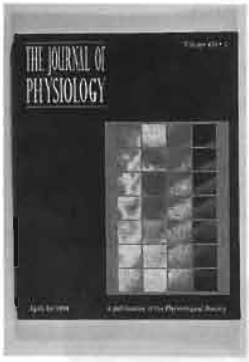
THE BRITISH POMC DISCUSSION GROUP

The British POMC Discussion Group is an informal group of researchers interested in pro-opiomelanocortin peptides. The Group's second meeting took place in April at the University of Buckingham, hosted by Dr John Morton of the Department of Life Sciences. The range of interests within the Group was reflected by the subjects of the main lectures presented in two sessions, chaired by Dr Margaret Smith (University of Birmingham) and Dr Laurence Eagle (University of Sunderland). Dr Anne White (University of Manchester) discussed the assay and clinical relevance of ACTH and ACTH precursors, Dr Gillian Hunt (University of Newcastle Upon Tyne) presented evidence that POMC peptides may be involved in regulating human skin pigmentation, Dr Salim Khan (University of Birmingham) examined the role of β-endorphin in neuromuscular function during exercise, Dr Marie Amos (University of Birmingham) described the effects of neurotoxins on POMC production in nerves, Dr Laurie Hynes (University of Bristol) discussed the binding of MSH analogues to Schwann cells and their possible role in mediating neurite outgrowth, Dr Simon Dunmore (University of Buckingham) described the role of β-cell tropin in diabetes and obesity and Dr David Jessup (University of Bristol) examined the production of POMC peptides in response to stress. In addition, there were several posters and there was lively discussion of all the presentations.

Another meeting is planned for 1996 and all new members are welcome (contact Dr John Morton on email: jlm@buck.ac.uk for further details). The organisers of the POMC Discussion Group Meetings wish to express their gratitude to Serotec Ltd (Oxford) for their continued generous sponsorship of the Group and to Anachem LTD (Luton) and V A Howe LTD (Banbury) for their kind support.

Gillian Hunt
Dept of Dermatology, University of Newcastle Upon Tyne

ELECTION OF JOURNAL EDITORS



Dear Editor

I refer to the letter by Timothy Simons which appeared in the Spring issue of the *Magazine*. In his last paragraph he suggests that the Ordinary Membership of the Society should nominate members of the Editorial Boards of the Society's journals. I thought it would be helpful if I were to set down the current procedure for *The Journal of Physiology*.

Editors are elected according to the need for expertise in specific fields of Physiology to ensure *The Journal of Physiology* can fulfil all its expectations and requirements. Needs are identified by members of the Board and reflect both the need to replace retiring Editors (the normal term is seven years) and the fields of the current submissions to the *Journal*. At present there are about 1,200 submissions and 50 Editors, but the number of manuscripts handled by a particular Editor will vary according to the fields of the papers submitted.

Current and retiring Editors identify suitable candidates by asking such people to act as expert referees. The names of helpful and effective referees are then discussed at the next available Board meeting (there are three per year, usually November, April and July). After discussion at two Board meetings, the names of suitable candidates are added to the ballot paper for the next AGM of the Society

Dr Simons' proposal for more input from the Ordinary Membership would be a helpful addition to the current system. If any Member of the Society would like to submit the names of suitable candidates to me, I will undertake to pass the suggestions to members of the Editorial Board. Alternatively, suggestions could be passed directly to any other members of the Board. The Distributing Editors would be particularly suitable since they have a clear picture of the needs in specific areas and are proactive in identifying effective referees.

My proposal enables the Ordinary Membership of the Society to participate in the identification of possible members of the Editorial Board. Nevertheless, it is important to stress that potential Editors need to be both effective (*ie* produce timely and substantive reports) and be able to cover areas of science in which there is a need, as a result of either levels of submission or retirement of a current Editorial Board member.

I look forward to receiving suggestions for potential members of the Editorial Board in the future.

Richard E J Dyball
Chairman of the Editorial Board of
The Journal of Physiology

"NETWATCH"

Dear Members

Many of you will have no doubt seen by now "Netwatch", in the new regular *IT Column* in The Physiological Society *Magazine*. As principal contributor to that column, I'd like to make sure that it properly reflects the IT interests of physiologists everywhere by listing Internet resources, projects, *etc* that you actually want to read about. I'd therefore like to make the first of what will probably be regular calls for ideas for the column. Now's the chance to send in items that you think will be of interest to other physiologists.

So, if anyone is involved in any physiology IT-related project, be it research or teaching, please feel free to Email me with the details for inclusion in the column.

David Davies
d.a.davies@bham.ac.uk

MUSIC AND PHYSIOLOGY

Dear Editor

The Special Feature on Music and Physiology is most welcome. Would Members think this topic suitable for a Special Interest Group?

I am interested in the basis of the "musicality" that often persists in Alzheimer's disease after other abilities have been lost. Anyone who would like to discuss this or the possible proposal of a Special Interest Group is invited to write to me at the address in the *Grey Book*.

Vernon Pickles

Talking Science+

Talking Science+ is a national database listing experts in every field of science, engineering, technology and the social sciences, who are willing to communicate their knowledge and enthusiasm to the public.

The service is currently funded by the Department of Trade and Industry. COPUS (the Committee on the Public Understanding of Science) provides training and support materials which are available to all Talking Science+ speakers.

If you would be willing to:

- give demonstration lectures with audience participation
- deliver informal introductory talks
- discuss your research
- get involved in hands on activities with adults and children organise or judge problem solving competitions
- take part in other activities aimed at increasing science awareness

then you might be a welcome addition to the database.

Details from: Talking Science+, British Association, Fortress House, 23 Savile Row, London W1X 1AB, fax (0171) 734 1658.

PROF B E ARGENT

Barry Argent has recently been appointed to a personal chair in Cell Physiology at the University of Newcastle Upon Tyne. Prof Argent obtained a BSc in Physiology from Newcastle in 1969 and then took a PhD at the University of Edinburgh. After a period at the Max-Planck-Institute für Biophysik in Frankfurt, he returned to Newcastle in 1973 to take up a lectureship in the Dept of Physiological Sciences. He was promoted to Senior Lecturer in 1983 and to a personal readership in 1992. His research interests are centred on secretory epithelial and he has made major contribution to our understanding of the CFTR chloride channel, and about the mechanism of bi-carbonate secretion by pancreatic duct cells. He has been an Editor of *Experimental Physiology* since 1992.

RESEARCH IN NEUROPHYSIOLOGY

Dept of Physiology
University of Birmingham

POSTGRADUATE RESEARCH STUDENT
POSTDOCTORAL RESEARCH ASSISTANT

Following the appointment of J G R Jefferys to the Chair of Neuroscience at Birmingham, we are looking for a postgraduate student and a postdoctoral research assistant to work on the properties of networks of excitatory and inhibitory neurones in epileptic and normal brain. For the postdoctoral post, experience of microelectrode recordings from brain slices is essential and of other aspects of neuroscience an advantage. The most important qualities we seek are enthusiasm, commitment and curiosity about the functioning of neurones in mammalian brain.

The newly refurbished laboratories will be equipped to a high standard for electrophysiology *in vitro*. They form a key part of the dynamic and growing neuroscience community at Birmingham, and of an international network of groups working on hippocampal and cortical physiology, epilepsy and prion diseases.

Starting dates: from October 1995.

Applications, with CV and names of two academic referees should be sent to arrive in Birmingham as soon as possible, and in any case by 29 September.

Further details from: John Jefferys, Dept of Physiology, The Medical School, University of Birmingham, Edgbaston, Birmingham B15 2TT, tel (0171) 723 1252 Ext 5904 or (0121) 414 6906, fax (0171) 723 7185 or (0121) 414 6919, Email j.jefferys@ic.ac.uk

PROF JANICE MARSHALL

Janice Marshall has been appointed to a personal chair in Cardiovascular Science at the University of Birmingham, from where she obtained a 2(i) degree in Biological Sciences (Zoology and Comparative Physiology) in 1970. After she completed her degree, she was offered an MRC Studentship in the Dept of Physiology to work for her PhD. There she developed techniques for intravital microscopy and studied neural and local control of microcirculation. She was awarded her PhD in 1973.

In 1978, she gained a lectureship in the Dept of Physiology at the University of Birmingham and began to build up her own research group. Her main research interests are centred on cardiovascular responses induced by systemic hypoxia, focusing on respiratory-cardiovascular interactions and on the mechanisms that lead to hypoxia-induced vasodilatation. She has always been interested in applying her knowledge of the central neural and peripheral control of the circulation to studies on human subjects. This has led to two current projects: on the mechanisms underlying vasospasm in Primary Raynaud's Disease and on the vaso-occlusive crisis in Sickle Cell Anaemia.

In 1988 she was promoted to Senior Lecturer and to Reader in Cardiovascular Science in 1991. In 1993, she was awarded a DSc. She is on the Editorial Board of both *The Journal of Physiology* (1991) and *The British Journal of Pharmacology* (1993). She has been on the Committee of The Physiological Society since 1990 and became Chairman of the Animal Welfare Sub-Committee in 1991. She has also been on the Committee of the British Microcirculation Society since 1990 and has been Treasurer of BMS since 1993.

We would be very interested in receiving information of personal chairs, new headships or any scientific awards given to Members of the Society. If you or someone in your department is in line for this, or has recently received an award, let us know and we will publish a biographical sketch and photograph.

INTERLEUKIN-1 – A NEW MEDIATOR OF NEURONAL DEATH?

Cytokines, once considered a topic for immunologists and cell biologists, are gradually sneaking into physiology. Amongst the confusing jargon, and the large number of cytokines now discovered, interleukin-1 (IL-1) has featured highly in pathophysiology, perhaps because of its availability.

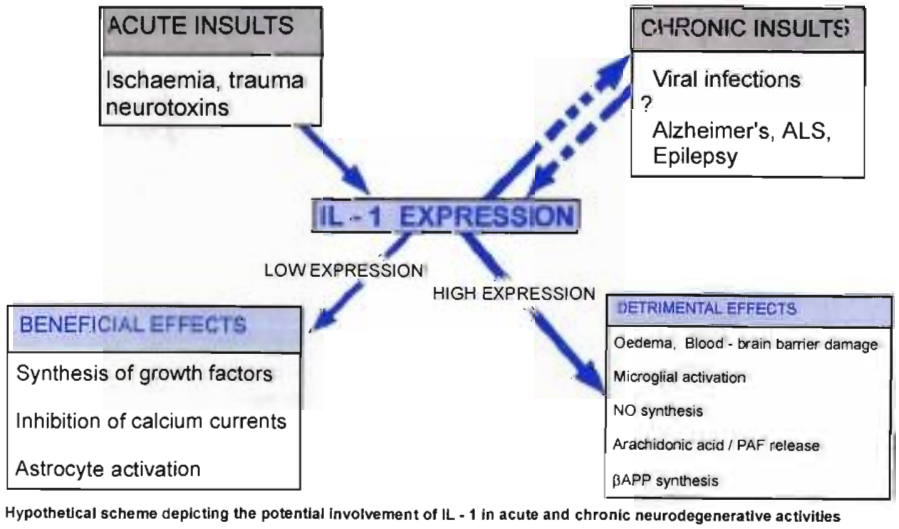
IL-1 can influence almost every aspect of brain function, and exerts direct effects on neuronal and glial activity. However, dissociation of physiological functions from pharmacological actions, related to over zealous or inappropriate application of this remarkably potent molecule, will be no easy task. Three separate members of the IL-1 family have been identified: the two agonists, IL-1α and IL-1β exert similar if not identical actions, while a naturally occurring competitive receptor antagonist (IL-1ra) binds to IL-1 receptors but fails to activate signal transduction. IL-1ra is the first selective cytokine receptor antagonist, and availability of recombinant protein has led to significant advances in understanding the biology of IL-1. All three IL-1 proteins, and the two known receptors for IL-1, have been identified in the brain and are expressed in resident cell types including glia, neurones, endothelial cells and invading immune cells. Constitutive expression of brain IL-1 is extremely low, but is rapidly induced by almost any form of experimental or clinical insult to the brain.

Many cytokines and growth factors exert neuroprotective or neurotrophic actions which have led to considerable scientific, clinical and commercial interest in their potential application to neurological diseases. IL-1 can induce the release of neurotrophins such as NGF, it protects cultured neurones against glutamate toxicity and exhibits other seemingly beneficial effects such as astrocyte activation. However, **endogenous** brain 1L-1β *in vivo* seems to act mainly as a mediator of neuronal damage.

Brain Injury and IL-1β

Central injection of picomolar quantities of recombinant IL-1β dramatically enhances ischaemic or excitotoxic brain damage in the rat. These observations are not consistent with the concept of IL-1 as a neuroprotective agent, but may of course reflect pharmacological actions which are not related to properties of the endogenous cytokine. To assess the role of brain IL-1 in experimentally induced neurodegeneration, we studied the effects of local injection of IL-1ra into the brain on neuronal damage. Inhibition of IL-1 receptor activation markedly attenuated (by 50-75%) neuronal damage caused by focal cerebral ischaemia, traumatic brain injury or pharmacological activation of NMDA or AMPA receptors in the rat.

Thus, experimental brain injury induces local IL-1 expression, is exacerbated by administration of exogenous IL-1 and is markedly inhibited by blocking brain IL-1 receptors. Together these data indicate that IL-1 is an important, causal step in neuronal death, resulting from a number of different experimental insults. Circumstantial evidence also points towards IL-1 involvement in clinical neurodegeneration. Increased concentrations of IL-1 have been detected in brain tissue or cerebro-spinal fluid from patients with both acute and chronic neurodegenerative disorders, but more direct evidence that IL-1 mediates these actions in patients can be achieved only from intervention studies.



Hypothetical scheme depicting the potential involvement of IL - 1 in acute and chronic neurodegenerative activities

Known activities of IL - 1 in the brain may have both beneficial and detrimental effects. The balance between these two crucial pathways may depend on the amount or location of IL - 1produced and the simultaneous expression of inhibitors and enhancers of IL - 1 action

The Cascade to Neuronal Death

The mechanisms by which IL-1 mediates neurodegeneration are largely unknown, and the quest to understand these processes is hampered by the fact that studies on isolated neurones *in vitro* have largely failed to reproduce *in vivo* data. Several factors already identified in the cascade of neuronal death are likely targets for IL-1. For example, IL-1 elicits release of nitric oxide and arachidonic acid, activates adhesion molecules, causes breakdown of the blood brain barrier and brain oedema, and activates microglia to release neurotoxic molecules. Further interest in the IL-1 family and neuronal death has been generated by the identification of an enzyme called ICE. ICE (IL-1β converting enzyme) cleaves IL-1β from its precursor, and is not only essential for activation and cell release of IL-1β, but has also been implicated in apoptosis.

Given the apparently detrimental effects of IL-1, it is reassuring to find that several endogenous inhibitors of IL-1 synthesis and action exist in the nervous system. IL-1ra, the natural receptor antagonist, is present in the brain, particularly in the susceptible (*eg* hippocampus) regions, and other endogenous inhibitors of IL-1 action such as lipocorton-1, melanocyte stimulating hormone and vasopressin may inhibit the potentially devastating effects of IL-1.

Several major questions remain to be answered about IL-1 and neurodegeneration. What mechanisms are involved in its synthesis and action? Is it involved in other acute and chronic clinical neurodegenerative disorders and what is the therapeutic value of modulating IL-1 synthesis or action? The exponential increase in research of cytokines and the nervous system suggest that answers to these intriguing questions may not be too far away.

Nancy Rothwell
School of Biological Sciences
University of Manchester

ARE YOUNG MOTONEURONES WORKED TO DEATH?

It has been known for many years that developing motoneurones depend upon continuous interaction with their target muscle for survival. This seems to be the main factor which distinguishes winners from losers during the embryonic period of programmed cell death, and also explains the vulnerability of early postnatal motoneurones after nerve injury. Two areas of research arising from these observations involve identifying the retrograde signal from muscle to motoneurone, and understanding the mechanism by which the motoneurones die when this signal is lost.

Much effort has been directed towards finding trophic factors in the periphery which maintain developing motoneurones, and a bewildering number of these factors are now known to delay motoneurone death when applied experimentally. However, the role which these factors play in normal development is not yet clear. No trophic factor has succeeded in permanently rescuing disconnected motoneurones, and mice bred without key genes for trophic factors develop apparently normal motoneurones. Perhaps trophic factors are ensemble players during development.

Overactive?

With regard to the mechanism of motoneurone death, we have recently proposed a hypothesis that developing motoneurones become overactivated when released from the retrograde influence of the muscle and are subsequently worked to death (Lowrie & Vrbová, 1992). Initially clues came from studies of the few motoneurones which survive peripheral nerve injury and reinnervate the muscle. They become smaller, their activity increases several fold and they become activated at inappropriate times during locomotion and reflex stimulation. Later we found that target-deprived motoneurones could be induced to die by direct application of the glutamate agonist NMDA to the spinal cord, and treatment with NMDA antagonists such as magnesium could reduce this cell death. Moreover, motoneurones destined to die following neonatal nerve injury can be rescued by blocking NMDA receptors with MK-801.

The Dendritic Tree or Synaptic Inputs?

The idea therefore evolved that loss of interaction with the muscle leads to a rearrangement of the inputs to the developing motoneurone. This predisposes towards increased excitation (Fig 1). How could this come about? One possibility is that the development of the dendritic tree, which receives virtually all of the synaptic inputs to the motoneurone, is altered by loss of neuromuscular interaction. This has subsequently been demonstrated not only after nerve injury but also after blockade of transmission with alpha-bungarotoxin, which also kills motoneurones (O'Hanlon & Lowrie, 1994). This could profoundly alter the way the motoneurone is activated but is it also possible for changes in the inputs themselves to bring about motoneurone death?

Neonatal nerve injury is known to kill dorsal root ganglion cells and alter the circuity of the dorsal horn. This in turn induces local changes in the dendritic field of motoneurones, which may partly explain the inappropriate activation. Nevertheless it is unlikely that such changes lead directly to motoneurone death, as dorsal root section alone does not kill motoneurones if their interaction with the target muscle remains intact.

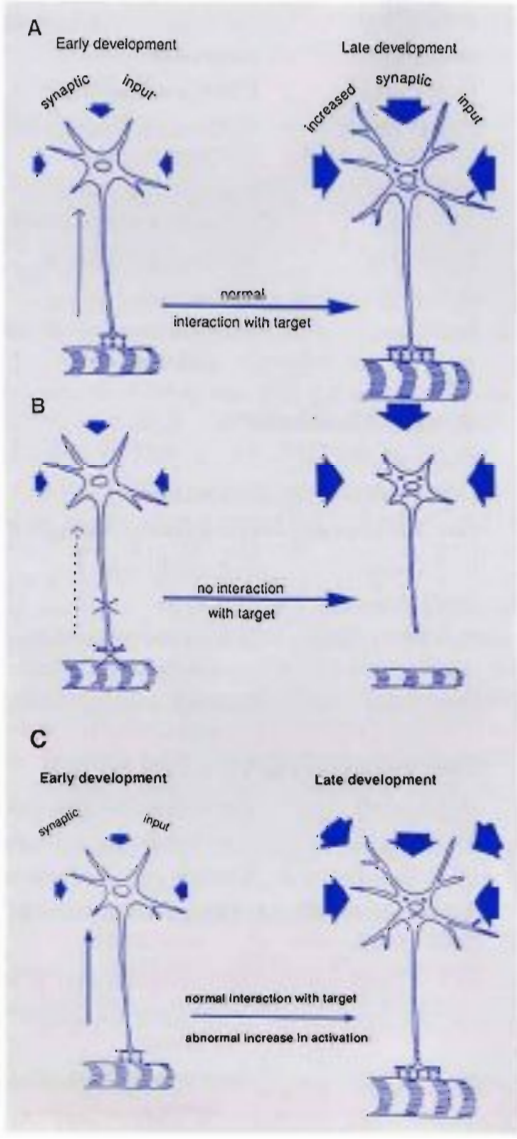


Fig 1

Possible mechanism for postnatal motoneurone death. (A) Continued interaction with the target muscle allows the motoneurone to develop normally, so that it is able to withstand increased activation. (B) Loss of interaction with the target affects development of the motoneurone so that it is less able to cope with increased activation. (C) Our most recent results suggest that increasing activation above normal levels during development may be sufficient to cause motoneurone death without loss of target interaction.

Descending Pathways

In our most recent work we have begun to look at the possible role of other inputs in motoneurone death. One of these, the descending dopaminergic pathway from the brainstem, develops postnatally and is thought to increase the activity of motoneurones either directly or indirectly as the animal becomes more mobile. Administration of L-dopa to neonatal rat pups increases the EMG activity of some leg muscles markedly and when we investigated the motoneurones innervating them, by retrograde HRP-labelling, we found that there was a 35% reduction in number, and corresponding wasting of the muscle (Sanusi *et al*, 1995). This is strong support for the role of increased activation in motoneurone death.

"Excitotoxicity" is known to cause neuronal death in a number of experimental situations, and has been suggested as an explanation for neuronal degeneration in several pathological conditions such as ischaemia and motoneurone disease. The clinical evidence for involvement in motoneurone disease is so far ambiguous. This reflects the difficulties inherent in investigating the cause of a degenerative disease which does not become manifest until after a considerable number of moto-neurones have died. In the absence of a close animal model for motoneurone disease we hope that our studies on target-deprived motoneurones may contribute some understanding of mechanisms involved in this devastating disease.

Maggie Lowrie
St Mary's Hospital Medical School
Imperial College London

Gerta Vrbová & Linda Greensmith
University College London

References

Lowrie MB & Vrbová G (1992) *Trends Neurosci* **15**:80-84
O'Hanlon GM & Lowrie MB (1994) *Dev Neurosci* **16**:100-107
Sanusi J, Greensmith L, Lowrie MB & Vrbová G (1995) *J Physiol* **483**:40P

Left to right: Linda Greensmith, Gerta Vrbová and Maggie Lowrie

MOUNTAIN AND HIGH ALTITUDE MEDICINE

Plas Y Brenin, North Wales

1-3 December 1995

Course Organiser Dr Andrew J Pollard

PGEA Approved Course, Fee £250 (includes meals and two nights accommodation)

This course is based on the successful April 1993/94 courses in *Mountain and High Altitude Medicine* for Hospital Doctors, Physiologists, General Practitioners, Travel and Sports medicine doctors and all interested in altitude, wilderness, and travel medicine and will include updated information and a full report of the research undertaken on the **1994 British Mount Everest Medical Expedition** and the 1994 NASA Shuttle Mission.

Friday 1 December

Registration 11.00 - 13.00

Dr A J Pollard	Introduction
Dr D Collier Dr S Currin	BMEME

Altitude and Mountain Sickness 13.00 - 15.30

Prof J West	The Atmosphere, Altitude and Barometric Pressure
Dr J Milledge	Acclimatisation - Overview
Dr D Murdoch	Epidemiology of Altitude Sickness
	Acute Mountain Sickness
Dr D Murdoch	Introduction
Dr J Bradwell	Prophylaxis

Cardiovascular Changes and Adaptation to Altitude 15.30 - 17.10

Dr A Peacock	Cardiovascular Overview
Dr J Milledge Prof J-P Richalet	Haemoglobin and Erythropoesis
Dr N Mason	ECG
Prof J-P Richalet	Heart and the Adrenergic System

Rescue 17.10 - 17.40

Dr P White	Mountain Rescue
Dr J Pote	Helicopters in UK Rescue

Saturday 2 December

07.40 - 07.45

Dr A J Pollard	Introduction

CNS and Altitude 07.45 - 11.00

Dr C Clarke	High Altitude Cerebral Oedema
Dr D Depla	High Altitude and the Eye
Dr A Knight	Sleep at Altitude
Dr G Dubowitz	Hypnotic Drugs at Altitude
Dr M Rosenberg	Balance and Orientation at Altitude
Dr C Collier	Audiometry and Auditory Localisation at Altitude
Prof L Hardy	Psychology and Mountains

More Mountain Sickness 11.00 - 13.00

Prof J-P Richalet	High Altitude and Pulmonary Oedema
Prof J West	Pathogenesis of Pulmonary Oedema
Dr D Webb	Endothelium and HAPE
Dr A J Pollard	Children at Altitude
Prof D Heath	Chronic Mountain Sickness

Respiratory Changes and Adaptation to Altitude 17.00 - 19.40

Prof J West	Overview
Dr D Collier	Control of Breathing
Prof D Heath	Pulmonary Vascular Reactivity at High Altitude
Dr D Williams	Genetic Adaptation to Altitude in Indigenous Mountain Mammals
Dr P Barry	Respiratory Defence
Dr R Pollard	Spirometry
Dr P Barry	Sex Differences in Blood Gases at Altitude

Sunday 3 December

07.25 - 07.30

Dr A J Pollard	Introduction

Gut, Kidneys and Performance at Altitude 07.30 - 09.30

Dr S Travis	Gut at Altitude
Prof J Edwards	Nutrition
Prof J-P Richalet	Renal Function and Fluid Balance at Altitude
Prof J West	Factors Limiting Performance at Altitude

The Environment at Altitude 09.30 - 11.25

Dr J English	The Mountains and Your Skin
Mr M Ward	Cold Injury and Extreme Altitude
Mr K Stewart	Altitude and the Environment

Accidents, Injuries and Preparation for Altitude 11.25 - 13.45

Dr D Hillebrandt	Immediate Care in the Mountains
Mr S Bollen	Upper Limb Injuries in Rock Climbers
Mr R Villar	Management of Musculoskeletal Injuries
Dr D Hillebrandt	Personal Preparation for the Mountains
Dr D Murdoch	First Aid Kits for Large and Small Expeditions

Closing Remarks

Application forms from:
Dr A K Pollard, 32 Mattock Close, Headington, OXFORD, OX3 7AH, tel/fax (01865) 62120

DOUBLE VISION

A novel class of fluorescent aminostyryl dyes, known as "FM" dyes has attracted the attention of a growing number of physiologists: the dyes have featured in several recent Communications to the Society from different laboratories. They promise to illuminate mechanisms in at least two important areas of synaptic physiology:

- the mechanisms and control of recycling of synaptic vesicle membrane during exocytosis and endocytosis.
- the relationships between synaptic structure and function that underly such phenomena as synaptic plasticity

Bill Betz at the University of Colorado School of Medicine in Denver and Fei Mao, a chemist with Molecular Probes Inc, collaborated in the manufacture of the FM dyes, taking as starting material an amphipathic styryl dye called RH414. This dye has been around for many years and used as a voltage-sensitive dye in optical recordings of action potentials. Betz and Guy Bewick found that one of the dyes derived from RH414 was highly effective in staining depolarised motor nerve terminals (Betz *et al* 1992). The code number for this dye was FM1-43.

A growing body of evidence now suggests that dyes of the class represented by FM1-43 stain recycling synaptic vesicles. The key to this property lies in the relative solubility of the dye molecules in lipid and aqueous solutions. Specifically, the aliphatic chains at the hydrophobic ends of the molecules allow them to partition into phospholipid membranes, whilst two charged quaternary nitrogen groups at the hydrophilic ends prevent the molecules from penetrating membranes completely (Betz *et al* 1992). An added bonus is that the intensity of the fluorescence increases when the dye molecules become associated with lipid. Electrical stimulation of motor nerve terminals (or depolarisation with solutions containing high concentrations of K^+) stimulates endocytosis as well as exocytosis. In the presence of FM1-43, recycled vesicles become loaded with dye molecules, which become trapped in the inner leaflets of vesicular membranes (Fig 1). The result is a simple and beautiful histological stain for living motor nerve terminals (*see back cover*)

FM-dyes stain motor nerve terminals in this activity-dependent fashion in species as diverse as flies, frogs and rodents (Ribchester *et al* 1994). Recently investigators have begun to explore the utility of FM1-43 for labelling recycled vesicles at synapses in the central nervous system. Problems with passive uptake by glia and damaged cells make it difficult to use FM dyes to visualise synaptic structure and function in slice preparations, although there are now a number of reports of success with isolated and cultured cells.

Mechanism and Control of Vesicle Recycling

Betz and his colleagues have seen beyond the merely aesthetic and qualitative utility of the FM dyes for studying synaptic vesicle cell biology. They have shown that when motor terminals previously loaded with FM1-43 are repeatedly stimulated (after washing the dye out of the recording chamber), further rounds of exocytosis and endocytosis are triggered and the fluorescence of the labelled terminals gradually dims. This "destaining" evidently takes place as labelled vesicles fuse with the plasma membrane; the dye molecules partition out and diffuse away into the bathing medium (Fig 1). The decline in fluorescence can be

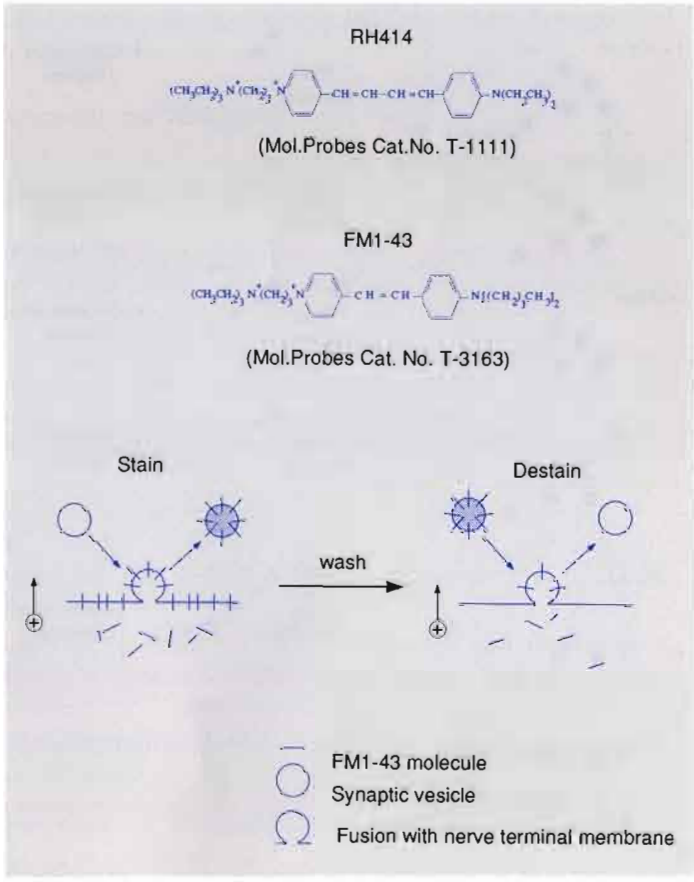


Fig 1

FM dyes appear to stain recycling vesicles as a consequence of their polarised lipophilicity/ hydrophilicity. The molecular structure (and Molecular Probes catalogue numbers) are shown in the upper part of the figure. The lower part of the figure shows schematically how the dye molecules stick into nerve terminal membranes and, during nerve stimulation, become incorporated by endocytosis into the pool of vesicles available for release by exoctytosis. On further stimulation in the absence of dye, the terminals "destain". Micrographs on the back cover of the Magazine *show frog and mammalian motor nerve terminals labelled with FM1-43 and RH414. (Diagram based on Betz* et al *(1992)).*

measured optically using digital fluorescence imaging techniques, of a similar kind to the single wavelength Ca^{2+} imaging methods, such as those based on flou-3. When taken together with electrophysiolgical measurements, the optical measurements allow the time course and extent of vesicle recycling to be calculated (Fig 2). In an analytical *tour-de-force*, Betz and Bewick showed that recycled vesicles rejoin and randomly mix with the pool of vesicles available for release after a "dead time" of about a minute (Betz & Bewick 1993). Recent data suggest it is also possible to apply these analytical methods to measurement of recycling in individual synaptic boutons between cultured neurones (Ryan & Smith 1995).

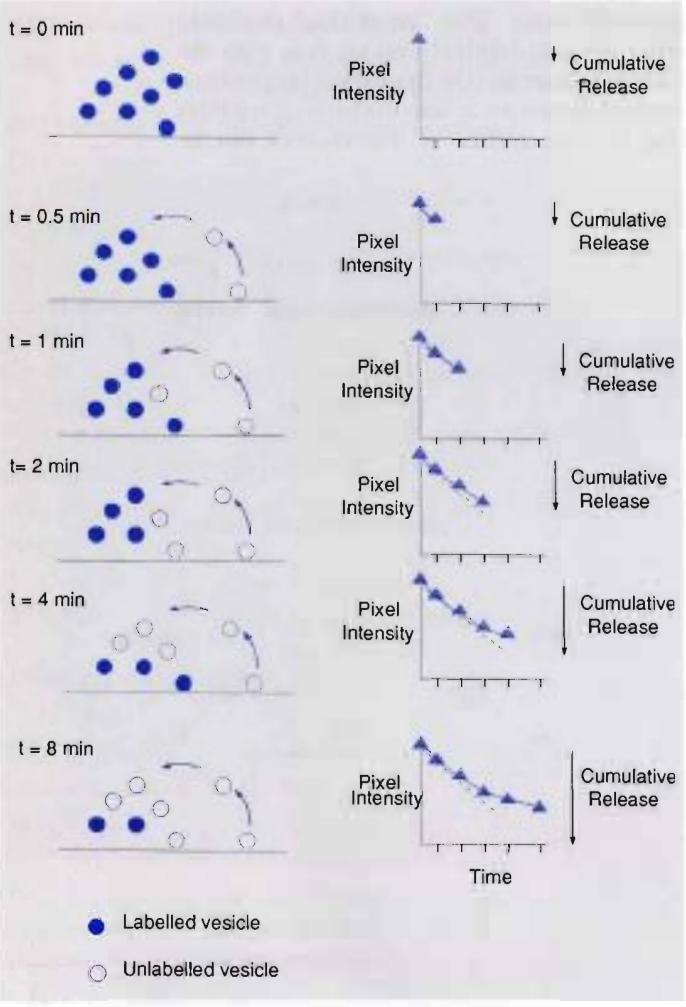


Fig 2

Terminals loaded with dye destain along an exponential time course during continuous nerve stimulation. The data suggest that this occurs because vesicle membranes lose dye upon exocytosis before being recycled by endocytosis and - after a "dead time" of about a minute- rejoin the pool of vesicles available for release. Labelled and unlabelled vesicles appear to have about equal probability of subsequent release. The rate of destaining thus deviates with respect to cumulative transmitter release (dotted lines and arrows, increasing downwards), for example measured electrophysiologically by summing the amplitude of synaptic potentials (based on Barry & Ribchester (1994)).

Structure-Function Relationships

The FM-imaging technique has also highlighted a number of fascinating aspects of intracellular organisation of synaptic vesicles. At frog neuromuscular junctions the staining pattern consists of blobs of fluorescence along the terminal. These sites coincide with clusters of synaptic vesicles seen in electron micrographs. Betz and colleagues have demonstrated directly the relationship between the numbers of vesicle clusters stained with FM1-43 and the amounts of neurotransmitter released by nerve stimulation. Sometimes the vesicle clusters move in relation to one another, but they mostly remained fixed in the terminals. Interestingly, the fluorescent blobs slowly disperse when terminals are treated with okadaic acid, a potent phosphatase inhibitor, but the terminals remain capable of transmitter release. These observations are consistent with a view that vesicles are somehow cross-linked or "caged". Vesicles liberated from their cages may be the ones that are available to fuse with the presynaptic terminal membrane. Phosphatase inhibitors like okadaic acid appear to maintain vesicles in their free state, perhaps by blocking dephosphorylation of synaptic vesicle proteins (Betz & Henkel 1994).

Henkel and Betz are currently investigating the effect of inhibiting protein kinases in nerve terminals using staurosporine. In this case terminals loaded with FM1-43 continue to release transmitter, but they do not destain when stimulated. The jury is still out on the interpretation, but one possibility is that inhibiting protein kinases switches the mode of transmission from one based on complete fusion of vesicles to the plasma membrane, to a "kiss-and-run" in which a transient fusion pore is formed between a vesicle at the active zone and the plasma membrane, sufficient for release of a pulse of transmitter - but not dye - before the vesicle is rapidly retrieved.

One potential application of the FM dyes lies in the study of the heterosynaptic, competitive interactions which lead to stabilisation versus elimination of neuromuscular synapses: an activity-dependent process which gives rise to the familiar one-to-one pattern of innervation of skeletal muscle fibres by motor axon collaterals. Jaqueline Barry and I recently reported (Barry & Ribchester 1994) that FM1-43 and RH414 can be used selectively and reliably to stain convergent sprouted and regenerated terminals (yellow-green and orange respectively) at poly-neuronally innervated junctions in isolated preparations of partially denervated and reinnervated adult rat muscle (*see back cover*).

The upshot from all this work is that the prospects for obtaining new insights into both synaptic physiology and plasticity look pretty bright.

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Acknowledgements

I am very grateful to Bill Betz, Jacki Barry, Guy Bewick and Tony Ridge for their help during the preparation of the manuscript. My work is currently supported by grants from Action Research and the Royal Society.

References

Barry J A & Ribchester, R R (1994) *J Physiol* **481P**, 39P
Betz, W J & Bewick, G S, (1993) *J Physiol* **460**, 287-309
Betz W J & Henkel, A, (1994) *J Cell Biol* **124**, 843-853
Betz, W J, Mao, & Bewick, G S, (1992) *J Neurosci* **12**, 363-375
Ribchester, R R, Mao, F & Betz, W J, (1994) *Proc R Soc B* **255**, 61-66
Ryan, T A & Smith S J, (1995) *Neuron* **14**, 983-989

For a more comprehensive list of references, Email requests to `rrr@ed.ac.uk`.

Biomedical Research Assistant Vacancies

Scientists seeking to recruit individuals looking for work in biomedical research may now find their task easier thanks to the creation of a new database. The Biomedical Research Assistant Vacancies Database, launched on 10 July by the Wellcome Centre for Medical Science, is now available to all users of the Internet and the Joint Academic Network (JANET).

The new database is the latest addition to the WISDOM (Wellcome Information Service Databases on Medicine) service. Information on UK vacancies for graduate, postgraduate and postdoctoral research assistants, technicians on fixed term contracts and PhD studentships will be supplied via electronic mail by grant holders at academic organisations. The details of the vacancy will include the subject areas, qualifications required, salary and location.

Further details from: Information Service (Enquiry Desk), Wellcome Centre for Medical Science, 183 Euston Road, London NW1 2BE, tel (0171) 611 8722, fax (0171) 611 8726, Email `infoserv@wellcome.ac.uk`

Posting a Biomedical vacancy on WISDOM

Step 1: If you wish to place a suitable vacancy on the database you must collect and complete the vacancy input template, in accordance with the accompanying guidance notes. These may be collected in one of two ways:

Collecting the vacancy input template and instructions from WISDOM

IF YOU ARE UNFAMILIAR WITH LOGGING A SESSION TO A FILE USING YOUR COMMUNICATION SOFTWARE PACKAGE, PLEASE CONSULT YOU LOCAL COMPUTING SUPPORT STAFF FOR ADVICE.

Log on to the WISDOM service (telnet `wisdom.wellcome.ac.uk` Login as `wisdom`) and press Return to proceed to the Main Menu. Enter **V** at the Main Menu prompt and press Return, to collect the template and guidance notes. Open your log file when you are prompted to do so. The service will display the instructions and vacancy input template as a continuous stream of text to the screen; this text will also be written to your open log file. Finally close the file when you are prompted to do so, and press Return to proceed.

Collecting the vacancy input template and instructions via ftp

IF YOU ARE UNFAMILIAR WITH ACCESSING AN ANONYMOUS FTP SERVICE, PLEASE CONSULT YOU LOCAL COMPUTING SUPPORT STAFF FOR ADVICE.

Begin by making an ftp call to `wisdom.wellcome.ac.uk` Login as "`anonymous`" and enter your Email address at the password prompt. Move down to the pub sub-directory and retrieve two files: the vacancy input template (template.job) and the accompanying guidance notes (README).

For example, if you have an account on a Unix machine, sign on to this account and enter the following sequence of commands to collect the files:

ftp wisdom.wellcome.ac.uk
login: anonymous
passwored: your_username@machine.address
ftp>cd pub
ftp> get template.job
ftp>get README
ftp> quit

Step 2: Complete the vacancy input template in accordance with the guidance notes, using an editor or word processing package. Save the completed template as a Text (or ASCII) file. Submit the information to the Information Service by Emailing the Text file to: **`wisdom-jobs@wellcome.ac.uk`**

The inclusion of a vacancy on the database is at the discretion of the Wellcome Trust.

NETWATCH

Welcome to this latest edition of NetWatch. In this issue, there's news of a new World Wide Web (WWW) home page for NetWatch, an announcement of an integrated computer-based learning system from the Dept of Physiology, UCL and an announcement of an upcoming "virtual" conference on Ion Transport. As ever, the success of the NetWatch coumn is greatly dependent upon Members of the Society sending in ideas for short articles, announcements, lists of Internet resources of interst to physiologists *etc* so please keep those suggestions coming in.

David Davies
Physiology Dept, Birmingham University.

Ion Transport in Health and Disease, a virtual symposium

`http://www.core.co.uk/core/`

This symposium will cover ion transport properties and regulation in a wide variety of mammalian tissues including lung, gastrointestinal tract, kidney, chondrocytes, and erythrocytes. The meeting itself will take place on 19-20 September 1995 at University College, Cork, Ireland. It is intended that all presentations from the meeting will be "mirrored" on the BioScience Digest Web Site at

`http://www.core.co.uk/core/`

so that "virtual attendees" could use BioScience Digest Web Site pages to browse through all the information presented. The obvious advantage is that those who are unable to attend the meeting in person will still be able to access electronic versions of individual presentations. The symposium will be preceded by a Workshop and Lecture Course on Computer Modelling and Thermodynamics of Ion Transport. The dates of the workshop are 14-18 September.

For further information follow the links on the Physiological Society web site at

`http://physiology.cup.cam.ac.uk`

or contact Prof Brian Harvey (`Harvey@iruccvax.ucc.ie`), the symposium organiser, Dept of Physiology, University College Cork, Ireland, tel 353 21 902235, fax 353 21 272121.

Brian Harvey
Dept of Physiology, University College, Cork

NetWatch Home Page

`http://medweb.bham.ac.uk/netwatch.html`

The NetWatch column now has a WWW home page based in the Dept of Physiology, Birmingham University. The NetWatch web site contains all the articles and announcements published in the column with the added advantage that you can follow any of the hypertext links contained within. In addition to hypertext versions of Netwatch column articles, the web site also contains many other links to Internet sites of interest to physiologists. There's even a page where you can enter suggestions for material for the *Magazine* column.

London Agreed Protocol for Teaching

`ftp://ftp.ucl.ac.uk/pub/users/cusplap`

An interesting new venture for Physiology teaching is LAPT (London Agreed Protocol for Teaching), based at UCL. Reactions from readers trying it out would be welcome in this column or via the physiology Email discussion list (`physiology@mailbase.ac.uk`). LAPT is a simple, flexible program for authoring and delivery of material, featuring CONFIDENCE ASSESSMENT. This novel element in testing and self assessment is designed to encourage students to think and identify when they really understand what is at issue. The currently available teaching material is mainly in physiology and basic medical sciences, but there are plans to expand into other basic sciences and clinical medicine. The system runs on a PC and can be downloaded via the Internet. It is hoped that this will encourage people to try it out, to tailor it to their own contexts, and to develop material for use as a shared resource. You can download the system in either of two ways: via World-Wide-Web from

`ftp://ftp.ucl.ac.uk/pub/users/cusplap`

or

using File Transfer Protocol (FTP) from `ftp.ucl.ac.uk` in the directory `pub/users/cusplap`. Any problems: contact Dr Gardner-Medwin at the Physiology Dept, UCL, London WC1E 6BT or by Email at `cusplap@ucl.ac.uk`.

Tony Gardner-Medwin
Dept of Physiology
University College London.

British Science Transferred to the Dept of Trade and Industry

The pressure group Save British Science has expressed concern over the transfer of the Office of Science and Technology from the Cabinet Office to the Dept of Trade and Industry. It fears "irreparable harm" to the science base, and "deeper cuts on all except short-term, strategic and applied research of direct relevance to industry". *Daily Telegraph, 7 July 1995*

An editorial say that the transfer of the Office of Science and Technology to the Dept of Trade and industry reveals a lack of understanding on the part of the British government of the role of science. *Nature* **376**, *13 July 1995*

Taken from SPIN

INFORMED CONSENT IN HUMAN EXPERIMENTATION

Phillip Harrison

While acting as Theatre Secretary at the Keele Meeting my duties involved, *inter alia*, asking whether the researchers had permission from the local ethics committee for their various experiments involving human subjects. One particular researcher replied that such permission was not necessary since the only subjects used were the experimenters themselves. What was implied by this was that since the experimenters were fully aware of the aims, purposes and risks of the experiments, any requirements necessary to obtain "informed consent" must have been complied with. In their case this may have been correct though it is worthwhile examining the rationale of obtaining informed consent in experiments involving human subjects.

The starting point begins in the common law and the maxim *volenti non fit injuria*, which embodies the principle that a person who agrees with another to run the risk of harm created by that other cannot sue in respect of damage subsequently suffered as a result of that risk. In everyday life a good example of this is if a car passenger takes a lift with a driver whom he knows to be drunk. The passenger is taken to voluntarily accept the risk of injury and if he is subsequently injured then cannot recover his losses from the driver.

This has obvious parallelisms with human subjects in physiological experiments. Thus, if a subject willingly and with full knowledge of the risks involved, allows himself to be subject to experimental procedures and those procedures subsequently cause him injury, he can no longer recover compensation from those that experimented upon him. The main difficulty with this is the extent to which the subject is able to assess, and to voluntarily take on those risks, in order that the maxim *volenti non fit injuria* applies.

Doctrine of Informed Consent

It has long been assumed that researchers can take comfort from the approaches adopted by the courts in case-law involving medical treatment. What has emerged from this is the so called "doctrine of informed consent". This is the right of a patient to decide for himself or herself whether or not s/he will submit to a particular course of treatment proposed after having been fully informed of the advantages and disadvantages of undertaking the treatment and, in particular, having been advised of the risks involved. This is problematical since, while some risks are obvious and in the forefront of the doctor's mind, some risks are easily overlooked and other risks are thought too remote to mention. This has generated a body of case law exploring the extent to which a patient is required to be informed. Generally, if the patient is not given sufficient information to allow him to assess all the risks, then any consent given is not informed consent - this is equivalent to no consent being given. The patient is then allowed to recover compensation for any disastrous consequences of the treatment.

Informed Consent in the Laboratory

In physiological experiments, while it is clearly good practice to obtain informed consent, it is uncertain whether we would have the protection of the doctrine of informed consent if an experiment led to disastrous consequences for the subject. For a start, in medical treatment, the intention is that the patient will benefit from the treatment. The courts are therefore likely to balance the potential benefit of the treatment against the remoteness of any risk, knowledge of which the patient was denied. In human experimentation, on the other hand, subjects usually derive no benefit from their participation. It follows that the courts will require a higher standard of care from researchers in informing subjects of the risks than is suggested from the case law on medical treatment. (One could argue that if subjects were to derive a benefit from the experiments - perhaps a financial one - the courts might treat researchers on an equal footing with that of doctors in medical treatment cases.)

Defining the risks

Another difficulty facing researchers in informing subjects adequately is that by virtue of the nature of experimentation the risks involved are difficult to define. Consequently, informing subjects appropriately is an onerous task. In addition there are other difficulties which, although avoidable, are indeed real. The first is that many experiments are undertaken by postgraduate or postdoctoral workers who, although they might fully understand the purpose of the experiments, might not themselves fully understand the risks involved, and are therefore unable to explain the risks to their subjects. Moreover, given that most subjects are unpaid, give up their time and often suffer some discomfort, more than gentle persuasion is needed to encourage subjects to participate at all. Thus, there is little incentive to inform subjects fully of the inherent risks involved. Indeed, it is more likely that information provided to the subjects at the onset of the

experiment will revolve mainly around the purposes of the experiments and not around the risks involved.

In conclusion, informed consent can only be obtained after having informed the subject of all the risks involved in participating in the experiment. Informing the subject of the purpose of the experiment is largely irrelevant. Finally, while informed consent is a goal to strive to achieve, in practice this may be difficult and we should be wary of becoming complacent in assuming that the courts will provide protection to researchers when their experiments go wrong.

Philip Harrison
Dept of Physiology
University College London

NORTHWEST AIRLINES TRAVELLING FELLOWSHIPS

Northwest Airlines have agreed to provide three Northwest Airlines Travelling Fellowships to The Physiological Society to encourage and enable academic biomedical interchange between the UK and USA.

The Fellowships are aimed at young research workers (up to and including lecturer level) who wish to visit a centre of excellence in the United States. Travel must be made between 1 October 1995 and 31 March 1996.

These Fellowships will be awarded to young Members or Affiliates by the Grants Sub-Committee, in conjunction with Northwest Airlines. For ease of administration, candidates will be considered in conjunction with the Rushton Fund and Affiliate Travel Grant Scheme. These Fellowships are considered particularly prestigious, being awarded to those applicants achieving the highest ranking.

Academic Fares

Northwest Airlines have arranged special fares for academics travelling to the USA.

- **No Saturday night stay is required for a discounted APEX fare**
- **Purchase a full economy ticket for travel Tuesday to Thursday and upgrade to World Business Class**

For further information on these fares, or to make a booking, call Northwest Airlines on (01293) 561000 quoting the Academic Fares programme.

Dept of Physiology
University of Bristol
POSTDOCTORAL RESEARCH
IN DEVELOPMENT OF CENTRAL CONTROL OF CIRCULATION

A postdoctoral research position funded by the Wellcome Trust is available for three years to investigate "Neuronal Mechanisms Underlying Development of Central Cardiovascular Activity and Reflexes". Many cardiovascular reflexes are immature at birth in neonates of small mammals. The present project will focus on the ontogenesis of synaptic and cellular changes within medullary regions controlling the cardiorespiratory system in a novel and innovative *in vitro* preparation. Applicants should either be interested in central regulation of circulation/respiration or have experience in patch clamping.

Starting salary: around £22,800.

Please apply to: Dr Julian F R Paton, Dept of Physiology, School of Medical Sciences, University of Bristol, Bristol BS8 1TD with a CV and the names and addresses of two referees.

For further details: tel (0117) 928 7818, fax (0117) 928 8923, Email julian.f.r.paton@bris.ac.uk

ISAN: THE INTERNATIONAL SOCIETY FOR AUTONOMIC NEUROSCIENCE

The International Society for Autonomic Neuroscience (ISAN), with Prof Geoff Burnstock as Foundation President, Prof Max Bennett as Executive Vice President, Dr Joel Bornstein as Executive Secretary, and an International Committee representing all major subfields and continents, has been formed.

The purpose of ISAN is to facilitate communication between those working in this area of neuroscience and to raise the profile of autonomic neuroscience. It will arrange meetings, lobby for an improved representation of autonomic neuroscience in such organisations as IBRO and aid communication between scientists who work on all aspects of the autonomic nervous system. ISAN intends to create formal links with IBRO and IUPS, and possibly other generalist societies. We will welcome close association with regional societies which focus on the autonomic nervous system.

The *Journal of the Autonomic Nervous System* is the Official Journal of ISAN. Members of ISAN will be entitled to a subscription discount.

The first International Meeting to be organised by ISAN will be held in Cairns in tropical Australia, an area of coral reefs, rain forest and spectacular scenery, from 14 to 20 September 1997. The meeting organiser is Prof David Hirst.

To join ISAN and register for the mailing list, please contact the Executive Secretary, Dr Joel Bornstein, at the Physiology Dept, University of Melbourne, Parkville, Vic 3052, Australia, fax (00 61) 3 9344 5850, Email joel@plexus.physiol.unimelb.edu.au

SIXTH FORM PHYSIOLOGY WORKSHOP AT BRISTOL UNIVERSITY

Hands-on practicals for the sixth-formers

In a survey of 150 first year A level students interested in registering for science degrees, 63% could not define physiology. After two days of practicals, lectures and discussions at the Dept of Physiology in Bristol, we had reduced this figure to 4%. This was accompanied by a 16% swing in favour of applying for a degree in Physiology. These students came from 75 different schools in the south west of England and when they returned many of them passed on their experience to colleagues, teachers and careers officers. The five Sixth Form Workshops throughout the country are thus an extremely effective way of putting a vision of Physiology into the minds of prospective undergraduates.

Bridget Lumb has organised two successive workshops at Bristol, and is planning another for next year based on the same very successful programme. This year the introductory presentation entitled "What is Physiology" by Bruce Matthews was a masterful demonstration of practical physiology, recording heart rate, muscle reflexes and control of oesophageal pressure. Audience participation ensured rapt attention from all of the students for one uninterrupted hour. This was an important prelude to the key component of the workshop, that being the set of four hands-on practicals. Working in groups of 4-5, students recorded nerve impulses, reflex and reaction times, lung volumes and the electrical activity of the heart. The principle here is the same as it is for presenting science through schools, museums, festivals, open days and television programmes: people have a healthy appetite for doing real experiments.

We did not choose to hide our use of animals in research and organised group discussions about animal welfare following an introduction by Simon Brophy of the Biomedical Research Education Trust. We were criticised by some students for producing a one sided argument and may plant an agitator next year. Intertwined with practicals and discussions were short demonstrations in the histology laboratory and presentations on careers in Physiology. We completed the workshop with a light hearted review of "Research at Bristol".

Significant, additional benefits of these workshops may not immediately occur to departmental staff as they gleefully entertain the idea of hosting one. The challenge to all those who took part was to communicate effectively with a constructive eye on the longer term implications of their research. The pressure to place those highly specialised activities in a constructive context and to justify the use of animals and money is an excellent exercise for all scientists.

We have enjoyed our Sixth Form Workshops. They not only promote Physiology but also give a positive, practical insight into university life and a better general understanding of science. The feedback from schools and students has been overwhelmingly in favour of them. Congratulations to The Physiological Society for supporting them and let's have more in the future.

Matthew Holley
Dept of Physiology,
University of Bristol

STUDENTS' REPORTS ON THE WORKSHOP

FORAYS INTO PHYSIOLOGY

A physiological broadening of the mind may create some weird and wonderful images in your head, but in essence this was the purpose of April's Physiology Workshop at Bristol for Sixth Form students.

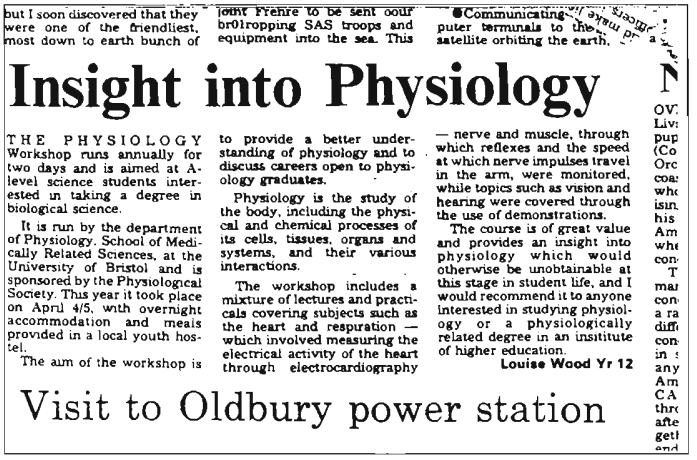
To give us an understanding of the methodologies as well as the applications and importance of physiology, we were involved in one and a half days of "hands on" experiments, discussions and lectures. All aspects of the discipline were covered from career prospects to animal experimentation, from PhD and research work to producing our own ECGs.

The general consensus of opinion at the end was that it had not only been very well organised and enjoyable but also highly beneficial to those of us who, like me, were definitely biologists but felt rather lost amongst the diversity of this fascinating subject. Knowing that the functions of living organisms was where my interests lay, I had considered taking a degree course in Human Biology, which demonstrates how oblivious I was to the numerous Physiology courses offered by universities around the country.

Due to the omission of "Physiology" in A level Biology courses, sixth formers often gain a vague understanding of the subject but do not consider it when looking for a degree course. Instead they choose between Medicine and Biology, neither of which satisfactorily encompasses the aspects of the living organism such as the structure and function so concisely as physiology does.

I would like to end by thanking the members of staff and the students who helped out as well as The Physiological Society for making the workshop so worthwhile.

Emily Roberts
Market Drayton, Shropshire



but I soon discovered that they were one of the friendliest, most down to earth bunch of

joint Frenre to be sent our br0lropping SAS troops and equipment into the sea. This

●Communicating puter terminals to the satellite orbiting the earth.

Insight into Physiology

THE PHYSIOLOGY Workshop runs annually for two days and is aimed at A-level science students interested in taking a degree in biological science.

It is run by the department of Physiology, School of Medically Related Sciences, at the University of Bristol and is sponsored by the Physiological Society. This year it took place on April 4/5, with overnight accommodation and meals provided in a local youth hostel.

The aim of the workshop is to provide a better understanding of physiology and to discuss careers open to physiology graduates.

Physiology is the study of the body, including the physical and chemical processes of its cells, tissues, organs and systems, and their various interactions.

The workshop includes a mixture of lectures and practicals covering subjects such as the heart and respiration — which involved measuring the electrical activity of the heart through electrocardiography — nerve and muscle, through which reflexes and the speed at which nerve impulses travel in the arm, were monitored, while topics such as vision and hearing were covered through the use of demonstrations.

The course is of great value and provides an insight into physiology which would otherwise be unobtainable at this stage in student life, and I would recommend it to anyone interested in studying physiology or a physiologically related degree in an insititute of higher education.

Louise Wood Yr 12

Visit to Oldbury power station

A VAGUE UNDERSTANDING OF PHYSIOLOGY

It was early April when, fresh faced and with only the vaguest concept of physiology, an invasion of sixth formers descended on Bristol Medical School.

Comfortable in the lecture theatre, we settled to watch a demonstration by Prof Bruce Matthews. Things were not to be so easy for Prof Matthew's "volunteers", who were attached to an impressive array of equipment to measure the action of their hearts, muscles and cardiovascular systems. However, it was fortunate that Prof Matthews led by example when he swallowed over a meter of tubing to demonstrate oesophagus movement!

Bruce Matthews

The afternoon commenced with a thought provoking small group discussion on "Animals in Medical Research", followed by two "hands on" practicals, where we were actually encouraged to select victims to pass electric charges through and hit with a rubber hammer (incidentally learning about nerve impulses and reaction pathways).

The evening was led by Marius Frank. Being a doctor of Neuroscience, a versatile musician, with a repertoire ranging from symphonies to "Saturday Night", and the former world expert on deaf mice, he was well qualified to combine physiology with physics, music, history, linguistics and even maths in an intriguing "whistle stop" tour of the vast culture surrounding music and hearing. For most, the day concluded with private research into Bristol's nightlife, followed by a welcome retirement to the local youth hostel.

Day Two opened with a valuable presentation on options open to physiology graduates: a subject often overlooked by prospective undergraduates preoccupied with the enticements of living away from home, an expanding social life ... and, of course, studying for a degree!

Next were practicals. At first it appeared that lying on a couch while an ECG was recorded would be the most demanding requirement, but the significance of an ominously placed exercise bicycle soon became apparent! For those with any breath left, there was a vitalograph, which proved that either our lungs were highly efficient or we were full of hot air!

Penultimately; we visited the histology laboratory. Despite several "Human Research Studies" ("dead bodies" to most of us) in the room above, we encountered nothing more unnerving than leg bones. The course closed with talks from department members on their own projects, ranging from the transmission of minute nerve impulses to the control of whole body movement.

When Dr Lumb safely saw us off, complete with consolidated ideas of physiology and our complimentary pens, it was with thinly disguised relief and, no doubt, suspicions that it would not be long before she re-encountered at least some of us.

Samantha George
Kidderminster, Worcestershire

SIXTH FORM WORKSHOP AT ST GEORGE'S HOSPITAL MEDICAL SCHOOL

A Sixth Form Physiology Workshop was held at St George's Hospital Medical School on Friday 7 April 1995. The event was arranged by the Dept of Physiology and organised by Dr Susan Ward.

The demand for such events was underscored by the large number of applications that were received - some 130 in all. Space and facilities constrained the final number to 80. Students came from as close as Croydon and as far afield as Canterbury and Southampton. In some cases, teachers also attended. Students were assigned to one of eight groups, each of which was named after an eminent physiologist - "Harvey", "Hodgkin-Huxley", "Starling", "Dale", "Sherrington", "Haldane", "Hill" and "Vaughan" - and ably led by a volunteer from the SGHMS Intercalated BSc Programme.

At 10 am, Dr Saffron Whitehead welcomed the attendees on behalf of the Dept of Physiology and then introduced the Principal of SGHMS, Prof Sir William Asscher, who provided a fascinating and entertaining history of SGHMS from its days at Hyde Park Corner to its present home in Tooting. Prof Brian Whipp, Chairman of the Department of Physiology, then addressed the fundamental issue of "What is Physiology?". Students were encouraged to view physiology from the relatively simple molecular and subcellular levels of organisation to those of large system integration at the whole body level.

After a short refreshment break, Dr Jack Botting of the RDS gave a provocative and carefully reasoned talk on "Animals in Research". He illustrated his presentation with a wide range of advances in medical science that depended for their development and implementation upon various types of animal investigation. The students were, however, deliberately left to reach their own conclusions on this contentious issue. These they were encouraged to express and develop in small-group tutorials which followed. Each tutorial was directed by a member of academic staff who was experienced in the issues of animal experimentation.

Left to right: Ahmet Ayar, Rod Scott, Mike Stock, Ursula Wells and Susan Ward

Lunch was a relaxing affair, with students getting to know each other as well as the academic staff and volunteer postgraduate and medical students. All too soon it was "Back to work" with the afternoon being given over largely to laboratory sessions. Half of the afternoon was devoted to "hands-on" experiments which involved students making measurements on each other: blood pressure responses with Dr Tony Woods and Ms Catherine Richards; physiological responses to exercise, with Professor Whipp; mechanical function of the lungs, with Dr Ursula Wells; and electrocardiographic analysis of the heart, with Prof Mike Stock. In the remaining part of the afternoon, students visited several of the Dept's Research Laboratories to view demonstration experiments: on excitable membranes with Dr Rod Scott, and on exercise physiology with Dr Sue Ward. Computer simulations of physiological systems were presented by Dr Saffron Whitehead and staff from the SGHMS Computer Unit. And, finally, interested students took a tour of the SGHMS Biological Research Facility, under the enthusiastic direction of Mr Rick Skilton and his staff.

A student discussion group

A Rewarding Experience

"I attended a physiology workshop on the 7 April 1995 at St George's Hospital Medical School. I found it a rewarding experience and would like to do similar work ... would it be possible to do two weeks of voluntary work experience at St George's Hospital. The careers that interest me include physiology, biological sciences and microbiology."

Extract of a letter from Bunsee Shah
Thornton Heath, Surrey

Measuring peak expiratory flow

The day's proceeding were brought to a close by Dr Ward at 4pm, followed by tea and further discussion for students who wished to linger. All in all, staff and students alike agreed it was an enjoyable and worthwhile experience. And as the only recurring criticism was that more experiments would have been welcome, we can only assume that the venture was a success!

Susan Ward
Dept of Physiology
St George's Hospital Medical School

EXAM BULES (SORRY - THAT SHOULD READ "BLUES")

Academics wandering the corridors with shell-shocked looks on their faces ... empty offices with the words "At home (marking)" on the doors ... the pile of 200 near-identical essays on platelet function to be marked by 5 pm the day after tomorrow ... It must be the EXAM SEASON.

It is not easy to find redeeming features in the process of marking exams (apart from knowing that when you finish them it will be a year before you have to repeat the performance). However, there is always the chance of light relief from the seemingly bottomless treasury of (inadvertent) student wisdom. For instance, who could fail to warm to the essay on sodium and potassium transport which began "The sodium channel is small and round ... "? And many of us can appreciate the deeper meaning behind the statement that "Ion gradients cause a charge indifference across the membrane".

Of course, a lot of the errors that cause one to wince simply involve misspellings or made-up words. Here one has a certain amount of sympathy for the unfortunate candidate. Given the bewildering number of different suffixes like "-ergic", "-genic", "-tonic" *etc.* it is easy to see how the sodium pump might be described as "electronergic", although "heterogenic" taxes the imagination rather more. Less common are misreadings of the meaning of words, although this year threw up "The gradients produced by the pumps are disseminated by the channels".

Inevitably, the more obscure the words, the easier they are to get wrong. I have now collected more than half a dozen different variants on "sarcoplasmic reticulum" in final year students' exam essays, including "sacroplasmic ... ", "sacriplasmic ... ", "sarcoplastic ... ", " ... recitulum" and " ... reticulin". As a footnote, though, it is worth pointing out that none of the students has ever approached the inventiveness of the well-known UK muscle physiologist who habitually referred to this organelle as the "sarcoplasmic reptilian". The name of this person has been withheld after payment of a substantial sum to the writer.

Occasionally the answers have a special logic all of their own. First year medical students are an especially rich source of this kind of material. For instance: "Hydrostatic pressure gradients arise because of the weight of blood in the body". Or the student who answered the question "Discuss the importance of inflation of the lung in terminating inspiration in man" with: "This is very important because otherwise your first breath would be your last and you would die."

Finally, there are the Freudian slips that seem to be telling us the candidate is questioning the wisdom of a science degree. Among these I class the student who referred to "the contractile proteins acting and myosin". Or, a personal favourite, the student who suggested "calculating the membrane potential using the Goldman-Sachs equation". Pining for that lost secure future in merchant banking?

Austin Elliott
School of Biological Sciences
University of Manchester

Editor's note: I would like to apologise to Austin Elliott for not running this in the Summer issue of the Magazine, but we are sure it will be appreciated just the same.

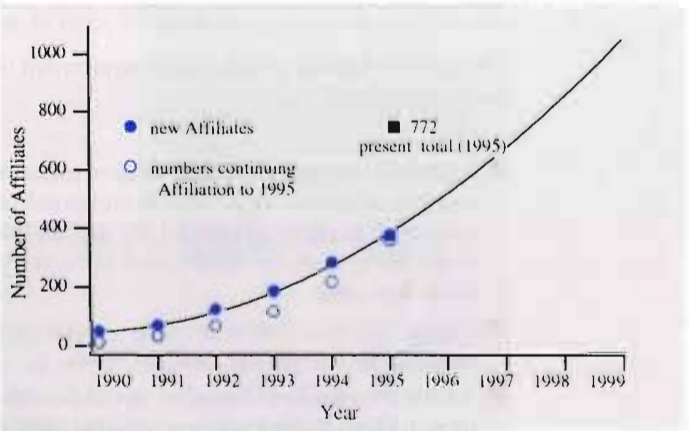
Postscript

Since this article was originally written, another series of exams has come and gone. This year's written papers offered only one classic, provided by the final year (sic) Honours Physiology student who divided the cells of the body into "excitable" and "unexcited". However, with the changing face of Physiology and medical courses, continuous assessment material now offers a rich new harvest of student-isms. This year's prize goes to a student in a practical measuring whole body oxygen uptake during exercise. Pondering the physiological variation of oxygen uptake values across the class, she concluded: "With respect to sex, more energy was required by men than by women".

AFFILIATES ... ARE YOU THERE?

The Affiliation scheme is thriving, at least in terms of numbers. Presently there are in excess of 770 and numbers joining each year have grown steeply over the past five years. (Extrapolation on present trends, always dangerous, implies that there will be over 1,050 **new** Affiliates in the 1999!) Of those who have become Affiliates since 1988, some 105 have already gone on to become Ordinary Members; 218 allowed their Affiliation to lapse.

It is clear that access to Meetings and the right to seek financial support are key features in making Affiliation attractive. But are there other needs amongst Affiliates that the Society should address? The Committee is always keen to hear opinions and suggestions from Affiliates on any matter relating to the Society. I have identified some specific points below relating to the organisation of Scientific Meetings and would welcome replies from as many of you as possible.



You might care to photocopy the page (please ring Yes/No *etc* as required) and post or fax it to me, or Email further comments (address below).

I would also welcome any comments from Ordinary Members about the Affiliate scheme, perhaps stimulated by the questions below.

David Miller, Affiliate Liaison Officer

AFFILIATE QUESTIONNAIRE

1 Would you like to see "Affiliates-specific" sessions (posters, communications) introduced into the scientific programme of Meetings?

Perhaps they would provide an attractively less formal medium for presenting new work, to help "break the ice" for those less experienced in giving presentations. Yes/No

If Yes:

Should such sessions be for

- posters? Yes/No
- oral communications? Yes/No

Should such sessions be attended by Affiliates only? Yes/No

If No:

Are you content with attending and contributing to Meetings as at present? Yes/No

If you have other suggestions to improve Meetings to suit Affiliates, please append them.

2 Is the Affiliate's perspective within the Society best represented by:

- periodic questionaires (like this one)? Yes/No
- elected representative(s) on certain sub-committees? Yes/No
- response to enquiries from individual Affiliates? Yes/No

If you have other suggestions to improve Affiliate feedback to the Society, please append them.

3 Has your experience as an Affiliate encouraged you to consider:

- presenting Communications at the Society's Meetings? Yes/No
- becoming an Ordinary Society Member in due course? Yes/No

(If you have other experiences of the Society as an affiliate to feed back, please append them)

4 About you

Which sex are you? Male/Female

In which subject was your first degree?

_____

How long have you been an Affiliate?

1 / 2 / 3 / 4 / 5 (years)

How many of the Society Meetings have you attended?

_____

How many other scientific meetings have you attended?

_____

Are you a PhD student? Yes/No

Are you a postdoc? Yes/No

Are you in a lecturing post? Yes/No

Are you employed in industry? Yes/No

What (broad) field of research are you active in?
eg Electrophysiology, Neuroendocrinology

_____

Replies and comments to: David Miller, Affiliate Liaison Officer, IBLS, West Medical Building, University of Glasgow, GLASGOW, G12 8QQ, Fax (0141) 330 4100, Email d.j.miller@biomed.gla.ac.uk

NEITHER STEPTOE AND COMMITTEE NOR THE ANTIQUES LABSHOW!

The natural history of laboratory equipment is well established.

- Dr Bright designs and makes a new piece of equipment and using it rewrites his branch of science. It is made commercially and as the latest thing - every well-found laboratory must have one.
- Along comes a better version - a project student can use the old one! He breaks it!
- A little later the field becomes unfashionable (doesn't attract automatic grants). If a curious youngster asks to see that famous piece of equipment, the lab technician replies "I think there is one in the drawer somewhere in the lab".
- Professor Bright retires. He has, for sentimental reasons, preserved the dusty remnants of the equipment that helped make his reputation ("We had to make our own in those days!").
- The Laboratory Manager is in a hurry, the RAE is only 12 months ahead. "Clear out that junk, our new mega buck research infant prodigy poached from St Elsewhere's is moving into this laboratory tomorrow."
- If the item is lucky, the chief technician, who is near retirement, remembers its glory days and puts it in the glass cabinet with the oncometer.
- In the rebuilding programme, the glass cabinet is consigned to the basement.
- Where is it now?

Fanciful? Perhaps.

As you may know, The Physiological Society and the Science Museum have set up a working party to examine this problem and to apply solutions. It is obvious that we should rescue important equipment before it is lost and that its contribution to science should be recorded by someone who had first hand experience of its use. The setting up of the working party was intended to, and has, raised the general awareness of the need to preserve interesting items which in itself creates problems.

The Science Museum has a large store in the old Post Office Savings Bank Headquarters, Blythe House. It cannot store everything. So, unlike Steptoe, we are not touting for unwanted equipment. We admit that in many cases the true significance of an item may not be immediately evident. Only the passage of time will confirm or reveal their true worth. Hence we do not feel that we or you can act as infallible valuers of antiques.

We have therefore set up a labelling scheme. The labels are small and distinctive. They are designed to be fixed to any item thought to be of historical importance by any of the players in the little charade. The piece should then be safe from accidental destruction. Along with the labels will come a few short forms. The most important is a Science Museum registration form that asks for brief details of the item and its history. Its history might include reprints of papers or reminiscences by its user. Also included is a note to be attached to the departmental inventory to remind future chief technicians of the Museum's interest.

We realise that many departments are well aware of the importance of the contents of their glass cabinets and would not part with them. The Labelling Scheme is also intended for them. It will allow a record to be kept in the Museum of the location of these treasured pieces which could be consulted by future historians.

We are particularly interested in items whose owners remember them being used. If you know of any appropriate pieces, labels are available from Asa Blakeley, tel (0116) 252 3082.

Asa Blakeley
Historical Equipment Working Party

The Physiological Society/ Science Museum

This piece is of historic interest. Please DO NOT destroy it or dispose of it without contacting us.

The Physiological Society / Science Museum
DO NOT DESTROY

If you see either of these labels, please do not ignore them.

The letter below was recently found in the Cambridge Publications Office by Jill Berriman, Senior Production Editor. It was inside one of the volumes of The Journal of Physiology *in the set that had belonged to E D Adrian and which was given to the Society by R H Adrian in 1992. The letter was passed to Ann Silver who has annotated it.*

University College,
London, W.C.1.
February 18, 1936.

My dear colleagues, Officers and Committee of The Physiological Society, and Editors of the Society's Publications,

The unexpectedness of your charming gift and the generosity of Dale's words made it impossible for me on Saturday to do more than blurt out a few inadequate - and probably ungrammatical - sentences, to tell you how touched I was by your kindness. I believe, however, that I managed to say one thing which I should still have wanted to say first, even if I had had sufficient time to think of a more adequate reply: that is, what a joy it has been to me to have had this long and delightful cooperation with C.S.S., J.B.L., E.D.A., and the rest of you: and not with you only, but with the main body of our Society.

For the "Journal" is a reflection of the Society's life and activity; and its success is due to the fact that Members of the Society have felt that it is their Journal, and have been willing, always without stint, to advise and help the Editorial Board. Once indeed, sending an admirable referee's report on a difficult paper, C.G.D. informed us, following other similar provocation, that he was not the Foundling Hospital, for us to deposit our unwanted babies on his doorstep. Once when X.Y.Z. was told that he must really be more careful, or we should publish his next paper exactly as it reached us, he expressed his indignant "hope that the Journal would never fall as low as that". J.S.H. has prayed over us: E.S.-S. has rebuked us: L.L. and W.A.H.R. have complained to us about each other's language, which perhaps we should have mollified: and E.S.V., asked, before he was an editor, to review a contribution from another country, replied, more in sorrow than in anger: "I note that this paper came as `First Class Matter' - I recommend that it be sent back Steerage". A.S.P. has advised us to return a paper to Holland, to be reduced to one fifth. B.A.Mc.S., as referee, has completely rewritten an article for us, to the complete satisfaction of its author. H.H.D. has rewritten many papers before we ever saw them. T.L. alone has refused, on principle, to act as referee, feeling that authors ought to have at least a sporting chance. And all the time E.D.A. has cunningly adjusted the size of the volume, so as to keep both the Treasurer and the Subscribers happy.

My own task, and not a very difficult one, was chiefly to provide the minor adjustments by which the Society, with the aid of my colleagues (including Mrs. M.), could run its own Journal as a common enterprise. Your gift to me is a sign, not only of your feeling that this common enterprise has been successful, but also of your friendship. It will remind me continually of much happiness with you and the Society. Thank you.

Yours very sincerely,
A.V. HILL

Footnote

The "language" used by L L and W A H R can be sampled in various volumes of the Journal *published in the early 1930s. Much of A V Hill's editorial correspondence can be found in the collection of his papers at Churchill College, Cambridge, and not in the Society's Archives.*

Key

C.S.S.	C S Sherrington	W.A.H.R.	W A H Rushton
J.B.L.	J B Leathes	E.S.V.	E S Verney
E.D.A.	E D Adrian	A.S.P.	A S Parker
C.G.D.	C G Douglas	B.A.McS.	B A McSwiney
J.S.H.	J S Haldane	H.H.D.	H H Dale
E.S-S.	E Sharpey-Schafer	T.L.	T Lewis
L.L.	L Lapique	Mrs. M.	Mrs E M Melville

JOINT MEETING WITH THE KOREAN PHYSIOLOGICAL SOCIETY SEOUL, 4-5 APRIL 1995

The Joint Symposium of the Korean Physiological Society and our own Society held in Seoul, Korea on 4 and 5 April 1995 to celebrate the 50th Anniversary of the Korean Society seems to have been very well timed. It occurred only a few weeks after the publication of an Office of Science and Technology Report on *Collaboration into the 21st Century: The UK/Republic of Korea relationship in Science, Engineering and Technology* prepared by a Committee (the UK/Japan and Asia Pacific Group) chaired by Sir Geoffrey Allen, and including Tom Bundell and Denis Noble. This report received a great deal of publicity and clearly outlined the case for seeking enhanced science links with South Korea (Republic of Korea). Our Joint Meeting in Seoul is actually listed in that report as one of the examples of existing UK-Korean collaborations.

The scientific programme of the meeting had been focused on an area (Membrane Transport and Ionic Channels) in which both the Korean Society and our own have considerable interests. The Chairman of the Organising Committee was Prof Kee Soon Kim (President of the Korean Society) from Hanyang University, but most of the work, including the crucial fund-raising, had been done by Professor Yung Earm from Seoul National University. He is a Member of our Society. We have reasons to be profoundly grateful to Profs Kim and Earm for all the work they and their colleagues had put into the meeting which was generally seen as a great success both scientifically and socially.

The meeting was very well attended, although the majority of the audience was from Korea. The programme contained about 20 British and 15 Korean presentations and it is clearly impossible to give an in-depth account of all these. I will mention here just a few talks that made a particularly strong impression on me, but my selection is inevitably arbitrary and there were many excellent talks that cannot be mentioned in this brief report.

The opening lecture was given by Peter Stanfield (Leicester), who gave an admirably clear and succinct account of recent studies on inward rectifier potassium channels. There was particular emphasis on the relationships between structure and function based on an elegant combination of electrophysiology and molecular biology. This was a good start to the first session dealing with cardiovascular ion channels which ranged widely from molecular to whole organ aspects.

The presentation by S D Koh, J D Campbell, A Carl, K S Kim and K M Sanders, arising out of a collaboration between Hanyang University, Seoul and the University of Nevada, USA, demonstrated activation of potassium channels in smooth muscle cells by nitric oxide (NO). The hyperpolarisation response to NO in colonic smooth muscle appeared to be mediated by multiple channels, most likely activated by dual pathways involving NO and cGMP-mediated mechanisms.

Kyung Woo Cho (Jeonbug National University Medical School) gave a most interesting talk on the possible involvement of glibenclamide sensitive ion channels in ANP secretion. The results, showing suppression by glibenclamide of mechanically-stimulated immunoreactive ANP secretion by way of changes in cytoplasmic Ca^{2+} concentration, suggest that ATP-sensitive K^+ channels play an important role in the regulation of ANP secretion from atria.

Won-Kyung Ho from Yung Earm's laboratory at Seoul National University presented a paper based on a collaborative study with Hilary Brown and Denis Noble in Oxford on the effect of divalent cations on the Ca^{2+} current in sinoatrial node cells of the rabbit. This elegant study showed that the previous concept of voltage-dependent gating for outward rectifier K^+ current should be re-interpreted as voltage- and time-dependent blocking and unblocking by Ca^{2+} and Mg^{2+}.

David Eisner (Liverpool) reported measurements of the Ca^{2+} content of the cardiac muscle sarcoplasmic reticulum (SR). This involves adding caffeine to release Ca^{2+} from the SR producing a transient increase in the cytoplasmic Ca^{2+} concentration which decays as Ca^{2+} is pumped out by the electrogenic Na^+-Ca^{2+} exchanger. The amount of Ca^{2+} released from the SR can be calculated from the integral of the current. Using this ingenious method it is now possible to relate changes of systolic Ca^{2+} transients to the SR Ca^{2+} content.

In the session on Epithelial and Membrane Transport, Peter McNaughton (King's College London) talked about control of drug transport by the human multi-drug resistance P-glycoprotein (P-gp). P-gp functions as an ATP-dependent drug transporter which reduces the intracellular concentration of cytotoxic drugs. A method using confocal microscopy had been developed to measure the transport activity of

Prof Ole Petersen (left) and Prof Kee Soon Kim (right), President of the Korean Physiological Society

P-gp from the rate of movement of fluorescent substrate across the membrane of a single cell. It was shown that cell swelling inhibits the transport mode of P-gp. This identification of a novel means for inhibiting P-gp-mediated drug transport seems to have considerable promise for future developments aiming at reversing multi-drug resistance.

Jin Sup Jung (Pusan National University) in a collaboration with Peter Agre (Johns Hopkins University) discussed molecular water channels in mammalian cells. These water channels (aquaporins) are members of the MIP (major intrinsic protein) super-family that may function as transporters for small solutes. Recently two new isoforms were cloned from kidney (AQP-3) and brain (AQP-4). AQP-3 is permeable to urea and glycerol as well as water. AQP-4 may be involved in CSF absorption and osmo-regulation.

Alexey Tepikin (Liverpool) demonstrated polarised Ca^{2+} extrusion fron single pancreatic acinar cells following stimulation with acetylcholine (Ach). In experiments with single cells immersed in a solution containing a Ca^{2+} - sensitive fluorescent probe linked to heavy dextran, severely limiting diffusion of Ca^{2+}, it was possible to show directly that following the Ach-evoked cytosolic Ca^{2+} rise, Ca^{2+} is extruded mainly through the secretory pole.

In the final session on neurophysiology, Jun Kim (Seoul National University) described a nice patch-clamp study of Ca^{2+} channels and exocytosis in chromaffin cells. Both Ca^{2+} channels of the L- and N- type were shown to be involved in the stimulation-secretion coupling process.

David Brown (University College London) demonstrated a cholinergic induction of a Cl^- current in sympathetic neurones involving both Ca^{2+} and protein kinase C. There was a delayed activation of Cl^- current following a muscarinic-induced cytosolic Ca^{2+} rise indicating that the channels were not directly switched on by Ca^{2+}. The channels may be opened by PKC-mediated phosphorylation with synergism occurring at the level of the PKC enzyme.

The Symposium in Seoul was certainly useful in signposting a number of areas in which considerable progress has been made in both Korea and the UK. It is likely that the Symposium will result in more collaborative efforts to our mutual benefit.

O H Petersen
The Physiological Laboratory
University of Liverpool

CONTRASTING VIEWS OF CARDIOVASCULAR, EPITHELIAL AND NEUROPHYSIOLOGISTS IN SEOUL

On arriving in Seoul from the Japanese meeting, we were immediately and pleasantly surprised to be in a vibrant, expanding far eastern economy that was still affordable by British standards. Exchanging two Japanese notes, that would just have covered one night's accommodation and dinner, rendered a thick bundle of notes which transpired to be more than sufficient to cover incidental expenses during a week's stay. This is not to say that Korea is particularly inexpensive, it is much like the UK; it is just that Japan is very expensive.

The hospitality of the Korean hosts was also immediately apparent, in the form of the cheerful face of a postgraduate student who was giving up his Sunday to make sure two British physiologists found their way to the hotel with the minimum of trauma. This consisted of a rather long car ride to the very centre of the city. Seoul traffic is busy, even on Sundays, and the journey took over one hour. The journey was also of interest to British eyes marked by the prominence of the riot police in armoured coaches; we do not think it was anything to do with our arrival, more that they were expecting a demonstration by some students (those not hosting British physiologists, I hasten to add). Nevertheless our journey was uneventful and arriving at the hotel, situated conveniently in the heart of the city opposite Seoul City Hall, we were invited to an informal dinner, hosted by Yung E Earm and Dae-Yong Uhm, that evening.

The Joint Symposium was held in the same hotel as the British physiologists were staying. We were welcomed by Kee Soon Kim, President of the Korean Physiological Society, and Chong Yang Kim, President of Hanyang University. The meeting was packed with exciting science,

Kee Soon Kim, President of the Korean Physiological Society, welcoming participants at the Symposium Banquet.

some tasters of which are described by Ole Petersen. During the Symposium Banquet, Kee Soon Kim again welcomed the physiologists of The Physio-logical Society of the United Kingdom and Eire; Brian Harvey had made it from Japan on his way to a fishing trip in Galway. Ole Petersen thanked the Korean hosts, in particular Kee Soon Kim and Yung E Earm, for organising the Joint Symposium and for inviting The Physiological Society to participate. Denis Noble, in congratulating the Korean Physiological Society on reaching its 50th anniversary, mused over the crowded nature of cardiovascular physiology as reflected by the presentations in the Symposium that day, which he likened to the crowded hustle and bustle of Seoul's Namdaemun Market. He compared this with

Yung E Earm (centre), with You-Qui Xu (left), Professor and Chairman of Physiology Shanghai Second Medical University and Peter McNaughton (right) at the Symposium Banquet.

Maynard Case lost in the open spaces of epithelial physiology during the after dinner entertainment.

the next day's session with its comparative open spaces of epithelial physiology, which he likened to the tranquillity of the Ch'anggyonggung Palace and its spacious gardens, followed by the culmination of the Symposium in the intellectual peaks of the neurophysiology, analogous to the hill of Namsan Park mounted by Seoul Tower. While some of the epithelial physiologists continued to be lost in the thoughts of their open fields of research, Denis and Ray Noble entertained the audience with guitar and song featuring numerous languages. Several Korean young lady physiologists met this challenge and formed an impromptu choir.

After a second day of excellent science, the Korean and British (Brian Harvey was elsewhere) physiologists were treated to a traditional Korean banquet at a restaurant on the outskirts of the city. This banquet included samples of Korean folk music and dance. I own up to being ill-informed on this point, since a small group, including Maynard Case (and the Eire representative), had been invited to a similarly entertaining gathering by Jong Heun Lee, Dean of Dentistry and Professor of Physiology at the College of Dentistry, Seoul National University. Our own evening ended with Barry Argent demonstrating what a fine karaoke singer he has turned out to be, his voice fully recovered from the excesses of similar recitals in Okasaki.

The heights of 'neurophysiology' (Seoul Tower atop Namsan Park), viewed from the hustle and bustle of "cardiovascular physiology" (Namdaemun Market).

Our departure from Seoul was equally as painless as our arrival, with another postgraduate student ensuring our safe passage through to the departure lounge at Kimpo airport. I am sure that everyone fortunate to attend this Joint Symposium celebrating the 50th anniversary of the Korean Physiological Society, was overwhelmed by the genuine warm

Karaoke king Barry Argent at his Seoul gig, following his successful Japanese tour.

and friendly welcome we all received. We were also impressed by the prosperity and energy of Korea. Many of the Korean physiologists are old friends in the UK and I am sure that we would all wish that it is not too long before we are able to return some of their hospitality.

Barry Hirst
Epithelial Research Group
University of Newcastle Upon Tyne

THE PHYSIOLOGICAL SOCIETY SPONSORSHIP OF ACADEMIC EXCHANGE PROGRAMMES

I am presently a doctoral physiology candidate working with Prof Anthony Ebeigbe in the University of Benin in Nigeria. I also have a tenured position in the fledgling medical school of Edo State University Ekpoma, 84km north of Benin City. A few months ago I arrived in the UK on an academic exchange programme.

The sponsorship of foreign scientific programmes seemed hesitant at the onset, but at last, it is today a reality. Apparently, I appear to be the litmus test of the present programme and I dare say it has been a resounding success.

The present visit arranged by The Physiological Society has given me the opportunity of visiting Newcastle-upon-Tyne and the rare opportunity of working with Dr Jim Gillespie and members of his group. I had visited a few laboratories in Continental Europe in the past, but the warmth and friendship that prevailed in his lab are unequalled in my experience. Everybody was willing to help in whatever way possible. The research techniques were quite novel to me but within a short while they were no longer quite so mysterious. I must confess, they were quite sophisticated. I realised that these techniques were quite a few steps ahead of us, thus highlighting the danger scientific research faces in developing countries such as Nigeria. If science is to be kept alive in Africa, contacts with these developed laboratories must be maintained. This is the only way ideas can be updated. I realise that Email and computer based programmes have made research here achieve otherwise impossible goals. These are worthy of emulation.

My visit to the "Phys Soc" Scientific Meeting held at Keele University (19-21 April) represented a cornerstone in my career as a physiologist. I admired the business like manner in which the scientific session started. What we have in Nigeria seemed old-fashioned to me after this Meeting. I must hasten to add that the papers presented at the Keele Meeting were novel in scope and I realised that a lot of papers were presented in areas we have problems in working in as a result of paucity of equipment.

Prof Colin Blakemore could best be described as one of the best known and respected physiologists of our time. Nothing could have been more inspiring than his lecture. If it were possible to videotape these Scientific Meetings, it would help disadvantaged laboratories in developing countries. The Meeting also offered me the opportunity of meeting Members of the Society. I had the pleasure of meeting with Prof Ole Petersen, Prof Colin Blakemore, Prof Chris Fry and Prof Roger Green, as well as others from the American subcontinent. No doubt strong academic ties have been formed.

I would like to use this opportunity to plead with The Physiological Society, and indeed the academic community and sociophilanthropic organisations in the UK, to come to the aid of us disadvantaged scientists. I am aware that scientific equipment is updated here frequently. We would find the research and teaching equipment not used by you any more very useful in Nigeria. We would very much appreciate you donating them to us. Every donor would be acknowledged. Dr Jim Gillespie is our strongest tie here in the UK, and his laboratory has established links with our laboratories in parts of Nigeria. Whatever materials that you could donate, would you please channel them through him in Newcastle-upon-Tyne. By this single act you could rewrite the tertiary educational history of Nigeria.

In Nigeria, we are proud to say that we are associated with The Physiological Society. The achievements here, both scientifically and financially, are a plus for us too. I strongly urge the Society to keep up the spirit of present sponsorship. It will contribute in no small measure to the development of science in the developing countries. Knowledge gained from this present visit is invaluable. I cannot begin to imagine the number of people that will benefit from my experiences here.

As I round up my present scientific visit to the UK, I would like to thank Jim Gillespie and Harry Otun, as well as members of the group for a stimulating academic visit. The receptors that would ensure a continuous flow of ideas between our labs and theirs have been identified. I also thank The Physiological Society immensely for the opportunity. Like we say at home "more jeleen" (petroleum jelly) to your elbow.

John C Igweh
Dept of Physiology, Edo State University
Ekpoma, Nigeria

See box on following page for details of the Scientific Apparatus Recycling Scheme.

ADRENERGIC SYSTEMS 100 YEARS AFTER THE DISCOVERY OF ADRENALINE

On 25 May this year (1995) four of us, Prof Ewan McDonald from Finland, Prof Geoff Burnstock, Prof Bob Burgoyne and myself from Britain, travelled to Cracow, Poland, as guests of the Polish Academy of Sciences and Arts, the Polish Academy of Sciences and the National Committee for Scientific Research. We were there to attend a symposium celebrating the discovery of adrenaline some 100 years ago, at the invitation of the Polish Physiological Society and the Jagiellonian Medical Research Centre in Cracow.

This turned out to be a splendid occasion with our plenary lectures perhaps being overshadowed by the historic magnificence of the setting in one of the oldest universities in Europe and in a city which is described as the cradle of Polish culture, art and science. The opening ceremony was in the Collegium Maius of Jagiellonian University where we were surrounded by the priceless riches bequeathed by King Casimir, the founder in 1364, and the instruments and artefacts of such great scholars of the past as Copernicus. All this was a pleasant reminder of the great impact that this little corner of Poland has had on the world outside although it does no harm also to remember that it is a place where mankind stooped to its wickedest crimes during the Nazi occupation of the Second World War. Despite the travails of the succeeding years it is all the more remarkable how our Polish hosts were able to mount such a lavish and generously supported event.

The occasion marked the independent discovery of adrenaline by Cybulski in 1895, which coincided with that of Schafer in England. I think this ranks as one of the really great discoveries in physiology. At the meeting, Prof Konturek, who is Chairman of the Polish Society of Physiology, gave an excellent survey of the history of the discovery providing a very balanced account and I can do no better than quote from his abstract:

"Here, February 4, 1895, Prof N Cybulski, Chairman of the Department of Physiology at the Jagiellonian University, reported to Cracow Academy of Sciences and Arts the studies performed together with Dr W Szymonowicz on the effects of the removal of adrenal "capsules" in dogs and on the action of extracts of these glands. He observed that adrenal extracts cause an immediate and potent vasoconstriction and a marked increase in the blood pressure. Most important, he found that venous blood outflowing the adrenals exert similar effects on the blood pressure, heart rate and respiration. These interesting studies of Cybulski were reported by Dr Zanietowski in April 1895 in prestigious Centralblatt für Physiologie (in German).

Cybulski was unaware of the fact that one year earlier Prof A Schafer, Chairman of the Dept of Physiology at the University College, London, presented on 10 March 1894 to The Physiological Society in London, the preliminary results "On the physiological action of extract of suprarenal capsules", published in full paper in 1895 in *The Journal of Physiology*. Working together with Dr G Oliver, Prof Schafer also found that extracts of adrenals cause a powerful action on blood vessels and enormous (2-4 fold) rise in arterial blood pressure. Schafer learned from Centralblatt für Physiologie about Cybulskis' observations, got in touch with him, acknowledged an independent work of Cybulski and emphasised that the major contribution of Cybulski was the finding that adrenals release the active principle in sufficient amounts to produce physiological symptoms.

These two independent works initiated a series of experimental studies which eventually succeeded in the isolation of adrenaline in crystalline form in 1900 and then in the discovery of other catecholamines."

The symposium aimed to commemorate Polish links to the discovery as well as to recognise the British contribution by reviewing recent achievements in central nervous and peripheral adrenergic systems. A full account of the proceedings is to be published in the *Polish Journal of Physiology and Pharmacology*.

As a British representative of The Physiological Society I was very proud to be present and to share with my Polish colleagues the wealth of research in adrenergic systems to which both our countries have made significant contributions.

John H Coote
Dept of Physiology
University of Birmingham

Scientific Apparatus Recycling Scheme (SARS)

The SARS Co-ordinator would be pleased to hear from anyone who has surplus apparatus, books or journals for disposal, for the benefit of Eastern European scientists.

Further details from: Prof P N Campbell, Biochemistry & Molecular Biology, University College London, Gower Street, London WC1E 6BT, tel (0171) 387 7050 Ext 2169, fax (0171) 380 7193.

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Review Article

Full-length Papers

Rapid Communication

No notice is carried for more than three successive editions. Notices are starred so that readers can see at a glance whether this is the first (one star) or final (three stars) appearance of the notice. Notices for the Winter 1995 edition (to be distributed on 24 November) should reach the ***Administration Office*** *by 13 October.*

Genetical Society
COMPUTER-BASED LEARNING IN GENETICS
University of Liverpool
7 September 1995
Workshop to review the provision of computer based materials for the teaching and learning of tertiary level genetics. Sessions to include examples and ideas for the use of commercial, shareware and public domain products. Themes include bioinformatics, mapping, techniques in molecular biology. A poster session will permit hands on evaluation of the products. Further details from: CTI Centre for Biology, Donnan Laboratories, University of Liverpool, PO Box 147, Liverpool, L69 3TX, tel (0151) 794 5118, fax (0151) 794 4401 ★

Spanish Society of Physiological Sciences
27th NATIONAL CONGRESS
Salamanca, Spain
2-5 October 1995
Organised in conjunction with The Physiological Society. Further details from: TESITEX. C/Melchor Cano 15, 37007 Salamanca, Spain, tel (00 34) 23 255115, fax (00 34) 23 258703 ★★★

11th Symposium on Biotechnology
GENES AND THE BRAIN
13-14 December 1995
University College London Medical School
Organised by the IOB and the BBSRC, this symposium aims to review an active area of neuroscience research, the genetic basis of brain function, with particular reference to the genes which influence animal behaviour and those which underlie human neurological and psychiatric illnesses. The £110 registration fee includes refreshments on both days. A reduced fee of £30 will be available for 20 senior graduate students, to be limited to one per institution and allocation on a first come, first served basis. Further details from: Barbara Cavilla, Institute of Biology, 20-22 Queensberry Place, London SW7 2DZ, tel (0171) 581 8333, fax (0171) 823 9409 ★★★

Gordon Research Conference
MAGNESIUM IN BIOCHEMICAL PROCESSES & MEDICINE
28 January-2 February 1996
Ventura, California, USA
To include: modern aspects of basic magnesium research; measurements of ionised plasma magnesium concentrations; recent clinical trials; poster session for PhD students and postdoctoral workers. Further information from: Prof J A S McGuigan, Institute of Physiology, Buhlplatz 5, 3012 Berne, Switzerland, tel (00 41) 31 631 8704, fax (00 41) 31 631 4611, Email mcguigan@pyl.unibe.ch ★★★

Euromech 344 Colloquium
FLUID-STRUCTURE INTERACTIONS IN BIOMECHANICS
10-13 April 1996
Imperial College London
Deadline for receipt of abstracts: 20 November. Further details from: Prof C G Caro, Centre for Biological & Medical Systems, Imperial College of Science, Technology & Medicine, London SW7 2BX, fax (0171) 584 6897, Email euromech96@ic.ac.uk ★★

2nd European Meeting on
GLIAL CELL FUNCTION IN HEALTH & DISEASE
21-25 April 1996
Arcachon, near Bordeaux, France
This international meeting will include 12 plenary lectures covering major fields of glial cell physiology (ion channels, membrane transporters, metabolism) and the cell biology of neurone-glia interactions. Most of the time will be allotted to poster presentations. Further details from: Dr Dionysia Theodosis, INSERM U378, Universite de Bordeaux II, 33076 Bordeaux cedex, France, fax (00 33) 56 98 19 15, Email dap@frbdx11.cribx1.u-bordeaux.fr ★

Micro 96
INTERNATIONAL MICROSCOPY CONFERENCE & EXHIBITION
2-4 July 1996
Hammersmith, London
Main themes of Probes in Light, Electron and Digital Microscopy. Life Sciences section including immunogold probes, living cell cytochemistry, affinity probes and NO synthase. The programme takes the form of lectures, tutorials and posters. Deadline for submission of contributed abstracts for oral or poster presentation is Friday 5 April 1996. Further details from: Royal Microscopical Society, 37/38 St Clements, Oxford OX4 1AJ, tel (01865) 248 768, fax (01865) 791 237, Email rms@vax.ox.ac.uk ★

4th IUBMB Conference
THE LIFE & DEATH OF THE CELL
14-17 July 1996
Edinburgh International Conference Centre
Topics include: cell death mechanisms; cell growth, control and development; cellular stress & protection mechanisms; cellular fates of proteins; signal termination & compartmentalisation. Further details from: The Conference Assistant IUBMB 1996, The Biochemical Society, 59 Portland Place, London W1N 3AJ, tel (0171) 580 5530, fax (0171) 637 7626, Email meetings@biochemsoc.org.uk ★

International Association for the Study of Pain
8th WORLD CONGRESS ON PAIN
17-22 August 1996
Vancouver, Canada
Further details from: IASP Secretariat, 909 NE 43rd St, Suite 306, Seattle, WA 98105, USA, tel (00 1) 206 547 6409, fax (00 1) 206 547 1703, Email iasp@locke.hs.washington.edu ★★

International Society for Mountain Medicine
2nd World Congress of
HIGH ALTITUDE MEDICINE AND PHYSIOLOGY
16-21 September 1996
Cusco, Peru
Sessions include: physiology of acute and intermittent exposure to high altitude; endocrine and reproductive physiology; exercise, sports and hypoxia training at high altitudes; cardiovascular and respiratory physiology and pathophysiology. Further details from: Dr F Leon-Velarde, Universidad Peruana Cayetano Heredia, Dpto de Fisiologia, Apartado 4314, Lima 100, Peru, fax (00 51) 14 482 34 35, Email fabiolv@upch.edu.pe ★

Journal Back Volumes
Dr John Kemm, a former Member of the Society, would like to dispose of his Member's copies of *The Journal of Physiology* (1975-1991) and his set of the *Journal of Endocrinology* (1973-1988). He can be contacted on (0121) 456 5600 and would be particularly pleased to hear from a Third World medical school. Merton College Library would also like to dispose of its copies of *The Journal of Physiology* (1949-1987); anyone interested should contact Dr Sarah Bendall on (01865) 276308. ★★★

Overseas Members
Overseas Members receive their Meetings packets only a short time before a Scientific Meeting. As a consequence, making travel arrangements and reservations can be a problem. To help Overseas Members, booking forms for Meetings can be requested in advance of the usual delivery date from the Meetings Secretary's office.

Designated Sessions at Scientific Meetings
The Society has agreed that part of each Meeting can be set aside in advance for a Designated Session on a special topic. Such Sessions will run in parallel with the other sessions of Communications. Suggestions from Members for Designated Sessions at future Meetings can either be made directly to the Special Interest Group organiser or to the Meetings Secretary.

Animal Legislation

The Committee of The Physiological Society has an advisory group that monitors the working of the Animal (Scientific Procedures) Act 1986. Members are asked to provide any relevant information relating to its local implementation to:

Tony Angel, Dept of Biomedical Science, The University, Sheffield S10 2TN, tel (0742) 701442

Cecil Kidd, Dept of Biomedical Sciences, Marischal College, University of Aberdeen, Aberdeen AB9 1AS, tel (0224) 640618/273004

Stephen Lisney, Dept of Physiology, School of Medical Sciences, University Walk, Bristol BS8 1TD, tel (0272) 303461

TITLE	PURPOSE	ELIGIBILITY	AWARDS	APPLICATIONS
AFFILIATE TRAVEL GRANT SCHEME	To enable Affiliates to attend meetings and symposia overseas	Affiliates in the British Isles who have not already received a grant under this scheme (Eligibility continues for a year after election to Membership of the Society)	Up to £600	Applications are considered at the end of January, March, May, July, September and November
BENEVOLENT FUND	To assist persons who have contributed to the advancement of Physiology and are in necessitous circumstances	Physiologists, their staff and dependants	Depend on circumstances	Applications are reviewed immediately on receipt
BURSARIES	To support graduates undertaking MSc courses in physiological disciplines who cannot obtain funds from other sources	Science graduates of institutions in the British Isles	Up to £2,000	Applications are considered at the end of May and November
DALE FUND	To promote new physiological research in the British Isles	Physiologists working in the British Isles	Travel for collaborative research, learning new techniques, practical workshops and training courses: up to £800. Travel to conferences and symposia: up to £300	Applications are considered throughout the year
EASTERN EUROPEAN AND THIRD WORLD SUPPORT SCHEME	To support centres of scientific excellence where high quality physiological research is threatened by lack of resources	Centres of physiological research in Eastern European and Third World countries demonstrating scientific excellence and financial need	Up to £10,000 per annum, for up to three years	Applications are considered at the end of January, March, May, July, September and November
EASTERN EUROPEAN AND THIRD WORLD VISITOR FUND	To allow physiological workers in Eastern European and Third World countries to visit laboratories in the British Isles	Physiologists in Eastern European and Third World countries seeking to undertake collaborative research in the British Isles	Up to £1,500	Applications must be made by the host in the British Isles, and are considered at the end of January, March, May, July, September and November
NEW LECTURERS SUPPORT FUND	To help young physiologists to establish independent research programmes	Academic staff in the first year of their first appointment to an established University lectureship in the UK or Eire	Up to £5,000 for consumables, equipment and, in exceptional cases, technical help	Applications are considered at the end of March and September
POSTGRADUATE SUPPORT FUND	To assist the completion of research projects which have been delayed due to circumstances outside the applicant's control	Graduates (normally PhD students) in departments of Physiology or a cognate science in the British Isles, whose supervisors are Members of the Society	Up to £1,000	Applications should normally be submitted before 31 July, but may be considered at other times
RUSHTON FUND	To promote new physiological research in the British Isles	Young physiologists working in the British Isles who are not yet Members of the Society	Travel grants for collaborative research, learning new techniques, practical workshops and training courses: up to £500.	Applications are considered throughout the year
VACATION STUDENTSHIPS	To enable undergraduates to undertake research projects in the summer vacation	Undergraduates in the UK and Eire in their second year or above, for work in the laboratory of a Member of the Society	Up to £500, for maintenance (no support available for consumables or other research expenses)	Applications **for 1996** must reach the Oxford Office by **30 April**

For Office use:		
A	R	L

Confidential

APPLICATION FORM FOR AFFILIATION TO THE PHYSIOLOGICAL SOCIETY

Surname (IN CAPITALS) ..... Forenames (IN CAPITALS) .....

Special Scientific Interest: (eg thesis title or postdoctoral project) .....

.....

Interests: IUPS classes ..... / ..... / .....
(See overleaf for codes)

Groups: .....
(See overleaf for codes)

Photograph of Candidate

Work address .....

.....

Tel ..... Fax .....

Email address ..... Date of Birth .....

Present Course/Postdoctoral Position .....

Qualifications:

Degree	Date	Subject	Awarding Institution

I enclose a cheque for £ 10 payable to The Physiological Society.

I confirm that the information given above is accurate and up to date and that I hereby authorise The Physiological Society to hold this, and such other personal information as is supplied to the Society by me or my authorised agents or representatives in future, in machine-readable form for use for the purposes registered under the Data Protection Act 1984.

Signed ..... Date .....

Members of The Physiological Society proposing Candidates should read the Guidelines overleaf and sign the following statement.

I hereby confirm that the Candidate:
(a) is either a postdoctoral worker or registered for a higher degree in Physiology or a cognate subject, and
(b) is a person suitable for admission to Society Meetings.

Name (IN CAPITALS) ..... Signature of Proposer .....

Tel ..... Fax ..... Date .....

Address .....

.....

On completion, please return this form to: The Physiological Society (Affiliation), PO Box 506, OXFORD OX1 3XE, (UK).

GUIDELINES TO MEMBERS OF THE PHYSIOLOGICAL SOCIETY

PROPOSING CANDIDATES FOR AFFILIATION

This form of association with the Society is intended for physiologists still in the early stages of their careers working in laboratories in the UK, Eire or **abroad**. It is open to postgraduate students registered for a higher degree in Physiology or a cognate subject and to postdoctoral workers who are not yet Members of the Society. **It is expected that postdoctoral workers proposed as Affiliates will normally be (a) within the first five years of attaining a first professional qualification (PhD or medical degree) or (b) awaiting the outcome of their proposal for nomination for election to Membership of the Society.**

The Committee has authorised the Committee Secretary to consider and accept or reject proposals for Affiliation to the Society as they are received throughout the year, so that these can be processed quickly. The Committee Secretary regards himself as free to withdraw a proposal and return the papers to the Proposer.

Affiliation is for a term of five years in the first instance . Affiliation must be renewed by payment of the appropriate fee at the start of each year (which for this purpose is the academic year, ie October to September). For administrative convenience, Affiliates registered after October will have to pay for the full year. The fees are determined from time to time by the Treasurer; they are currently:

	UK & Eire	Europe	Non-Europe
With Abstracts	£10	£30	£35
Without Abstracts	N/A	£15	£20

All Affiliates receive copies of programmes, notices and the Society's Magazine. Affiliates can attend Meetings in their own right but must be introduced by a Member of the Society when giving a Communication or Demonstration. Affiliates are not Members of the Society and do not have the right to vote at its General Meetings.

Field of Interest:

01	Anaesthesia
02	Anatomy & Embryology
03	Anthropology
04	Biochemistry
05	Biophysics
06	Biomedical Engineering
07	Blood
08	Cardiovascular
09	Cellular & Tissue
10	Comparative Physiology
11	Electrolytes & Water Balance
12	Endocrines
13	Energy Metabolism & Temperature Regulation
14	Environmental
15	Enzymes
16	Gastrointestinal
17	General Physiology
18	Gerontology
19	Immunology
20	Liver & Bile
21	Lipids & Steroids
22	Microbiology
23	Minerals, Bones & Teeth
33	Molecular Physiology
24	Muscle & Exercise
25	Neuroscience
26	Nutrition & Food
27	Pathology
28	Pharmacology
29	Radiation
30	Renal
31	Reproduction
32	Respiration

You may specify up to three fields of interest.

Special Interest Groups
Current Codes

AF	Autonomic Function
BB	Blood-Brain Barrier
CC	Cardiovascular Control
CI	Comparative & Invertebrate Neuroscience
CN	Cellular Neurophysiology
CP	Comparative Physiology
DP	Developmental Physiology
EM	Epithelia & Membrane Transport
GI	Gastrointestinal Tract
HC	Heart & Cardiac Muscle
HI	History of Physiology
HP	Human Physiology
IC	Ion Channels
ME	Microvascular & Endothelial Physiology
MC	Muscle Contraction
MP	Molecular Physiology
NE	Neuroendocrinology
PP	Placental & Perinatal Physiology
RP	Renal Physiology
RE	Respiratory Physiology
SC	Sensorimotor Control
SF	Sensory Functions
SM	Smooth Muscle
SP	Somatosensory Physiology

NEW
4/8/95

For Office use:		
A	R	U

STUDENT ASSOCIATE PROPOSAL FORM

Surname (IN CAPITALS) ..... Title*: Mr/Mrs/Ms/Miss * Circle as appropriate

Forenames (IN CAPITALS) ..... Date of Birth: .....

Details of the degree for which you are currently registered:

Degree title: .....

University: .....

Department: .....

Commenced (date): ..... Due to complete (date): .....

Special Scientific Interest, if any (*eg* thesis or project title): .....

.....

Photograph of Candidate

Current Address

Please give here the address to which you would like correspondence from the Society, including Meetings Programmes and Magazines, to be sent for the current academic year

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Tel: .....

Fax: .....

Email: .....

Permanent Address (if different)

Please state your permanent/home address, at which we will be able to contact you after completion of your studies.

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Tel: .....

I enclose a cheque for £5 payable to The Physiological Society.

I confirm that the information given above is accurate and up to date and that I hereby authorise The Physiological Society to hold this, and such other personal information as is supplied to the Society by me or my authorised agents or representatives in future, in machine-readable form for use for the purposes registered under the Data Protection Act 1984.

Signed ..... Date .....

Members of The Physiological Society proposing Candidates should read the Guidelines overleaf and sign the following statement.

I hereby confirm that the Candidate:
(a) is registered for a first degree in Physiology or a related science, and
(b) is a person suitable for admission to Society Meetings.

Membership No
— — — — —

Name (IN CAPITALS) ..... Signature of Proposer .....

Tel ..... Fax ..... Date .....

Address .....

.....

On completion, please return this form to: The Physiological Society (Student Associateship), PO Box 506, OXFORD OX1 3XE.

GUIDELINES FOR MEMBERS OF THE PHYSIOLOGICAL SOCIETY

PROPOSING CANDIDATES FOR STUDENT ASSOCIATESHIP

Eligibility

Persons registered for an undergraduate degree course in Physiology or a related science. Candidates will normally be expected to have completed their first year of study. Students are encouraged to associate at the beginning of their second year.

Proposal

Candidates must be proposed by a Member of The Physiological Society. The Committee has authorised the Committee Secretary and/or the Student Associate Liaison Officer to approve proposals as they are received throughout the year.

Publications

Student Associates receive copies of the Magazine and Programmes of Meetings.

Fee

The mailing fee for Student Associates is £5 per academic year (or part thereof).

06/95

At The Physiological Society Staff get-together in Oxford. Clockwise: Jane Ault (Administration Office) (standing), Sue Dodds (Experimental Physiology)*, Ron Edmondson (the Treasury), Victoria Penrice (the Treasury), Fiona Catherines (the Committee Secretary's Assistant), Deborah Paul* (Magazine *Office), Nina Burdakova (the Foreign Secretary's Assistant), Hilary Howard* (Experimental Physiology) *and Helen Fitzwilliam (the Meeting Secretary's Assistant)*

Andy Mell (Publications Office)

Barbara Ellis (Publications Office)

The Pharmacological Society and The Physiological Society get together at the Jazz Evening

Hilary Howard (right) (former Meeting Secretary's Assistant) greets Helen Fitzwilliam (left) (current Meeting Secretary's Assistant)

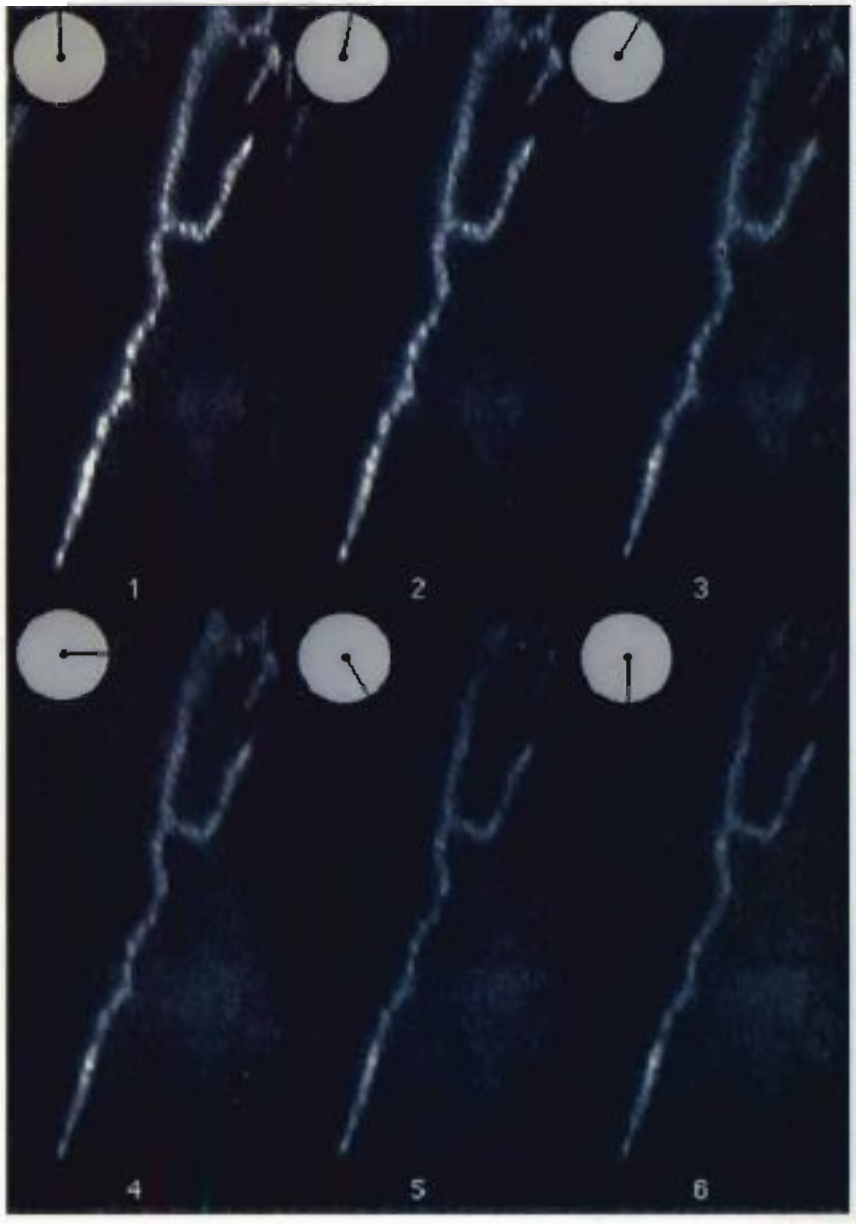
Photography by Deborah Paul and Saffron Whitehead

Clockwise from the left: Ole Petersen (Foreign Secretary), Nina Burdakova, Hilary Howard, Helen Fitzwilliam, Sue Dodds, Ron Edmondson and Victoria Penrice enjoy the afternoon sunshine

Back Cover:

Recycling Vesicles

The monochrome series shows a frog cutaneous pectoris motor nerve terminal labelled with FM1-43. Each bright spot is a cluster of synaptic vesicles. The spots dim during an eight minute period of stimulation at 30Hz, as labelled vesicles are replaced with recycled, unlabelled membrane. The colour image on the top right shows a terminal in a reinnervated 4th deep lumbrical muscle from an adult rat, labelled with RH414. In the lower right panel, two end-plates are visible apparently on the same muscle fibre, innervated by fibres labelled with FM1-43 (fluorescent yellow/green) and RH414 (fluorescent orange). Note the intermingling of fluorescent yellow/green and orange boutons at the lower end-plate, indicating the fibre is polyneuronally innervated.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