The Dublin Meeting

Trinity College from College Street.

Professor C S Breathnach.

Dr Philip Nolan and his wife Dr Miriam Langdon.

Bernard Donne with his subject Liam Glynn in the Exercise Laboratory.

(L-R) Tom Fay, Brenon Leeson and Alfred Byrne, Principals and Senior Technicians.

Photography by Martin Rosenberg

Front cover: Magnolia, courtesy of Saffron Whitehead
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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 whenever possible. Use of disks reduces the risk of introduction of errors during retyping. 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
Contact the Editors office or the Administration office for submission dates. 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).

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By the 16th Century, several universities had been established in England and Scotland, but there was not one in Ireland. Lobbying of successive monarchs eventually led in 1592 to creation of 'The College of the Holy and Undivided Trinity near Dublin founded by the Most Serene Queen Elizabeth', the purpose of which was to provide 'for the education, formation, and instruction of youths and students in the arts and faculties'. It has been doing so ever since. The first recorded medical graduate of Trinity was John Stearne (1658), who achieved a powerful double: he not only became the inaugural Regius Professor of Medicine but also founded the Royal College of Physicians of Ireland. Teaching of Trinity undergraduates actually took place at that venue until 1711, when a new building known as the 'Anatomy House' was erected on the current site of the main Trinity library and three lectureships in preclinical sciences were created.

It was, however, another 200 years before a department of physiology arrived at Trinity, since the subject was taught through the Institutes of Medicine until 1922. In that year, the professorship of the Institutes of Medicine was replaced by a Chair of Physiology and Sharpey-Schafer's former assistant, Harold Pringle, became the first Professor of Physiology. Remarkably, only three other incumbents have held the Chair over the succeeding 75 years; David Smyth Torrens (appointed in 1936), Roland Edward Moore (1968) and Christopher Bell (1995). Opinion is divided on how to interpret this statistic.

Teaching and staff

The Department of Physiology is within the Faculty of Health Sciences. We provide courses in both physiology and histology to students of medicine, dentistry, pharmacy and several therapies, as well as to science students. In medicine, normal and pathological physiology are taught over the second and third years of the 6-year course, with a current class size of 115 students. More condensed courses are provided for the other health sciences streams. The Honours course in science is 4 years in duration, the last two of which involve attachment to a specific Department. We currently admit 12 students annually into the Honours programme in physiology. While this is far less than the demand for places, our view is that an Honours degree should include a substantial research component and we cannot guarantee laboratory placements for more than this number.

There are currently 9 full-time academic staff and 22 research students and post-doctoral fellows. Since its inception, the Department has been located in the former College museum designed by Deane and Woodward, architects of the University Museum at Oxford. As the exterior must not be altered, adapting this building to provide additional modern space is a chronic problem. Fortunately this year, at the expense of severe emotional stress on all members of the Department, we have been able to create a new story of accommodation within the existing shell, which goes some way towards relieving these pressures.

Research themes

Current research facilities in the Department are directed towards cellular neurophysiology, neurochemistry, intracellular ion measurement, image analysis, cell culture and metabolic assessment in animals, and metabolic and climatic studies, locomotor evaluation and cardiorespiratory assessment in human subjects. A Departmental laboratory on the St James' Hospital site provides bench facilities close to the bedside.

Most of the Departmental research centres around three general themes. One of these is cellular neurobiology. Roger Anwyl and Marina Lynch head two active groups investigating different aspects of hippocampal function, with R. Anwyl’s approach being electrophysiological and M. Lynch’s being biochemical. As well, Chris Bell brought with him an interest in neural development and
an inbred rat strain which has defective neurotrophic control. Previous studies of this strain concentrated on abnormalities of the peripheral nervous system but, in collaboration with M. Lynch, central defects are now also being revealed. A second research theme is lung biology. Mary McElroy, who joined the Department from UCSF last year, is using immunological probes to study responses of the lung to injury. Helen Harty, who came from Charing Cross at around the same time, has interests in respiratory sensation and its relationship to respiratory control. Their arrival has provided a valuable range of pulmonary expertise, with links to other workers in the Department. The third general area of research is exercise physiology, which covers a large number of studies being carried out. Individual interests focus on biomechanics (Roger Luckwill, Bernard Donne), metabolism (Fred Andrews), endocrinology (Pat Hartigan) and respiratory and circulatory performance (H. Harty, C. Bell). The Departments of Physiology and of Anatomy also conjointly administer an exercise research laboratory, which is based in the Anatomy building and supervised by B. Donne. Other research interests of individual staff members include obesity (F. Andrews), reproduction in farm animals (P. Hartigan), thyroid function (Alan Tuffery) and mechanisms of hypertension (C. Bell).

In addition to laboratory research, the Department is actively involved in development of computer-based teaching programmes in physiology and histology. In particular, A. Tuffery, assisted by our computer technician Quentin Comerford, has produced a bank of scanned microscopic images accompanied by tuition material and multiple-choice questions, which is being phased into the histology course to replace use of microscopes. A pilot version of this package was shown to the Society at Cork 1995; the version in current use will be on view during the March Meeting.

Long overdue

The records are indistinct, but we know the Department hosted a Meeting of the Physiological Society at least as long ago as 1948. However, this has certainly not occurred since 1976, so next March's gathering is long overdue. We are delighted at the interest that has been shown and the Meeting promises to be both large and wide-ranging. Seven of the Society's Special Interest Groups have been able to schedule designated sessions. Keynote lectures will be given by David Adams and Daniel Wolpert and Stewart Sage will be the Wellcome Prize lecturer. A star-studded symposium will be held on the Neurobiology of Ageing and there is an additional bonus to participants in the form of the Purser Lecture. John Mallet Purser was King's Professor of the Trinity College Institutes of Medicine over 1874-1901 and had a substantial influence on the development of Irish medical research. He was as well especially important in the development of physiology here, since he was the first to insist that Trinity medical students received an identified course of lectures in the subject. The periodic lecture given in his memory is hosted jointly by the Departments of Physiology, Anatomy and Pathology and lecturers are chosen on the basis of achievements that span these three disciplines. Such a breadth of impact certainly characterizes this year's Lecturer, Ronald Oppenheim, from Wake University, whose work on neural development and repair processes will be familiar to many readers.

A millenium of accumulated bibulosity

Social events at the Meeting will include a reception after the Purser Lecture, the usual Society dinner - held in the 18th Century College Dining Hall and preceded by sherry - and, on the last evening, a ceili for anyone who has not been able to work off sufficient energy during the scientific sessions. For the rest - the innumerable pubs within walking distance of Trinity represent more than a millenium of accumulated bibulosity; interspersed with them are restaurants to suit all pockets and all taste buds. There is something for everybody in Dublin - just hail a local physiologist for directions!
1997 AGM: Committee Nominations and Agenda Items

The Committee will be considering nominations for candidates for election as Ordinary Members of the Committee at the AGM in Bristol in September. As usual, nominations can be made either by the Committee itself, or by five Members of the Society (with the agreement of the nominee). Anyone wishing to suggest a candidate for nomination should contact the Committee Secretary, Professor Peter Stanfield. There will be a further call for nominations after the March Meeting.

Any Member wishing to raise items for discussion at the next AGM is asked to send details to Professor Stanfield before 1 May 1997.

- Molecular Techniques Workshops
Following the success of last year's Molecular Techniques Workshop, a further workshop has been arranged at the University of Glasgow from 1 - 12 September 1997. The course is aimed at people who are reading for a PhD or who are at post-doctoral level and offers a training in molecular biological techniques. The number of students on the course is limited to 16. A notice of this course appears elsewhere in this Magazine.

For further details please contact the Committee Secretary's Office. The closing date for applications is 31 March 1997.

- Vacation Studentship Scheme
The Committee has awarded £15,000 to provide vacation studentships in 1997. Members are reminded that the closing date is 30 April 1997 and that all applications must be made by a Member of the Physiological Society on behalf of the student. Please contact the Administration Office for further details and application forms.

- Comparative Physiology / Endocrinology Special Interest Group
After discussion by the Committee at its November Meeting, it was agreed to replace the Comparative Physiology Special Interest Group with a SIG in Endocrinology, a subject given too little prominence at Society meetings. All members of the former Comparative Physiology SIG are warmly encouraged to present their work at designated sessions of other relevant SIGs. Comparative Physiologists are reminded that the Society will hold a scientific meeting at the Laboratory of the Marine Biological Association, Plymouth, in May this year.

- UK Life Sciences Committee
The UK Life Sciences Committee (formerly known as the UK National Committee for Molecular, Cellular & Physiological Life Sciences) held its first meeting at the Biochemical Society on 2 December 1996. An executive committee will shortly be elected from among the member societies, and the UK Committee can then start its work enhancing the influence of life scientists in public policy.

- Millennium Working Party
The Millennium Working Party held its first meeting in December to discuss the 1000th meeting of the Society which also coincides with the Millennium. Suggestions made included a Symposium on Historical and Future Themes, an art exhibition on Faces in Physiology, and the commissioning of a Work of Art or Music or a postage stamp.

- Scientific and Charitable Expenditure of the Society
Decisions regarding the scientific and charitable expenditure of the Society were finalised at the Newcastle Meeting in November. It was agreed that the Society is currently over-reliant on profits from sale of investments and that steps must be taken to reduce costs. Savings of some £70,000 will be sought this year in Society expenditure. It was also decided that budget bid rankings should be closely linked to the aims and objectives of the Society and that the Strategic Plan would be revised to facilitate this by clarifying strategy and methods of implementing policy.

- Continuing Medical Education (CME) Accreditation
Following negotiations by the Meetings Secretary, Professor Chris Fry, Physiological Society Meetings have been approved by two of the Royal Colleges (Anaesthetists and Surgeons) for CME accreditation for medical trainees. The scheme is expected to commence at the Dublin Meeting in March and interested parties should write and register with the Administration Office.

- Journal of Physiology and Experimental Physiology
The Journals Management Group has approved the electronic publication of the Society's Journals and available software is now being explored. A trial period should commence during 1997, with an appropriate schedule of charges being developed next year.
Centres of Excellence Scheme
The Foreign Secretary presented details of the Centres of Excellence Support Schemes which the Physiological Society runs in St Petersburg, Sofia, Prague and Minsk. Most of the centres do not receive support from any other organisation and are reliant on the Society's support for basic equipment. A final report was also presented from Professor PG Kostyuk in Kiev. The Society is considered to have played a small but crucial and honourable role in saving Ukrainian Physiology after 1994.

Genes & Function
The first issue of Genes & Function will be published in February.

Outcome of the 1996 Research Assessment Exercise
The 1996 RAE saw mixed fortunes for Physiologists. Among the traditional Departments of Physiology, Cambridge, Edinburgh and Newcastle improved their ratings, and Liverpool was awarded 5*. In the event 44% of staff presented under the Physiology RAE were in departments rated 5 or 5*. The Committee is aware that many physiologists are now in departments that have been reorganised. There is a need to conserve and extend the constituency of the Society as departmental reorganisations take place and to help develop the research base in the physiological sciences. The support for the Molecular Techniques Workshop, outlined above, is part of the Committee's commitment to this development.

If you have any items that you feel the Committee should discuss, please contact the Committee Secretary.

Christina Docchar

MOLECULAR TECHNIQUES WORKSHOP
1 - 12 September 1997

A workshop for the training of physiologists in molecular biological techniques is to be run at the Institute of Biomedical and Life Sciences at the University of Glasgow from 1 to 12 September 1997. The workshop, which is organised under the auspices of the Physiological Society and the Wellcome Trust, will be based on practical experimental procedures (including the handling of DNA and RNA, cloning, expression in oocytes, the use of antisense technology, RT-PCR, and site-directed mutagenesis) and will be appropriate for physiologists who are reading for a PhD or are at the post-doctoral level. The number of students on the course will be limited to 16. Students should intend to follow a career in the physiological sciences.

Applications for a place on the course will be treated competitively and should include the following information:

- The nature of your current work (PhD/post-doctoral project).
- A brief account (fewer than 500 words) of how attendance at the workshop would benefit your current project and your subsequent career.
- A letter of recommendation from a Society member to whom you are known.

Applications should be sent to the Committee Secretary’s Office at the Department of Cell Physiology and Pharmacology, University of Leicester, PO Box 138, Leicester LE1 9HN; telephone: 0116 223 1400; FAX: 0116 223 1401; Email: cd22@le.ac.uk

Applications should be received by 31 March 1997 and candidates may be expected to be informed of the outcome of their application by the end of April 1997. Further details concerning the course itself and possibilities for assistance towards accommodation and subsistence will be sent to successful candidates.
On 1 October 1996, a musical evening was held in memory of Hugh Davson. Some hundred people attended the evening which was held in the splendour of the restored Governors Hall of St. Thomas’ Hospital, London. The evening was introduced by Dr Malcolm Segal, Chairman of Physiology of UMDS who has worked with Hugh on several textbooks over the past thirty years. The evening commenced with a breathtaking performance by Zora Mihailovich, who was Professor of Music at Belgrade University. Zora is married to Berislav Zlokovic and often played for Hugh at his house in Wimbledon. Zora played a selection of some of Hugh’s favourite Chopin pieces: two Nocturnes, op. 61 in B-major and op. 27 in C-sharp minor followed by the Sonata op. 35 B-flat minor. Hugh joked with Zora that part of this latter piece “Marche funebre” with the wind rushing around the grave stones would be ideal for his funeral service. This section of the programme was concluded with some choral works by the Ashstead Singers, one of whom, Jim McGarrick, a lecturer at UMDS often discussed music with Hugh over a lunchtime pint. Following a finger buffet accompanied by Hugh’s fine claret, the second half of the evening commenced with a Haydn sonata played by Mary Leonard, a St. Thomas’ social worker and concert pianist, followed by readings from Shakespeare by John Abbott, Head of English at a Hertfordshire School, interspersed with pieces played by Mary to reflect the mood of the readings. Hugh loved Shakespeare and used to learn the sonnets as a relaxation in the small hours of the night. Mary’s programme was completed with a piece by Mendelssohn which led to eulogies of Hugh, his life and science by Professor Mike Bradbury and Professor Alan Howe of King’s College London. The evening was completed by a little Italian Opera sung by Professor Berislav Zalokovic who spent a year with Hugh in London and now works in Los Angeles as Professor of Neurosurgery and Physiology at the University of Southern California.

Dr Adrian Pini had been appointed as Senior Lecturer in the Sherrington School of Physiology. Adrian originally trained as a dentist at Guy’s Hospital gaining an intercalated B.Sc. in Physiology en route. After an M.Sc. at University College, while he was the Bayliss Starling Scholar, he completed a Ph.D. with Bruce Lynn. He then spent two years in the Department of Pharmacology at Cambridge, then time at Columbia and McGill. He returned to University College in 1990 and established his own research laboratory funded by the MRC. His main research interest is on chemorepulsion and mechanisms of guidance of neurones between the CNS and their target tissue such as the retina. He has published several seminal papers on this topic in Nature and Science.

Many of Professor K D Bhoola’s friends in this country may be interested to learn that, in recognition of his contributions to the kallikrein/kinin field, Professor Kanti Bhoola (ex Department of Pharmacology, Bristol) now Head of the Department of Experimental and Clinical Pharmacology, University of Natal Medical School, was awarded the E K Frey-E Werle Commemorative Medal on October 25, 1996 at the Kinin 96-Durban Meeting.

Mary Forsling, Convenor of the Special Interest Group in Neuroendocrinology has been appointed to a Chair in Neuroendocrinology in the Division of Physiology at Guy’s and St Thomas’s Medical and Dental School, London.
TO VOTE OR NOT TO VOTE - AND WHEN!

Results of questionnaires on Voting for Abstracts and the Annual Number of Domestic Meetings

Many of you may remember returning two questionnaires last year concerning the above issues. Scientific Meetings are the most overt expression of Physiological Society activity so they should be managed in a way which gains a broad consensus of the Membership, as well as reflects the current academic atmosphere. The response was impressive and many of you also took the trouble to write further about individual points. I am very grateful for the time and effort taken by all who replied and when particular issues were raised I have tried whenever possible to put them into effect.

The first question was about the number of annual domestic Scientific Meetings. For many years the Society organised about eight relatively small meetings per year which were often hosted on Friday and Saturday at Departments of Physiology. Around the time of the Glasgow IUPS conference the number of meetings was reduced to three or four larger affairs, held during weekdays and requiring considerably larger resources. When I became Meetings Secretary I had many comments favouring both options and so in a spirit of compromise I tried to tread a middle ground and arrange about six meetings per year. The results are shown in Figure 1: most prefer this middle ground.

The second, more thorny, question was about voting on abstracts. Several arguments can be put both for and against the procedure and many were summaries on the back of the questionnaire. Furthermore there was a common perception that the approval procedure for Posters and Demonstrations was particularly poor and so the question was asked for each category of presentation. The results are shown in Figure 2. There was a clear majority to retain voting for Oral Communications and smaller majorities for Posters and Demonstrations. Meanwhile I have tried to revive Poster approval by including it within the appropriate Special Interest Group Session and allocating a small time for each group to summarise their Poster. If anyone has views on this procedure, either as a success or failure, please let me know.

It is interesting to reflect on some of the side-issues that emerged from the second questionnaire.

- Was voting only favoured by Members and disliked by the more dynamic Affiliates? No, both groups had identical views - eg retention of voting for Oral Communications: 80.2% Members (n=823), 74.5% Affiliates (n=322).

- How many of those replying had given a presentation in the past five years? The result was a gratifying 79% (81% Members, 74% Affiliates).

- What was the most frequently cited reason for retaining voting? 83% said “Voting improves the quality of submitted abstracts and presented talks. It also ensures that people show up to present their work rather than having a submitted abstract published automatically”.

Is the current number of scientific meetings (about 6) per year adequate?

<table>
<thead>
<tr>
<th>Number</th>
<th>Yes 725 (70%)</th>
<th>No 315 (30%)</th>
</tr>
</thead>
</table>

Do you wish to maintain voting?

<table>
<thead>
<tr>
<th>Number</th>
<th>Yes 78.7%</th>
<th>Yes 64.2%</th>
<th>Yes 54.2%</th>
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<tr>
<td>Orals</td>
<td>901</td>
<td>731</td>
<td>609</td>
</tr>
<tr>
<td>Posters</td>
<td>244</td>
<td>408</td>
<td>514</td>
</tr>
<tr>
<td>Demonstrations</td>
<td>390</td>
<td>440</td>
<td>420</td>
</tr>
</tbody>
</table>

Fig 1.

Fig 2.
What was the most frequently cited reason for abolishing voting? 80% said “Voting does not work well, few people in the audience vote on a particular abstract and the procedure can centre on debates about the exact wording. Even poor abstracts are usually accepted. Abstracts for Posters and Demonstrations are simply nodded through”. However, this is something we can all rectify. The majority clearly want to retain the system and it is therefore up to us to ensure that it is carried out as enthusiastically and honestly as possible.

The success of Meetings depends on your views, do let me know if there are issues you would like to raise and that you think I might be able to do something about.

Chris Fry
Meetings Secretary
Institute of Urology
London

No longer have space to keep my Journals of Physiology for the period 1976 to 1986 (inclusive). I have heard that you may have a scheme to send these to third world universities. Please let me know if you or anyone else would like them - otherwise I will dispose of them.

Dr TIB Simons
Physiology Group, King's College London
Tel: & Fax: +44 (0)171 873 2873

Four vice-chancellors, Sir Derek Roberts, provost of UCL, Alec Boers of Cambridge, Brian Follett of Warwick and Sir Stewart Sutherland of Edinburgh, put forward their case for the need for the formation of a twelve-strong league of premier universities for the brightest students following fears that standards in higher education are falling. They envisage that if higher education is to be of the highest quality, then it must offer outstanding academic staff, excellent facilities and civilised funding for students.

Observer 22 December 1996 p.21
Guardian 23 December 1996 p.7

Source: SPIN

In a new venture that aims to encourage the development of talented scientists intending to pursue careers in academic pharmacology, the Department of Pharmacology appointed 3 Pharmacology Fellows in 1996. We intend to extend the scheme this year by appointing additional Pharmacology Fellows for fixed tenures of up to 5 years. Successful applicants are likely to have up to 5 years postdoctoral experience, but the terms are flexible and would allow part-time appointments or appointment of staff returning after a career break. Fellows will be associated with existing research groups within the Department and will be expected to develop research programmes that benefit from the interactions between labs offering a range of approaches to pharmacological problems. Substantial research expenses will be provided and Fellows will have access to the resources of their host laboratories. With guidance from experienced staff, Fellows will also be able to broaden their experience of teaching in both practical and lecture courses for graduates and undergraduates. The teaching commitments will be modest and leave ample time to develop innovative research programmes.

Research potential and commitment to excellence in teaching will be the foremost criteria for appointment. Salary will be on the appropriate university scale. College appointments may also be available.

An information package and application details are available from Dr D James (Department of Pharmacology, Tennis Court Road, Cambridge, CB2 1QJ, UK. Tel: 01223 334002 Fax: 01223 334040) or on the www at http://www.pharm.cam.ac.uk/FP/Fellowships.html. The closing date for applications is May 10 1997 and interviews of short-listed candidates will take place on June 24.
The recent symposium on "Respiratory & Cardiovascular Adaptation to Chronic Hypoxaemia" organised by the Respiratory Special Interest Group was both interesting and stimulating. The wide range of topics covered - from birds flying over Everest (how do they do that?) to the effects of hypoxia on gene expression - reflected the huge diversity and applicability of this important subject.

There was also a SIG convenors’ meeting at Sheffield and I would like to summarise our discussions. Future meetings and venues for our Group will be planned two years in advance. For 1998 we will meet at Liverpool (April) and Southampton (with the Pharmacological Society; September). It was agreed that there would be two SIG sessions per year and every effort would be made to run any related SIG sessions (ie Respiration, Autonomic Function) in series with Cardiovascular and Respiratory Control. There will be time allocated for one Business Meeting per year. The duration of term of a convenor will be increased from three to four years but this does not prevent a change of convenor during this time if the Group so wishes. There will be a maximum of 12 symposia in the coming year plus up to two teaching workshops and one teaching symposium.

Looking ahead to Trinity College Dublin, I am delighted that David Adams from the Department of Physiology & Pharmacology, University of Queensland, Australia will be giving us a Designated Lecture entitled “Intrinsic Neural Control of the Heart: Role of Intracardiac Ganglia”. I am sure this will be a fascinating lecture and will include studies on the modulation of both the intrinsic membrane properties of intracardiac parasympathetic ganglion cells and muscarinic receptors.

Looking further ahead to the Meeting in Bristol, I am planning a symposium entitled: “Maturation, Modulation & Plasticity in Cardio-Respiratory Control” which will be held on Friday 5 September 1997 and follow the scientific programme of the Physiological Society Meeting at Bristol (2-4 September). Standby for more details! A Pfizer Prize round will also be associated with our SIG Session at the Bristol Meeting - nominations forms can be obtained from the Meetings Secretary’s Office and page 171 of The Grey Book gives further details.

The Sheffield Meeting

The Sheffield Meeting witnessed a lively G I Tract Designated Session with a full day of Oral and Poster Communications. Mind you, as Graham Dockray eloquently pointed out in his after dinner vote of thanks on the eve of the Designated Session, where better to contemplate one’s gastrointestinal tract than in Sheffield with its long tradition of research on brain-gut interactions. Graham specifically wanted to know how the brain managed to ignore luminal satiety signals from the gut at times like Christmas and Physiological Society dinners.

Congratulations go to Dr Kirsteen Browning who was presented with the Glaxo Prize at the Society dinner for her winning Communication given at the Edinburgh Meeting. Dr Dave Gunput of Glaxo-Wellcome presented her with a cheque and an engraved crystal bowl.

The trademark of this Group is the wide range of topics and experimental approaches that are brought to the Meeting. Secretion, absorption, endocrine function and intestinal afferent sensitivity featured in the morning session while topics covered after lunch ranged from gastric mucus secretion, ion and nutrient transport, to emesis. Poster Communications covered an equally diverse range of subjects and sparked a lively discussion during the approval session. Molecular techniques, isolated cell and integrated approaches fitted comfortably side-by-side throughout the day. A K Stewart, scheduled to present his data on pH regulation in duodenal enterocytes, turned green and lost his voice 45 minutes before his Communication was scheduled to start putting his co-author in the nightmare scenario of having to present his students’ results in an off-the-cuff talk; which he did admirably.

The highlight of the session was an outstanding Designated Lecture given by Professor Michael Gershon from Columbia University in New York. He reviewed the way in which the enteric nervous system develops and in particular described how the use of mutant and knockout mice had enabled the sequence of events whereby neural crest cells migrated to the bowel, dropped anchor and differentially developed in response to local

\[\text{Julian Paton}\]
growth factors and components of the extracellular matrix to be described.

What made the day though was the quality of work presented by the young investigators, nominated for the Glaxo-Wellcome and Pfizer Prizes. It is a pity that the competition was so fierce and not all will be rewarded with a Prize this time around. However, I hope that they will be in the competition again in Bristol when we hold the next GI Tract Designated Session.

David Grundy

HEART AND CARDIAC MUSCLE

IMPORTANT NOTICE
Election of New Convenor

I am, as current Convenor of the Heart and Cardiac Muscle Special Interest Group, standing down, and three nominees have emerged as possible replacements. This is an opportunity to vote for one of the three people listed below either by emailing the name of your chosen candidate, or completing and returning the section below, to:

Dr G L Smith
West Medical Building
University of Glasgow
GLASGOW G12 8QQ

e-mail: g.l.smith@biomed.gla.ac.uk

Heart and Cardiac Muscle Convenor Election

Please vote by ticking the box of your chosen candidate:

Dr Simon Harrison (Leeds) .......... □

Dr Jonathan Kentish
(UMDS, St Thomas’) .................. □

Dr Stephen O’Neill (Liverpool) .... □

Please return the voting slip or email your response by Friday 7 March 1997.
[Photocopied voting slip will not be valid.]

SPECIAL INTEREST GROUP HISTORY
OF PHYSIOLOGY
7-8 November 1997

There is to be a designated session on the history of physiology at the UMDS meeting in November 1997. The Historical Studies and Archives Subcommittee would like to encourage the submission of posters, communications and demonstrations on historical themes, and this advance notice is to alert you to the possibility of contributing to such a session. Anyone wanting particular advice or to discuss a suitable project is asked to contact any current member of the Subcommittee as listed in the Grey Book.

For further information, please contact Dr Tilli Tansey, Wellcome Institute for the History of Medicine, 183 Euston Road, London, NW1 2BE. Tel: 0171 611 8553; Fax: 0171 611 8562; e-mail: t.tansey@wellcome.ac.uk.

Tilli Tansey

HUMAN PHYSIOLOGY

The Sheffield Meeting featured a smaller than usual representation from the Group, with 13 Oral Communications and four Posters in addition to a Designated Lecture. There was, however, a large audience for the sessions - yet again, the accommodation was too small and the seating capacity was exceeded. Some lively
debate took place, with one casualty - unfortunately, Eric Hultman was prevented by illness from travelling to deliver the Designated Lecture, but Paul Greenhaff stepped in as replacement at short notice and made a stimulating presentation.

The Annual Business Meeting of the Group was held after the Designated Lecture and was well attended. Once again, the name of the Group was debated, with strong opinions voiced in favour of a change to include the word “Integrative” in the title, and some suggestions that a reference to “Exercise” should be included. The arguments have been rehearsed on several occasions previously, but repetition helps to ensure that the focus and direction of the Group are not lost sight of. A vote resulted in the present name remaining unchanged.

Concern was expressed that the Group is seen as a soft option, where people present results that would be more appropriate in other Special Interest Groups in the belief that they will be subject to less searching review. This may be the perception of some within the Group, but does not seem to be a generally held view. The remedy, if any is needed, remains as always in the hands of the Group members: there are ways of dealing with material that does not meet the standard of research or presentation that we expect. In spite of often repeated tales of papers that should have been rejected, but were not, this Group probably votes against the publication of abstracts more frequently than most.

The major meeting of the Group for 1997 will be at the Cambridge Meeting in December, and it is proposed that this meeting will feature a Symposium on muscle physiology. There will be a joint session with the Nutrition Society in Dublin on June 15-17: this meeting will feature a Symposium. A Designated Session for 1998 will be at the Cardiff Meeting in December.

Ron Maughan

At the last meeting of the Society in Newcastle (20-21 November 1996), several members of our Special Interest Group presented Oral and/or Poster Communications which were integrated into the Designated Meeting on Cell Signalling. The review lectures on the role of Ca2+ in cell signalling were extremely informative and both Oral and Poster Sessions were well attended and ensuing discussions lively.

During our Business Meeting we considered future venues for the Special Interest Group, bearing in mind the annual Spring meetings of the British Microcirculation Society. The consensus of the members present was that we should hold Designated Sessions during the fall Meetings of the Society. Stuart Sage’s suggestion to hold our next Designated Session at Cambridge (15-17 December 1997) was welcomed. We also briefly discussed the pros and cons of organising another specialist symposium, as at King's College in December 1995, versus Designated Lectures. As more of our members needed to be consulted, I am sending out a circular asking for specific proposals and an update of postal and email addresses (questionnaire to be mailed in due course).

Another news item is that the next meeting of the British Microcirculation Society will be held at the University of Birmingham, 10-11 April 1997. Professor Janice Marshall is also co-ordinating a symposium entitled “Cellular Mechanisms Underlying Control of the Microcirculation” with the following programme:

W F Jackson (Western Michigan University, USA)
K<sub>ATP</sub> channels and regulation of microvascular tone

M J Mulvany (Aarhus University, Denmark)
P-450 cytochrome metabolites and myogenic activity

R Busse (Johann Wolfgang Goethe University, FRG)
Endothelial-derived relaxing factors and their interactions

J M Marshall (University of Birmingham, UK)
Adenosine as a regulator of microcirculation in systemic hypoxia

G E Mann (King’s College London, UK)
The regulation of endothelial cell function in diabetes

H Drexler (University of Freiburg, FRG)
Endothelial dysfunction in heart failure

S E Egginton (University of Birmingham, UK)
Cellular interactions and angiogenesis

S Nourshargh (National Heart & Lung Institute, UK)
Inflammatory mediators and leucocyte migration in the microcirculation
For those interested, the deadline for submission of abstracts for Oral or Poster Communications is Monday 3 February 1997. Further information regarding the British Microcirculation Society meeting or application for membership can be obtained from the Honorary Secretary Professor Rodney Levick, Dept Physiology, St George’s Hospital Medical School, Cranmer Terrace, London SW17 ORE, tel (0181) 725 5354/5391, fax (0181) 725 2993.

The European Vascular Biology Association is holding its annual conference in the Château Grand Romaine in the outer suburbs of Paris, France from 15-18 May 1997. The theme for this conference is “Vascular Response to Stress Factors”. The deadline for abstracts is 15 February 1997. Further information can be obtained from Professor Jean-Luc Wautier, Hôpital Lariboisière, Laboratoire de Recherche Biologie Vasculaire & Cellulaire, 2 Rue Ambroise Paré, 75475 Paris Cedex 10, France. The 29th Meeting of the European Pancreatic Club will be held at King’s College London from 9-12 July 1997. For further information contact Dr Giovanni E Mann, President of European Pancreatic Club, Biomedical Sciences Div, King’s College London, Campden Hill Road, London W8 7AH, email g.mann@kcl.ac.uk or Ms Theresa Potter, Congress Secretariat, tel/fax (0171) 333 4371, email theresa.potter@kcl.ac.uk.

Best wishes for 1997!

Janet Allen
Stanley White

RESPIRATORY PHYSIOLOGY
The Sheffield Meeting
Firstly an apology. Leeds, I’m sorry. Perhaps student bathroom facilities, like previous pains, really are impossible to recall fully but I now have a slight fondness, perhaps verging on romantic nostalgia, for the shared convenience of the quirky, shower cupboard combination you can really get a proper perspective on architectural design. Whatever, the Respiratory Special Interest Group Symposium and Designated Sessions of the Sheffield Meeting of the Society held at an ice-locked Ranmoor House Hall Residence early in January 1997 were, for me, some of the most enjoyable, friendly and informative times I’ve spent at any Meeting for a long while and certainly outweighed any inconvenience that I might have incurred elsewhere. Thanks go to all the local organisers who made my job so easy that I wasn’t even aware I was doing anything but especially to Denise Bee. Ta.

A Symposium on the “Respiratory & Cardiovascular Adaptations to Chronic Hypoxia” preceded the Meeting proper and was attended by some 120 delegates. The day flew by despite being a 9am till 6pm affair, with four sessions each consisting of three speakers presenting half-hour talks on the causes and consequences of chronic hypoxia. This is a topic of much current interest to those of us interested in the fundamental mechanisms underlying oxygen-sensing and vascular remodelling but is also, of course, of great clinical relevance and it was particularly pleasing to find that, for one day at least, science and medicine were not divided by a common language.

MOLECULAR PHYSIOLOGY
The Sheffield Meeting
There were 165 registrants for the Teaching Symposium “Jargon-Free Molecular Biology for Physiologists” held at the Meeting at the University of Sheffield. Ten speakers were asked to deliver half-hour overviews of various molecular biology techniques that can be readily applied to help address physiological questions. The speakers were specifically asked to avoid too much technical jargon that makes the subject incomprehensible to outsiders. All the speakers rose to the challenge and presented lucid talks.

The importance of integrating molecular biology and physiology was perhaps best exemplified by Richard Boyd’s introductory talk where he stated that the MRC have identified as their top priority in the post-sequencing era, the challenge of identifying the function of the gene products. Molecular biology has provided us with valuable tools but we now need to use the wealth of information to define the mechanisms underlying protein function and integrate these back to the whole animal. The explosion of information following the sequencing of all the genes in the genus presents the next major challenge and physiologists are in a prime position to take this on.

Janet Allen
Stanley White
I don't really have the space to describe it all adequately so can only mention a few of the highlights. Peter Scheid gets my regular "best-slide-of-the-Meeting" award for his photo showing respiration being measured *via* a face (beak?) mask in a goose on a treadmill. I'm not entirely sure, but I think I convinced at least one electrophysiologist that it was actually an in situ, whole-animal patch clamp recording. The session on the pulmonary circulation complemented the previous day's Symposium on "30 Years of Hypoxia in Sheffield" and Gwen Barer's and Celia Emery's double act worked smoothly in presenting findings detailing the adverse impact of a relatively short duration perinatal hypoxia upon pulmonary vascular resistance in later, adult life. Peter Ratcliffe provided an indication of the shape of things to come with an excellent description of oxygen-regulated gene expression. Gels were only shown when they were really required and, if they didn't make sense to anyone waiting for the post-Meeting Symposium on Jargon-free Molecular Biology for Physiologists, could have been used to provide mildly-diverting amusement as Rorschach Ink-Blots. In the final session the talks by Peter Robbins, Chris Peers and Colin Nurse epitomised the day by describing elegant experiments aimed essentially at answering the same question but performed on a range of experimental subjects from cultured humans to cultured cells.

The formal part of the day was completed by what was, as I am sure anyone who was there will agree, a most eloquent and witty "concluding remarks" by Jim Milledge who, in his time-allowance, as well as providing a fine and concise summary of the day's talks graced us with some philosophical musings and a collection of wonderful photographs from his Everest expedition. For me, there just has to be some gain for all the very real pain involved in maintaining. This gain was made abundantly clear in the photograph Jim showed that he had taken of a silhouetted John West standing on top of the world, high above the surroundings, sunrise - coloured clouds stretching for miles away from him. We all knew by now the cardiopulmonary adaptations that had allowed Jim to be in a position to get that photo but that knowledge only added to the beauty of the image. A reception, an excellent dinner and a late-bar provided the perfect end to a great day which was simply added to by the antics of the double-decker bus arranged to transport us to and from the Restaurant.

The six Communications and one "Poster that should have been a Communication" of the next day's Session were held in the cozy Upper Library of Ranmoor House. The Session ended with a discussion as to whether the simplification of an equation made it a better equation and concluding that this was so, and even more so if the original equation was in fact incorrect in the first place. In between we were told about the interaction between the behavioral and chemical drives to breathe but, unfortunately, by not studying the effects of hypercapnia, Doug Corfield was not in a position to inform us whether the ability to do mental arithmetic could be enhanced by breath-holding.

Abstracts please for the UMDS (St Thomas') Meeting in early November 1997. I have been informed that this will be the last ever Meeting at "Tommy's" so take your place in history. I look forward to seeing you there.

*Prem Kumar*

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**SOMATOSENSORY PHYSIOLOGY**

The Group has not been idle since the Edinburgh Meeting. We will be convening later this year at the Bristol Meeting in September and at the last ever St Thomas' Meeting in November. I am currently organising a symposium for the Thomas' event, on "Parallel Regulation of Somatosensory Processing with other Physiological Systems" (ie how our stuff fits in with everything else). So far John Coote, Thelma Lovick and Peter Redgrave have accepted invitations to speak, Al Randich has accepted subject to the agreement of his departmental chairman and I am still waiting on a few others. Watch this space. Our Group will also be involved in a Pfizer Prize competition at the November meeting.

For 1998 I have asked for Special Interest Group Sessions at the Liverpool Meeting in April and at Cardiff in December. Put the dates in your diaries.

*Rob Clarke*

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*N* eal Lane, Director of the National Science Foundation, writes about the importance of scientists and engineers being in "dialogue with the public about the role of science and society." Scientists ought to consider speeches and discussions with the public a part of their professional responsibilities.

*Chronicle of Higher Education* 6 December 1996 p. A84

*Source: SPIN*
EMPSO'S MISSING DATES

Dear Editor,

I have seen your letter in The Physiological Society Magazine. I suspect that the experiment referred to, though not as precisely described in the poem, is the one carried out by Alexis Carrel and described by Lecomte du Noüy on page 115 of his book 'Biological Time', published by Methuen in 1936. Carrel was the originator of successful tissue culture following his demonstration that 'embryo tissue fluid' in the culture medium could prolong the survival of tissue cultures indefinitely whereas the serum of older animals led to death of the culture in a time which got shorter the older the donor animal was. I enclose the extract from Lecomte du Noüy's book (see below) which describes the experiment and the results. I am sorry I cannot help with the other poem.

Ivor Mills
Dept of Surgery
University of Cambridge

Dr Carrel was induced to study these problems by former experiments on the ageing of animals. These experiments had led him to admit that with age blood-serum accumulates toxines which are increasingly noxious or abundant. He had convinced himself of this fact by a series of experiments. One of these is particularly striking and deserves to be mentioned, especially as it was never published.

There was at the Rockefeller Institute, before the war, a dog nearly eighteen years old. This poor animal never stirred from its corner and could hardly get up to eat. He slept all day, his coat was coming out, his eyes were dim, and his eyelids stuck together.

This animal was anaesthetized, put on the operating table and treated as follows. Carrel bled him by the carotid artery and removed nearly two-thirds of his blood. This blood was collected aseptically and immediately centrifuged, so as to separate the red cells from the serum. The red cells were washed in Ringer solution, recentrifuged and mixed with fresh Ringer solution to re-establish the initial volume of the blood. This was then re-injected to the dog. The circulation was restored by massaging the heart, and the skin was sewn up. A prince of royal blood, heir to the throne, on whom the peace of the world depended, could not have been the object of more attentive care than this old animal. After several days he had regained strength and appetite. The same operation was repeated so as to eliminate practically all the serum of his blood and replace it by this artificial solution which, besides the blood cells, contained only salts such as chlorides of sodium, potassium, and calcium in the same proportion as those found in the blood. The animal lived. Not only did he live, but, once over the operative shock, he was a different dog. He ran and barked, a thing he had not done for years. His eyes were clear, his eyelids normal. His coat started to come in; he was gay, active, and most important of all, he was no longer indifferent to the charms of the other sex. He was regenerated.

The logical conclusion which Carrel deduced from this remarkable experiment was that his hypothesis on the increase of toxicity of serum with age was verified...

NOTICE FOR ALL AFFILIATES

Dear Affiliates,

Due to the retirement of Valerie Cox from the Magazine Sub-Committee, we are looking for an affiliate to replace her and to take responsibility for the Young Physiologists ‘section’ of the Magazine. The task is not too onerous!

Members of the Editorial Group are expected to commission articles, proof read manuscripts submitted to their appropriate section of the Magazine and enjoy writing articles themselves. The Sub-Committee meets bi-annually (January and September) and all expenses for attending the meetings are covered by The Society.

So any affiliate who is interested in writing, journalism and/or becoming involved in the Magazine, drop me a line letting me know a little bit about yourself and why you would be interested in joining the Editorial Group.

Saffron Whitehead
Editor

In a poll of the 71 winners of the Nobel prize for physiology and medicine still alive, none of the 39 who responded dissented from the proposition that “animal experiments have been vital to the discovery and development of many advances in physiology and medicine”. The poll was carried out by Seriously Ill for Medical Research (SIMR), a charity that encourages research into serious conditions.

Times 10 December 1996 p.4

Source: SPIN
Hypoxia gives a sustained constriction of pulmonary blood vessels - a response which contrasts strikingly with that of systemic blood vessels which almost invariably relax when challenged by hypoxia. These two forms of behaviour are physiologically appropriate because the job of systemic vessels is to match local perfusion to local metabolism, while that of the pulmonary vessels is to match local perfusion to local ventilation. So in systemic vascular beds hypoxia signifies too little blood flow, while in the lung it signifies too much. The hypoxic constriction of pulmonary vessels diverts blood away from poorly ventilated areas, thereby reducing the flow of poorly oxygenated blood which would otherwise be added to the arterialised blood leaving the lung.

**Increasing simplicity**

The big question for physiologists is ‘how, at the cellular level, does one get from a reduction in alveolar $P_O_2$ to the constriction of a pulmonary vessel? By what mechanism does hypoxia excite pulmonary vascular smooth muscle cells?’ Experiments approaching this question have, over the years, employed increasingly simple preparations with each simplification reducing the number of potential contributing factors that might be responsible for observed responses. First there were measurements made in the living animal, too complex a system to give easily interpretable results. Then came the isolated lung in which blood flow could be held constant. This had the advantage that at constant flow, perfusion pressure gives a straightforward index of vascular resistance. Next there was the isolated ring of pulmonary vessel strung between a micrometer and a force transducer - the easiest way to record hypoxic responses in the absence of blood and the chemicals that it contains. Most recently have been studies, mostly electrophysiological, of individual cells, either in situ or wrenched enzymatically and mechanically from their neighbours.

**Falling into the pit**

I would like to spread a note of caution and to emphasize a pitfall that those working on the subject may fall into. This is that, although the results obtained from a given preparation may superficially resemble the real thing, they may in fact represent the responses of a traumatised cell or scrap of tissue. I will focus on the responses of isolated small pulmonary arteries, but what I say about these presumably applies, with equal or greater force, to the isolated cells removed from them. If the responses of an isolated vessel, stripped to its adventitia, deprived of the conditioning factors normally brought to it by the blood, are to be convincingly demonstrated to reflect the responses of intact, blood-perfused lungs then the two preparations should surely share certain essential characteristics. If they do not then it is all too likely that the same processes are not being observed in both.

So what are the essential properties of an intact preparation? When an intact perfused lung is challenged by moderate (25 to 30 Torr $P_O_2$) hypoxia there is usually a latency of a minute or two and then there is a monotonic constriction...
which raises pulmonary arterial pressure to a higher, sustained or gently rising level. If repeated hypoxic challenges are given, leaving only five or ten minutes of normoxia for recovery, each response comes in with a shorter latency and also with greater vigour (Fig 1A).

A euphoric event

It is very understandable that a research worker who has spent months of frustration trying to coax a positive result from an increasingly disillusioned graduate student, should rejoice uncritically at the first indication of success. I can see the pair of them now: they have managed to mount a delicate vessel only 300 microns in diameter onto two wires, they have demonstrated that it is alive by constricting it with 60mM KCl, they have gone to considerable trouble to ensure that the ionic composition, pH and Pco2 of the bath are all physiological, and now they switch to a hypoxic gas. Nothing happens for a minute or two but then there starts a vigorous constriction which continues for about five minutes. The physiological significance of this euphoric event is, for them, fully substantiated when tension returns promptly to the baseline in response to the restoration of normoxia. The whole research group would be in the pub within twenty minutes to listen to their supervisor’s alcohol-enhanced hallucinations about the lavish sums of grant money they must now have access to.

Transient and sustained responses

How would our group have reacted if Patient Jeremy, an unusually cautious barfly, had pointed out to them that, unlike the response of the intact lung, the contraction they observed was only transient and that a similar transient contraction in response to hypoxia can also be observed in isolated mesenteric arteries (Leach et al. 1994 and Fig. 2)? Furthermore he might have added that if they had waited for 20 minutes or so after the start of the hypoxic challenge the pulmonary vessel would have slowly developed a sustained secondary contraction which resembles more the response of the intact lung. A resemblance all the more striking because with repeated hypoxic challenges the sustained component of each response comes in with a shorter latency and also with greater vigour (Figure 1B). In contrast the first phase of contraction diminishes in amplitude with each successive challenge and, occasionally, it disappears altogether. It seems therefore that the first, transient phase of contraction, the response which has been studied by the not-so-patient majority of those working on isolated pulmonary vessels, may have little to do with the responses observed in intact lungs.

Should those who work at the cellular level, studying either the ionic channels or the intracellular calcium levels of pulmonary vascular smooth muscle bear in mind the very different behaviours of isolated vessels and the lungs from which they are removed? I think so. Robertson, Aaronson & Ward (1995) have made a promising start on this by showing that the rising part of the secondary contraction depends not on rising Ca^{2+}, but on an increased sensitivity of the contractile apparatus to a raised but steady Ca^{2+}. This increased sensitivity might underlie the build-up of the hypoxic response that is seen with successive challenges. It might also explain the slow, progressive increase in the intensity of pulmonary vascular constriction which develops over the course of hours during sustained hypoxia in rabbit and man (Vejlstrup and Dorrington 1993, Clar et al. 1996).

Fig 2. Isolated PGF2α-constricted small mesenteric artery responding to three hypoxic challenges. Like the pulmonary vessels, there is an initial transient contraction which diminishes with each challenge, but in contrast to the response of pulmonary vessels there is no sustained contraction.

Acknowledgement: Sulayma Albarwani, Blair Robertson and Niya Xia did the experiments shown in the figures. Their work was funded by the Wellcome Trust, the BHF and the New Zealand and Omani Governments.

References:
Benefits of intracellular flash photolysis

Delivering a compound of interest at a known concentration, to a specific location and at a time when it is wanted presents particular difficulties when studies involve biological preparations. These problems are perhaps most acute when an intracellular site of action is under investigation, but the use of photolysis of caged compounds can overcome or limit some of the difficulties. A caged compound is a photolabile, inactive molecule which when irradiated by intense near UV light liberates an active molecule plus a by-product. The continual development of a wide range of caged compounds offers powerful tools for the rapid photorelease of second messengers and pharmacological agents inside cells, or intercellular signalling molecules and pharmacological agents in the extracellular environment.

Some key advantages of flash photolysis include:

- Relatively rapid, concentration jump of photoreleased compound (from less than a millisecond to several hundred milliseconds depending on the light source and the chemical properties of the caged compound).

- Protection of the compound of interest from metabolic breakdown prior to photorelease.

- Minimised diffusion barriers, as a result of the active photoreleased compound being in close proximity to a site of action.

- A cell or tissue can be preloaded with caged compound, and control data obtained before photolysis, so experimental and control data can be obtained from the same preparation.

- The concentration of a photoreleased material can be easily increased by successive flashes or by varying the intensity of irradiation.

- Flash photolysis can be applied at the tissue, single cell or sub cellular levels. Lasers enable photolysis of caged compounds in discreet regions of a cell.

- The presence of a caging group may in some instances improve the water solubility, and so help with delivery and distribution of a molecule.

Some practical aspects of intracellular flash photolysis

A variety of caged compounds are available from Calbiochem and Molecular Probes although collaborations with people who make them is, in our experience, particularly enjoyable and fruitful. For studying intracellular signalling, caged Ca$^{2+}$, Ca$^{2+}$-chelator, NO, ATP, cyclic nucleotides, inositol phosphates, GTP and GDP analogues have proved useful.

Loading the intracellular environment with caged compound can be achieved relatively easily by including the caged compound in a patch pipette solution and delivering it using the whole cell variant of the patch clamp technique. Once the whole cell recording configuration is achieved the cell should be left for at least 5 minutes before starting an experiment. This allows time for the constituents of the patch pipette solution to diffuse into the cell and equilibrate. Other alternatives include microinjection and using permeabilized cells. There are also commercially available membrane permeable acetoxyethyl (AM) esters of some caged compounds (including the caged Ca$^{2+}$ nitric oxide scavenger diazo-5/AM and the caged Ca$^{2+}$ scavenger diazo-2/AM). Once inside the cell the AM ester is hydrolysed by cytoplasmic esterases leaving the free caged compound trapped inside the cell.

The use of lasers are an option for some people, but flash photolysis can be achieved using cheaper xenon flash lamps (Hi-Tech Scientific & Chadwick Helmuth). The lamp can be focused directly onto the cells (Fig. 1) or passed through the optics of a microscope (Gurney 1994). With a UG11 filter in place, to cut out
those wavelengths of light which do not produce photolysis, but may cause cell damage, our measured power output can be varied between 50 and 175 mJ.

In addition to light intensity, the native compound and the caging group determines how much photolysis takes place. We have obtained between 5 and 40% photolysis for a variety of caged compounds with a single 100 mJ flash. This was determined by flashing 12 μl samples and analysing the products using reverse phase HPLC. There are benefits from being inefficient, as it is possible to get consistent and repeatable responses from a single cell if only a modest proportion of caged compound is photolysed by the first flash. We have used concentrations of caged compounds in our patch pipette solution of between 100 μM and 5 mM, and experiments have been conducted under low illumination.

The potential problems with flashing

There are potential problems with flash photolysis. However, controls can be carried out to evaluate difficulties and validate observations.

- Firstly, the unphotolysed caged compound may evoke biological activity. This can occur as a result of the caged compound not being inert or due to contamination of the caged compound preparation with active compounds, including the uncaged compound which is under investigation. This possibility can readily be studied by carrying out control experiments and not flashing, but leaving the caged compound unphotolysed in the cell.

- Secondly, flashing the cell even in the absence of caged compound may produce artefacts due to the intense near UV irradiation or possibly by vibration during the lamp discharge.

- Thirdly, the by-products of photolysis (protons, nitrosoacetoephene or nitrosobenzaldehyde for examples) may cause biological responses. Proton effects can be minimized by efficient pH buffering and the actions of nitroso compounds on sulphhydryl groups can be limited by including dithiothreitol (2 mM) in the patch pipette solution. The controls for this are to photolyse a different or inactive molecule which has the same caging group as the compound of interest (for example nitrophenyl ethyl ATP has proved useful as a control for nitrophenyl ethyl GTP (δ)).

- Fourthly, the distribution in a cell of lipophilic caged compounds such as nitrophenyl ethyl caged cGMP may introduce diffusion barriers and modify responses because the photorelease may occur from compound concentrated in membranes rather than globally distributed in the cell cytoplasm. But in some circumstances this could be an advantage - For example where an experimenter wanted to mimic the effect of a second messenger being produced by a membrane bound enzyme. The development of more water soluble caged compounds may help with this problem.

It is also clear that there can be great variability in the sensitivity of different cell preparations to photorelease intracellular messengers. It is therefore worth using several cell types to check cellular responses to intracellular photolysis to ensure that the system can work. For example, intracellular photolysis of IP₃ appears not to evoke Ca²⁺-activated conductances in cultured sensory neurones, but works well in smooth muscle (Currie et al. 1995). Non-responding cells which do not express a system under investigation can also prove to be useful as controls for intracellular photolysis.

**Fig 2. Examples of whole cell currents evoked by intracellular flash photolysis of caged compounds.** All the events were recorded from cultured sensory neurones voltage clamped at -90 mV. (a) Ca²⁺-activated Cl⁻ current evoked by photolysis of DM-nitrophen, (estimated [Ca²⁺] 30 μM). (b) Direct activation of a cGMP-dependent current, (estimated [cGMP] 4 μM). (c) Delayed activation of Ca²⁺-dependent cation currents following photolysis of caged cGMP (60 μM). Inset expanded trace shows the development of this activity.
What can be done with caged compounds?

Having got a flash lamp and caged compounds what can be studied? Well, none of the following because they belong to us (joke, of sorts)! Photorelease of ATP has been used to investigate muscle contraction, directly modulate K⁺ currents, support Na⁺ / K⁺ pump activity and reverse the prolongation of Ca²⁺-dependent Cl⁻ currents following chemically induced metabolic stress.

The role of pertussis toxin sensitive G-proteins in the regulation of ion channels has also been investigated using a variety of caged relatively nonhydrolysable analogues of GTP and GDP. The photorelease of Ca²⁺ and Ca²⁺ chelators (Zucker 1994) has proved particularly useful in studies on aspects of muscle physiology, vesicular neurotransmitter release and the modulation of cell excitability through Ca²⁺-activated conductances. Photolysis of caged Ca²⁺ has been used not only to evoke Ca²⁺-activated K⁺ and Cl⁻ currents in a variety of cell types (Currie et al. 1995), (Fig. 2a) but also to produce inactivation of voltage-activated Ca²⁺ currents in invertebrate and vertebrate neurones.

Direct and indirect activation and modulation of cell membrane conductances has been achieved by intracellular photolysis of caged cAMP and cGMP (Figs. 2b & c). Photorelease of IP₃ in smooth muscle cells, hepatocytes (Ogden et al. 1990) and cerebellar Purkinje neurones has been shown to liberate Ca²⁺ from intracellular stores and activate Ca²⁺-dependent conductances. The recent development of caged NO, cyclic ADP-ribose and sphingolipids will enable their potential roles as intracellular messengers to be investigated. No doubt, there is a growing future for flashing these caged chemicals.

We are very grateful to John Wootton (Cornell University), Uri Zehavi (Hebrew University of Jerusalem) and David Trentham (NIMR, Mill Hill) for all their help, encouragement and generously supplying, well characterised caged compounds. Our research is supported by the Medical Research Council, Merck Sharp & Dohme, Nuffield Foundation and a Firat University scholarship.

References:

In brief: Unwelcome news

The Wellcome Trust is threatening to take funds out of UK research projects and send them abroad if the Government levies an overhead charge for academic biomedical research. In its submission to Dearing, the Trust says it does not accept that its scientific research grants should include an element for the general running of public education establishments.

Moral:- Always remember, at least, the title of the grant you typed on the grant form - especially if it is awarded.

Roy Levin
FLEXIBLE LEARNING

Flexible learning is a somewhat strange term. It conjures up images of students doing the lotus position in the library or sitting in lectures with their legs wrapped around behind their heads. It is one of the terms used to refer to various types of learning materials that can be used by a student at their own speed and often at a time of their choosing. This is in contrast to lectures and practical classes which happen for a fixed duration at a fixed time.

Pacing oneself

Of course the trendiest types of flexible learning packages are those that are computer based. However, the actual medium used can be anything from computer programmes to audio or video cassettes or even a humble set of notes on paper. The important point is that the student works through the material at their own pace. At suitable points in the package there must be self-assessment questions and feedback from these to tell the student if they are correct. Better packages also try to point out to the student where they are going wrong if they give an incorrect answer. The idea is that by working through the package the student will develop a feeling of ‘ownership’ of their successes while conserving the lecturer’s time and skills for things that really need human presence and feedback (Race, 1994).

A rosy picture and response

You can use such packages to replace any traditional aspect of a course, such as lectures or data handling tutorials. In science based subjects such as physiology they can also be used to ‘simulate’ practical classes. My own experience of using flexible learning material was a computer mock-up of the classic frog muscle-nerve preparation. As an undergraduate back in the eighties I carried out this practical on a recently deceased frog. I seem to remember that though 20 amphibians laid down their lives only two sets of data were obtained by the class. I was therefore an immediate fan of this computer model which worked every time. However this undoubtedly gives students an impossibly rosy picture of research. The students were led through concepts of basic muscle physiology such as recruitment and summation. They had to type in values for various stimulation voltages and frequencies and record the resultant force produced by the muscle. At various points they were asked to type in their results and could not proceed with the programme until they obtained the correct values.

What did the students think? They loved it. Pressing buttons and watching things happen on the screen fascinated them. Part of the programme showed what happened during depolarisation and repolarisation of a nerve. The sodium and potassium ions actually moved on the screen and for most of the students this was a far more understandable way of seeing this than the static overheads used in the lecture. These were the children of the computer age and this was science in the form of a computer game. Importantly, it was a game they could play at their own pace and there was no-one to see how many times they got the answer wrong. Importantly, as in all practical work they were learning by doing not just listening to a lecture or reading a book.

Problems with the ‘virtual’ experiments

So the students love it but how do we mark it? Here there are problems. Some computer packages incorporate ‘student management systems’. Students have to log in and a message is sent to you when they complete the programme. Poor ‘attendance’ and slow progress can also be reported so that action can be taken. You can even set up an automatically marked multi-choice assessment as part of this. But does this really tell you what you want to know? When I used the computer package I know that all the students completed the package. I also know that they gave all the correct answers as they navigated through the package. However, I also made the students write up the ‘virtual’ experiment as if it was a traditional practical as part of the assessment for their module. It was at this point that my faith in such programmes was shattered somewhat. Most of the students produced...
good reports but a proportion were almost painful to mark. Clearly, despite working through the whole programme, they still had no clear idea what the experiment was all about. Hence, I was informed that the electrodes stimulated the knee and the force transducer produced an EMG. We are left then with the problem of how do we identify the students that have managed to work through a package, answering many questions along the way, and still really don't understand the material we are presenting. The packages alone are clearly not enough and personal contact with lecturers or tutors is also needed.

**Educating students and staff**

My own experience, therefore, was that some students failed to learn (or perhaps worse still came out with incorrect information). This is clearly not an isolated incident. In their book on course design for resource based learning Exley and Gibbs point out that some students do not know how to learn from resources and are completely lost once spoon feeding stops. For flexible learning to work students need to be able to analyse information and extract the important points. The packages can, therefore, act as an important way of teaching these vital study skills as well as presenting scientific information. However, induction of both students and staff into the materials and media to be used and exactly what you expect the students to extract out of it is vital. Students should also be given an estimate of how long you think the exercise should take them and who to contact if they are having problems.

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### FIVE GOOD REASONS TO USE FLEXIBLE LEARNING MATERIALS

- You have a mixed background class and you want to give directed help to those who need to ‘catch up’.
- You want to promote study skills such as information gathering and analysis that are difficult to promote in a classic large lecture format.
- You want to simulate a practical experiment that is too expensive or otherwise difficult in ‘real life’.
- You have part-time students with work, family and other commitments that make it difficult for them to attend classes at fixed times.
- Students are far more likely to learn from doing something than from being told about it in books or lectures.

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### FIVE BAD REASONS TO USE FLEXIBLE LEARNING MATERIALS

- It’s two weeks to finals and you’ve just realised you forgot to give the lectures on one of the topics in the exam.
- You fancy a fortnight off to go and do research somewhere sunny.
- It’s a trendy thing to do and you think the Teaching and Learning Assessment Committee will like it.
- You can set loads of work without having anything to mark.
- Your Department has spent half this year’s teaching budget on the software so someone has to use it.

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**Advocates and cynics**

There is one area in my own teaching where I can see that flexible learning will be a huge bonus. I teach exercise physiology to a group of 80 students. 30 of these are registered for a sport based degree and do not have ‘A’ level biology. However, they do have good ‘A’ levels in non-science subjects and a strong interest in learning how their bodies work. They are therefore both bright and motivated. ‘Remedial’ material that they can use to cover the relevant parts of the ‘A’ level syllabus at their own pace will be ideal for this group. I’ll give them my own written notes and direction on which parts of the set text to read. They will then be given a set of questions to answer, along with the correct answers with explanations. Importantly, this will be a lot more ‘focused’ on their specific needs than just presenting them with the text book and they will get continuous feedback on their progress through the questions. Getting them to work in self-help groups will also promote what Exley and Gibbs call social glue, ‘binding students to each and to the course and avoiding feelings of alienation’. However, tutorial sessions will still be necessary to check they really have understanded the work and to let them talk about any problems.

Of course the cynical will point out that flexible learning is merely giving students work to not do whenever they like instead of sleeping in
lectures at fixed times. Undoubtedly there is a point there as student motivation is generally low for activities they perceive as ‘extra’ or ‘unassessed’. What is needed is for the material to be presented in a way that provides motivation through being an important (and assessed) part of the course and also through novelty value. As with all aspects of any course it is vital to canvas student opinion and act on useful suggestions for improvement.

To do or not to do

So ‘to flexible learn or not to flexible learn’ that is the question. Perhaps the last words are best summarised by Exley and Gibbs. ‘Flexible learning is capable of producing exciting improvements in the way students learn, releasing their learning potential and greatly enhancing the quality of learning outcomes while saving resources. Whether the potential benefits are reaped or quality collapses depends on careful and thoughtful design, sufficient planning and preparation time, adequate resourcing, thoughtful implementation and a continuing cycle of evaluation and development’.

All you need to do now is persuade your Head of Department to let you have a six month sabbatical to develop the packages. If you do fancy giving flexible learning a try then many commercial packages are available that are relevant for Physiology. Alternatively if you fancy designing your own then the following publications may be useful. Alternatively get your Staff Development Department to organise a course. The course I attended was run at the University of Durham by Professor Phil Race. I’d be pleased to hear from anyone with experience (good or bad) of using flexible materials in physiology teaching.

Further Reading:


I know from personal experience of writing lay summaries for BHF grants that condensing scientific studies in a way that the general public will understand can be difficult. However, I never cease to be amazed and dismayed at how bad women’s magazines are at this. For example, this particular bit of statistical nonsense appeared in the Christmas 1996 edition of Family Circle Magazine.

“Pregnant and breast feeding women should not eat peanuts if they want to avoid triggering a nut allergy in their babies. Research from Southampton University shows 40% of mums whose children have peanut allergy ate peanuts regularly while pregnant or breast feeding.”

I may be missing the point here but surely the mothers of 60% (i.e. the majority) of these children didn’t eat peanuts. Therefore, not eating them is a bigger risk! I would also point out that I eat peanuts regularly, once a year on Christmas Day at my mother-in-law’s house. Do the writers perhaps mean frequently? Sadly no citation is given so I can’t consult the original research and find out.

Valerie Cox

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RESULTS OF THE CAPTION CONTEST

Readers were invited to compose a caption for the photograph of Derek Bacon talking to Tilli Tansey during an oral history interview for the Society archives.

The entries were judged (anonymously) by members of the Committee and the Administration Office.

The winning entries were:-

“Oh! He could be very cutting with his oblique insults!” from Tony Taylor and

“If the Head of Department comes in, say we are rehearsing Pyramus and Thisbe” from Brian Whipp.

They will each receive a bottle of wine.
How do you feel when you're asked to give a communication, seminar, or lecture? No doubt flattered, but is your pleasure mixed with trepidation? And does that trepidation increase as the time for the talk draws closer? I well remember my first talk to the Physiological Society. I had been thoroughly coached and was virtually word-perfect. But when the day came I felt as if I was about to be thrown to lions. I spent the half hour before my talk in the loo, convinced I was about to be sick. The idea of giving a Departmental Seminar was even more of a nightmare. How could I possibly speak for so long? How could I learn so many lines? How, indeed, were actors able to do so? Years later, although I am no longer paralysed with fear, I still feel the same adrenaline rush before I stand up. I do not think that my experience is a unique one. Most research students and many post-docs confess to experiencing that same sinking feeling when asked to give a Physiological Society Communication and it is particularly hard for those for whom English is not their native language.

The pitfalls of poor speakers

Of course, nervousness is not the only problem about giving a talk. There is also the difficulty of presenting your work clearly and effectively and at the same time convincing your audience that your research is both exciting and important. This is not always easy. We have all listened to lectures where the science is exciting but the monotonous voice of the speaker or their own apparent lack of interest in the subject makes it easy to fall asleep. One ends up concentrating on trying to keep awake rather than listening to what the lecturer is saying. Then there are those frustrating speakers whose work is really interesting but who present it so impenetrably, talk so fast, or put so much information onto their slides that it is virtually impossible to understand them. On the other hand, some individuals are so enthusiastic about their subject and present it so effectively, that our attention is engaged despite the fact they have rather little of substance to say!

The broader aspects of public speaking

Giving a Communication to the Physiological Society, or a Departmental Seminar is, of course, not the only sort of lecture we have to give. There are also undergraduate lectures. A good lecture makes learning a pleasurable experience. It may even change a student's life, so enthusing them about a topic that it becomes their life's work. The ability to lecture well at the undergraduate level is very important. Indeed the HEFC considers it so crucial that it is proposing to link the money each University receives to the quality of its teaching - and thus to the lecturing ability of the individual lecturers. We may be suspicious of having our teaching assessed in this way, but it is clear that the ability to teach well, and especially to lecture well, is an essential part of a University job. Finally, it is becoming increasingly important for scientists to be able to speak clearly and authoritatively about their work to the media and explain why it is exciting and important. What we would all like to emulate are those (rather rare) individuals who both speak well and have something exciting to say. What is their secret? And how does one learn to speak as well as they do?

The LAMDA experience

In an attempt to improve our lecturing skills, I and five other members of my group undertook an intensive course in the 'Art of Presentation' which was run by LAMDA Training. LAMDA Training is the commercial arm of the London Academy of Music and Dramatic Art (the oldest drama school in England). It runs training courses for a variety of professions, including the House of Lords, Sotheby's and the Police Force. The aim of these courses is to enable the participants to present themselves and their work effectively when speaking at conferences, at interview or to the media, even under conditions of extreme stress. LAMDA do not advertise and recommendation is entirely by word of mouth. I was made aware of their existence through the actress Janet Suzman (a director of LAMBDA), whom I met at a meeting run by my old University College. During the subsequent discussion it became apparent that scientists, and women scientists in particular,
were considered to be very poor public speakers! This provided the impetus to do something about both my own lecturing skills and those of my group - LAMDA provided the way to do so.

The course was preceded by an afternoon visit from the course leaders in which they met each of us individually to discuss what we hoped to gain from the course. We all began with different goals. Some of us wished to learn how to overcome the paralysing effect of nervousness, others how to engage the audience's attention, communicate their passion for the subject or speak with authority. My own aim was to learn to talk confidently without a prepared speech, not only about my own research but on more general topics. I also wanted to learn how to speak also at a lower pitch - one problem for many women is that when they are nervous their voice tends to rise.

The course itself consisted of four sessions spread over four weeks: two communal sessions, each of 3 hours, which were attended by the whole group, and two individual sessions each of one hour. The first session consisted of a series of 10 min talks to the whole group by each of the six participants, which were recorded on video-tape. This was followed by an introduction to the art of presentation from the course leaders. Session two involved a one-to-one consultation between each of us and the course leaders. During this period, the video-tape of the talk was viewed. If you've never seen yourself on video, this can be quite an eye-opener. I found, for example, that every time I took a breath I shrugged my shoulders so that by the end of the talk the audience felt utterly exhausted! The third session consisted of another series of individual talks, during which we tried to implement the things we had learned and tried out new ideas. This was quite a challenge but, perhaps somewhat surprisingly, also great fun. The course concluded with another series of individual sessions.

So what did we learn?

Many other training courses focus simply on techniques - such as how to use your voice, posture and visual aids most effectively. While LAMDA believes this is necessary, they argue that such techniques cannot, by themselves, ensure the development of the long-term confidence and ‘presence’ that characterises the best lecturers. Instead, they taught us that attitude is the most important attribute of a good speaker. And they emphasised that that the aim of giving a talk is to communicate - to build a relationship with the audience so that each of them feels they are being addressed individually. Clearly, to achieve this, the speaker must appear relaxed and confident.

The most important thing I personally learnt from the course was the courage to be myself. I learnt that that art of giving a talk is communication and that one’s priority is to ensure that your audience have understood you. When you recognise this, the feeling of fear recedes. I learnt the value of eye contact and how to establish and maintain this with the whole of the audience. As a consequence I am now able to recognise when I have not made myself sufficiently clear, and explain the point again in a different way. I learnt to throw away the prepared speech and speak with just a few words to key me. As I have to think about exactly what I am saying as I go along, I’m forced to speak more slowly - which also makes me sound less tense and makes the audience more relaxed. A further advantage of speaking more slowly is that I naturally speak at a lower pitch and consequently sound (I hope!) more authoritative. Finally, although I still carefully prepare the structure of my talks, the time that I would have spent polishing the wording of my speech, I now spend, with profit, on making better visual aids. It is not easy for me to see exactly how the course instilled into me the confidence and the ability to change my attitude towards giving a talk, but this was the most valuable thing of all.

The course also had a remarkable effect on the attitude of the other members of my group to giving talks. They are now eager to give talks and view them as a challenge rather than a chore. Even more surprising, some of them have decided that they would like to lecture on topics not directly concerned with their work: for example, to present science to a wider audience. The course has certainly changed all of us. We have come to realise that the essence of a good talk is to connect with your audience - ‘only connect’, as Forster said.
FORWARD TO THE FUTURE IN PHYSIOLOGY

By 2001 will the reductionist approach have obliterated physiology and animal experimentation? What is happening to the training of physiologists? These articles, commissioned by John Chad, highlight the growing loss and increasing demand for experimental physiologists.

As members of the Physiological Society, we play a major part in collectively defining what constitutes ‘Physiology’ as a research and teaching discipline. The Little Oxford Dictionary defines physiology as the ‘science of functioning of living organisms’. This broad definition predates and would be inclusive of areas now termed ‘molecular biology’, ‘pharmacology’, ‘neuroscience’ and even ‘biochemistry’. However, as research studies have become more powerful and more reductionist there has been a level of dislocation with the broader aspects of education of physiologists. Thus more focused degree courses, or modules within them, become popular, but there is a danger of weakening the broader perspective to which these relate.

These articles were elicited in response to musings on addressing the questions of what physiology should be in the year 2001? There are many issues that may affect the current and future state of affairs: the apparent conflict between research and teaching in the Universities, the drive to increase student numbers with less resource leading to reduced laboratory practical experience and less small group teaching, reduced animal tissue experimentation and changes in student intake.

Student recruitment is still relatively healthy but with competition from the new range of sports-oriented courses this may not continue unless school pupils are persuaded of the educational and vocational merits of a broad physiological approach. Where financial rewards are society’s definition of merit, career physiologists are not highly placed and slip further back annually. Furthermore, in the narrow aspect of the direct justification to government, corporate UK and tax-payers (above and beyond the ‘transferable skills’ of any numerate, scientific degree), is the importance of physiology research and teaching made clear enough to influence policy and secure resources?

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DOES UK PLC NEED TRAINED PHYSIOLOGISTS?

The pharmaceutical industry is experiencing a period of unprecedented change. Companies are aiming to succeed by exploiting the new technologies that will allow a much greater number of compounds to be screened for biological activity against a host of new molecular targets derived from genome sequencing initiatives. Is there still a role for physiologists in this world of robots and biosensor chips? Yes, the ‘science of functioning of living organisms’ remains a cornerstone discipline in defining the biological activity of new drugs and will continue to do so as long as we are interested in the effects of new molecules on the whole human.

Where physiologists fit in

Graduates and postgraduates from physiology departments find pharmaceutical company employment in areas ranging from recordings at the whole animal level, right down to single channel patch clamp studies on isolated membranes from tissue cultured cells. Across this spectrum, which covers the entire range of topics addressed by the meetings of the Physiological Society, awareness of modern molecular genetic techniques and their applications need to be integrated into the more classical approaches. At all levels there is a need to understand and employ the most up to date methods of instrumentation, computer analysis and control, and information technology in order to work as efficiently as possible. A broad understanding of physiological mechanisms, coupled to subsequent laboratory experience, provides the background for many people to move on into non-research disciplines within the industry as their careers progress. The complexity of our industry puts a high priority on team working and the ability to communicate with colleagues of many disciplines. Interpersonal skills such as being able to work effectively in teams and communicate specialised results to non-specialist audiences are also highly important.
Hands on experience

Physiology is still a practical experimental discipline, and graduates need to be fully prepared for this aspect of research. For this reason we feel that sandwich courses allowing significant laboratory work in a ‘real world’ environment are very valuable, although a full year of practical work is not essential. At many institutions students get a good appreciation of research by continuously working on a problem day after day via a project. However, this is not always the case. Recently, our department interviewed for a laboratory position suitable for a recent graduate. We were struck that two, otherwise well qualified, candidates from a well known university that has a splendid reputation for research at the post graduate level had had very little practical experience during their undergraduate course. In one case it had been possible to avoid virtually all practical work in the final year. When it comes to assessing candidates, those with the greatest practical experience have a significant advantage as they can more readily demonstrate an aptitude for research work.

Lacking the more authentic feel

The trend towards replacing practical work involving animal tissues with computer simulated experiments was reflected in several cases where candidates described their experiences of these classes. When recounting their experiences at interview, graduates gave the impression that these simulations were in some way inferior to the messy reality of non-virtual experimentation, and often had to be pressed to describe them in detail. If such methods are to be the future of replacement of animal materials, which is an admirable goal, they need to be structured so that they give a more authentic feel and give the participants the feeling of making real decisions rather than simply playing a tape through to its conclusion, in the manner of some software tutorials.

It may be that research scientists working in the industrial sphere could make more efforts to interact with academic departments at a level relevant to graduate and post graduate education. Many industrial laboratories have collaborations which involve academic graduate students and their supervisors via CASE awards. Some academic laboratories also have partly or totally industrially funded post-doctoral workers. In the best cases these are genuine collaborations with both sides gaining significant advantages. Often there are frequent visits to the academic laboratory sites for discussion and presentations. These could provide an opportunity to give seminars to a broader range of undergraduates (and interested staff), on the structure and nature of research in the industrial environment and help to make the industrial working style and range of career choices available to physiology graduates clearer.

All the major pharmaceutical companies with UK research bases are multi-national in organisation and outlook. One reason for the success of the pharmaceutical industry in the UK has been to interact with the thriving academic community. This has provided an employable pool of well trained, motivated graduates equipped in suitable analytical, practical, organisational and social skills, and they bring with them a wealth of ideas to share and develop. If this synergistic infrastructure is lost the industry will soon move to more attractive locations in the world. We need each other.

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BRAIN AND MOVEMENT ST PETERSBURG, MOSCOW, RUSSIA
6 - 10 JULY 1997

This symposium will be held immediately after the IUPS Congress. It will be dedicated to N A Bernstein’s 100th Anniversary. The programme of the Symposium includes:

A workshop “Adaptive Mechanisms in Spinal Control of Movement”, to be held in St Petersburg July 6-7 1997. Topics include:
- Supraspinal mechanisms of motor control;
- Motor learning;
- Posture and locomotion;
- Modelling of motor control.

Registration Fees: Active participants - $300. Students & accompanying persons $100. Abstract submission - 1 February 1997. The registration fee covers the book of abstracts, refreshments during sessions, travelling from St Petersburg to Moscow by overnight train, social programme and banquet.

For more information please contact Yuri Levik, lab9@ac.ippi.msk.su, Marat Ioffe, ioffe@ivnd.msk.su or Elena Biryukova Institute of Higher Nervous Activity & Neurophysiology, RAS, Butlerov Str., 5a, 117865, Moscow, Russia.
There can be no one who is involved in the teaching of physiology and related disciplines who does not recognise the changes that have occurred in the design and structure of University degree courses over the past 5 to 10 years. A combination of increased student numbers and the drive for so called “efficiency” has led to a decrease in the truly practical content of courses and to the nature of such practical work which remains. In particular, increasingly tighter legislative control through the Animals (Scientific Procedures) Act, changes in student attitudes, and prohibitive costs, have dramatically decreased the “whole” animal component of Physiology programmes.

**Darwinian evolution of antediluvian Physiology?**

The development and increased availability of “reductionist” technology and the spectacular impact of molecular biology are allowing a number of fundamental questions to be addressed for the first time. The justified importance of such technologies have been reflected in funding and research activities and also in the scientific interests/expertise recruited to teaching posts in what were the more “traditional” departments of Physiology. So, is there an inevitable almost Darwinian evolution of the discipline from what might be described as antediluvian Physiology which, although some might find uncomfortable, is necessary and healthy? And are the changes in the organisations of Departments/Schools and the scientific profile of graduates merely a reflection of this fact? To extend the metaphor, perhaps Physiology has evolved into a “new species” (or diversified into several) and the original only exists as a relic, relevant only in the preclinical teaching of medical, veterinary and dental students or to form part of sexy Sports Science courses.

**Demand never been greater**

I would shamelessly submit that the demand for trained “whole animal” Physiologists has never been greater. In order to make any real sense of the reductionist/molecular approach, for example to characterise the physiological and/or pathophysiological significance of genetic manipulations employed in transgenic and knockout preparations and fully realise their therapeutic potential, we need young scientists who are not only knowledgeable of these concepts but who can apply their knowledge in a practical way at the systems or whole animal level.

The ‘combinatorial’ approach to the generation of potential drug development candidates necessitates the availability of increased numbers of physiologists who can help filter out the best from this massively increased choice of chemical entities. Alas, gone (almost) are the days when we can expect a physiology graduate to have experienced the type of invasive surgical techniques which are so vital to the later preclinical stages of drug development.

The technological advances in the identification of novel molecular targets and the quantum leap in the numbers of potential drugs/ligands must be reflected in the development of novel and predictive models of disease and the methods whereby we can assess their importance and progress them to the clinic. The progress of Physiology as a discipline must match those of medicinal chemistry and molecular biology and this must be reflected in undergraduate and research training.

**The changes of reductionist technology**

There is a real danger that the reductionist and molecular bias in funding will result in a self-perpetuating change in the structure of undergraduate and postgraduate experience. The modern techniques of analytical work at the systems or whole animal level and their associated technologies will form an ever decreasing part of the training of young scientists and it may well be that the training offered in the workplace, either as part of placement, CASE type initiatives or following employment will be inadequate to make up the deficit.

Unless we recognise the importance of these factors and build them into course design, we will be guilty of offering courses in Physiology which do not reflect the progress of the discipline. Moreover, we will see other countries capitalising on our good work and reaping the benefits of our efforts as has happened all too often in other fields of R&D.
In August 1996 the Society's Honorary Archivist, Tilli Tansey, travelled to Penarth, near Cardiff, to interview Mr T J Surman, who started his career as a laboratory technician working with Charles Sherrington in Oxford, before moving to Cardiff where he remained for over fifty years as senior and then chief technician in the Department of Physiology. Sadly, Mr Surman died, aged 92, just as this article was going to press. This is a part of the interview, describing his early years with Sherrington.

**TT** When did you start working with Sherrington?

**TJS** In 1918, just as the First World War was finishing. I was 14 at the time, an Oxford boy, born and brought up there. My father was away as a soldier in France, and they used to have volunteer ladies calling on the wives of the soldiers and it was the lady who visited us who said: “You’re leaving school, aren’t you? I’ll ask my friend Professor Sherrington if he wants a lab boy”. That was how I started there.

**TT** Where was the lab then?

**TJS** In the University Museum - there’s the big museum in the front, and all the departments were behind. When I first went here it was Physiology and Chemical Physiology together. Then they made a separate professor of it [Chemical Physiology] and called it Biochemistry. What happened was there used to be a visiting professor, Professor Moore of Liverpool, he had a friend, a Mr Whitley who gave the money to create the Chair of Biochemistry, and Moore got that chair and was first Professor of Biochemistry in Oxford.

**TT** You were in Physiology, not Chemical Physiology?

**TJS** Yes.

**TT** What did you do, what were your duties?

**TJS** I was working in research, helping the Professor with his experiments and classwork.

**TT** How many people were there in the Department?

**TJS** There was the Professor, one senior lecturer, I think, and another couple - every year two of the young men who had passed the Honours exams the previous year came as Demonstrators.

**TT** What about technicians?

**TJS** There was George Cox, the chief technician, and two or three of us lab boys - not much really.

**TT** Who taught you what you needed to know?

**TJS** You just picked it up as you went along - George Cox was supposed to help. Cox had been with Sherrington right from the time Sherrington had been in St Thomas’ as an assistant lecturer, when George Cox had been his lab boy. He’d been with him all the time he’d been Professor in Liverpool, and had travelled all around with Sherrington, and finished up in Oxford with him. He was with him virtually all his life.

**TT** And how did you help Sherrington with his experiments?

**TJS** I assisted at the tables. When I was there he was working mainly on proprioceptive reflexes in cats. I was there for six years and he only used one dog. He wanted to do some cooling experiments, and when he finished he gave the dog to someone as a pet. He didn’t mind using cats, but he loved dogs too much, and didn’t like using dogs. We had a mammalian class there with 6-7 cats every week, on a Tuesday. They mainly came in from Liverpool, there was a chap there who used to supply us with cats.

**TT** What did you do for the classes?

**TJS** Lay them all out, all the equipment and instruments, help out the students, because after a bit I knew it all inside out, so I was a demonstrator as well really.

**TT** Did you prepare the cats? Did you do the decerebrations?

**TJS** I never had a licence at Oxford, so I couldn’t. I didn’t have a University degree which you needed then to get a licence. I got one when I came down here [Cardiff], I just anaesthetised the cats, it’s quite a skill really, getting them deep enough.

**TT** What kind of a man was Sherrington?

**TJS** He was nice to work for, but very quick-tempered, but he’d tell you off, but never kept it going. You were in for a real good telling-off if you did something wrong.
TT What might you do wrong?

TJS Sherrington was very fussy about apparatus - if you left apparatus out in the open. If he happened to see something on the table uncovered, he'd give you a real good lacing down. If you used a piece of apparatus, when you were finished you had to put it back in its place, and if he saw it lying about, he'd go mad. I liked him very, very much. I got on extremely well with him. I did most of my work with him when he was working with Liddell.

TT What happened to the student? Did he pass?

TJS Oh yes, we didn't get many failures in that class.

TT Did you help him with his own research work?

TJS Oh yes, with the proprioceptive work, and he always took the Mammalian class. Sometimes it was 5 cats and 2 rabbits. That was Sherrington's main job - he was very proud of that mammalian class. The mammalian class he always took charge of himself, and for that class all the lecturers from the whole department used to come in to assist. All the staff came in for that class.

TT Was that when he was writing Mammalian Physiology [a course of practical exercises]?

TJS He wrote that whilst I was there, he was very good at all the drawings. Mind you I was only a young fellow, I didn't understand half of it at the time. I was busy learning it myself.

TT Did Sherrington explain it to you?

TJS Oh yes.

TT Did you have to smoke all the [kymograph] papers?

TJS Yes, that was my job.

TT Did you enjoy it?

TJS Well, we took it all for granted really - I started off as a youngster and it became my life really. Sherrington also did the senior Frog Class. And we also had revisions and all sorts of other classes going on.

TT What was the “Frog class”?

TJS Mainly nerve stimulation; they did it all themselves. All they had to do was kill a frog and get on with it. There was very little to do in that. The “Frog class” was a long room, tables coming out from one side, and for the exams we put a screen between the tables, and I used to walk up and down the outside. During the Final exam in one of the “Frog classes” there was this chap I liked very much who was in a hell of a mess, and when I went by, I never stopped, I just put two fingers on the [induction] coil as to where he should connect up. The examiner said: “You just showed that man how to connect his coil”. I had to admit I did, and I was sent out to get George Cox to send in another technician. The examiner was a chap called Flack. He chucked me out.

TT What did you do at lunch time?

TJS Sherrington ate in his own room. They were very short of room there. George Cox had his own room, and I used to spend a lot of time in his room. But there were few private rooms.

TT Did you work on Saturdays?

TJS Yes, every Saturday morning until one o'clock, and I had to go in on a Sunday to check the animals. In August everyone had their holidays, and the lab was shut, but I had to go in every day still if there were animals there.

TT And how much were you paid?

TJS 7s6d a week to start with, and by the time I came to Cardiff in 1924 I was getting 30s.

TT What was it like when you got to Cardiff?

TJS I didn't like it a bit when I got here. It was very snobbish. The step between technicians and lecturers was very great. Oxford had been a lovely place. Dr Liddell, who became Professor there after Sherrington, would come by and sit on the desk and chat whilst I was getting the classes ready. You never got that in Cardiff, the technical staff were very separate from the teaching staff. I almost packed it in when I first came down. I was absolutely browned off with it, the atmosphere was so different from Oxford.
The Forth Institute in Iraklion coupled with the residences in the small bay of Lygaria provided an excellent setting for the 1996 Crete Course in Computational Neuroscience, 25th August to 20th September. The course, which was the first of its kind in Europe, was organised by Erik De Schutter (Antwerp, Belgium), Jim Bower (Caltech, USA), Idan Segev (Jerusalem, Israel) and Adonis Moschovakis (Iraklion, Crete) and funding for the course was provided by the European Commission, Brain Science Foundation (Tokyo), UNESCO and Sun Microsystems.

The principal aim of the organisers is to set up a European Centre for the teaching and training of Neuroscience which will bring the experimental and theoretical aspects of this field together. Twenty-eight students were selected for the course, with backgrounds in neurobiology, physics, electrical engineering, computer science and psychology. Each had a basic background in neurobiology as well as some computer experience, and were either completing PhD’s or young post-doctoral fellows. The resulting variety of backgrounds allowed many interesting links to be formed and for many nights of interesting debates on current issues in Neuroscience, relaxing around a drink in the evening.

The faculty of 25 experts gathered for the course included many leading neuroscientists, present at various stages of the course, such as Julian Jack, Rudulfo Llinas, Henri Korn and Robert Burke to name but a few. In addition, there were 4 teaching assistants present to help students with problems in running the various software packages available.

About the course

The course started in a relaxed way with a short talk on the Sunday evening about the History and Culture of Crete. This was followed by a meal at one of the many tavernas near Iraklion, which gave us a chance to develop student-student and student-faculty friendships. These were to continue for the remainder of the course, now and beyond.

The more formal teaching began in earnest on the Monday morning with a fine opening lecture by Julian Jack on “Introduction to Cable Theory” which set the tone and standard for the rest of the week. The lectures in that first week concentrated on “Methods and Passive Membrane Models”, the essence understanding Computational Neuroscience. All lectures were delivered in the morning, with the afternoons set aside for the teaching of the various software packages available for Computational Neuroscience - GENESIS, NEURON, MATLAB & XPP - and for starting or continuation of student projects. To help the students get as much time in as possible for their projects each was provided with their own Sun Unix workstation. In addition, the afternoons were used by the students to have conversations with faculty, who were encouraged by the course organisers to be present for as much of each working day as possible.

The second week of lectures continued with ‘Methods and Passive Membrane Models’, changing over in the middle of the week to topics on ‘Cellular Processes’ and how they
could be modelled. Henri Korn gave an outstanding lecture on ‘Quantal Analysis at Central Synapses’, whilst John Rinzel gave an interesting lecture on ‘Phase Plane Analysis’ in understanding the concept of firing threshold of a neuron. This week saw the first full week of project work with the students really getting stuck in, once they had chosen which software system they would use.

The third week saw a change in the lectures from single cell modelling to ‘Systems Modelling and Neural Networks’, concentrating mainly on areas related to simple circuits. Two lectures stood out during this week. The first was a joint presentation by Drs Ekeberg and Lansner, who showed an elegant, simple system model for swimming in the Lamprey, which they then demonstrated later in the week on computer. The second was by Prof. A. Berthoz who gave an excellent lecture on the ‘Neuronal Basis of Gaze Control’. Friday saw the start of the lectures on the cortex and its associated circuitry.

The fourth week of lectures were all concerned with synchronous firing of the cortex, and involved the presentation of complex algorithms - a veritable feast for those interested in abstract modelling of the nervous system. Much of the remainder of time was spent in front of computers, with students, working into the early hours of the morning, trying to complete projects prior to Fridays presentations.

The last day of the course was devoted to presentation of student projects. Each student had 10 mins to describe what they had or had not done. Whilst not all students had managed to get their projects started or running properly, all agreed that the time spent in learning the software would stand them in good stead. The day ended with group photographs and a farewell party at the Sirocco. Presentations were made to the course organisers by the students expressing their gratitude for setting up a great course. There were many sad faces when people started to leave to get ready for flights home. However, it is hoped that a reunion will be organised soon and that some might even be invited back as technical assistants or faculty.

**Not all work, some play**

Much fun was had in the evenings gathering together for our meals at the Sirocco - which quickly became our second home. Impromptu partying allowed for some steam to be let off and a great opportunity to relax following a hard days or weeks work.

An important feature of the course was its setting - Crete. It is a wonderful island and has much to offer in terms of tourist attractions. As part of the course, the organisers had set up two weekend trips. The best trip was to the Western side of Crete, where we went to visit a monastery high in the mountains and had an overnight stay in the town of Chania. Chania is a beautiful town that has managed to mix together Venetian, Turkish and Greek culture together. On the Sunday, we hiked down the 18km long Samaria Gorge, one of the many wonders that Crete has to offer. This was considered to have been a wonderful experience, even if many a student or faculty member had aching legs for a few days after.

**For next year’s course .....?**

As far funding goes, if accepted on the course, some students will receive help from the course organisers provided they can show that they will not be able attend otherwise. Alternatively it is up to the individual to find the funding for tuition fees and airfare. I was fortunate enough to obtain a grant from the Dale and Rushton Fund which went part way towards my tuition fees. The cost of the airfare is refunded after the course when you return your ticket stub to the course organisers.

Numbers are limited to 28, with about 20 students who will be nationals from the European Union. The date for next years course is September 7 - October 3, 1997. Applications start in January 1997 with an expected deadline of April 5th. More information is available on WWW http://bbf-www.uia.ac.be/Crete_index.html.
WASHINGTON D.C. IN THE FALL

Society For Neuroscience 26th Annual Meeting, 16th - 21st November 1996

Washington D.C. ‘the nations capital’ which lies on the Potomac River contains some of the most stunning monuments ever created as well as the National Mall with a wealth of museums and galleries along its length. Roads radiate from this central hub punctuated by plazas, bridges and some breathtaking sculpture all originally planned by the Frenchman Pierre Charles L’Enfant who was employed by George Washington in 1791 to survey and plan the city.

Nothing could have prepared me for the size of the meeting I had just walked into through the doors of the Washington Convention Center in Downtown Washington. A total of over 24,500 delegates had registered for the meeting with more than 12,000 poster and slide presentations being given during the five days. I think that the 3 telephone book-like abstract volumes was the first hint of the size of the meeting which taxed you both mentally in terms of the science and physically in terms of the miles you have to walk to get around the huge 1st floor of the exhibition hall to see all the relevant posters. Even three day Phys. Soc. meetings couldn’t have prepared me for this.

The meeting was organised around broad themes and a logical layout of the poster boards meant that relevant ones were not that far away from each other. Slide presentations were either conducted on the ground floor of the Convention Center or across the road in one of the two Conference Hotels. My poster presentation was on the Wednesday, the penultimate day of the meeting and my fears that no one would come and ask any questions or show any interest was completely unfounded. As I arrived 15 minutes early to start pinning the poster to the board there was already 2 people waiting to speak to me about the results. A constant stream of inquisitive neuroscientists attended and ‘put me on the spot’ with some thought provoking questions and constructive ideas for future work. When the announcement 4 hours later on the PA system said that the hall would be closing in 15 minutes it was all over. I felt relieved and was on very much of a high as I felt that the afternoon had been a success.

I regarded the meeting as an excellent opportunity to meet some of the ‘big’ names in the field of autonomic neuroscience and as a way to get some international exposure for the work which is undertaken in our lab in Birmingham (England, not Alabama as I had to explain to more than one American).

On the Thursday after the meeting had ended a group of us hired a car and drove up Interstate 95 to New York for a couple of days of sightseeing before returning home on the Monday. New York was in stark contrast to Washington with its high rise buildings and traffic jams like you could never imagine, a city where you could shop 'til you drop and still only have been in Macy's-the worlds largest department store. Washington was the place to go for the culture whereas if you like the high speed lifestyle and hustle bustle of a big city New York is the place for you.

I am indebted to the Affiliate Travel Grant Scheme for their generous financial support and the Brain Research Association for the sponsored abstract form.

Simon Gladwell
Department of Physiology
University of Birmingham
Information for applicants

The workshop provides intensive practical experience of a number of microelectrode, patch clamp and optical techniques applied to single cells. It is intended for postgraduate students, post doctoral workers or established scientists wishing to apply these techniques in their research.

The following basic techniques are offered:
- Two electrode voltage clamp
- Patch clamp
- Single electrode voltage-clamp
- Dye injection
- Ion-sensitive microelectrodes
- Fluorescent indicators

In addition there are lectures and demonstrations of electronics, computing, microscopy, bilayer recording, flash photolysis, single cell RT-PCR and capacitance measurements.

There are 16 places. Participants work in pairs and have the opportunity to do three 3-day experiments in the two weeks. In addition, lectures and practical sessions of electronics, data acquisition and computer analysis, and microscopy will be given. Daily lectures given by teachers and visiting lecturers cover the basic techniques taught and certain specialised topics. A copy of the Plymouth Microelectrode Handbook will be provided.

Accommodation (for 14 nights- arrive & depart on Wednesday) is close to the laboratory and includes breakfast, lunch is provided in the lab each day and an allowance is given for an evening meal.

The course fee of £1100 includes accommodation, meals and tuition. Participants are responsible for their own travel arrangements.

Applications should be sent to:-
David Ogden, Microelectrode Techniques, NIMR, The Ridgeway, London NW7 1AA, U.K.
E-mail d-ogden@nimr.mrc.ac.uk

Applications will be acknowledged on receipt. Please provide 2 self-addressed envelopes. A meeting to assess applications will occur during May and all applicants will be notified of the outcome.

How to apply:

There is no application form.

1. Please give a concise description of your research, your reasons for wishing to attend and your experience of techniques taught on the workshop. List in order of priority four techniques you would like to learn.

2. Provide a brief CV (2 sides maximum), including list of publications (no reprints please).

3. The application must be accompanied by a letter of recommendation from an academic referee, preferably PhD supervisor or Head of Laboratory. This letter should indicate how your career, the laboratory in which you work and the area of research that you intend to pursue will benefit from your participation in the workshop.

4. What is your likely source of funding?

Funding

MRC and BBSRC Studentships - applicants with Research Council studentships are funded once accepted for the workshop - simply state you have a studentship in your application. Do not apply to the Research Council directly.

Dale and Rushton Funds of the Physiological Society - help with funding (upto £500) is usually available for young physiologists working in the UK. If you wish to apply please indicate in your application to the workshop. There is no need to apply directly to the Dale and Rushton funds before workshop applications are assessed.

Bursaries - The workshop can provide some half bursaries - if you think you will have difficulty finding the full fee please indicate in your application.

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Effect of phloridzin on net rate of liquid absorption from the pleural space of rabbits ZOCCHI L, AGOSTONI E & RAFFAII A 957

Perspectives in Physiology (x, associated paper)
Review Article

Starling: the formulation of his hypothesis of microvascular fluid exchange and its significance after 100 years 

Mini Review Article

The medullary raphe nuclei: a system for integration and gain control in autonomic and somatomotor responsiveness

Full-length Papers

An early transient current is associated with hyposmotic swelling and volume regulation in embryonic chick cardiac myocytes

Osmotic flow transients during acetylcholine stimulation in the perfused rat submandibular gland

L-type calcium current in catecholamine-induced cardiac hypertrophy in the rat

Effect of the potassium channel opener ZM260384 on skeletal muscle function during restricted blood flow in the anaesthetized cat

Effects of nitric oxide on diaphragmatic muscle endurance and strength in pigs

Mechanical behaviour of rat skeletal muscle during fatiguing stretch-shortening cycles

Organization of the sural cutaneous input regulating the discharge of triceps surae γ-motoneurones in the cat

Quantification of efflux into the blood and brain of intraventricularly perfused [3H]thymidine in the anaesthetized rabbit

Acetylcholine-evoked potassium transport in the isolated guinea-pig pancreas

The validity of the recollection technique in micropuncture experiments on the rat kidney

Glucose, lactate and oxygen metabolism in the fetal pig during late gestation

The role of carotid chemoreceptors in the effects of hypoxia on renal blood flow in the late gestation sheep fetus

Effect of diets varying in nitrogen or phosphorus content on indicators of bone growth in lambs

Differential responses of glycogen synthase to ischaemia and ischaemic contraction in human skeletal muscle

Dissociation between metabolic and contractile responses during intermittent isometric exercise in man

Intracellular pH and H⁺ buffering capacity in guinea-pigs with left ventricular hypertrophy induced by constriction of the thoracic aorta

Is human skeletal muscle capillary supply modelled according to fibre size or fibre type?
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 Spring 1997 edition (to be distributed on 14 February) should reach the Administration Office by 13 January.

EUROPEAN CONGRESS ON THE ETHICS OF ANIMAL EXPERIMENTATION
17-18 December 1996
Palais des Congrès, Brussels
Members of the animal research community and animal protection community are invited to debate the future regulation of animal experimentation. Organised by the European Biomedical Research Association (EBRA) and the Federation of European Laboratory Animal Science Associations (FELASA). Posters are invited on the following subjects:
The regulation of Animal Experiments
Animal Biotechnology
Replacement Alternatives
Refinement of Animal Experiments
The Use of Primates in Experiments
Public Understanding of Animal Research
Improved Animal Models
General
Participation fee: ECU 200. Languages: English, French & German. Further information from Congress Secretariat, BW & Partners, 9 rue du Moniteur, B-1000 Brussels. Fax: +32 2 219 32 15. ***

Open Meeting at The Royal Society
DISCUSSION MEETING
KNOWLEDGE-BASED VISION: MECHANISMS AND APPLICATIONS
12-13 February 1997
Organised by Dr H B Barlow, Professor R L Gregory & Professor G D Sullivan. Further information from the Science Promotion Section, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG. Tel: 0171 839 5561 ext 2574/2575, Fax: 0171 930 2170. WWW address: http://britac3.ac.uk/rs/ ***

Open Meeting at The Royal Society
DISCUSSION MEETING
WHAT ARE THE PARIETAL AND HIPPOCAMPAL CONTRIBUTIONS TO SPATIAL COGNITION?
19-20 March 1997
Organised by Dr N Burgess and Professor J M O'Keefe. Further information from the Science Promotion Section, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG. Tel: 0171 839 5561 ext 2574/2575, Fax: 0171 930 2170. WWW address: http://britac3.ac.uk/rs/ *

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 specific 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.

EUROPEAN CONGRESS FOR MOLECULAR CELL BIOLOGY
22-25 March 1997
Brighton Conference Centre
This congress organised by "Triangle 3" will cover topics across the full spectrum of contemporary molecular cell biology. The plenary symposia and poster sessions will be complemented by twenty or more concurrent symposia. To receive details of the congress, send an email to ebc97@immunology.org with the subject of <Update> and nothing in the message itself. You will then receive an automatically generated reply with details. Further information from Triangle House, Brookhill Road, London SW18 4HX. Tel: 0181 875 2400 or Fax: 0181 877 9308. *

FETAL & NEONATAL PHYSIOLOGY SYMPOSIUM
in association with the IUPS Congress 25-29 June 1997, Cambridge
This symposium has been organized by the Fetal Commission of the IUPS and will contain invited lecturers, oral communications and poster presentations. It will include eight sessions as follows:
Fetal programming
Fetal endocrine development
Placental structure and function
Growth and metabolism
Cardiovascular development
Fetal lung and respiratory control
Fetal brain
Transition at birth
Further information can be obtained from Mrs Sharon Holder, R & W Publications (Newmarket) Ltd., Goodwin House, Willie Snaith Road, Newmarket, Suffolk CB8 7SQ. tel (01638) 667600, fax (01638) 667229.

CYRO 97
THE APPLICATION OF THE MICROSCOPE IN LIFE SCIENCES
CYTO 97
CELLS AND SIGNALLING INCL.
FLOW 97
6-9 July 1997, University of York
CYTO 97 is the second of a series of biennial international scientific meetings organised by the Royal Microscopical Society. The conference will cover 'fundamental' cellular processes as well as the disturbance of cells leading to 'pathological' change. Plenary lectures from keynote speakers will describe research at the forefront of science today. Considerable time as been allocated in the programme for poster communications.

Registration for CYTO 97 will enable delegates to attend presentations in either conference. Further information from RMS, 37 - 38 St. Clements, Oxford OX4 1AJ. Tel: 01865 248768, Fax: 01865 791237. *

Bedroom Accommodation and Meeting Facilities at The Ciba Foundation
Any graduate in a scientific discipline on a period of up to two weeks. Charges as from 1 January 1996 are £37 for a single and £47 for a twin room which includes breakfast. Further details from: Sue Venables, The Ciba Foundation, 41 Portland Place, London W1N 4BN, tel (0171) 636 9456.

VISITING SCIENTISTS
Foreign visitors of the status of at least post-graduate student, working in laboratories of Members of the Society, may be made "Visiting Scientists" by the Society. The names of such persons, with the dates of their visits and a letter of support, should be sent to the Foreign Secretary, Professor O H Petersen, The Physiological Laboratory, University of Liverpool, PO Box 147, Crown Street, Liverpool L69 3BX.
At the Sheffield Meeting....

Peter Price, Mayor of Sheffield, has some amusing tales about his early life as a physiology technician.

And the winning number is...
(L-R) Peter Hardcastle, Master of Ceremonies and Chris Fry.

The registration desk at Ranmoor House.

At the reception held in Kelham Hall Industrial Museum.

Photography by Saffron Whitehead