Quarterly

SGM

VOLUME 25 PART 4

NOVEMBER 1998

- Xenotransplantation
- Living alternatives to antibiotics
- Is BSE an autoimmune disease?
- Women in science
- IUMS Congresses 1999
- Special book review issue

PUBLISHED BY THE SOCIETY FOR GENERAL MICROBIOLOGY

Quarterly

Volume 25
Part 4 • November 1998

CONTENTS

Articles

Regular Features

Other Items

IUMS CONGRESSES 1999

Sydney, Australia

Second circular now available!
Check http://www.tourhosts.com.au/iums for details of programme and registration. See p. 149 for SGM travel grants and packages.

Front cover: The shortage of human donor organs for transplantation has led to the possibility of using tissues from other sources such as pigs. *See article on p. 130. Photo courtesy of Travel Ink/Tony Page.*

REMEMBER! Always quote your Membership number in any correspondence.

SGM Headquarters: Marlborough House, Basingstoke Road, Spencers Wood, Reading RG7 1AE (Tel. 0118 988 1800; Fax 0118 988 5656; e-mail mtoday@socgenmicrobiol.org.uk).

SGM Web site: http://www.socgenmicrobiol.org.uk

Editor: Dr Dave McL. Roberts

Managing Editor: Janet Hurst

Production Editor: Ian Atherton

Production Assistant and Book Review Manager: Janice Meekings

Contributions: These are always welcome and should be addressed to the Editor (c/o SGM Headquarters).

ISSN: 0142-7547

COPY DATES

Last dates for receipt of copy at Marlborough House are:

Issue	General Copy	Advertisements (camera-ready copy)
February	1 December	11 January
May	8 March	19 April

Advertisements *– all enquiries should be sent to Ina Cocks, NWH Sales Ltd, Cedar House, Cedar Lane, Frimley, Surrey GU16 5HY (Tel. 01276 685111; Fax 01276 685011).*

Special Mailings *– all enquiries should be sent to Janice Meekings, SGM Headquarters (Tel. 0118 988 1802; Fax 0118 988 5656; e-mail j.meekings@socgenmicrobiol.org.uk).*

COMMENT

Quality Assurance, Accreditation and CPD: Bright Future or Nightmare Scenario?

Probably the single most striking characteristic of Higher Education (HE) in the UK in the last couple of decades has been the extent to which it has become increasingly politicized. Issues such as accountability, public confidence and financial viability have seemingly taken precedence over the more traditional educational concerns such as course content and scientific validity. The academic has to some extent been usurped by the administrator and the financial director; while all three have been required to trim their sails in a continuous effort to get the maximum purchase out of the variable winds blowing from the Funding Councils. The practical manifestations of these policies have been increased access through the creation of new universities and the overall augmentation of student numbers, coupled with decreases in numbers of teaching staff and general financial resources. HE institutions have responded to these pressures by introducing modular courses and computer-assisted learning (CAL), and by subsuming smaller departments into larger units.

While no institution or department would make a formal admission of any lowering of standards, there can be few individual academics who would not admit privately that, at the very least, the maintenance of these standards has become increasingly difficult. What is almost as important in the present climate is the perception of these standards in the eyes of prospective students and potential employers; stakeholders, as they are referred to in current quality-speak. There can be little doubt that the plethora of degree awarding bodies and of course curricula, each claiming to offer a gold standard BSc (Hons) Biological Sciences, carries the danger of raising confusion if not downright cynicism in the minds of these same stakeholders. This is essentially the position recognized by the Dearing Committee. The rectification of the perceived failings and limitations is the remit of the Quality Assurance Agency (QAA), set up by the Government to implement the Dearing recommendations.

In March of this year the QAA published a consultation issue of its house journal *Higher Quality* in which it set out a range of proposals designed to achieve its objective of "safeguarding the quality of provision and the standard of awards". Significantly, an underlying theme of these proposals was the concern that they should reduce the burden of external scrutiny of HE institutions. Amongst the proposals were:

(a) the development of a national qualifications framework covering all awards in HE;
(b) the setting up of subject benchmark groups with the remit to define so-called threshold standards within each given subject group, e.g. biosciences;
(c) the establishment of registered external examiners (REEs) who would have the remit to report both to the institution being examined, and to the QAA.

An informally constituted Biosciences Subject Group, which includes the Institute of Biology (IOB), Heads of University Biological Sciences (HUBS), UK Life Sciences Committee (UKLSC), UK National Committee for Microbiology (UKNCM), British Ecological Society, Linnean Society and the BioIndustry Association considered the QAA document in some depth and made a number of points in response. For example, although the concept of a national qualifications framework was accepted, it was pointed out that it would be extremely difficult to design templates that could be simultaneously universally applicable and yet academically meaningful in each individual case. Similar reservations were expressed in respect of benchmarking. More specifically, threshold benchmarks (that is to say, Third Class in terms of Honours) were seen as having little practical value in HE. The dual reporting status of REEs was recognized as being effectively unworkable.

As a result of these criticisms, and similar feedback from a wide range of academic institutions and other professional and learned societies, QAA has radically altered its REE proposal and extended the timetable for the introduction of a national qualifications framework and subject benchmarking groups. The essential point here is that a body set up by Government to reshape HE in the UK has both sought the opinions of the academic community in the widest sense, and modified its initial proposals in the light of these opinions.

Accreditation and continuous professional development (CPD) are issues essentially independent of those discussed above in respect of Dearing and QAA, but they do very much run in parallel with them.

It is common practice in professions such as law, medicine and engineering for new graduates to be required to satisfy the appropriate Royal College or Chartered Institute of their fitness to practise. Such accreditation generally involves both ratification of their formal course work by the chartered body and elements of relevant practical experience gained in the workplace. Even in scientific disciplines, such as chemistry, which are more closely related to the biological sciences, it is the Fellowship of the Royal Institute which is taken as the mark of the appropriately qualified and experienced individual. Also, medical microbiologists are familiar with the specific elements of further training and acquisition of practical experience that are necessary for the maintenance of their professional posts.

At the present time such elements of accreditation and CPD are not central issues in the education, training and employment of graduates in the biological sciences. They would, however, seem to be logical developments from the re-appraisal of educational provision arising from Dearing and QAA. A further point in this regard is the statement from Sir William Stewart when, as Chief Scientific Adviser to the Government, he formally opened this Society's

In this issue ...

Professional matters such as accreditation and quality assurance are the cause of much concern in academia at present. Allan Hamilton brings us up-to-date on the issues involved (pp. 126–127).

Therapies for a range of medical conditions come under the spotlight. Milton Wainwright takes a look at some old alternatives to antimicrobial drugs that are coming back into vogue (pp. 128–129). Some of the illustrations are not for the squeamish!

On p.130 Jonathan Stoye considers the hazards from retroviruses that might prove a stumbling block to the developing technology of xenotransplantation.

The cause of spongiform encephalopathies is a controversial issue and Ebringer *et al.* put forward the view that these are autoimmune diseases and not prion protein infections on pp. 136–137.

Other topics covered include career development for women in science (pp. 132–134) and promotion of the public understanding of science (pp. 138–139). A new feature, *Science Scene*, briefly surveys some current affairs of interest to microbiologists (p. 140).

These articles appear in addition to all the regular features and reports of Society activities.

headquarters at Marlborough House. He made it clear that the learned societies, and they alone, had the responsibility for championing and preserving the integrity of their chosen subject disciplines; Government, Research and Funding Councils, and HE Institutions all had larger, more generic fish to fry. The development of meaningful accreditation and CPD systems, designed and operated by these same learned societies, therefore, offer the mechanism to achieve this objective and at the same time to give shape and coherence to the broad-brush proposal coming from QAA.

Of course, mechanisms of accreditation and CPD do exist in the biological sciences. The Institute of Biology, the single body with authority conferred by Royal Charter to speak for biology as a whole, confers on its members the title of Chartered Biologist (CBiol), along with MIBiol or FIBiol, depending on the individual's status. The Institute is well aware, however, that at present CBiol does not have the cachet of equivalent accreditation in other disciplines. It is now a major component of IOB's strategic plan to restructure its educational and experience/training requirements for both the initial award and retention throughout an individual's career of the status of Chartered Biologist.

The Institute is very clear that this objective can only be obtained through a partnership with both the degree awarding bodies and the learned societies. It is hoped that these bodies will also make it possible to progress to more specific awards such as, for example CMicrobiol or CBiochem.

Such professional and educational matters have not in the past figured prominently in the strategy of learned societies such as SGM. But times are changing: there are both threats and opportunities for microbiology and related disciplines. The opportunities lie in the apparent willingness of the QAA to listen to the concerns and views of those of us at the coal face and in the attempt to forge a meaningful partnership with IOB, universities and other learned societies such that quality of provision and standards of awards can be truly safeguarded. The threats are in possible emergence of unworkable and over-bureaucratic procedures which do not produce the required outcomes and standards.

This article is an attempt to clarify some of the major issues currently determining what may be radical changes in HE. It is to be hoped that it may also stimulate debate on the importance of these issues for microbiology, and for the SGM. We do have a chance to influence the outcomes, but we must first be sure of what we really want.

The author of this article has some degree of knowledge of these matters through his chairmanship of UKNCM and membership of the Executive Board of IOB. The views expressed are, however, exclusively his own and do not necessarily reflect the consensus within the Committee, Institute or SGM Council.

W. Allan Hamilton, Chairman,
UK National Committee for Microbiology

NEW YEAR NEW LOOK NEW NAME

The *SGM Quarterly* is being redesigned and given a new name and a brighter look. It will contain more features and articles of topical interest to microbiologists, as well as all the usual news and information about Society activities. From February the magazine will be called *MICROBIOLOGY TODAY* to reflect the greater emphasis on current affairs and the latest developments in our area of bioscience.

The *Quarterly* began its existence in 1973 as the *Proceedings of the Society for General Microbiology*, mainly as a vehicle for publishing abstracts of SGM scientific meetings. This evolved into a newsletter which also contained notices of meetings and publications, news of Council and the Groups, letters, comment and reviews. To reflect this change the name was changed in 1978 to the *Society for General Microbiology Quarterly*. In 1982 the abstracts were discontinued and the *Quarterly* became the SGM house magazine. In recent years the *Quarterly* has received several facelifts, with the first colour cover appearing in August 1992. Now colour is used throughout the publication and it will be an important design feature of *Microbiology Today*.

These are exciting times in microbiology. There is always something new happening scientifically, yet microbiologists as a profession face challenges other than their work such as funding, accreditation and quality assurance. We are even facing an identity crisis in our discipline. Many named microbiology groups have disappeared in universities and, coupled with the inexorable rise in specialization, it is difficult to pin down who microbiologists are these days.

The new *Microbiology Today* will address all these issues and more, but to produce a magazine that meets your needs, feedback is required. Why not suggest some interesting topics or submit an article yourself? If you feel strongly about something, write a letter to the Editor. Let us know what you think of the design. Some old features, perhaps most obviously News from the Groups, will be disappearing – if you miss them, tell us. With your help the magazine can evolve not only into a stronger voice of the Society, but into a powerful promotional tool for the science of microbiology.

Dave Roberts, Editor

MICROBIOLOGY TODAY

Living Alternatives to Antibiotics

Milton Wainwright

Some experts predict the imminent end of the antibiotic age. If this happens we will be desperate for new ways of treating infections. Could a reappraisal of some old approaches using living organisms be the answer?

Imagine that during the next century you go to your local hospital suffering from an infected wound and are told that antibiotics are no longer of any use. You are reassured by your doctors who consider their options, which include the use of maggot therapy and bacteriophages. However, after carefully considering the nature of your infection, the doctors decide instead to apply a living anaerobic bacterium to your wound and within a few days you are cured. Although this scenario may seem unlikely, in the future we will need to consider all kinds of alternatives to antibiotics, including the use of biocontrol agents (or biotherapy).

Although plant pathologists use non-pathogenic organisms to defeat infections in plants, can we seriously expect to apply living organisms to treat infections in humans? Well, to some extent, the future is already here, since maggot therapy, the use of living maggots to treat wounds, has recently made a spectacular comeback into medicine and bacteriophage therapy has been used continuously since the 1930s in parts of the former Soviet Union.

Let us look at these and other biocontrol approaches in medicine in more detail and see what might be in store for us in the not too distant future.

MAGGOT THERAPY

Maggot therapy, as its name suggests, is the use of living maggots on infected wounds. It has a surprisingly long history of use by most civilizations throughout the world. Maggot therapy was also used in the American Civil and First World wars. It relies for its effectiveness upon the ability of fly larvae to eat dead flesh, while at the same time producing antibacterial agents. The American surgeon, William Stevenson Baer, is usually credited with introducing this bizarre therapy into medicine. During the 1930s, he used maggots to treat numerous bacterial infections, particularly osteomyelitis, an infection of the long bones that caused considerable suffering, particularly amongst children.

The modern approach to maggot therapy is essentially the same as that used by Baer. Maggots of the green blow fly (*Lucilia sericata*) are grown aseptically and introduced into the infected wound. Here they eat only decaying flesh and are removed at intervals before they can pupate. Electric light bulbs can be applied to force the maggot deep into the underlying tissues and petroleum jelly smeared around the opening of the wound helps prevent the larvae from escaping. Although Baer and his colleagues administered anti-tetanus vaccine and pain-killers, it is not clear whether the patients were given details of the treatment they were having to suffer.

When I wrote a historical account of maggot therapy in the mid-1980s, it was regarded as a back-water in the fight against bacterial infection and few could foresee its re-introduction. However, over the past few years maggot therapy has undergone something of a renaissance and is now being used throughout the world, notably in developing countries where, because it is cheap, it is used to treat long-standing and antibiotic-resistant infections.

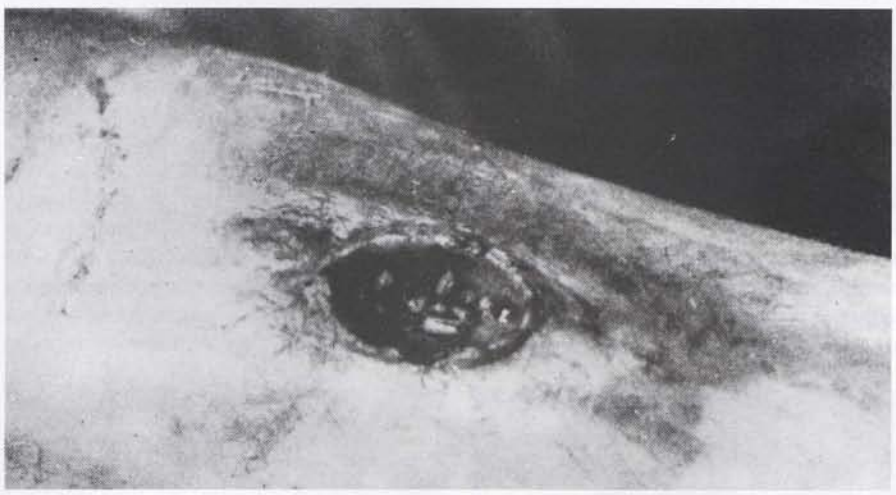


Fig. 1. Maggot therapy applied to a deep, open wound.

BACTERIOPHAGE THERAPY

Since bacteriophages infect and lyse pathogenic bacteria it is not surprising that soon after they were discovered by Frederick Twort in 1915 attempts were made to use them to treat infections. A vast literature on bacteriophage therapy exists, much of it confirming the ability to treat effectively a wide range of complaints, including cholera, dysentery and wound infections. While research into bacteriophage therapy largely died out when antibiotics appeared, it continued to be used by doctors in Poland, and in Tbilisi, Georgia, bacteriophage therapy is still used to treat infected hip replacements and septic arthritis of the knee.

MOULD THERAPY (MYCOTHERAPY)

There is an extensive folklore based on the use of mouldy foods to treat bacterial infections. Mould therapy is mentioned in the Jewish religious text, the *Talmud*, and was used by the ancient Egyptians. A mouldy loaf (the so-called Easter Bun) was also used until relatively recently by Devon farmers' wives to treat minor cuts and abrasions.

Mould therapy in its more scientific guise was widely used during the early 1940s when penicillin was not widely available. Doctors throughout the world grew Fleming's original penicillin-producing mould on bandages and then applied these to infected wounds where the mould continued to grow and secrete penicillin. In a modification of this approach, called 'Vivicillin', a suspension of macerated fungal mycelium was applied to the wound. Such *Penicillium notatum*-based mycotherapy saved a number of lives before it was inevitably replaced by pure penicillin.

Mould therapy might be worth re-evaluating, especially since fungal mycelium itself is known to aid healing, a property which might prolong the effectiveness of this approach, even if bacteria develop resistance to the antibiotics produced by the actively growing mould.

Surprisingly, nematophagous fungi (i.e. those that feed on nematode worms) have also recently been used to eradicate parasitic nematodes in animals; this highly unusual form of mycotherapy may yet be used on humans.

BACTERIOTHERAPY

The use of living bacteria in medicine reached its historical climax when, during the early part of this century, Robert Donaldson

employed a non-pathogenic *Clostridium* to treat infected wounds. Donaldson used an anaerobic, non-pathogenic strain which he called the 'Reading bacillus', after the town where its use was developed. Although this bacterium proved an effective biocontrol agent, its association with gas gangrene made its use appear extremely foolhardy and as a result it was never widely used. More recently, a non-pathogenic strain of *Clostridium difficile* has been used to treat diarrhoea, and it is also worth noting that Dussosy, in 1884, used *Clostridium*-rich dressings to treat breast cancers. Another recent example of bacteriotherapy in humans is the use of *Bacillus subtilis* to treat diarrhoea. Interestingly, this bacterium was also used by Chambers & Weidman in 1928 to eradicate ringworm infections of the feet.

Modern bacteriotherapy is, however, largely devoted to the consumption of so-called 'probiotics', that is cultures of *Lactobacillus* and *Bifidobacterium* to prevent gastroenteritis and diarrhoea. So-called bio-yoghurts containing these bacteria can also be used to alter the bacterial flora of the colon, or more directly to control vaginal thrush infections.

Fig. 2. Application of mould to skin during mycotherapy (simulation).

FEVER THERAPY (MALARIOTHERAPY)

Fever therapy is based on the observation that a fever induced by infecting a patient with malaria (the biocontrol agent being *Plasmodium vivax*), can sometimes cure a life-threatening infection. In the past, the induced malaria was treated with quinine, but in modern malariotherapy this is replaced by the more reliable drug, chloroquine. More recently fever therapy has been used to treat the tick-borne Lyme's disease. Amazingly, induced malaria infections also appear capable of restoring immunological function in AIDS patients and may even help remove HIV from the body.

CONCLUSIONS

The recent use of maggot and bacteriophage therapies shows how minds are gradually being opened to the view that biocontrol agents might find a use in the medicine of the future. Armed with our ability to genetically engineer micro-organisms, it should be possible to produce biocontrol agents that are far more effective than those used in the past. It might be possible, for example, to engineer maggots to prevent them from pupating and also make them have an aversion to nerve endings! Bacterial and mould biocontrol agents might be more effective by the judicious application of genetic engineering.

Clearly, the likely resistance amongst the medical profession to the use of living organisms, however benign, on humans will have to be overcome before the use of biocontrol agents in medicine becomes widespread.

Although talk of the end of the antibiotic age is somewhat premature, we may yet see the last 60 or so years as a brief respite in our continuing struggle against disease. If the doomsday scenarios of the pessimists do come true then we will have to consider every approach, no matter how bizarre, to infection control. The use of biocontrol agents, which historically have a promising track record, would seem a good place to start.

Dr Milton Wainwright is at the Department of Molecular Biology and Biotechnology, University of Sheffield, Sheffield S10 2TN (Tel. 0114 276 8555; Fax 0114 272 8697).

FURTHER READING

For a comprehensive review of this topic, see:
Wainwright, M. (1994). *Biocontrol Sci Technol* **4**, 123–131.
Donaldson's work is reviewed in:
Wainwright, M. (1998). *J Med Biogr* **6**, 86–88.
Recent references include:
Maggot therapy
Thomas, S. (1998). *Chem Ind* **17**, 680–683.
Thomas, S. & others (1996). *J Wound Care* **5**, 60.
Bacteriophage therapy
Barrow, P.A. & Soothill, J.S. (1997). *Trends Microbiol* **5**, 268.
Malariotherapy against AIDS
Heimlich, H.J. & others (1997). *Mech Ageing Dev* **93**, 79.
Bacteriotherapy
Seal, D. & others (1987). *Eur J Clin Microbiol* **6**, 51.
Nematophagous fungi against worms:
Wolstrup, J. & others (1996). *J Nematol* **28**, 129.

Endogenous Retroviruses and Xenotransplantation

Jonathan Stoye

Transplantation offers potential treatment for many human conditions but the use of pig tissue presents serious challenges to microbiologists.

Transplantation is the treatment of choice for many forms of end-stage organ failure. The successes of allotransplantation has now led to a significant shortage of organs for transplantation. Cell or tissue transplantation have the potential to provide dramatic new therapies for a number of conditions, including Parkinson's Disease, Huntington's Disease, diabetes and the chronic pain associated with terminal cancer. However, the source of material provides a problem. Attention has therefore turned to the possibility of using cells, tissues or organs from a non-human source such as the pig in procedures collectively known as xenotransplantation (1).

Provided that a variety of ethical concerns can be met, there are three major scientific and medical challenges to be overcome for xenotransplantation to live up to its promise. First, immunological rejection must be overcome. Significant progress has been made in this area and some will argue that we are ready for clinical trials. Second, the cell or organ must function in the recipient. Preliminary evidence suggests that this condition can be met, at least in certain cases. Third, there is the spectre of a disease epidemic resulting from transmission of animal pathogens to human recipients and from them to the human population at large. This fear is strengthened by evidence that human diseases such as AIDS and new variant Creutzfeld–Jacob disease have their origins in transfer of pathogens from animals to humans. To complicate matters, many infectious agents can be essentially non-pathogenic in their natural host but cause fatal disease after transfer to another species. Thus an animal could appear perfectly healthy but carry, say, an unknown virus which could cause lethal disease in humans.

The microbial status of source animals thus becomes a key issue. Over the past 30 years there has been considerable demand for healthy pigs and a variety of techniques for producing relatively pathogen-free animals have been developed. These procedures are expected to get rid of all known and unknown microbial pathogens except those capable of infecting foetuses congenitally and those which are transmitted in the germline. It is the latter group, the so-called endogenous retroviruses, that is currently believed to pose the greatest potential danger from xenotransplantation.

We, and all other vertebrates, carry tens of thousands of genetic passengers in our genomes (2). They represent the remnants of a series of integration events, going back through evolution, involving retroviruses, retrotransposons and retrotranscripts. Only a few of these endogenous retroelements appear to show significant biological consequences, but those that do are responsible for a fascinating range of phenomena and their study has been richly rewarding (see Table 1).

The best characterized group of elements are the endogenous retroviruses. Structurally related to their exogenous cousins, they appear to have co-evolved with their hosts, rendering their lifestyles compatible with one another. Often defective, endogenous retroviruses replicate relatively poorly in their hosts. In addition, genetic changes in their hosts, for example the inactivation of specific viral receptors, will limit virus replication. Thus, with a few notable exceptions, endogenous retroviruses do not cause disease in their normal hosts. Relatively little is known about pathogenicity following cross-species transmission though there are at least two cases where horizontally transmitted diseases have their origin in an endogenous retrovirus of another species.

How great a risk do the porcine endogenous retroviruses (PERVs) pose? Initial alarms, mainly based on theoretical considerations, were sounded in the absence of information about PERVs. These warnings prompted examination of PERVs; the resulting studies rapidly revealed the existence and widespread distribution of PERVs capable of infecting human cells *in vitro* (3, 4). These PERVs are expressed in many different cell types in a variety of pig breeds. It now appears virtually certain that xenotransplantation will expose a large fraction of recipients to infection by PERVs.

TABLE 1. SELECTED BIOLOGICAL PHENOMENA ASSOCIATED WITH ENDOGENOUS RETROVIRUSES

1. Virus expression can result in spontaneous neoplasms; study of the resulting tumours has led to the identification of numerous cellular oncogenes.
2. Deletion of T lymphocyte subsets associated with endogenous retroviruses has led to the identification of virally encoded superantigens.
3. Recombination can occur with exogenous retroviruses leading to generation of novel viruses with unexpected properties.
4. Viral insertion acts as insertional mutagen thereby allowing cloning of novel genes, e.g. the murine dilute and hairless genes.
5. Viral insertion alters gene expression patterns; e.g. the salivary expression of amylase in humans and old world monkeys, with consequent effects on diet, most probably results from a retroviral insertion.

As yet we do not know whether such expression will lead to widespread virus replication in transplant recipients and if so whether this will lead to disease. Indeed, preliminary studies suggest that PERVs do not replicate to high titres *in vitro* and are poorly contagious *in vivo*. Nevertheless, the fact that the growth of related viruses can lead to tumour development in immunosuppressed hosts is grounds for concern and has prompted calls for a moratorium on xenotransplantation until exposure to PERVs can be prevented (5). However, the only feasible approach to this problem is selective pig breeding; a process which could easily hold back the whole field of xenotransplantation for 10 years.

The dilemma facing regulatory authorities is that it is only by human trials, with their associated risk of xenozoonosis, that the clinical promise of xenotransplantation can be assessed. It is likely that clinical trials to test the effectiveness of xenotransplantation will take place in the near future. However, it should be borne in mind that early therapeutic successes might set the scene for the greatest danger. Such successes would increase the pressure for more human subjects, perhaps before objective safety trials could be completed – and retrovirally induced diseases often have a long latent period. Early clinical trials must therefore be conducted in a deliberate, stepwise fashion with specific protocols for monitoring PERV expression and one foot very close to the brakes (6).

Dr Jonathan P. Stoye is a member of the Division of Virology, National Institute for Medical Research, The Ridgeway, Mill Hill, London NW7 1AA (Tel. 0181 959 3666 ext. 2140; Fax 0181 906 4477; e-mail jstoye@nimr.mrc.ac.uk).

FURTHER READING

1. Advisory Group on the Ethics of Transplantation (1997). In *Animal Tissues into Humans*, pp. 1–258. Norwich: HMSO.
2. Boeke, J. D. & Stoye, J. P (1997). In *Retroviruses*, pp. 343–435. Edited by J. M. Coffin, S. H. Hughes & H. E. Varmus. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory.
3. Patience, C. & others (1997). *Nature Med* **3**, 282–286.
4. Le Tissier, P. & others (1997). *Nature* **389**, 681–682.
5. Bach, F. H. & others (1998). *Nature Med* **4**, 141–144.
6. Stoye, J. P. (1998). *Lancet* **352**, 666–667.

The Problems Facing Women Researchers

Lawrence Low and Jonathan Grant

What are the factors that influence the number of women achieving senior positions in biomedical science? The Wellcome Trust is commissioning an independent study to find out.

One hundred years ago one woman made an exciting discovery, the importance of which has been one of the most significant events in the twentieth century. Consequently she was the first ever woman to receive international recognition for her efforts in the form of the Nobel Prize in Physics in 1903 and in Chemistry in 1911. The woman was Marie Curie and her achievement was the discovery of two radioactive elements, polonium and radium, and their chemical properties. Since then there have been nine other Nobel-prize-winning women in the sciences, only one of whom (Dorothy Hodgkin) has been British. These few, but nonetheless important successes by women epitomize the difficulties faced by women in professional careers. In the UK women scientists are still seriously under-represented in senior academic positions; the proportion of women Fellows of the Royal Society, for example, has remained at about 3% of the total fellowship since the 1960s; only one in nine professors are women in the biomedical sciences (in the physical sciences it is as low as 1 in 50 (1).

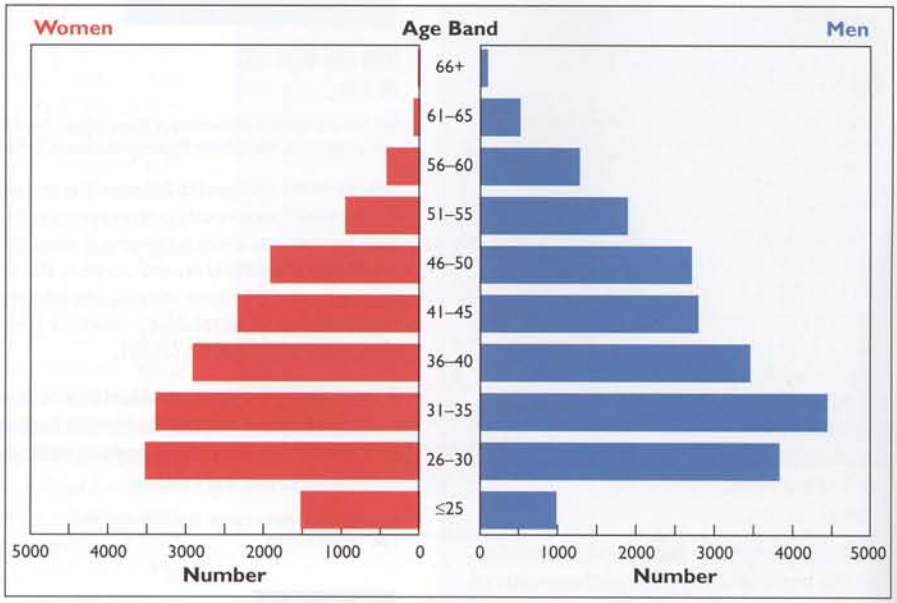


Fig. 1. Numbers of biomedical academic staff by age and sex in 1995–1996. *Source: HESA.*

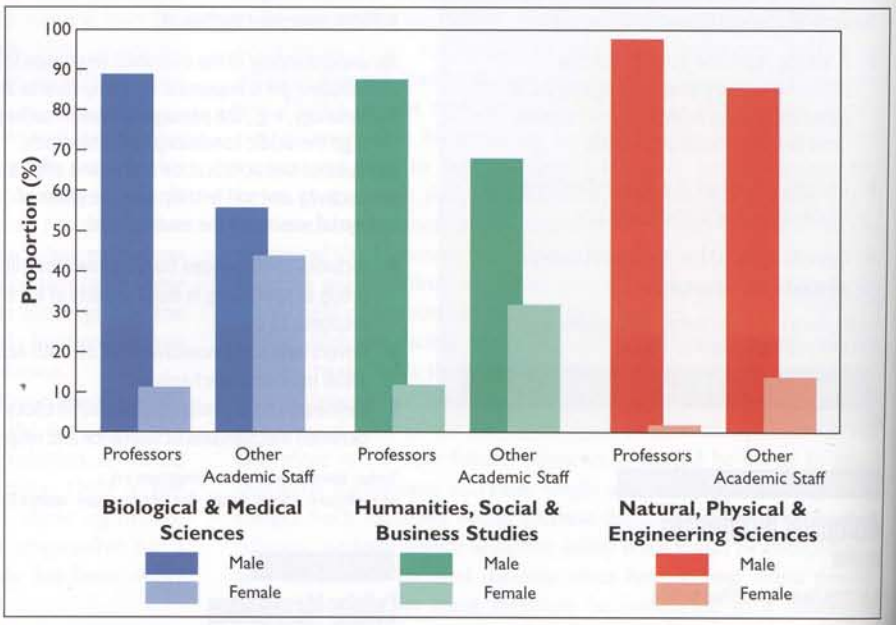


Fig. 2. Proportions of academic staff according to discipline, status and sex in 1995–1996. *Source: HESA.*

Why have there not been more successful women in research? A study conducted in Sweden in 1997 revealed systematic discrimination against women applying to the Swedish Medical Research Council for fellowships (2). In contrast, similar studies conducted by the Wellcome Trust (3) and other funding bodies (4) in the UK failed to reveal any evidence of discrimination against women in the assessment of applications for grants. However, a key finding of these studies was that proportionally more men than women apply to UK biomedical funding bodies for support. At the Wellcome Trust there were four times as many male as female applicants for project grants, five times as many for programme grants and twice as many for the senior fellowship scheme.

This bias might be expected if there were very few women working in biomedical academia. However, the number of women making applications does not reflect current patterns of employment. Within a decade the overall proportion of female to male biomedical academics has improved significantly at all grades. Full-time male academics, whether research orientated or otherwise, out-number women only slightly; there are three women for every four men (see Fig. 1).

In fact, women are more highly represented in biomedicine than in any other scientific area, a reflection of the increasing number choosing to study biomedically related degrees (see Fig. 2). Between 1985–1986 and 1994–1995 the proportion of women biomedical students (undergraduate and postgraduate) has increased by 11%. Currently over 60% of undergraduates and 50% of postgraduates studying biomedicine are women.

However, the current imbalance between those who manage to reach the more senior positions and the number of women entering biomedicine, and those currently working in the community may be related to the discovery of the lack of female applicants applying for funding. In academia promotion is dependent upon the establishment of a successful research career. So, if only a small proportion of women are applying for research grants, then there are fewer women who can create the kind of career that makes them eligible for promotion.

There are clearly complex factors at work which appear to have either directly prevented women from progressing to more senior academic grades or have indirectly influenced their decision not to attempt to ascend the career ladder. If this is the case then it is a problem which needs to be swiftly addressed. The Wellcome Trust in collaboration with other UK funding organizations, is exploring the complex factors that prevent researchers from applying for grants and an independent study is being commissioned. This study will examine such factors as the prevalence of fixed-term contract work, or being employed on 'soft' money and how this affects grant-applying behaviour and career choices. It will also investigate the different responsibilities and the stresses that researchers have to cope with, as well as their attitudes towards their careers and the methods of gaining promotion. Hopefully it will not be too

long before the study produces results that can be transformed into policies which address the problems faced by women researchers and increase the number of female applicants for grants.

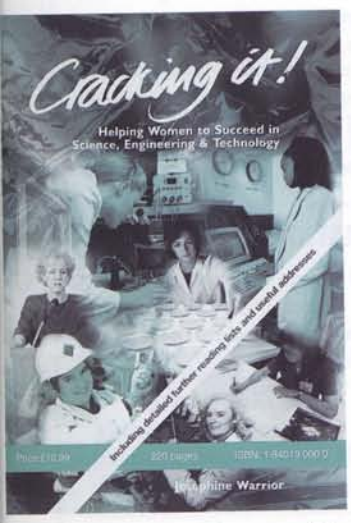
Lawrence Low is a Research Assistant and Jonathan Grant is a Policy Analyst with The Wellcome Trust's Unit for Policy Research in Science & Medicine (PRISM).

REFERENCES

1. Source: Data commissioned from the Higher Education Statistics Agency.
2. Wenneris, C. & Wold, A. (1997). *Nature* **387**, 341–343.
3. PRISM (1997). *PRISM Report No. 8*. The Wellcome Trust.
4. Grant, J., Burden, S. & Breen, G. (1997). *Nature* **390**, 438.

WOMEN IN MICROBIOLOGY

Janet Hurst



A book recently sponsored by the DTI and other bodies to help women scientists.

AS THE PREVIOUS ARTICLE HAS SHOWN, biological sciences are popular subjects for study by women, but the number of females in senior positions is small compared with those entering the field. Where does microbiology fit into this picture? Subject-specific statistics are hard to come by. The most recent available figures for students in UK higher education show that in 1996–1997 55% of microbiology undergraduates and 61% of postgraduates were women. At the last SGM meeting in Norwich one-third of the delegates were female. Microbiology always seems to have been a subject where women have played a significant role. Indeed Marjory Stephenson, a distinguished bacterial chemist, was instrumental in setting up the SGM in 1945. She has been the Society's only (!) female president.

As described below, many outstanding women microbiologists in academia, hospitals and industry in the 1950s and '60s entered their career as a result of war work. I suspect that most of these ladies were childless, or came from a social background where it was the norm to employ a nanny. Certainly for my own generation, trained in the 1960s, it was not accepted, as it is today, that women would work after starting a family, nor were there helpful legal requirements for maternity leave in place. This was due to discrimination and was not related particularly to science. Law and attitudes have changed, but as Annette Cashmore points out, even today taking a break to have children makes career development very difficult for women scientists.

In recent years there have been a number of initiatives to help women in science. The Office of Science and Technology (OST) established the Development Unit on Women in Science in 1994 to take forward the recommendations of its *Rising Tide* report. This sought to identify measures to tackle the low representation of women in scientific careers. The 1996 concordat between the Research Councils, Royal Society, and CVCP covering key aspects of employment conditions of contract researchers offers helpful provisions to women. The Research Councils and other bodies have developed special policies for their female employees and for returners after career breaks; fellowships and grants are now available for returners and innumerable pressure and support groups for women scientists have been set up. Many large companies have equal opportunities policies and run women's networks.

None of this relates specifically to microbiology and it is unclear if female microbiologists fare any differently from those in any other area of science. In the profiles below, three women microbiologists have kindly provided their own perspective on career development. Hard work and determination seem to have been the key factors in their success.

Is gender an issue? Feedback on this article would be welcome.

Janet Hurst is Deputy Executive Secretary of the SGM. She worked as a food microbiologist before having her children, retrained as a librarian and has been an administrator for the Society since 1990.

The Good Old Days

BEFORE 1939 BACTERIOLOGY was only taught in various agriculture degree and diploma courses, especially for dairying students; the other source of training was in the medical schools. In World War II the government inaugurated the National Milk Testing Scheme to safeguard the country's milk supply. It was regarded as work of national importance and women, mainly with dairy diplomas, but also school-leavers, really came into their own and ran the scheme. At the end of the war, having acquired considerable practical bacteriological experience, many of these ladies used their Ex-services Grant to enter higher education.

In 1945, after 3 years as a Laboratory Steward with the National Milk Testing Scheme at Lincoln, I went to University College, Nottingham to take a degree course in Botany and Zoology. There were no degree courses in microbiology anywhere in the UK and I was not enamoured of cows and the practical dairy farming that one had to do for the diploma! In 1950 there were only three (1 year) postgraduate courses in bacteriology in the UK: the London School of Hygiene and Tropical Medicine and Manchester University, which each accepted 10–12 students annually, preferring medics, chemists and biochemists, and Reading University which ran a diploma course in bacteriology, taking 5 students per year. I had my name down for 3 years prior to entry! This course, which also taught bacteriology to the dairy degree and diploma students, trained some valuable ladies. Dr Tal Richards headed the course, but much of the teaching was done by two women: Dr Frances Shattock and Dr Audrey Jones. Many of the women students went on to become university lecturers in microbiology or to work in senior positions in the pharmaceutical or food industries.

I stayed at Reading until 1961 as an assistant lecturer and later a lecturer in microbiology. Reading was the first university to have a named microbiology department and in 1955 I was the first woman to gain a PhD in the subject. The department was regarded as a big joke in other institutions. For example:

Q. *What is a microbiologist?*

A. *One with a microscopic knowledge of biology!*

I conducted research in the field of bacterial plant pathogens, especially *Pseudomonas*. This was pioneering stuff and there was a great panic to find an external examiner who knew anything about bacterial phytopathogens. B.C.J.G. Knight and A.A. Miles (of Topley & Wilson fame) were my examiners and neither knew anything about *Pseudomonas*, other than *aeruginosa*! It was a jolly session …

From 1961 until my retirement in 1990 I was lecturer, then senior lecturer in the Department of Botany at University College of Wales, Aberystwyth, where I was influential in founding the Department of Microbiology. I was responsible for teaching bacteriology to all (100+) biology students and I supervised research students in widely ranging microbiological projects.

Re gender and professional progress – in a nutshell I feel that a woman has to be 'twice as good to get half as far' but I am still an outsider here in Wales. I suspect it would have been easier to progress had I stayed in England, but B.C.J.G. Knight did NOT encourage one. The Ministry of Agriculture and Fisheries treated me well during the war and, strangely, this is the bacteriology I enjoyed most. The hours were horrendous, but we felt really useful and fully appreciated. We were our own bosses and just got on with it.

Muriel Rhodes-Roberts, retired university lecturer, Aberystwyth

From Technician to Senior Researcher

I DEVELOPED MY INTEREST in microbiology as an assistant scientific officer (ASO) at a Government research institute in West Sussex, working for Dr Naresh Magan as part of a team developing a microbial cocktail for the accelerated degradation of cereal straw. I joined the project with an OND in Biological Sciences and Naresh arranged for me to study for an HNC in Applied Biology on a day-release basis, which not only enabled me to move up the scale as a technician, but also saved me a year in my BSc degree. When funding for the project came to an end, I moved to the pharmaceutical industry. Working as a senior technician at Beecham Pharmaceuticals in Worthing, W. Sussex, I became responsible for the day-to-day running of the random screening programme for high-titre mutants of *Streptomyces clavuligerus*. Within a year I realised that working in industry was not as stimulating as working in a research environment. Six weeks after deciding to leave I started on the second year of the Applied Biology BSc at Thames Polytechnic.

After graduating I spent a year doing short-term contracts as a research assistant at Cranfield University and then at the Natural Resources Institute (NRI) in Chatham, Kent. In 1991 I was fortunate enough to be offered the post of Scientific Officer (SO) at the International Institute of Biological Control (IIBC), now CABI Bioscience, where I have been working on mass production techniques for entomopathogenic fungi as part of an international collaborative research programme to develop a mycoinsecticide for locusts and grasshoppers. I travel a lot as part of my job and in 1996 I was posted to Benin, West Africa, for a year. I registered for a PhD at Cranfield University as an external student in 1992 and was able to use the research work that I did as part of the project in my thesis. Writing up was difficult as I also had other work and travel commitments and a very strict deadline, but my boss was sympathetic and allowed me a lot of time to concentrate on my thesis during work hours. Also, with the agreement of the other programme staff, I was able to arrange my travel schedule around writing up.

So, how has being a woman affected my career? Well, I consider myself to be very lucky in being able to say not very much. Right from the beginning when I started working for Naresh, I have had nothing but encouragement to expand on my interest in microbiology and develop my career prospects. Since working for CABI, I have been promoted twice and am now a Senior Scientific Officer (SSO). This year has been particularly eventful, in that I had my first baby in April. I took 3 months maternity leave and soon after returning to work I took my son with me to work in South Africa for 6 weeks. Life is certainly more difficult now. Having a family generally puts a greater strain on women with careers than on men. I am very fortunate in that my husband is happy to share the responsibilities. And, with careful time management, most things are still possible.

Nina Jenkins, Microbial Production Specialist, CABI Bioscience, Ascot

Women in Academia – A Personal View

I RUN A RESEARCH GROUP, plan, organize and teach a variety of modules to medical and biology students and do my share of administration, etc. I am also mother of two boys (aged 9 and 11) and have the usual delights, crises and fun that goes with that role.

When trying to consider how to relate my perception of the experiences of women in science, I first decided, being an avid reader of the *Sunday Times Magazine*, to complete a 'life in the day of...' for myself. *6.30 am start to work on a manuscript, spelling tests in the car, four lectures a day, students with major academic, personal or (all too common these days) financial problems, tutorials, practical classes, meetings, rugby matches, after school clubs, school homework, more on the manuscript, then collapse...* However, on reflection, I realised that my account did not highlight anything special about women. It illustrated the experiences of a busy academic who combines research, teaching and family. It could just as well have been describing my husband's day (Chris is also an academic), or indeed the day of several of my male colleagues who have their university life and an active role in their families.

Throughout my career I have not encountered any problems of prejudice related to being a woman, either with respect to promotion and recognition or to the types of responsibility given to me. I have been part of a good team. Also Chris and I work as a good partnership in combining home and academia. Therefore, I have not experienced the same pressures encountered by many women wanting to have an academic career, whilst having to be the main 'home-maker' within their family. However, there is one difference between men and women that no-one can escape, and that is the biological difference that results in women having the babies. Giving birth means taking some break in work, no matter how short. When many women want to have children, they are at a stage in their scientific careers when they are employed on short-term contracts, gaining their research independence and under pressure to publish results and attract research funding. It is impossible to take a break of any significant length, and return to research.

Problems associated with this compromise can only ever be addressed by considering many factors as specific as child-care provision and a more secure career structure and as broad as society's general attitude to the role of women and the family. With the birth of both of my children I chose to take only a few weeks break. I realise now that I did not really have a choice. I have now reached a point where I can put my family first and still juggle all aspects of academic life, but as I'm sure my boys would agree, to play the games well you have to be part of good teams both at home and at work!

Annette Cashmore is a Senior Lecturer in Genetics at the University of Leicester, where she has worked for 11 years. She teaches human, molecular and microbial genetics and researches factors influencing the virulence of *Candida albicans*.

SOURCES OF HELP & INFORMATION

Promoting SET for Women, DTI Office of Science and Technology
http://www.dti.gov.uk/ost/ostbusiness Information line: Tel. 0171 233 0743
Materials include: case studies for employers, leaflets on career development, posters and videos for schools

Association for Women in Science and Engineering (AWISE)
http://www.awise.org
Information on careers via website, regional branches, meetings, newsletter

Women in Science, Engineering and Technology (WSET)
http://www.ae.ic.ac.uk/wset/home.html
A directory of women's organizations: support groups, networking, funding

Friendly Fire; Molecular Mimicry and BSE

Alan Ebringer, S. John Pirt and Clyde Wilson

Is BSE an autoimmune disease or caused by prion proteins? Here the two opposing views are considered.

At the Phillips BSE Inquiry on Day 11 (26 March 1998), Alan Ebringer and John Pirt gave their evidence that the spongiform encephalopathies (SEs), including BSE, Scrapie, CJD and kuru, are autoimmune diseases and are therefore non-infectious. That is, they are not caused by prion protein infectious agents. The counsel for the inquiry, Paul Walker, termed this autoantibody production as 'friendly fire'. The cause of the autoimmune response has long been the subject of scientific and medical controversy.

It was postulated more than a quarter of a century ago that the cause of the host's autoimmune response is that invading microbes bear antigens that can mimic self antigens in the host, thus antibodies to the invader cross-react with and attack the mimicked host tissue. This hypothesis has previously been accepted by the medical establishment as the explanation of rheumatic fever, where streptococci antigenically mimic cardiac myosin. Consequently, the host produces anti-streptococcal antibodies which cross-react with the host heart muscle and then impair its function.

On the basis of the molecular mimicry hypothesis, the Ebringer group discovered that the autoimmune disease ankylosing spondylitis (AS) is triggered by *Klebsiella* species. *Klebsiella* has two epitopes, present in nitrogenase reductase and pullulanase, which can specifically mimic the patient's self antigens. Thus the disease can be defined in microbiological terms. The Ebringer group subsequently identified that rheumatoid arthritis (RA) is triggered by *Proteus* species. This micro-organism contains two key epitopes, one in haemolysin, the other in urease, which mimic self antigens in the host, thereby accounting for the disease symptoms. Elimination of the *Proteus* infection results in regression of the disease's active phase.

Alternative explanations of the cause of autoimmunity have centred around a hypothetical 'T-cell' antigen. In contrast, the molecular mimicry explanation is simpler and is experimentally verifiable. This theory could lead to dramatic developments in investigation and therapy of autoimmune diseases.

A more politically sensitive development of the autoimmune theory is the startling discovery that BSE and related spongiform diseases are autoimmune in origin. They are not caused by spurious 'prion' agents but are instead due to molecular mimicry; they are non-infectious.

A key to this discovery is that injection of a minute amount of bovine myelin (0.1 μg) into a test guinea pig or rabbit will cause experimental allergic encephalomyelitis (EAE), which is pathologically the same as BSE. Symptoms are identical, clinically and histopathologically. Both EAE and BSE give rise to ataxia and hind-leg paralysis; both result in spongiform brain tissue appearance. The cause of EAE has over the years been confirmed as due to an encephalitogenic epitope of myelin A1 protein, which has been injected into the test animal.

In contrast, prion theory adherents insist that there is no reason to accept that EAE occurs in their experiments. Their experiments require injection of neural tissue, including myelin, into test animals; no control experiments with normal brain tissue are usually reported. According to the autoimmune theory, all such injections of myelin-containing protein will result in non-infectious and non-specific EAE, indistinguishable by its symptoms from BSE or other SEs.

Based on the hypothesis that BSE might be an autoimmune disease, we searched the computer databases on known protein structures to find a microbial protein which antigenically mimicked the EAE epitope in myelin. It was found that *Acinetobacter* species contain such a sequence (Fig. 1). We predicted that sera from BSE-positive cattle should contain elevated titres of antibodies to *Acinetobacter*. This was shown to be correct; antibodies to *Acinetobacter calcoaceticus* were identified in BSE-positive cattle sera. Confirmation of these tests is shown in Fig. 2.

Following this confirmation, we located a paper published by the group of Gajdusek, who had been awarded a Nobel Prize for his viral theory of SE causes. His group reported the presence of autoantibodies in sera of patients with kuru, in CJD cases and in sheep with natural scrapie (1). This discovery was never followed up; instead the prion theory of SE diseases and the Prusiner prion proposal have been emphasized.

In antibody tests, it was found that sera from CJD patients have highly elevated titres to *Acinetobacter* species. They also made the discovery that patients with multiple sclerosis (MS) have highly elevated titres to *Acinetobacter* in their active disease phase. The antibodies involved are of the IgA class; this means that the *Acinetobacter* infections occur across a mucosal surface.

The BSE epidemic in the UK cattle chronologically fits with the feeding to cattle of meat and bone meal (MBM), including 'red' and 'green' offal, the latter including ruminant faecal matter. Nowhere in nature do ruminants such as sheep and cattle eat their own faeces, or their cadavers. BSE has now rapidly disappeared in the UK since the ban on feeding MBM to ruminants was applied. Our proposal is that such feedstuff probably contained *Acinetobacter* levels sufficient to cause BSE in the cattle fed with this MBM and that myelin present in that offal may have been a source of EAE epitope, inducing ruminant autoantibody production after being taken up through the intestinal wall. Experiments in which cattle are fed with raw 'BSE' brain material have shown that clinical BSE is inducible in this way. We can predict that feeding of normal bovine brain tissue into ruminants will have the same effect as the feeding of so-called infected BSE brain tissue, both resulting in a BSE-

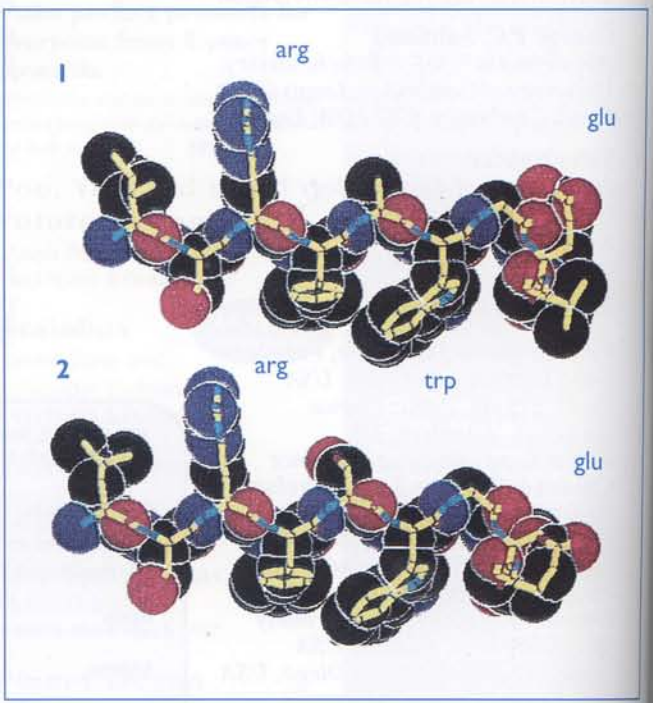


Fig. 1. Comparison of space-filling models of the epitope in *A. calcoaceticus* 4-carboxymuconolactone decarboxylase (4CMD) which shows molecular mimicry between 4CMD (1) and the EAE epitope in myelin (2).

type disease. Have such controls been carried out and what were their results? This is a testing requirement of momentous importance.

The autoimmunity theory accounts for the following aspects of SE.

- Pure prion protein fails to induce SE
- SE disease is restricted to central nervous system (CNS) tissue and does not affect other host tissues which also contain prion protein
- Immunodeficient mice (SCID mice) are not susceptible to SE disease
- There is antibody cross-reaction between the sera of BSE-affected animals (and humans) and *Acinetobacter* species

The molecular mimicry hypothesis accounts for many autoimmune diseases and offers the solution to a huge problem for the scientific, medical and agricultural communities. We can at last conquer 'friendly fire' diseases which affect so many millions of people and animals, in the UK alone, to huge economic and personal costs.

SUMMARY

The production of autoantibodies (or 'friendly fire') by the host is attributed to molecular mimicry of self antigens in the host by specific invading microbes. So-called 'transmissible spongiform encephalopathy' (TSE) is clinically indistinguishable from EAE. Both TSE and EAE conform unequivocally with the molecular mimicry explanation of autoimmune disease.

Professor Alan Ebringer leads an Autoimmune Diseases Group at King's College, University of London. Professor S. John Pirt and Dr Clyde Wilson are members of the group.

REFERENCE

1. Aoki, T. & others (1982). *Infect Immun* **38**, 316–324.

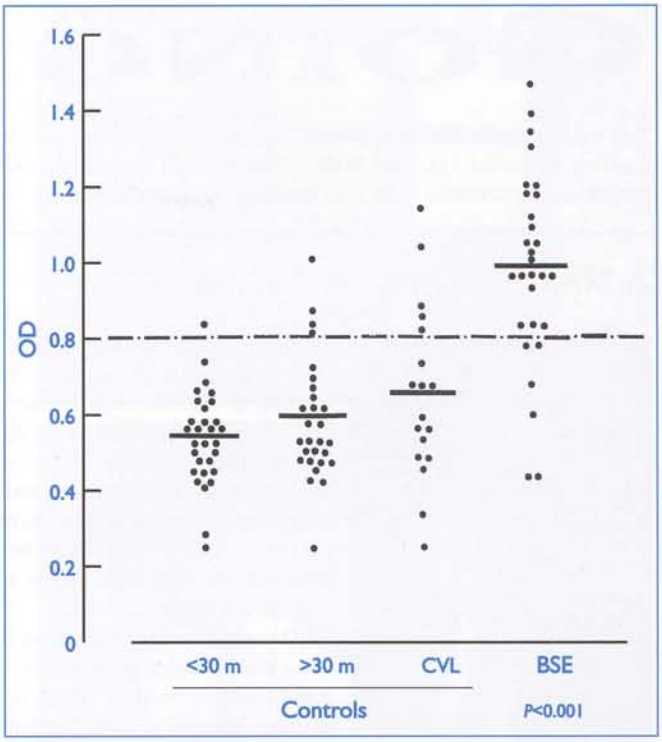


Fig. 2. Comparison between IgA antibody titres (ELISA) against *A. calcoaceticus* of BSE sera and controls [normal cattle sera (age < or > 30 months) and Central Veterinary Laboratory (CVL) sera from animals free of BSE].

FURTHER READING

Ebringer, A., Pirt, S.J., Wilson, C. *et al.* (1997). *Environ Health Perspect* **105**, 1172–1174.

Ebringer, A. & others (1998). *J Nutr Environ Med* **8**, 267–275.

Pirt, S.J. & Pirt, M.W. (1998). BSE is an Autoimmune Disease. The Prion Infectious Protein Fallacy. *Pirtferm Papers Series B No. 1*.Published by MP Biotechnology Ltd, 50 Chartfield Avenue, London SW15 6HG (pp. 22; £7.00; ISBN: 1-874685-40-1).

Autoimmunity or Infection in the TSEs?

A Comment on the 'Friendly Fire' Theory

Moira E. Bruce

THE TRANSMISSIBLE SPONGIFORM encephalopathies (TSEs) or 'prion diseases' are undoubtedly unusual in many respects and novel theories about their aetiology are welcome. However, new theories are only useful if they are consistent with existing data. In their enthusiasm for an autoimmune mechanism, Ebringer and colleagues have overlooked an extensive documentation of the neuropathology and infectious nature of this group of diseases (1).

The neuropathology of TSE disease does not, in fact, include the severe demyelination that is the major pathological feature of EAE (2). For most natural and experimental TSEs, disease can be transmitted readily, not only from brains of affected individuals, but also from other tissues such as spleen and lymph nodes which have an extremely low myelin content (3). A well-ordered replication of infectious agent can be demonstrated in these non-neural tissues from early in the incubation period, often months or years before infectivity can be detected in the central nervous system. Homogenates of normal brain are regularly used as control inocula in these studies and these do not cause disease in injected animals. It is true that grossly immunodeficient (e.g. SCID) mice are relatively resistant to infection with TSE agents, but only if they are challenged by peripheral routes (4). They are just as susceptible as immunocompetent mice when infection is introduced directly into the brain, an observation that is totally at odds with the autoimmune theory. Rather, there is strong experimental evidence that TSE agents replicate in specific cells of the immune system (probably follicular dendritic cells) that are missing in SCID mice (5).

The immune system is clearly important in the TSEs, not because any autoimmune mechanism is involved, but because the spleen and lymph nodes are early sites of replication of infectious agent.

Dr Moira E. Bruce is Head of the Pathology and Pathogenesis Section, Institute for Animal Health, Neuropathogenesis Unit, Edinburgh.

REFERENCES

1. Farquhar, C.F. & others (1997). *Immunol News* **4**, 198.
2. Fraser, H. (1993). *Br Med Bull* **49**, 792–809.
3. Fraser, H. & others (1992). In *Prion Diseases of Humans and Animals*, pp. 308–317. Edited by S.B. Prusiner & others. Chichester: Ellis Horwood.
4. Fraser, H. & others (1996). *J Gen Virol* **77**, 1935–1940.
5. Mabbott, N.A. & others (1998). *Immunol Today* **19**, 201–203.

GOING PUBLIC

THE SCIENCE PROMOTION SLOT IN THE *QUARTERLY* HAS BEEN GIVEN A NEW NAME. YOUR COMMENTS AND CONTRIBUTIONS ARE WELCOME. WHY NOT SHARE YOUR EXPERIENCES OF PROMOTING MICROBIOLOGY OR YOUR IDEAS OR OPINIONS WITH FELLOW MEMBERS OF THE SGM?

A NANO TELEVISION APPEARANCE

ON 6 JULY, Allan Hamilton, whose seven year term as Treasurer came to an end at the recent Society AGM, was having a quiet meeting at Marlborough House to discuss financial matters. The earnest deliberations were disturbed by a member of the External Relations Office interrupting to ask if anyone present knew anything about nanobacteria. Allan foolishly asserted "*I do; we think we've found them in cores from petroleum reservoirs*", only to be told that ITN had been on the phone seeking an expert on the subject to appear on the television programme *News at Ten* that very evening.

ITN were interested in nanobacteria as a result of an article by some Finnish researchers in *Proc Natl Acad Sci USA* (95, 8274 ff.). These tiny bacteria, which are less than 0.1 μm long, can develop a mineral coating. The Finns had found nanobacteria in human kidney stones and blood; they speculated that the organisms could be implicated in a range of diseases involving calcium deposition. They also suggested that nanobacteria may have come from outer space. ITN wanted to feature this story, but needed a UK microbiologist to comment on the findings.

Our former Treasurer, when not directing the SGM finances, carries out research at the University of Aberdeen into microbes associated with oilfield souring and corrosion. He agreed to be interviewed and a copy of the research paper was hurriedly faxed to Marlborough House. Before an hour was out the science producer for the television news programme and his crew (one man with a microphone and a camera) were on the door step at SGM Headquarters. Where to hold the interview? An office block does not look very 'scientific'. Fortunately one wall in the *Microbiology*/IJSB editorial office has a large and colourful display of front covers of the journals. In front of this backdrop, Allan parried the journalist's questions on the origins, lifestyle and practical implications of nanobacteria, for the universe as a whole, and for various microniches therein.

Later that evening, members of Council gathered in a hotel ready for their meeting the next day were all agog to see if any of the interview was broadcast on the Ten O'clock News. For a few seconds the Treasurer did indeed appear and his opinions on nanobacteria were heard throughout the UK. His name was even spelt right in the caption, and at least he was 'on air' twice as long as Bill Clinton who featured in the same news bulletin. The Council meeting next day was Allan's final one as Treasurer and he was warmly thanked by all present for his sterling work over the past seven years. However, as one door closes, another opens ... does a new career in the media beckon? Have we found the microbiological equivalent to David Bellamy at last?

Many thanks are due to Allan for taking up the challenge of the interview with no prior notice. A video of the event was made for posterity. The story about nanobacteria was also reported in *New Scientist* where other SGM members' opinions on the topic were quoted. Should any member require further information on communicating science to the media, a free booklet is available from the External Relations Office at SGM HQ (e-mail: info@socgenmicrobiol.org.uk).

Janet Hurst, SGM External Relations Manager

SCIENCE AND FOOD SAFETY

Roy Postlethwaite

CIRENCESTER LIES on the southern edge of the Cotswolds, at the junction of the Fosse Way and Ermine Street, within 40 miles of Bath, Bristol, Cheltenham, Gloucester, Oxford and Swindon. Edward Jenner went to school and Edgar Hope-Simpson practised medicine in this Gloucestershire town which is home to the Royal Agricultural College. In 1996 the Cirencester Science and Technology Society was established with the specific intent of promoting the public understanding of science.

On Saturday 27 June, the Society arranged a one-day exhibition on *Science and Food Safety* and an evening lecture by Professor Hugh Pennington from Aberdeen on *Food Poisoning: Out of Control?* The intention was to address a topical public health problem, show the importance of relevant science to the man in the street and enhance the standing of the society locally. Contributions were sought

SGM SCIENCE PROMOTION ACTIVITIES IN 1999

For further information on any of the following contact Jane Westwell (Tel. 0118 988 1820; e-mail j.westwell@socgenmicrobiol.org.uk)

JANUARY

Association for Science Education Annual Meeting

7–9 January, University of Reading

This popular annual event attracts over 4,000 science teachers and technicians from around the world. It offers lectures, talks, workshops, educational visits and displays by manufacturers, publishers, examination boards, professional bodies and many other organizations involved in all aspects of science education. Why not come along and visit the SGM stand in the Living Science Exhibition to see how we are promoting microbiology teaching in schools? This year the theme is *Magnification*.

FEBRUARY

Careers 2000

26–28 February, Glasgow SECC

The *Life Science at Work* stand, run jointly by SGM, BSI, BPS, Phys. Soc. and NCBE, will be in action promoting courses and careers in biology in Scotland. John Schollar will be entertaining the visitors with exciting biotechnology demonstrations.

MARCH

setWeek

20–21 March, University of Reading

setWeek is once again looming on the horizon and staff in the External Relations Office are making plans for their contribution to set99. After the success of *Food Microbes – the Good, the Bad & the Ugly*, we have decided to go back to the University of Reading *Science Family Fun Days*. Attention will focus on environmental microbiology with the main theme being *Where in the World?* which will show the influence of microbes on the natural world. The exhibition will explore the occurrence of microbes in environmental 'opposites', for instance 'near and far', 'hot and cold' and 'high and low'. A second theme will be *But Are They Useful?* and will show how naturally occurring microbes are exploited in traditional and novel ways.

The event will consist of the usual mix of hands-on activities and informative poster displays with the emphasis very much on 'hands-on'.

Microscopy workshops will run throughout the two-day event. Participants will be guided through a series of activities, including collection, preparation and close inspection of a wide range of environmental microbes. We are still in the early stages of planning at the moment and would welcome ideas and offers of help from Society members who would like to take part. Over 3000 people came to our event last year so the more helpers the merrier...

APRIL

Antibiotics Use or Abuse?

6.30 pm
Thursday
15 April 1999
Royal Museum of Scotland

edinburgh international **science** festival

Antimicrobial resistance is causing many problems to clinicians and microbiologists and it poses a tremendous threat to future human health. The SGM submitted detailed evidence to the recent House of Lords Select Committee on Science and Technology Inquiry into this subject. The report was published in April this year and it included a list of recommendations for urgent action. In April 1999 the SGM is holding a symposium at its Edinburgh Spring Meeting to cover recent developments in the field. But has any action been taken since the House of Lords' alarming findings were published? A special session at the Edinburgh Science Festival will focus public attention on the issues involved and invite debate.

Programme

Prof. Richard Wise (President, BSAC)
Introduction & Overview

Dr Konni Smalla (Germany)
Antibiotics and the Environment

Dr Peter Rudman (National Farmers' Union)
Antibiotics and agriculture

Prof. Peter Hawkey (University of Leeds)
Antimicrobials and patients

Dr David Livermore (PHLS, Colindale)
The epidemiology of antibiotic-resistant microbes

Round Table Discussion – Chair:
Dr Bernard Dixon (Science writer)

Entry will be by ticket only.

For further details of the 1999 Edinburgh International Science Festival contact:
Tel. 0131 220 3977;
e-mail esf@scifest.demon.co.uk
or visit the web site at:
http://www.go-edinburgh.co.uk

from Cirencester and the wider scientific community. Most appeals were received enthusiastically. Funding was obtained from COPUS (Committee for the Public Understanding of Science) and the Cirencester Bingham Trust.

Viewer-friendly exhibits illustrated the microbiology that underlies key aspects of food production, spoilage and poisoning (15). The types, growth, spread and killing of bacteria that cause food poisoning (2, 6, 9) were highlighted as were the relationships between symptoms and mechanisms of disease production (15), the use of the diagnostic laboratory (2), and the epidemiology and burgeoning impact of food-borne infections in the UK and Gloucestershire (12). Based on these fundamentals, practical aspects of safety, storage and refrigeration, and of personal and kitchen hygiene were exhibited (7, 9), and the lessons of the 1964 Aberdeen typhoid outbreak (507 cases) were re-learned by displays from Aberdeen (1), the local Environmental Health Department (4) and a local supermarket (16).

Displays to educate the public at the *Science and Food Safety* exhibition in Cirencester.

Popular hands-on exhibits included the use of oil-immersion microscopy of food poisoning bacteria (2), low power microscopy of realistic colonial forms on artificial culture plates (6) and interactive computer displays (2, 15). Complementary presentations included projects from schools and colleges (3, 5, 13, 14)* and posters and pamphlets (11) on additives, allergies, labelling, cold-storage, genetically modified foods and the ethics of genetic engineering (17), and on healthy eating and the constituents of good diets (8, 11).

In an authoritative lecture Professor Pennington described the origins, evolution and control of the 1997 *E. coli* O157 outbreak in Scotland and how his committee reported its conclusions and recommendations. Delivered in layman's language and with much humour, but with measured conviction on the need for hygienic procedures at all stages of food production and preparation, the account attracted many searching questions and received a prolonged ovation.

Two hundred and twenty visitors attended the exhibition and 70 attended the lecture. Animated discussions at display points and written responses on a short questionnaire showed that, as a first attempt, the effort had been well worthwhile.

The Society is indebted to all contributing organizations (listed below) and individual helpers and participants.

Professor Roy Postlethwaite, a retired SGM member, is Chairman of the Cirencester Science and Technology Society. He can be contacted at 6 Rendcomb Drive, Cirencester GL7 1YN.

PARTICIPATING ORGANIZATIONS

1. Aberdeen Medico-Chirurgical Society
2. Bristol Centre for Antimicrobial Research and Evaluation, Southmead Hospital.
3. Cirencester College
4. Cotswold District Council Environmental Health Department
5. Deer Park School, Cirencester
6. Department of Medical Microbiology, Royal Free Hospital, London
7. Food and Drink Federation, London
8. Health Promotion Unit, Gloucestershire Royal Hospital
9. Institute of Food Research, Norwich
10. Learning Interventions Company, Cirencester
11. Ministry of Agriculture, Fisheries and Food
12. Public Health Laboratory Service, Gloucestershire Royal Hospital
13. Rendcomb College, Cirencester
14. Royal Agricultural College, Cirencester
15. Society for General Microbiology, Reading
16. Tesco, Cirencester
17. University of Reading

Free copies of the SGM set of three wallcharts illustrating various aspects of food microbiology which were distributed at this event are available from Jane Westwell at SGM HQ (Tel. 0118 988 1821; e-mail info@socgenmicrobiol.org.uk).

Science Scene

A brief look at some topical issues

New UK Minster for Science

IN THE RECENT CABINET RESHUFFLE John Battle was replaced by Lord Sainsbury as junior science minister in the Department of Trade and Industry (DTI). Lord Sainsbury is former chairman of the well known supermarket chain but he has long been active in promoting science, mainly through his funding of the Gatsby Foundation, a charitable organization which supports a wide range of projects, many of direct benefit to microbiology. Peter Mandelson, a leading Labour Party 'spin doctor', becomes the cabinet minister responsible for science. The effect of these changes on the future health of the biosciences is a matter for speculation, but Lord Sainsbury has pledged to maintain the excellence of the UK science base and to campaign to maintain the current level of funding.

MICROBIOLOGY IN BRIEF

LOSS TO MICROBIOLOGY

MARINE MICROBIOLOGIST Holger W. Jannasch has died aged 71. With his colleagues from Woods Hole Oceanographic Institution he discovered the hyperthermophile microbial ecosystems which flourish around deep-sea hydrothermal vents, opening up a whole new realm of research for microbiologists. Dr Jannasch was not a member of the SGM but he gave the keynote lecture at the joint ASM/SGM meeting on *Bioremediation* in Aberdeen in 1995.

Several scientists were killed in the recent SwissAir plane crash off Canada in September. These included Jonathan Mann, founding director of the WHO's Global Programme on AIDS and his wife Mary-Lou, an AIDS vaccine researcher.

XENOTRANSPLANTATION UK GUIDELINES

READERS OF THE ARTICLE on p. 130 will be interested to learn that the UK Xenotransplantation Interim Regulatory Authority (UKXIRA) has drawn up guidelines for xenotransplantation experiments. Applications for human clinical trials must be made to the authority, which is also devising surveillance procedures for patients who receive animal tissue. The measures were announced by the government Health Minister, who will have the final say before any trials are allowed. A statutory backing for regulation is to be developed.

Director of the Research Councils

DR JOHN TAYLOR, Director of the Hewlett Packard Laboratories in Bristol, is to take over from Sir John Cadogan as director general of the UK research councils in January. Funding and industry/academia links are likely to be among his priorities.

EDUCATION MATTERS

AUGUST SAW the UK GCSE results announced, preceded by the 'A level' outcomes with attendant press interest in the effects of these on university entrance. The lists of vacancies in clearing helped to fill many column inches in an otherwise quiet season for education in the media.

'A LEVELS'

THE NUMBER OF STUDENTS taking 'A level' biology rose by 3% this year and other traditional sciences such as chemistry and physics also attracted more examination candidates. With 58,457 students taking the exam, biology was the third most popular subject in terms of total numbers, after English and maths. This increased interest in science is welcome, but note should be taken of the rise in the fastest growing subjects such as computing, up by 22% compared with 1997, sports studies and media studies up by around 17% and business studies up by about 10%. For how much longer will biology hold its popularity and how easy will it be to fill university places in the future?

UNIVERSITY STATISTICS

STATISTICS RELEASED by the Higher Education Statistics Agency (HESA) about students in the academic year 1996/97 show that 5.7% of all first degree students were studying biological sciences whereas 11.8% of those registered for a higher degree by research were life scientists. In total 1,597 students were following a named microbiology full-time first degree course out of 59,853 biological scientists. Of 8,987 full-time postgraduate students of biological science, the 360 studying microbiology were divided into 295 carrying out their degree by research and 53 engaged in a taught course. These figures must represent a tremendous under-recording of the amount of microbiology being taught, given that it is an important component of most medical and molecular life science courses.

UNIVERSITY ENTRANCE

EVEN IN 1998 there were plenty of places left in the lab, judging by the lists of course vacancies released by UCAS. All of the biological sciences seem to have been similarly affected and microbiology was no exception. Places in maths, engineering, physics and chemistry were also all reported to be slow to fill whereas those up-and-coming subjects of sports science and computing, not to mention media studies, proved to be very popular with sixth-formers. The learned societies representing life sciences are not complacent about the problems of recruiting students to their courses and are collaborating to produce appropriate promotional literature and to lobby school students at careers fairs. The SGM and the Biochemical Society have been running a joint stand at careers events since the early 1990s, but in 1999 it is pleasing to report that we will be joined by the British Society for Immunology, the British Pharmacological Society and the Physiological Society. More participants means that we can afford to attend a wider range of events. Other members of the UK Life Sciences Committee are also considering participation.

A 'Wellcome' Boost to Funds

UNDER THE UK GOVERNMENT Comprehensive Spending Review to 2002, science and engineering will receive £1.1 billion in funding.

The funds are extra to the £1.34 billion science budget already set for 1999–2002. Research charity the Wellcome Trust is donating £400 million of this new money.

The Joint Infrastructure Fund of £600 million (split between the government and Wellcome) will be allocated to universities for upgrading laboratories and equipment; £400 million will go to the research councils to meet current and capital costs of new project funding in priority areas like life sciences; and £100 million from Wellcome will be spent on a new synchrotron X-ray machine to aid genetic research.

Postgraduate Concerns

MEMBERS REPORT that studentships in microbiology are becoming increasingly difficult to fill; with either no applications or candidates of poor quality. These observations are part of a national trend, as shown by Office of Science and Technology figures which record that the total number of PhD students fell by nearly 15% between 1994 and 1996. Money is thought to be a significant factor despite the 20% rise in stipend that new government-funded postgraduate students received this October. A minimum annual income of £6,545 does not compare well with the *ca* £15,000 a new graduate is likely to receive in their first job. What can be done to attract bright students to research careers in life science? Some of these concerns were addressed at a recent one-day conference on postgraduate training held by the UK Life Sciences Committee. Delegates from industry, academia and the research councils concurred that a bigger stipend is needed to recruit well qualified students, especially now that most graduates are burdened with huge debts at the end of their first degree. They also felt that a four-year PhD incorporating a foundation year would produce higher calibre researchers, echoing the SGM view in its submission to the Dearing Inquiry.

Meanwhile in the United States, a recent report has shown that the number of life sciences PhD students is growing so fast each year that there are not enough jobs to go round at the end of the studentship. Many post-docs are working as laboratory technicians and there is a call for a freeze on life science PhD programmes. Much of the growth is due to foreign students. Perhaps America is the destination of all those missing high quality UK graduates?

SocietyNews

July Council Meeting

Quality Assurance in Higher Education

COUNCIL WAS INFORMED by the President of recent moves on QA, whereby the Institute of Biology proposes to work closely with the Quality Assurance Agency in the development of new procedures and especially in 'benchmarking' to establish minimum requirements for degree courses in biology. Serious misgivings had been voiced by senior academic microbiologists and some vice-chancellors, questioning the necessity for detailed and prescriptive external QA in established HE institutions which already had well-tried, effective and largely autonomous procedures in place. The President and others were also very concerned that the Society's name had been cited in support of IOB/QAA proposals. While Council members endorsed the view that the bulk of HE institutions teaching microbiology were doing so with competence and delivering good quality under existing procedures, it was also recognized that change may well be unavoidable. They accepted that the best way to ensure that new procedures are cost-effective, practicable and valid is through the active involvement of learned societies whose members uniquely possess the necessary breadth of expertise. Council will further debate these issues and develop policy in the coming months, and Society members are invited to contribute their views, via the Editor in these columns or directly to myself.

Professional Affairs Officer

COUNCIL ENTHUSIASTICALLY APPROVED the appointment of Professor Don Ritchie (University of Liverpool) as Professional Affairs Officer to succeed Professor Chris Thurston. Professional matters, including issues like Quality Assurance discussed above, as well as a wide range of developments in professional status and the interface of the Society with Government and the media, are increasingly significant to our members. Council was confident that Professor Ritchie would bring the necessary skills and application to this post.

IUMS Nominations

THE INTERNATIONAL UNION of Microbiological Societies, the principal international body representing our interests, is approaching the time for major changes on its executive board. Vacancies will arise for President, Secretary General, two Vice-Presidents, Treasurer and two Members at Large next year, and nominations will be required by **31 January 1999**. The Society, on a decision by Council, may make nominations and any Society member who is interested should let me know as soon as possible.

Charles Penn, General Secretary

Address Book

With this issue of the *Quarterly* you should have received a copy of the latest edition of the SGM Address Book giving information about all Society members. The list was taken off the membership database in the summer and therefore some of your details will already be out-of-date. Please check your entry and inform the membership office (Tel. 0118 988 1803, e-mail members@socgenmicrobiol.org.uk) of any changes or corrections.

Group Committee Elections 1998

NEW COMMITTEE MEMBERS, elected by postal ballot (Microbial Infection and Virus Groups) or elected unopposed (all other Groups), are as follows:

Cells & Cell Surfaces

J. Armitage	(University of Oxford)
S. Brul	(Unilever Research Division, Vlaardingen, the Netherlands)
D. Quain	(Bass Brewers Ltd, Burton-on-Trent)
A. Smith	(University of Bath)

Clinical Virology

In the absence of nominations for the two vacancies, W. Irving (University of Nottingham) and T. Wreghitt (Addenbrooke's Hospital, Cambridge) have agreed to serve for a further year.

Education

P. Handley	(University of Manchester)
A. Eley	(University of Sheffield)

Environmental Microbiology

K. Semple	(University of Lancaster)
G. Underwood	(University of Essex)

Fermentation & Bioprocessing

M.M.G. Duchars	(Zeneca LSM, Billingham)
R.M. Hall	(Glaxo-Wellcome, Stevenage)
D.J. Mead	(Delta Biotechnology, Nottingham)

Irish Branch

E. Doyle	(University College Dublin)
C. O'Reilly	(Waterford Institute of Technology)
N. Ternan	(University of Ulster at Coleraine)

Microbial Infection

D. Devine	(University of Leeds)
L. Piddock	(University of Birmingham)
D. Smith	(Royal [Dick] School of Veterinary Studies, Edinburgh)

Physiology, Biochemistry & Molecular Genetics

D. Archer	(IFR, Norwich)
N. Bruce	(University of Cambridge)
G. Stephens	(UMIST)

Systematics & Evolution

C. Arnold	(CPHL, London)
B. Austin	(Heriot-Watt University, Edinburgh)

G. Saddler (IMI, Egham) will succeed G. Alderson as Group Convener.

Virus

I. Brierley	(University of Cambridge)
D. Evans	(University of Reading)
J. Fazakerley	(Royal [Dick] School of Veterinary Studies, Edinburgh)
E. Hoey	(Queen's University of Belfast)

Marlborough House News

• WEDDING BELLS have been ringing in the editorial offices this summer. In July Debbie Clegg, Deputy Managing Editor of JGV, became Mrs Ollman and in August *Microbiology* Staff Editor Joanna Coleman married Martin Couchman. Debbie and her husband Matthew spent their honeymoon touring Canada whilst Jo and Martin holidayed in the Seychelles. We wish both couples every happiness in the future.

• WELCOME TO Dr Robin Dunford who joined the JGV team as a Staff Editor in June. Robin gained his PhD from the University of Cambridge and then spent several years in the Department of Plant Sciences at Oxford University carrying out post-doctoral research centred on the metabolic and molecular analysis of selected transgenic potato lines.

Book Reviews on the Web

ALL BOOK REVIEWS published in the *Quarterly* since February 1996 will shortly be available on the SGM web site.

News of Members

At the recent Annual Meeting, in Brisbane, of the Australasian Division of the International Association for Dental Research, the prestigious Alan Docking IADR Science Award was presented to ***Dr Tony Rogers***, Reader in Oral Microbiology, Department of Dentistry, The University of Adelaide, South Australia. The Award is made 'on the basis of outstanding scientific achievement in the field of dental research over a period of time', and is assessed on the basis of published work.

Dr Colin J. Stirling, reader, has been appointed to a Personal Promotional Chair of Genetics at the University of Manchester.

The Society notes with regret the deaths of ***Dr J. Lacey*** (member since 1963), ***Professor M. John Pickett*** (member since 1964) and ***Dr George S. Turner*** (member since 1966).

SocietyNews

Grants & Awards

Details of all SGM grant schemes are now on the SGM web site at http://www.socgenmicrobiol.org.uk

Most application forms can be downloaded. Any enquiries should be made to the Grants Office at SGM Headquarters, Marlborough House, Basingstoke Road, Spencers Wood, Reading RG7 1 AE (Tel. +44 118 988 1821; Fax +44 118 988 5656; e-mail grants@socgenmicrobiol.org.uk

Vacation Studentships 1999

COUNCIL WISHES TO OFFER a limited number of awards to enable undergraduates to work on microbiological research projects during the summer vacation. The purpose of the awards is to provide undergraduates with experience of research and to encourage them to consider a career in scientific research. The studentships provide support at a rate of £120 per week for a period of up to 8 weeks. An additional sum of up to £400 for specific research costs may also be awarded. Applications on behalf of named students are now invited from SGM members in higher education institutions and research institutes. Details of the scheme are given below.

Please note that the closing date has been brought forward this year, so that awards can be notified to applicants in April instead of May.

Guidelines

1. Applicants must be members of the Society working in a higher education institution or research institute in the UK or Republic of Ireland. Applications must be made on behalf of a named student. More than one application from a department/school will be considered, but in the case of several applications being submitted, departments/schools may be asked to rank the applicants.
2. Students must normally be in the penultimate year of their undergraduate course and registered at an institution in the UK or Republic of Ireland. Applications for students in their final year will not be considered. Medical students will be accepted at the end of their intercalated studies, but not during their elective period.
3. The research project must be on a microbiological subject. Studentships will not be awarded for projects that are part of degree work. A studentship may be held in a laboratory away from the normal place of study, but it must be located within the UK or Republic of Ireland.
4. Applications will be assessed by a Council Award Panel, based on the reports of two referees. The scheme is competitive and applications will be judged primarily on the scientific merits of the project and the suitability of the student. Once an award has been offered, it cannot be transferred to another student.
5. The awards will provide support for the student at a rate of £120 per week for a period of up to 8 weeks, and not usually less than 6 weeks. An additional sum of up to £400 for specified research costs may also be awarded. Grants are made to the institution to which the applicant belongs, not to the supervisor, on the understanding that it will administer the award.
6. It is a condition of the award that the student submits a brief report of the research at the completion of the studentship.
7. Applications must be made on the appropriate form. The closing date for applications is **27 February 1999**.

President's Fund

THE PRESIDENT'S FUND PROVIDES SMALL GRANTS TO YOUNGER MEMBERS OF THE SOCIETY TO ASSIST TOWARDS TRAVEL WORLDWIDE TO PRESENT THEIR WORK AT A SCIENTIFIC MEETING, MAKE A SHORT RESEARCH VISIT OR ATTEND AN APPROVED COURSE. APPLICANTS MUST BE RESIDENT AND REGISTERED FOR A PHD IN A EUROPEAN UNION COUNTRY. APPLICATIONS WILL NOW ALSO BE CONSIDERED FROM MEMBERS IN THEIR FIRST POST-DOCTORAL POSITION, IN CASES WHERE THERE IS EXCEPTIONAL NEED. GRANTS FROM THE FUND ARE AWARDED AT THE PRESIDENT'S PERSONAL DISCRETION. THE RULES OF THE SCHEME ARE AS FOLLOWS.

Rules

Applicants must be paid up members of the SGM of at least 3 calendar months standing before the date of their application for a grant. Applicants must be resident and registered for a PhD, or in a first post-doctoral position, in a country in the European Union.

Limited support is available for the following:

(a) Travelling to present a paper or a poster on a microbiological topic at a scientific meeting.

(b) Making a short research visit.

(c) Attending a short course (up to 2 weeks).

Applicants must submit evidence of the oral or poster presentation at the meeting, or acceptance on the course or by the host institution, as appropriate, with their completed application form.

Applicants who are funded by a research council or other funding body that regularly supports conference attendance must submit evidence that they have applied for sponsorship from that body. Salaried applicants must submit evidence of their annual income (net, after tax).

Grants are usually limited to £100 for attendance at meetings or institutions in the country of residence, £155 for travel to another European country and £220 for travel outside Europe.

Only one application may be made to the President's Fund during the term of a postgraduate studentship or first post-doctoral position.

Retrospective applications will not be considered.

TWO copies of the completed application form and all supplementary documentation must be submitted for consideration.

Postgraduate Conference Grants

POSTGRADUATE STUDENT MEMBERS of SGM currently resident in the UK or another European Union country are eligible for a grant to cover the costs of accommodation and travel in attending ONE of the following Society meetings in 1999: Warwick (January), Edinburgh (April), Leeds (September) or any other SGM Group or Branch meeting. Application forms giving full details of the scheme were sent to all Student Members with their subscription invoices. A copy can be downloaded from the SGM web site.

Seminar Speakers Fund 1998/99

THE PURPOSE of the Seminar Speakers Fund is to promote talks on microbiological topics in departmental seminar programmes. Applications are invited from higher education institutions where microbiology is taught for grants of up to £200 towards the travel, and if necessary, accommodation, expenses of an invited speaker. The full rules of the scheme were published on p. 67 of the May *Quarterly*.

Applications will be dealt with on a first come, first served basis during the academic year, which is defined as running from September 1998 to June 1999. Written submissions should be sent to the Grants Office at SGM Headquarters.

SocietyNews

Fleming Award 1999

The Fleming Lecture is an annual award made by the SGM to recognize outstanding research by a young microbiologist.

The field of research may be in any branch of microbiology and the recipient, the Fleming Lecturer, need not be a member of the Society. The award is £1000.

Nominations are now invited by the Council Award Panel for the next Fleming Lecturer who will be appointed in 1999.

Rules

1. Nominees should normally have been engaged in research for not more than 10 years after doctoral qualification or equivalent. Years may be added to this total in respect of career breaks, for parenthood or other substantive reasons.
2. There should normally have been a connection with the scientific activity of the Society, either by means of past and continuing membership of the Society (a minimum of 3 years' membership of the Society would normally be expected), or past presentation(s) at a Society meeting or publication(s) in a Society journal, or an organizational or administrative contribution to the scientific work of the Society.
3. Candidates, who need not be members of the Society, should submit an outline CV, including details of qualifications, scholarships, research grants obtained etc., a list of publications, an outline of their career progression (posts held in post-doctoral research) and the names of two members who are familiar with their work, who will be asked to provide a statement detailing the candidate's contribution to microbiology and merit for the award. Alternatively members who wish to make a nomination should provide such a statement and should arrange for a second member willing to support the nomination to provide a statement, and should ask the candidate to provide the CV and publications list. The General Secretary will be pleased to advise members preparing nominations about the information to be supplied.
4. The recipient will be expected to give a lecture based on his or her work to a meeting of the Society, which will usually not be that which takes place in the spring. He or she may be asked by the Council of the Society to repeat the lecture at another centre in this country or in Europe. Expenses of the lecturer will be paid by the Society. Requests for such a second lecture should be made to the General Secretary and will be considered by Council. The text of the lecture will be published in either *Microbiology* or *Journal of General Virology*, whichever is the more suitable. The choice will be at the discretion of the Editors of the two journals.
6. In the event of there being no successful nominee in any particular year, the Award money will be returned to the funds of the Society. Any given nominee may be chosen once only.
7. Nominations should be sent to the General Secretary, Dr C.W. Penn, School of Biological Sciences, Biology West Building, University of Birmingham, Birmingham B15 2TT, to reach him **before 18 December 1998.**

SGM MEMBERSHIP SUBSCRIPTIONS 1999

All members receive the quarterly magazine *Microbiology Today*; in addition they may take any of the Society's journals.

ORDINARY MEMBER		
Membership Subscription (inc. *Microbiology Today*)	£37.00	(US$65.00)
Additional concessionary subscriptions for publications:		
Microbiology	£60.00	(US$110.00)
JGV	£60.00	(US$110.00)
International Journal of Systematic Bacteriology	£50.00	(US$80.00)
STUDENT OR RETIRED MEMBER		
Membership Subscription (inc. *Microbiology Today*)	£20.00	(US$30.00)
Additional concessionary subscriptions for publications:		
Microbiology	£28.00	(US$55.00)
JGV	£28.00	(US$55.00)

The above subscription rates were agreed at the AGM of the Society. Members are reminded that their 1999 subscriptions are due for payment **by 1 December 1998.**

As in previous years, no journal or meetings information will be despatched to members who are in arrears, and there will be no guarantee of provision of back numbers of journals for members who pay their subscription late.

Payment by Direct Debit or Continuous Credit Card

Subscription notices were despatched recently to all members paying by direct debit or by continuous credit card arrangement. To continue your present status and journal requirements, no further action is necessary. However, if you pay by continuous credit card, you should check that the card number and expiry date on the subscription notice are correct. To change your membership status or journal requirements for 1999, or your credit card details, you should have amended your subscription notice and returned it to the Membership Office **by 14 November 1998.** However, if you have missed this deadline, your amended notice will be accepted if it is submitted immediately.

Payment Against Invoice

Invoices were despatched during October to all members who pay by this method. If you did not receive one, please advise the Membership Office.

Subscriptions Waived for Unemployed Members

As in previous years, subscriptions will be waived for unemployed members under the age of 35 who are resident in the UK. If you are eligible and wish to benefit in this way in 1999, you should send a signed statement that you are currently unemployed to the Membership Office **before 30 November 1998.** (Please note that no increase in journal requirements will be permitted.)

Income Tax Relief on Membership Subscriptions

Members who are liable for UK income tax are reminded that their annual subscriptions to the Society have been approved by the Inland Revenue as qualifying for income tax relief. Any member who would like further information or has difficulty in obtaining this relief should contact the Executive Secretary.

Airmail Despatch of Quarterly Magazine, *Microbiology Today*

All members resident outside the UK are offered the option of regular airmail despatch of *Microbiology Today* and meetings information. There is a surcharge of £8.00 (US$14.00) per annum for this service, payable at the same time as the annual membership subscription. Members who would like to start this service in 1999 should make the appropriate alterations to their subscription invoice.

SocietyNews

New Professional Affairs Officer

Professor Donald Ritchie

AS A BOTANY UNDERGRADUATE at Leicester University I was deeply influenced by John Fincham's lectures on bacterial and phage genetics. A seminar by George Beadle on DNA and genes in 1958 convinced me that microbial genetics was the emerging powerhouse for genetics. With great fortune I joined Bill Hayes' newly-formed MRC Microbial Genetics Research Unit at Hammersmith Hospital under the supervision of Neville Symonds, a theoretical physicist turned biologist and part of the movement at that time into biology which created what has become molecular biology. Working with phage T4, alongside contemporaries Paul Broda, Julian Gross, Marylin Monk and the sadly lost John Scaife at a London watering hole was an excellent training. 1964–1966, during which I was registered for service with the US military, was spent with another ex-physicist Charlie Thomas at John Hopkins University where we defined aspects of the anatomy of T2, T4 and T7 phage DNA molecules. There I met many of the giants of molecular genetics. The greatest, in my view, was the infinitely thoughtful, creative and modest Alfred Hershey.

After 12 enjoyable years in Glasgow, recruited by Michael Stoker to run a phage course and working under John Subak-Sharpe, one of the most far-sighted scientists I have known, I moved to the Chair of Genetics at Liverpool in 1978. My interest in the genetic and functional organization of phage genomes continued but was gradually replaced by a shift to environmental microbiology with the intention of applying molecular genetic approaches to understanding natural bacterial community structure and function, particularly in relation to spatial, temporal, physico-chemical and climatic change. This has demanded a substantial re-appraisal to my thinking about microbes and is a source of continuing stimulation.

NEW MEMBERS OF COUNCIL 1998

MR PETER STANBURY (University of Hertfordshire) commenced his 7 year term as Treasurer, and PROFESSOR DON RITCHIE (University of Liverpool) commenced his 5 year term as Professional Affairs Officer, on 8 September 1998. A profile of the new Treasurer appeared on p. 104 of the August 1998 *Quarterly*.

Following the recent ballot of Ordinary Members, the following have been elected to serve as Members of Council for a period of 4 years: *Professor Richard Elliott* (Institute of Virology, Glasgow), *Dr Colin Harwood* (University of Newcastle) and *Dr Lynne Macaskie* (University of Birmingham).

Prof. Richard Elliott
Institute of Virology, Glasgow

I DID MY UNDERGRADUATE DEGREE in microbiology at the University of Surrey where I became hooked on viruses, and then moved to Oxford for graduate studies, supervised by David Kelly, on frog virus 3, a large DNA virus, in the NERC Institute of Invertebrate Virology. For my post-doctoral stint I switched to RNA viruses and worked with Peter Palese in New York on influenza virus. I kept with RNA viruses when I returned to the UK in 1981, to study bunyaviruses in the MRC Virology Unit in Glasgow. In 1986 I was awarded an MRC Senior Fellowship, which I held until 1995 when Glasgow University appointed me to a Personal Chair in Molecular Virology. Bunyaviruses continue to be a major research interest, though I have expanded my research to encompass hepatitis C virus.

Dr Colin Harwood
University of Newcastle

MY INTEREST IN MICROBIOLOGY developed during a biological sciences degree at London University and I consequently went on to a PhD in microbial genetics with Simon Baumberg in Leeds. A post-doctoral fellowship with the Meynells at Kent on enterobacterial plasmids was followed by a lectureship in microbiology at Newcastle. Our work has focused mainly on *Bacillus subtilis*. We contributed to the *B. subtilis* genome sequencing project and participate in the functional analysis programme. We also have projects on protein secretion and responses to phosphate starvation. I am currently a representative on the British Co-ordinating Committee on Biotechnology and the European Federation of Biotechnology's Applied Genome Research Section.

Dr Lynne Macaskie
University of Birmingham

MY FIRST DEGREE was in microbiology (UCL) and my PhD in microbial biochemistry. I joined Oxford University (Physical Chemistry Laboratory) in 1979, moving to the Biochemistry Department and my own group in 1985. I was appointed to a lectureship at the University of Birmingham in 1991 and to a Readership (Biotechnology) there in 1997. My interests in microbial accumulation/transformations of heavy metals now extend into xenobiotics/phosphate metabolism, biofilms/bioreactor processes and bioremediation of the transuranic elements. My multidisciplinary group, funded by BBSRC/EPSRC/NERC and the EU, has collaborations with BNFL and with several UK/European universities and research organizations.

SGM JOURNALS ON-LINE: *LATEST DEVELOPMENTS*

Ron Fraser & Duncan McGarva

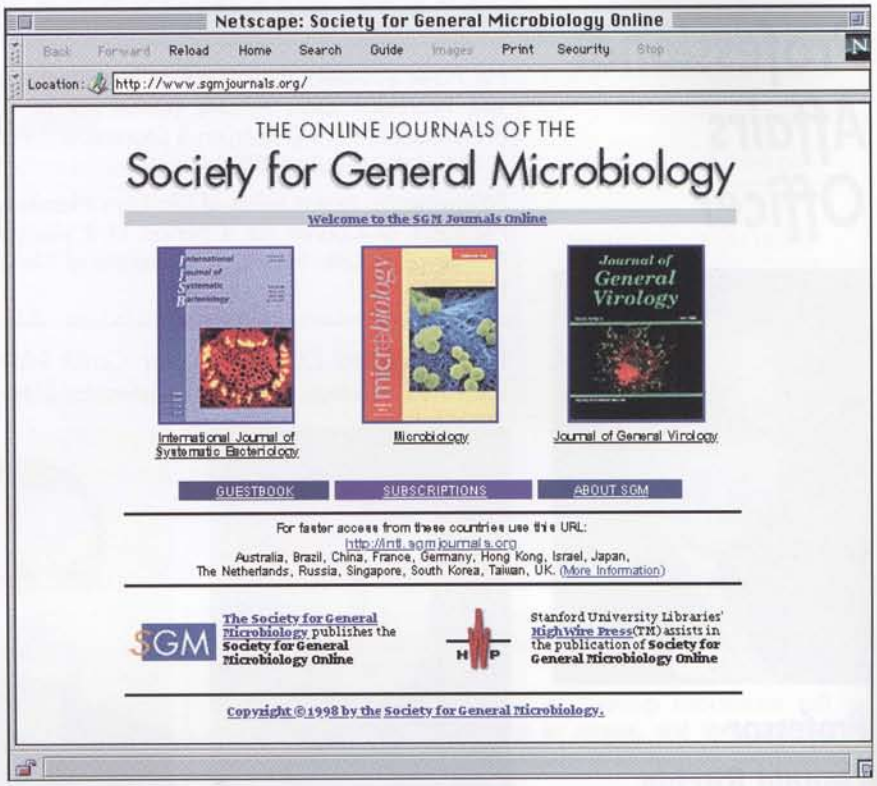
ON-LINE WITH HIGHWIRE

Following the news in the August *Quarterly* that the three SGM journals were to go on-line with HighWire Press of Stanford, California, there has been intense activity on both sides of the Atlantic.

In collaboration with Dr Rod Mulvey, Electronic Products Director, and colleagues at our printers Cambridge University Press, work has been going on to demarcate responsibilities, agree on file structure and naming conventions, timings, transfer methods, features required … no-one ever thought it would be easy!

In California, HighWire produced a 'mock-up' SGM journals site, available on the Internet on a password-protected basis. Staff at Marlborough House and the Editors-in-Chief were able to review the structure and design and to start preparing content for a number of pages. The mock-up site was discussed in a number of transatlantic conference calls. Generally these are scheduled for 4 pm UK time, which is 8 am in California, but on one occasion we had our collaborator at HighWire at his desk at 2 in the morning!

A screen shot of the SGM journals home page is shown on the right. It will be accessible either via the HighWire home page (which contains details of all the journals hosted by HighWire, and facilities for cross-title searches etc.) or directly via its own URL (see box below). The SGM journals home page has buttons for information and a number of services common to all three journals; the three cover images give access to the home page of each journal, and thence to all the features such as full text articles in HTML and PDF formats, searches, links, electronic and future tables of contents. Each journal home page also has its own URL for direct access.



Screenshot of the 'mock-up' of the SGM journals home page.

HighWire are now working on the 'pre-production' sites; after further review and development the hope is to go live with all three journals in late November. This will involve delivering and converting a vast amount of text, and preparing lots of other material for incorporation at the time of launch or soon thereafter. At present, the intention is to mount full text HTML and PDFs from the January 1998 issues onwards, headers and PDFs for 1997, and headers and PubMed abstracts back to 1990. This will ensure that the journal sites represent substantial resources from the time of launch, rather than waiting for them to build up content as current issues are added. Discussions have been initiated with ASM regarding access to electronic back issues from the period when they were the publishers of *International Journal of Systematic Bacteriology*.

URLs FOR JOURNALS' HOME PAGE, SGM, ETC.

SGM journals:	http://www.sgmjournals.org
IJSB:	http://ijs.sgmjournals.org
JGV:	http://vir.sgmjournals.org
Microbiology:	http://mic.sgmjournals.org
HighWire Press:	http://www.highwire.org
SGM Home Page:	http://www.socgenmicrobiol.org.uk

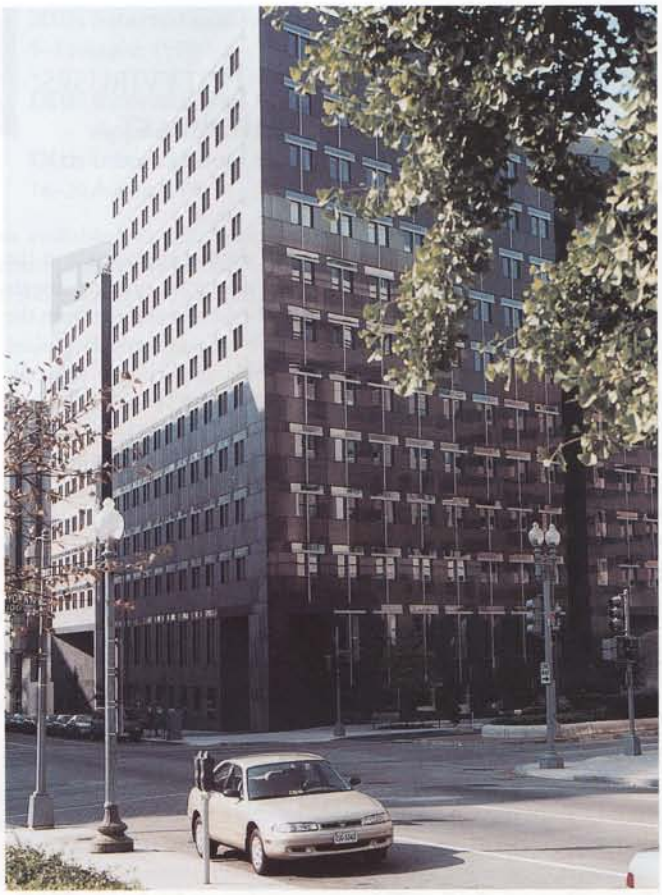
HIGHWIRE PUBLISHERS MEETING

HighWire Press organize regular meetings for their publishers, to review the latest developments and share experiences. The latest was held in September, at the American Association for the Advancement of Science in Washington, DC. It was attended by representatives of over 30 HighWire Publishers, including the Executive Secretary on behalf of SGM.

At the time of the meeting the HighWire system contained sites for 61 top-rank journals plus 17 *Annual Review* series in the biomedical sciences, with a further 27 journal sites under development. Negotiations are proceeding with a number of other publishers, including several in the UK and continental Europe. Among the topics discussed were:

- publishing on-line ahead of print
- publishing some articles – such as short communications – as on-line only versions
- including videos in on-line articles
- on-line letters to the Editor, as exemplified by a successful new feature in the *British Medical Journal*
- content awareness: publishers' experience of current and future tables of contents alerts, and of alerts set up for particular keywords and authors
- setting up 'collections' for site or cross-journal browsing, as a more user-friendly mechanism than using a search engine
- cross-journal searching and linking. With one exception, all HighWire Publishers have agreed to allow toll-free full text access to articles cited in the reference lists of other HighWire titles

View to The Capitol along Pennsylvania Avenue, Washington, DC.



The headquarters of the American Association for the Advancement of Science, Washington, DC, scene of the recent HighWire publishers meeting.

- expansion of the existing PubMed and MedLine links to include PubRef and Agricola. This will provide onward linkages to a wider range of journals – including, for example, agricultural and plant science titles – than the present basically medical content of PubMed
- subscription models: divergence into new products such as pay-per-view, and enhanced services for readers and librarians
- on-line submission and review

The SGM journals will certainly be offering a number of these features: keep in touch by visiting the journal sites. Access will be free for all until April 1999, when access controls will be introduced. Thereafter, institutions with full-price paper subscriptions can enable full electronic access for their readers; individuals at non-subscribing institutions will have free access to information such as tables of contents and article headers. Some of the more contentious policy matters in the list above will clearly be matters for discussion by Editors, Publications Committee and Council.

OTHER ELECTRONIC DEVELOPMENTS

Although HighWire is unique in the sophistication of the electronic facilities it provides, and in the quality of the journals mounted there, there are numerous other intermediaries in the electronic publishing market. Council has agreed that the SGM journals should also be made available on-line through a system known as SwetsNet. This is run by Swets and Zeitlinger, our largest subscription agent. It will offer a more limited service of searchable headers and full-text PDFs, to libraries buying their paper subscriptions through Swets. The advantages are that the SwetsNet system contains details of a different range of journals from those on HighWire. And since the great majority of institutional subscriptions to our journals are sold through agents, it makes sense to see how their version of the electronic market develops.

Ron Fraser, Executive Secretary, and Duncan McGarva, Systems & Web Site Manager, SGM, Marlborough House

JGV News

Aphid Transmission of Potyviruses: Uninvited Guests at the Feast

K.E. Richards

While the summer vacationer is idly sipping a lemonade in the shade and watching his or her garden grow, probing insects such as aphids are similarly partaking of liquid refreshment from the unwary gardener's vegetables, and in the process, spreading plant viruses. The mechanisms by which aphids acquire and transmit viruses from plants are of much interest and JGV has published quite a number of papers dealing with the process. The June issue contains the latest installment in a series of papers by T. P. Pirone and co-workers (79, 1519–1524) concerned with aphid transmission of members of the Potyviridae, one of the most economically troublesome families of plant viruses.

Potyviruses are flexuous rod-shaped virions with a genome of plus-sense RNA of 8–10 kb encoding a polyprotein from which mature viral proteins, including the capsid protein (CP), are released by proteolytic processing. Although purified potyviruses are highly infectious when mechanically inoculated into plants, they cannot be transmitted by aphids after membrane-feeding (aphids can be induced to probe through a stretched Parafilm membrane and feed on a droplet of nutrient solution to which purified virus can be added). Transmission occurs readily, however, if the aphid is allowed to membrane-feed on a crude extract from an infected plant, suggesting that some critical component for transmission is lost during virus purification. This component proved to be an ~55 kDa virus-encoded protein known as the helper component (HC; reviewed by Pirone & Blanc, *Annu Rev Phytopathol* **34**, 227–247). HC purified from infected plants enables transmission when membrane-fed to aphids prior to or along with purified virus, providing a convenient biological assay for HC activity. Furthermore, the HC of one potyvirus can sometimes, but not always, assist transmission of another potyvirus, indicating that heterologous HC–virus interactions are possible.

The HC is believed to serve as 'double-sided sticky tape' with affinity for sites on the virion and in the food canal in the aphid's stylet, with the added refinement that binding of the HC to the virion and/or the stylet must be reversible, so that the virus, once acquired, can be later delivered to a new host plant. Much effort has been devoted to characterizing the binding dŏmains. A highly conserved DAG motif in the viral CP is known to be critical for the HC–virion interaction, and, recently, a virus-binding motif has been located in the central part of the HC (Peng *et al.*, JGV **79**, 897–904). A point mutation in a highly conserved KITC motif in the N-terminal part of the HC inhibits virus retention in the stylet, either because the altered HC does not bind to the virus, the stylet or both (Wang *et al.*, JGV 77, 861–867).

The nature of the HC–virus attachment sites in the stylet food canal is not known. Aphid species differ in their ability to transmit different potyviruses, however, and the most recent paper from Pirone's group (Wang *et al.*, JGV **79**, 1519–1524) investigates factors that could govern this specificity. Four aphid species and two potyviruses [tobacco etch virus (TEV) and turnip mosaic virus (TuMV)] were used in the experiments. *Myzus persicae* and *Aphis gossypii* transmitted both viruses efficiently, *Lipaphis erysimi* transmitted TuMV but not TEV and *Myzus ascalonicus* was a non-transmitter of both viruses.

An important question is whether the inability of an aphid such as *M. ascalonicus* to transmit is due to lack of affinity between the aphid's stylet and the HC or is related to inappropriate feeding behaviour. When feeding, aphids first make exploratory probes to locate a sieve tube and electrical penetration graphs (EPG) can be used to study the details of this process. In this technique one end of an extremely fine gold wire is fixed to the back of the aphid and the other end is led through an amplifier to a small DC power supply. A second electrode connects the power supply to the potting soil of the plant. When the aphid inserts its stylet into a leaf of the plant, the circuit is completed and one can detect tiny but reproducible changes in electrical potential which are associated with different steps in the probing process. Earlier studies have shown that potyvirus acquisition and transmission are primarily associated with two well-defined subphases during probing (Powell *et al.*, *Eur J Plant Pathol* **101**, 411–420; Martin *et al.*, JGV **78**, 2701–2705). Comparative EPGs of *M. persicae*, *L. erysimi* and *M. ascalonicus* revealed no differences in feeding behaviour sufficient to account for the noted differences in virus transmission by the three species, indicating that non-behavioural factors are at cause (Wang *et al.*, JGV **79**, 1519–1524).

The aforesaid findings suggest that the stylets of transmitter and non-transmitter aphid species differ in their affinities for the HC–virus complex. To test this, Wang *et al.* took advantage of the differential ability of *L. erysimi* to transmit TuMV but not TEV. In membrane-feeding experiments, the TuMV HC efficiently 'helped' *L. erysimi* transmission of purified TEV, indicating that the TuMV HC can bind to TEV and 'stick' it to stylet binding sites for which the TEV HC has no affinity. All of the heterologous HC–virus combinations were efficiently transmitted by *M. persicae*, but there was little or no transmission by *M. ascalonicus* for any of the couples tested. Finally, membrane-feeding experiments with the different HCs complexed to ^{125}I-labelled TEV or TuMV followed by autoradiography of dissected stylets revealed that, although comparable amounts of virus were ingested during feeding by the different species, retention of virus in the stylet correlated well with the transmission data for the different HC–virus combinations.

This study provides additional confirmation of the importance of HC–vector compatibility for potyvirus transmission. It may also be noteworthy that transmission by *L. erysimi*, a crucifer-adapted aphid, was only observed when the HC was provided by TuMV, a crucifer-infecting virus, suggesting that specific virus–vector adaptation may be particularly favoured when the aphid and virus share hosts. Finally, the availability of an aphid species, *M. ascalonicus*, which is apparently a general non-vector of potyviruses, will provide a negative control for comparative biochemical studies of the aphid food canal in the quest for HC receptor sites in this organ.

Dr K.E. Richards, Institut de Biologie Moléculaire des Plantes, 12 Rue du Général Zimmer, F-67084 Strasbourg Cedex, France (Tel. +33 3 88 41 72 51; Fax +33 3 88 61 44 42; e-mail ken.richards@ibmp-ulp.u-strasbg.fr)

LETTERS TO THE EDITOR

100 YEARS OF VIROLOGY

1998 IS THE 100TH ANNIVERSARY of the report by Friedlich Loeffler, Director, Institute of Hygiene, University of Greifswald, and Paul Frosch, Professor at the Royal Institute of Infectious Diseases, Berlin, to the Prussian Ministry of Science and Education in which they described their studies on the infectious agent causing foot-and-mouth disease. In their report the agent is identified as a 'virus' with the property to pass through bacteria-retaining filters and to replicate in the host animal. These discoveries mark the beginning of animal virology. Also in 1898, Beijerinck in the Netherlands reported his studies on tobacco mosaic disease and came to a similar conclusion, thereby identifying the first plant virus.

An international symposium entitled *One Hundred Years of Virology: Past, Present and Future of Virus Research*, organized by the University of Greifswald and the Virus Research Institute, Insel Reims, was held at the Ernst-Moritz-Arndt University, Greifswald from 25 to 27 June 1998 to commemorate Loeffler & Frosch's discoveries. Around 200 delegates attended and heard talks presented by an international panel of speakers on topics ranging from the history of the commencement of virology to modern molecular virology.

Virologists may well be interested in the proceedings of the symposium which contain a biography of Loeffler, historical accounts of the Institute of Hygiene, University of Greifswald and the Institute of Reims (the places associated with his work on virology), as well as abstracts of the papers presented. Please contact me for further information.

Alex I. Donaldson, Institute for Animal Health, Pirbright, Surrey GU24 0NF

THE RELEVANCE OF THE HISTORY OF MICROBIOLOGY

SIMON BAUMBERG, in his article discussing attendance at the Society's main symposia [*SGM Quarterly* 25(3), 90], suggests that a tell-tale sign of when a scientist is over the hill is when they take an interest in the history and philosophy of science. Although this seems to have been a tongue-in-cheek comment, it does reflect a view that many scientists would agree with. In contrast I believe the idea that the history of microbiology is only for 'old duffers' is not only wrong, but wastes a unique resource. In fact much of what we accept as 'old hat' is worth re-evaluating. In previous articles in the *Quarterly* I have discussed how the view that eukaryotic organelles originate from prokaryotes has a long history; similarly, the existence of bacterial conjugation and pili was recognized long before they became accepted fact. When Barry Marshall discovered that *Helicobacter pylori* caused stomach ulcers he went to the 'ancient' literature and found earlier reports on ulcer-causing bacteria and also that bismuth (an antibacterial agent) had long been used to cure stomach ulcers. The idea that bacteria might seed the earth in meteorites and comets also has a long and neglected history, as has the apparent ability of non-viral micro-organisms to cause cancers. Much time could have been saved if, instead of rediscovering these facts and ideas, the original papers had been unearthed and brought to modern light. Unfortunately working scientists, like myself, who take an active interest in the history of microbiology are often seen to be wasting valuable time that could be otherwise used to get grants! However, it is clear to me that hidden within the old journals there is a wealth of written, but unrecognized, knowledge just waiting to be discovered. Any young scientist can do themselves a big favour by spending a few hours looking at antecedents to their current research. I guarantee they will find jewels in the gathering dust.

Dr Milton Wainwright, Department of Molecular Biology and Biotechnology, University of Sheffield, Sheffield S10 2TN (Fax 0114 272 8697)

ARE YOU IN CHARGE OF A MICROBIAL CULTURE COLLECTION?

AS YOU MAY BE AWARE, a recent government review of UK National Culture Collections resulted in the setting up of a three year initiative designed to ensure the long-term survival and development of the UK National Collection network. Administered by the Biotechnology and Biological Sciences Research Council (BBSRC) via an Advisory Group chaired by Professor Roger Whittenbury, this initiative is now well under way. Primarily its task is to co-ordinate National Culture Collection activities and to promote all ten member collections as a UK National Culture Collection (UKNCC).

It is intended the UKNCC will function as a single contact point to the range of cultures, services and expertise within the network, allowing users rapid and easy access to the organisms and information they require. The UKNCC will have co-ordinated marketing, quality assurance and accession policies and has a Web site (http://www.UKNCC. com.uk) which will allow access to strain and information databases of all member collections.

While it is clearly of some considerable importance to safeguard the future prosperity of the ten existing National Collections, there is also a need to take stock of the many other collections within the UK. These may range from privately managed industrial collections to departmental or institutional collections through to those smaller collections which may have arisen from the research activities of a single scientist over several years. Some of these collections are either becoming increasingly non-cost-effective (in the private sector) or moribund, moth-balled and in danger of a date with an autoclave in other quarters. A significant number of these collections, some of which will be irreplaceable genetic resources, are unknown to the scientific community at large. It is therefore of growing concern to both the UKNCC and the UK Federation of Culture Collections (UKFCC) that such collections should be protected and remain available to future generations of scientists. Not all of these collections can be 'saved', nor do the major collections presently have the resources to rescue them, but clearly some action is required.

A first step must be to locate non-national collections in the UK and find out about their holdings and current status. Only then can the UKNCC and UKFCC attempt to co-ordinate and initiate a policy which will seek to ensure the long-term survival of these biological resource centres. Consequently, I am trying to update the register of all such collections in the UK. This register will be made available on the UKNCC web site and will allow the UKNCC to prioritize its actions in this area. Collections who do not wish information to be published will have their confidentiality respected.

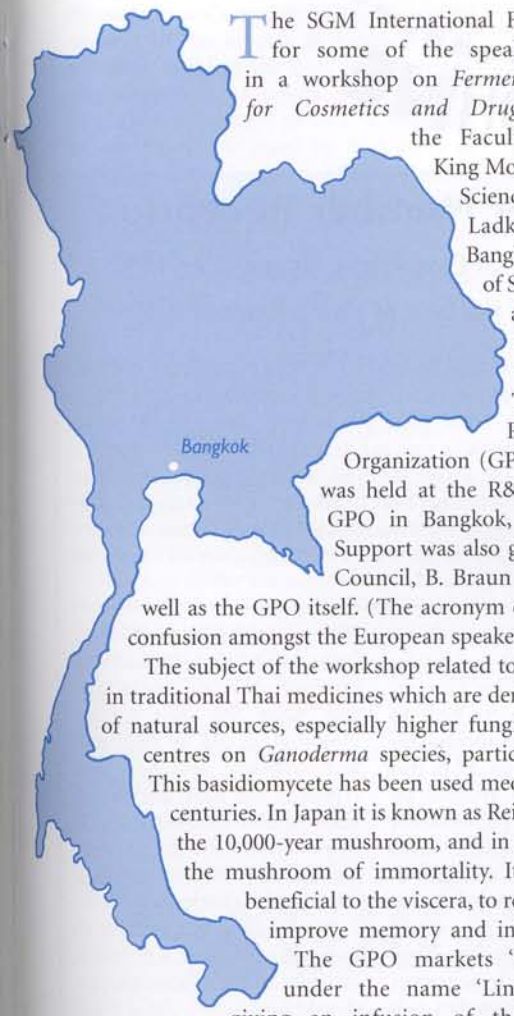
Could I therefore ask the scientist in charge of all private or publically owned or maintained collections of micro-organisms, plasmids, plant, human or animal cell lines within the UK to contact me urgently for a questionnaire.

PLEASE ACT TODAY, TOMORROW COULD BE TOO LATE.

Dr P.N. Green, NCIMB Ltd, 23 Machar Drive, Aberdeen AB23 4RY (Tel. 01224 273332; Fax 01224 487658; e-mail ncimb@abdn.ac.uk)

International Development Fund Report: Cosmetics and Drugs in Thailand

Mike Mattey



The SGM International Fund gave support for some of the speakers participating in a workshop on *Fermentation Technology for Cosmetics and Drugs*, organized by the Faculty of Science at King Mongkut's Institute of Science and Technology, Ladkrabang (KMITL), Bangkok, the University of Strathclyde, Glasgow and the Research and Development Institute of the Thai Government Pharmaceutical Organization (GPO). The workshop was held at the R&D Institute of the GPO in Bangkok, Thailand in July. Support was also given by the British Council, B. Braun (Thailand) Ltd, as well as the GPO itself. (The acronym caused some initial confusion amongst the European speakers!)

The subject of the workshop related to the GPO's interest in traditional Thai medicines which are derived from a variety of natural sources, especially higher fungi. Current research centres on *Ganoderma* species, particularly *G. lucidum*. This basidiomycete has been used medicinally in Asia for centuries. In Japan it is known as Reishi or Mannentake, the 10,000-year mushroom, and in China as Ling Zhi, the mushroom of immortality. It is believed to be beneficial to the viscera, to retard ageing, and to improve memory and intelligence. The GPO markets 'tea bags', under the name 'Lingzhi Tea' giving an infusion of the correct strength, as well as health drinks based on the same ingredients, which taste rather like flat cola. The speakers drank quantities of these products, but the effects are evidently subtle. Maybe the benefits will become apparent in future years! *Ganoderma* extract is also incorporated into cosmetics, such as lipsticks, but greater difficulty was encountered in persuading us to try them!

The workshop covered both theoretical and practical aspects of fermentation technology.

Dr Krisana Kraisintu, the Head of the R&D Institute at GPO, delivered the opening lecture on phyto-pharmaceuticals in Thailand.

Bjorn Kristiansen, Borregaard Co. Norway, formerly the Robertson Professor of Bioprocess Technology at the University of Strathclyde, spoke about the design and economics of fermentation plants and demonstrated advances in plant design and operation simulations. Dr Brian Wood (Strathclyde) discussed the use of solid substrate fermentations appropriate to the production methods currently used, while Dr Yorwapa Boonpu (GPO) described cultivation in liquid media in bioreactors, which may well represent the future developments. Dr Angela Brown, MA Bioservices UK, talked about the fermentation and physiology of hyaluronic acid and other poly-saccharides, requirements of GLP and GMP, and their impact on these and other processes. Dr Mike Mattey (Strathclyde) dealt with some theoretical background, in particular metabolic control theory in relation to fermentation technology and optimization strategies for various aspects of medium design and process management, as well as antibiotic and vitamin fermentations. The areas of downstream processing and product recovery were covered by Dr Promote Sirirote (KMITL) and Dr Hla Shain (GPO), respectively.

A practical course, run by Associate Professor Dr Dusanee Thanaboripat (KMITL), Dr Brown and Dr Boonpu, accompanied the lectures and involved a novel vitamin B12 fermentation, using a fungal producer and an ELISA system, and various computer simulations and demonstrations, including the use of 'Trian Run' from SPSS for the optimization practicals. Dr Dunanee Thanaboripat also played a major part in the design and organization of the workshop, and we are grateful for her efforts in ensuring the smooth running of the event.

The closing ceremony and certificate presentation were carried out by Associate Professor Prakit Tangtisanon, Rector of KMITL.

The participants on the course came from a variety of backgrounds, both industrial and academic; all worked very hard and enthusiastically during the week. Although the Thai economy, in common with others in South East Asia, has experienced a severe downturn, there is a determination to overcome the various economic problems and return to the progress of the previous decade. Judging by the standards of this workshop they are likely to succeed!

Dr Mike Mattey is a lecturer in the Department of Bioscience and Biotechnology, University of Strathclyde, The Todd Centre, 31 Taylor Street, Glasgow G4 0NR.

Student Membership

STUDENT MEMBERSHIP of the Society is available to postgraduate students who have no taxable income and are resident and registered for a higher degree in any European Union country. For an annual subscription of only £20 sterling, Student Members can take advantage of the many benefits that this category of membership provides, such as free registration at SGM meetings and the purchase of Society publications at greatly discounted prices. They are also eligible for certain grants such as the President's Fund and Postgraduate Conference Grants (see p. 143 for details) which provide financial assistance (including accommodation and travel costs) for attendance at one SGM meeting per year.

Web Sites for Job Hunters

http://www.jobs.ac.uk

A web site has recently been set up which advertises academic posts in UK universities. It is easy to use, being searchable by discipline. In late September there were 554 jobs on the database, of which 131 were classed under biological science. Many of these posts were relevant to microbiologists. The positions, which range from technician through studentship and research assistant to lecturer, are listed in date order of being posted and the site seems to be updated daily. Clicking on an entry then brings up full details of the post and there is usually e-mail access to make further enquiries.

BIOMEDNET JOB EXCHANGE

http://biomednet.com/jobs

Also updated daily, this is an extensive site with around 1000 jobs world-wide in biology and medicine. The range of posts available is wide, including senior appointments in industry as well as research opportunities in academia. The search engine is sophisticated and user-friendly. Jobs can be advertised free of charge. In addition to the lists of vacancies, the site offers links to many other useful sources such as articles on various science careers, an extensive range of other listings of jobs on the web, miscellaneous employment resources, e.g. CV creation, salaries index, career development advice and interviews. It is well worth a browse.

WISDOM BIOMEDICAL RESEARCH VACANCIES

http://wisdom.wellcome.ac.uk/wisdom/jobshome.html

This is a much more specialized database run by the Information Service of the Wellcome Trust. It contains fixed-term contract posts in biomedical science only. However, it is useful for checking on research assistant, post-doc and postgraduate studentship vacancies in this field.

Younger Member Reception

University of East Anglia, September 1998

Making the best of your presentations

GEOFF HARRIS AND PAT GOODWIN OF THE WELLCOME TRUST STRESSED THAT GIVING A SCIENTIFIC PRESENTATION IS ESSENTIALLY A THEATRICAL PERFORMANCE, AND THEIR OWN INTERACTIVE SESSION PROVED THE POINT! IN AN IMPRESSIVE DOUBLE-ACT GEOFF, WHO IS HEAD OF AUDIOVISUALS AT THE TRUST AND PAT, SGM SCIENTIFIC MEETINGS OFFICER, A FORMER UNIVERSITY LECTURER AND RESEARCHER AND NOW A SCIENTIFIC PROGRAMME MANAGER, OUTLINED THE GOLDEN RULES FOR MAKING PRESENTATIONS BEFORE GOING INTO DETAIL ABOUT GOOD AND BAD VISUAL AIDS.

The workshop began with an amusing video of a lecturer who got everything wrong, from talking with his back to the audience to muddling his slides and overheads. All of this could have been avoided by preparing the presentation properly, which often takes much longer than anticipated, especially if using mixed media. The talk should be pitched according to the audience, and well structured, with the correct balance of time allocated to each section – introduction, body of discussion, conclusion, questions. It is important to rehearse the talk, asking colleagues to comment if possible, and to take great care with the visual aids. Speak clearly and at a measured pace, addressing the audience, not the screen. Run through the slides and overheads to ensure that they are in the right order and orientation. Above all try to enjoy sharing your knowledge with the audience. Giving a well organized presentation is very satisfying.

Good visual aids are crucial. These improve the clarity and understanding of the topic, whereas bad aids detract from the presentation. A mixture of slides and overheads helps to keep the audience's attention. Design is important. Each slide should have a maximum of 6 lines of text, the font size should be no smaller than 24 point and there should be 8–10 words per line. Keep the style simple. Headings should be brief and in a consistent style. Sans serif typefaces like Arial are easy to read. Bullets provide a useful *aide memoire* for the speaker. Colour can be used to great effect; a dark background with a harmonious colour text is pleasing to the eye, e.g. yellow or white on blue. However, care should be taken to avoid using red/green combinations which cannot be read by the colour-blind (at least 4% of all men).

Illustrations such as charts, photographs and drawings can add to the presentation but they should be clearly and concisely labelled. The style of charts should be appropriate for the data. Colour can be used to bring out parts of complicated systems such as diagrams of biochemical pathways. Layering of transparencies to build up a theme is also effective. Powerpoint is a particularly useful tool for microbiologists.

After this instructive and entertaining session the audience and speakers headed for the 'Hive' in the Students' Union where a sumptuous buffet and welcome drink of wine were laid out.

Notes: If you would like a copy of the handout from the session please contact Janet Hurst at SGM HQ (Fax 0118 988 5656; e-mail j.hurst@socgenmicrobiol.org.uk).

Promega Prize Competition 1998

THE PRIZE SCHEME HAS BEEN SET UP BY PROMEGA TO PROMOTE COMMUNICATION SKILLS AND TECHNICAL EXCELLENCE IN YOUNG SCIENTISTS.

On 9 September five nervous young microbiologists gathered in a lecture theatre at the University of East Anglia for the finals of the Promega Prize Competition. These were the winners of the rounds at previous SGM meetings to select the best oral or poster presentations by a young member. Each finalist was required to give a 10 minute talk on their work, followed by 5 minutes of questions. Pat Goodwin, SGM Scientific Meetings Officer, chaired the session and the contestants were as follows:

Simon Lee (University of Nottingham)
Haem iron acquisition in Streptococcus pneumoniae

Susan McGrath (University of Ulster)
The development of a competitive RT-PCR assay for the detection of Clostridium botulinum toxin gene expression

Sonya Patterson (University of Newcastle)
Antigen-specific membrane fusion mediated by the haemagglutinin protein in influenza virus: separation of attachment and fusion functions on different molecules.

Elizabeth Mathew (University of Oxford)
The extracellular domain of vaccinia virus protein B5R affects plaque phenotype, EEV release and intracellular actin tail formation

Alistair Scott (Queen's University of Belfast)
Chicken anaemia virus valuation and genetic investigation of the ability of Strenotrophomonas maltophila strain W81 to confer plant protection against fungal pathogens

The judges, an exacting lot, were Group representatives Peter Andrew, Martin Collins and Tom Wileman with Pat Goodwin in the chair and Sarah Lampitt representing Promega. The President, Howard Dalton, also joined the panel. Selecting the two winners was extremely difficult as all of the presentations were good, with splendid visual aids and able parrying of some tough questions by each contestant. In the end it was down to matters of detail and Elizabeth Mathew and Susan McGrath were chosen as the two winners. The results were so close that the panel felt that the runners-up also merited a prize.

The names of the winners were announced at the Society Dinner where each was presented with a cheque for £200 and the runners-up received cheques for £25.

Elizabeth and Susan will go on to represent SGM for the *Promega Young UK Life Scientist of the Year Award* which is to be held on 31 March 1999. There they will be competing against other Promega prizewinners from the Biochemical Society, British Society for Immunology, and the Genetical Society.

Full details of the Promega Prize competition can be found on the Promega UK web site:

http://www.euro.promega.com/uk

Student Societies

SGM Sponsored Lecture Scheme

GRANTS ARE AVAILABLE TO SUPPORT TWO LECTURES ON MICROBIOLOGICAL TOPICS PER ACADEMIC YEAR AT STUDENT SOCIETY MEETINGS.

A Student Society is eligible for support if:

- It is run mainly by and for students of life sciences, either postgraduates and/or undergraduates.
- It is based in the UK or Republic of Ireland.

The invited speakers will be reimbursed directly for reasonable costs of travel and accommodation. However, please note:

- The maximum claim for each lecture is £150.
- One speaker may be invited from abroad or from Ireland, but there can be no increase in the maximum claim for the lecture.
- The Society will be reimbursed for the costs of entertaining the speaker to dinner, including the expenses of ONE member of the committee.

Application forms are available from: The Grants Office at SGM HQ (Tel. 0118 988 1821; Fax 0118 988 5656; e-mail: grants@socgenmicrobiol.org.uk).

European Federation of Biotechnology: Activities of the Section of Microbial Physiology

Dave Kelly

In a previous article (*SGM Quarterly* 23, 127), I described the rôle and scientific activities of the Microbial Physiology Working Party (WP) of the European Federation of Biotechnology (EFB). This was always one of the more active groups within the EFB and regularly organized fairly small but high quality scientific conferences, often twice a year. However, by 1997 it had become clear that a re-organization of the WP was necessary to enhance its breadth of scientific coverage, as well as increase awareness and participation in its activities and, following a proposal by Prof. Jeff Cole, the EFB executive formally agreed the formation of a Section of Microbial Physiology. Unlike the WPs, where only designated national delegates were involved, any active microbiologist can join the Section as a delegate, and we would strongly encourage SGM members to support and participate in its activities. It is hoped that the new Section will not only promote a vigorous and original scientific programme of conferences and workshops, but will also be associated with other activities such as the organization of short training courses in microbial physiology and providing an input to European Union research funding programmes.

RECENT MEETINGS

The formation of the Section was formulated during an extremely successful WP conference entitled *Microbial Responses to Stress: What's New and How Can It Be Applied?*, held at Sesimbra, Portugal on 15–18 March 1997, which attracted around 150 participants. The aim of this conference was to exchange information about the latest developments in our understanding of stress responses and to explore how fundamental studies of the way microbes respond to a variety of stresses could be used to provide the foundation on which to develop new biotechnological processes or to optimize existing ones. The success of this conference underlines the continuing importance and vitality of research on microbial stress responses in Europe (indeed this is a priority funding area for the BBSRC Plants and Microbial Sciences Committee).

The Microbial Physiology WP also made a contribution to the European Congress of Biotechnology (ECB8), held in Budapest, Hungary, from 18 to 22 August 1997. A symposium *Microbiology at the Edge* was organized and consisted of a programme which covered microbial life at high and low cell densities and growth rates, the microbiology of the colony, environmental sensing, various forms of tactic behaviour and extremophile microbiology.

In 1998 a symposium on *Biochemical Principles of the Biosynthesis and Degradation of Polymers* in Münster, Germany, from 3 to 6 June, attracted nearly 200 participants from Europe, USA and Japan. A bewildering variety of enzymes are employed by all living organisms to synthesize, degrade or modify polymers, and the properties of these enzymes are of considerable fundamental and applied interest. The proceedings of this meeting will be published shortly by Wiley-VCH Verlag (Weinheim, Germany).

FUTURE MEETINGS

The next major meeting of the Section is *Analysis of Microbial Cells at the Single Cell Level*, to be held at the magnificent Villa Olmo, Lake Como, Italy, from 25 to 27 March 1999. The topic of this meeting is very timely and will provide a comprehensive review of the state of knowledge of the behaviour and properties of single cells within microbial populations, as opposed to the average behaviour of such populations which is the situation usually studied by microbiologists! It will also focus on methodologies (such as flow cytometry, image analysis, cell synchronization, cell sorting, and mathematical analysis of population dynamics) that can be used to provide data about culture heterogeneity and single-cell parameters. The meeting is being organized by Dr Danilo Porro and colleagues. For scientific correspondence, contact Dept. of General Physiology and Biochemistry, University of Milan, Via Celoria 26, 20133 Milan, Italy (Tel. +39 270 644805; Fax +39 270 632811; e-mail porrod@imiucca.csi.unimi.it). Further information can be obtained from the conference web site at http://imiucca.csi.unimi.it/~phybioch/index1.html or the Organizing Secretariat, Centro di Cultura Scientifica 'A. Volta', Villa Olmo, Via Cantoni n.1 22100 Como, Italy. Copies of the first circular for the meeting can be obtained from Prof. Jeff Cole (j.a.cole@bham.ac.uk; Fax 0121 414 5440).

Attention is also drawn to a meeting entitled *Microbial Stress and Recovery in Food*, to be held in Quimper, France, from 14 to 16 June 1999. For further information about this meeting, e-mail symposium@tech-quimper.fr or visit the web site at http://www.tech-quimper.fr/symposium

Additional future meetings and activities of the Section will include Symposia on *Metabolic Flux Control and Metabolic Engineering*, *Physiology of Yeasts and Filamentous Fungi*, probably in 2001, and *Regulation of Anaerobic Bacterial Metabolism*, either in 2000 or 2001. It is also hoped that one or more short training courses in microbial physiology will be organized within the next two years. The details of these meetings are yet to be finalized, so look out for information in future issues of the SGM's new quarterly magazine, *Microbiology Today*.

Dr Dave Kelly is the SGM/UK representative on the EFB Microbial Physiology Section (Department of Molecular Biology and Biotechnology, University of Sheffield; e-mail d.kelly@sheffield.ac.uk).

Cells & Cell Surfaces

Warwick, 5–7 January 1999

A one-day symposium entitled *Microbial–Host Interactions at Mucosal Surfaces* will be held on 6 January 1999. Full details are provided in the accompanying Programme Booklet. Enquiries may be made to the symposium organizers, H.F. Jenkinson or I.C. Sutcliffe (iain.sutcliffe@sunderland.ac.uk).

Edinburgh, 12–16 April 1999

A one-day symposium entitled *Stress Response* is being organized by A.M. Carr and M.J. Woodward. Provisional speakers and titles include: T. Humphrey (Exeter), *Salmonella* and *Campylobacter* stress and survival in the real world; J. Millar (London), Stress response MAP kinase pathways in fission yeast; C. Dorman (Dublin), Twist and writhe in stress responses; B. Morgan (Newcastle), SKN7 and interaction with the MAP kinase pathway; J. Foster (Alabama), ATR, the meaning of acid responses; C. Dodds (Nottingham), Novel genetic ways of teasing out stress responses. Poster papers relevant to the symposium are encouraged with titles due **by January 1999**. Please send these to one of the organizers, Tony Carr (a.m.carr@sussex.ac.uk) or Martin Woodward (mwoodward.cvl.wood@gtnet.gov.uk), who will be pleased to respond to any other enquiries or suggestions.

Leeds, 7–9 September 1999

A one-day symposium on *Adhesive Structures* is planned to cover a diverse range of adhesion-related cell-surface macromolecular products elaborated by micro-organisms. If you are interested in presenting an oral paper or poster, please contact one of the organizers: Mike Wilson (mwilson@eastman.ucl.ac.uk) or Anthony Smith (prsaws@bath.ac.uk).

Warwick, 10–14 April 2000

A symposium on *Proteases, Proteolysis and Control* is being planned in conjunction with the Physiology, Biochemistry & Molecular Genetics Group. The C&CS Group contact for enquiries or suggestions about this symposium is Colin Stirling (colin.stirling@man.ac.uk).

Exeter, September 2000

The Group is working with the Environmental Microbiology Group in planning a Main Symposium on *Community Structure and Co-operation in Biofilms* to be held at the University of Exeter, September 2000. Enquiries at this stage should be addressed to the Environmental Microbiology or C&CS Group Convener.

Convener:
Professor Howard Jenkinson
Department of Oral and Dental Science
Division of Oral Medicine, Pathology and Microbiology
University of Bristol Dental Hospital and School
Lower Maudlin Street
Bristol BS1 2LY
Tel. 0117 928 4358 (DD)
0117 928 4304 (Office)
Fax 0117 928 4428
e-mail howard.jenkinson@bristol.ac.uk

Clinical Virology

Edinburgh, 12–16 April 1999

The Group will be holding a symposium on *Antivirals* on 15 April and Offered Papers on 16 April. The deadline for offered papers to the programme is **17 January 1999** and for abstracts **12 February 1999**. Also in the Society's Edinburgh programme are Virology Group workshops on hepatitis C and herpesviruses.

Future Meetings

Year 2000 will feature important SGM activities, including virological ones. On 5–7 January 2000, the CV Group will join with the Virology Group at the University of Surrey for a symposium on *Virus Infection – Life or Death for a Cell.*

CV Group members will note that, as well as the SGM's main symposium in April, *Fighting Infection in the 21st Century*, there will be a joint CV symposium with the Systematics & Evolution Group on *Molecular Epidemiology*.

There will also be an SGM-sponsored meeting, *European Virology 2000* on 17–21 September (details from Dr Bill Carman, Institute of Virology, University of Glasgow, Church Street, Glasgow G11 5JB).

Looking further ahead, to January 2002, it is proposed that the CV Group have a joint meeting with the European Society for Clinical Virology in London.

Convener:
Dr Philip P. Mortimer
PHLS Virus Reference Division
Central Public Health Laboratory
61 Colindale Avenue
London NW9 5HT
Tel. 0181 200 4400
Fax 0181 200 1569

Environmental Microbiology

Edinburgh, 12–16 April 1999

The Group is developing an exciting and topical joint programme with the Systematics & Evolution Group. The symposium – *Detection of Microbes in the Natural Environment* – will be held on 15 and 16 April and we will have prestigious speakers covering many important areas in relation to the way that new approaches and methodologies in microbial detection can be used to help microbiologists answer real ecological and environmental questions. Speakers will cover the tracking of specific groups and communities of microbes, as well as microbial genes and their activities. A number of very different approaches and diverse environments will be included. We are very keen to include offered papers and posters in the meeting; please contact Chris Clegg (cclegg@scri.sari.ac.uk) or Grant Burgess (J.G. Burgess@hw.ac.uk) if you wish to contribute to the meeting. We especially encourage postgraduate students and young scientists to offer papers and posters. Remember you are eligible to enter for the Promega Prize (the winner receives £2000!). Please contact the SGM web site for details of the Promega Prize.

Leeds, 7–9 September 1999

The Group is holding a one-to-two-day joint meeting with the Geological Society on *Deep Subsurface Microbiology*. There will be invited and offered papers and posters on this topic covering mixtures of microbiology, geology and geochemistry. Some of the topics to be covered include: bacteria at depth in marine sediments, bacteria under pressure, geochemical evidence for deep bacterial activity, a deep biosphere in oil reservoirs, bacteria in salt mines, bacteria at high temperatures, aquifer and groundwater microbiology, biogeochemical alteration of hydrothermal minerals, microbial role in concretion formation. The meeting is being organized jointly by Rachel Mills, Southampton Oceanographic Centre, and John Parkes, Bristol University. Anyone wishing to contribute an offered paper or poster to this meeting should contact John Parkes (J.Parkes@bristol.ac.uk). Again, young scientists are encouraged to participate in this meeting and enter for the Promega Prize (see SGM web site for details).

Warwick, 10–14 April 2000

For the millennium meeting of the Society the Group will be holding a meeting on *The Microbial Ecology of Food Poisoning and Spoilage*. This will be organized by Linda Lawton, Robert Gordon University.

Convener:
Dr Hilary M. Lappin-Scott
Department of Biological Sciences
Exeter University
Hatherly Laboratories
Prince of Wales Road
Exeter EX4 4PS
Tel. 01392 263263
Fax 01392 263700
e-mail H.M.Lappin-Scott@exeter.ac.uk

Education

Edinburgh, 12–16 April 1999

Liz Sockett (Nottingham) is organizing a *Novel Microbiology Teaching and Learning* symposium. We will be including novel examples of classroom teaching, tutorials and non-standard projects, group vocational activities, industrially relevant projects and a lesson on bacterial pathogenicity through considering a fictional biological warfare attack, all of which make microbiology students think and learn. We will be introducing an international flavour to the symposium, so come and see what the Americans are doing! CAL is welcome, but is not the main focus of the symposium. What novel things are you doing with your lectures, projects or tutorials? How do you assess such novel learning? Don't be shy, share your ideas! Contact Dr Liz Sockett (Tel. 0115 951 3234; e-mail liz.sockett@nottingham.ac.uk).

Leeds, 7–9 September 1999

Helen O'Sullivan (Liverpool Hope) will be organizing a general event on *Microbiology for Non-microbiologists*! Perhaps not the first thing you'd think of at the SGM, but it is surprising how many scientists of all kinds make use of microbiology without knowing a great deal about it (have we heard this before?). If anyone has thoughts or ideas about this which they'd like to express, please contact Helen or the Group Convener.

Warwick, 10–14 April 2000

The Millenium Meeting – we will be tying in with the Main Symposium on *Fighting Infection in the 21st Century*, and we will be presenting our own perspective on education of the public about infection.

Convener:
Dr Peter Wyn-Jones
School of Health Sciences
Darwin Building
University of Sunderland
Wharncliffe Street
Sunderland SR1 3SD
Tel. 0191 515 2520
e-mail
peter.wyn-jones@sunderland.ac.uk

Exeter, September 2000

Ron Bishop (Ulster) will be organizing a (user-friendly!) symposium on *Developing Mathematical Skills in Microbiologists*. Everything you wanted to know about analysing those data but were afraid to ask.

Committee Membership

Alan Jacob (Manchester) has recently retired from active service on the Education Group committee. Alan has given sterling service and organized a successful symposium on *Innovations in the Teaching of Molecular Biology* at the UEA meeting. We would like to extend our thanks to Alan for his contributions during his time on the committee. We welcome Adrian Eley (Sheffield) and Pauline Handley (Manchester) to the committee.

Fermentation & Bioprocessing

Edinburgh, 12–16 April 1999

The Group will be holding a one-and-a-half-day meeting entitled *Archaea*, organized by Rod Herbert (Dundee) on behalf of the Group. The invited papers are as follows: N. Raven and R. Sharp (CAMR), Large-scale cultivation of Archaea; M. Danson (Bath), Enzyme evolution and thermostability; D. Cowan (UCL), Diversity of Archaea – molecular genetics approach; W.D. Grant (Leicester), Halophiles/alkaliphiles – isolation and physiological adaptations to life at high salt concentrations and high pH; D. Prieur (Roscoff, France), Extremophiles from deep sea thermal vents – isolation, taxonomy and physiology; F. Robb (Baltimore, USA), Whole cells and growth of Archaea; P. Schonheit (Keil, Germany), Metabolism in Archaea. If you are interested in presenting a poster (postgraduate students are particularly encouraged), then please contact the Convener in the first instance and **before 14 January 1999**.

Future Meetings

The committee is planning a one-and-a-half-day meeting on *Cell Lysis in Fermentation and Bioprocessing* to be held at Leeds in September 1999 and is being organized by Rob Cumming (Teesside). If you are interested in presenting an offered oral paper or poster (postgraduate students are particularly encouraged) then please contact the Convener in the first instance and **before 10 May 1999**.

The committee would welcome suggestions from any SGM member for topics of symposia within the area of fermentation and bioprocessing. Please contact the Convener or any committee member.

Committee Membership

Three people retired from the committee this year, Craig Gershater (SKB), Glyn Hobbs (Liverpool John Moores University) and Dave Langley (Glaxo-Wellcome). I would like to take this opportunity to extend my thanks for all the hard work and support they have given to the Group in organizing several successful meetings over the last four years. I would also like to welcome to the committee Matthew Duchars (Zeneca, Billingham), Richard Hall (Glaxo-Wellcome) and Dave Mead (Delta Biotechnology).

Convener:
Dr Reg R. England
Department of Applied Biology
University of Central Lancashire
Corporation Street
Preston PR1 2HE
Tel. 01772 893513
Fax 01772 892929
e-mail r.england@uclan.ac.uk

Irish Branch

It is unfortunate that the recently organized meeting at Queen's University of Belfast joint with Virus Group on *Microbial Neuropathogenesis*, had to be cancelled due to the low number of registrations. The Irish Branch wishes to thank all those who were involved in organizing the meeting for their efforts and the speakers both for agreeing to present papers and for being so understanding over the cancellation.

University College Cork, 4–5 March 1999

The invited speakers at a symposium on *Food-borne Toxic Agents* will be: P. Granum (Norway), Overview on food-borne toxins; Prof. John Linz (Michigan State University, USA), The regulation of aflatoxin biosynthesis and biological significance to the producing fungus; Mike Peck (IFR Norwich), Neurotoxins produced by *Clostridium botulinum* – food safety issues; Prof. Charles Dorman (Trinity College Dublin), The regulation of *spv* virulence gene expression in *Salmonella typhimurium*; John Morgan (University College Cork), Food-borne viruses and gastroenteritis; Henry Smith (PHLS Colindale), Vero cytotoxin-producing *Escherichia coli* – epidemiology and virulence mechanisms; Mark Rogers (University College Dublin), The genetics and biology of human and animal prion diseases. For further information and offers of open papers or posters, contact Dr Alan Dobson, University College Cork, Ireland (Tel. +353 21 902743; Fax +353 21 903101; e-mail a.dobson@ucc.ie).

Convener:
Dr Martin A. Collins
Department of Food Science
Agriculture and Food Science Centre
The Queen's University of Belfast
Newforge Lane
Belfast BT9 5PX
Tel. 01232 255314
Fax 01232 668376
e-mail m.collins@qub.ac.uk

Royal Irish Academy, Dublin, 21 April 1999

A symposium on *Developments in Food Science and Technology* is being organized jointly with The Royal Irish Academy, National Commission for Microbiology. For further information, please contact Margaret Critchley, Royal Irish Academy, 19 Dawson Street, Dublin 2, Ireland (Tel. +353 1 6762570; Fax +353 1 6762346, e-mail m.critchley@ria.ie).

The Marino Institute of Education, Dublin, 14 May 1999

A joint meeting is being organized with the Irish Diagnostic Virology Group.

University of Ulster at Coleraine, 16–17 September 1999

The group is planning a meeting on *The Commercialization of Microbial Biotechnology*.

Microbial Infection

Warwick, 5–7 January 1999

Following a proposal from Tim Wallis (Institute of Animal Health, Compton) the Group will be holding an informal 'hot topics' workshop on *Secreted Proteins from Salmonella*. The workshop will take place on the evening of 6 January 1999. Anyone interested in further details should contact Tim Wallis (timothy.wallis@bbsrc.ac.uk) or Carlos Hormaeche (C.E.Hormaeche@newcastle.ac.uk). This is a new venture for the group, but we would be very happy to hear of other suggestions for workshops on topical subjects. A two-day symposium on *Respiratory Pathogens* also will be held. This meeting has been organized jointly with the Systematics & Evolution and Clinical Virology Groups. The MI group organizer is Tim Mitchell (University of Glasgow). Full details can be found in the Programme Booklet.

Convener:
Professor Peter Andrew
Department of Microbiology and Immunology
University of Leicester
Medical Sciences Building
PO Box 138
University Road
Leicester LE1 9HN
Tel. 0116 252 2941
Fax 0116 252 5030
e-mail pwa@le.ac.uk

Edinburgh, 12–16 April 1999

A three-day meeting on *Microbial Evasion of the Host Immune Response* is being planned jointly with the Virus Group. Details of the invited speakers can be found in Virus Group News on p. 163. Our organizers are Petra Oyston (CBDE, Porton Down) and Brian Henderson (Eastman Dental Institute). The meeting will include time for offered papers. Offered papers and posters submitted through the MI Group will be considered for the Group's nomination for the Promega Prize if the presenter is under 28 years old and is a research student or first-time post-doc. Titles and abstracts should be submitted to either Brian Henderson (B.henderson@eastman.ucl.ac.uk) or Petra Oyston (100432.3200@compuserve.com) **by 20 December 1998**. Details on the format of abstracts can be found on the Society's Web site.

Leeds, 7–9 September 1999

A three-day meeting on *Food-spoilage and Food-borne Diseases* is being planned for the next joint meeting with The Pathological Society. This meeting also will be a joint effort with Physiology, Biochemistry & Molecular Genetics Group and Systematics & Evolution Groups. Our organizer is Ian Poxton (Edinburgh; i.r.poxton@ed.ac.uk); he will be very happy to receive any views that you may have on this meeting. Titles and Abstracts for offered papers and posters should be submitted to him **by 30 July 1999**.

Royal Society Discussion Meeting, 20–21 October 1999

The Royal Society is organizing a discussion meeting on *The Activities of Bacterial Pathogens In Vivo* in London. The Microbial Infection Group will be organizing an offered poster session as part of this meeting. Those interested should send a title and abstract to Paul Williams (paul.williams@nottingham.ac.uk) or Peter Andrew (pwa@le.ac.uk) **by 20 September 1999**.

Warwick, 10–14 April 2000

As a satellite to the Main Symposium on *Fighting Infection in the 21st Century*, the Group will be holding a meeting on issues on *Vaccine Delivery*. Our organizer is Petra Oyston (100432.3200@compuserve.com) and she will be delighted to hear any views on the composition of the programme. There will be an opportunity to present offered papers and posters.

Future Meetings

Ideas for symposium topics and speakers for future meetings are always welcome. Among the ideas under consideration is a joint meeting with the Irish Branch for 2000 on a topic to be decided. Please contact the Convener or any committee member if you have any comments.

Physiology, Biochemistry & Molecular Genetics

Warwick, 5–7 January 1999

There is no group meeting at this venue.

Edinburgh, 12–16 April 1999

The Group will hold a symposium on *Regulation of Complex Processes in Bacteria* at this meeting in honour of Professor Willie Donachie. Speakers are: W. Donachie (Edinburgh), The cell division cycle of *E. coli*; J. Lutkenhaus (Kansas), The molecular machinery of bacterial cytokinesis; J. Errington (Oxford), Asymmetric cell division and differentiation in *Bacillus subtilis*; D. Nunn (Urbana-Champaign), One brick at a time – making a protein secretory apparatus; K. Hughes (Seattle), Making a flagellum with style and efficiency;. L. Frost (Alberta), Making a sex pilus; A. Downie (Norwich), Bacteria in symbiosis – factors affecting nodulation by *Rhizobium*; H.Wolf-Watz (Umea, Sweden), Bacteria attacking animals – current approaches to the study of *Yersinia* virulence regulation; M. Daniels (Norwich), Bacteria attacking plants – unusual regulatory mechanisms. C. Hughes (Cambridge), Bacterial differentiation and population migration – *Proteus* swarming; P. Rainey (Oxford), Genetic basis of niche specialization in experimental populations of *Pseudomonas fluorescens*. The organizer is George Salmond (Cambridge).

The Group will be assessing posters for inclusion in the Promega Prize at this meeting. Qualifying candidates please identify which posters are to be assessed by our judging panel when the abstract is submitted to Marlborough House. Posters do not have to be directly relevant to any of the Group's symposia to be included in the assessment.

Leeds, 7–9 September 1999

The Group will hold a symposium on *Molecular Machines: Mobile Protein Complexes in Micro-organisms* at this meeting. Topics to be covered include: the bacterial flagellum; the bacterial flagellar motor; kinesin, actin and microtubule motility in eukaryotic microbes; actin-based motility in bacteria; enzyme complex motility in electron transport systems; DNA recombination machines; and nucleotide polymerases as mobile machines. The organizer is Liz Sockett (Nottingham). Short contributions are solicited, especially if they include videos of microbe movement or movement of microbial subcellular components. There will also be a joint symposium with the Microbial Infection Group and the Pathological Society on *Food-spoilage and Food-borne Diseases*. The PB&MG co-organizer is Simon Foster (Sheffield) and the Microbial Infection organizer is Ian Poxton (Edinburgh).

Warwick, 10–14 April 2000

The group will hold a symposium on *Transcriptional Control Circuits in Fungi* at this meeting. The organizer is Alistair Brown (Aberdeen). The group will hold a joint meeting with the Cells & Cell Surfaces Group on *Proteases, Proteolysis and Control*.

Future Meetings

The Group committee is always receptive to suggestions for topics for symposia, workshops etc. within its remit from any SGM member. Please contact the Convener or any member of the Group committee.

Convener:
Dr David A. Hodgson
Department of Biological Sciences
University of Warwick
Coventry CV4 7AL
Tel. 01203 523559
Fax 01203 523701
e-mail dm@dna.bio.warwick.ac.uk

Systematics & Evolution

Warwick, 5–7 January 1999

The Group is holding a collaborative symposium with the Microbial Infection and Clinical Virology Groups at this meeting venue on the subject of *Respiratory Pathogens*. Details are given in the accompanying Programme Booklet.

Edinburgh, 12–16 April 1999

The Group is developing an exciting and topical joint programme with the Environmental Microbiology Group. The symposium – *Detection of Microbes in the Natural Environment* – will be held on 15 and 16 April and we will have prestigious speakers covering many important areas in relation to the way that new approaches and methodologies in microbial detection can be used to help microbiologists answer real ecological and environmental questions. Speakers will cover the tracking of specific groups and communities

Convener:
Professor Grace Alderson
Department of Biomedical Sciences
University of Bradford
Bradford BD7 1DP
Tel. 01274 383564
Fax 01274 386210
e-mail g.alderson@bradford.ac.uk

of microbes as well as microbial genes and their activities. A number of very different approaches and diverse environments will be included. If you can offer a short paper or a poster on a topic relevant to our theme, please forward your proposal with a title and draft abstract to the Convener, as soon as possible, but **before 15 December 1998**. The deadline for finalized abstracts will be mid-February 1999.

Leeds, 7–9 September 1999

The Group is planning a large and exciting joint symposium with the Microbial Infection and the Physiology, Biochemistry & Molecular Genetics Groups along with the Pathological Society on *Food-spoilage and Food-borne Diseases*. See Microbial Infection Group News on p. 161 for further details.

Future Meetings

The Group is already planning symposia into 2000 and will hold a joint Group symposium with the Clinical Virology Group on *Molecular Epidemiology* during the Spring 2000 meeting in Warwick (10–14 April 2000).

Committee Membership

The Group committee will have some new faces at the end of 1998. At this time two new committee members join us: Dr Catherine Arnold (Colindale) and Professor Brian Austin (Heriot-Watt). They replace Dr Bill Grant (Leicester) and Dr John Stanley (Colindale) who reach the end of their 3-year term of office. The Convener also reaches the end of her 5-year term of office (6 years in reality because of changes in election dates and an earlier period as 'acting Convener'). The new SEG Convener will be Dr Gerry Saddler from CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY (Tel. 01784 470111; Fax 01784 470909; e-mail g.saddler@cabi.org). I wish Gerry and the new Group committee every success in the coming years. I would also like to express my sincere thanks to all of the committee members who have contributed to the work of the SEG with me in recent years. Much excellent work has been done on behalf of Society members.

Virus

Convener:
Professor Geoffrey L. Smith
Sir William Dunn School of Pathology
University of Oxford
South Parks Road
Oxford OX1 3RE
Tel. 01865 275521 (direct)
01865 275524 (secretary)
Fax 01865 275501
e-mail glsmith@molbiol.ox.ac.uk

It was with great regret that the meeting on *Microbial Neuropathogenesis* to have been held jointly with the Irish Branch was cancelled because of the very small number of delegates registered. This was most disappointing for all concerned and the Virus Group and Irish Branch would like to convey their apologies to all the scheduled speakers and registered delegates, and to thank all those who had worked hard to help prepare this meeting.

Promega Prize

(i) 1998. The Virus Group selected two nominations for the Promega prize from the Open Papers presented at Nottingham. These were Sonya Patterson (Newcastle) and Liz Mathew (Oxford). They each presented their talks again in the final at the SGM meeting at the University of East Anglia in September (see p. 155 for details).

(ii) 1999. All those presenting an Open Paper at the Virus Group activities at the University of Edinburgh, April 1999 (see below) are eligible for consideration for the 1999 Promega Prize, provided that they are not more than 28 years old and that they are either a research student or a post-doctoral fellow in their first post-doctoral appointment. The Virus Group encourages all eligible to consider entering this competition.

Edinburgh, 12–16 April 1999

The Virus Group is organizing a three-and-a-half day joint symposium with the Microbial Infection Group on *Microbial Evasion of the Host Immune Response*.

Symposium. The symposium will start on Tuesday afternoon and run until tea time on Friday afternoon. Plenary speakers are: B.M. Chain (London), M.A. Kerr (Dundee), P.J. Lachmann (Cambridge), B.R.G. Williams (Cleveland, USA), B. Henderson (London), S.J. Turco (Kentucky, USA), G.L. Smith (Oxford), P. Murphy (NIH, Bethesda, USA), K.A. McDonough (USA), A. Fosberg (Sweden), N. Davis-Poynter (Animal Health Trust, Newmarket), G.E. Blair (Leeds), S. Rowland-Jones (Oxford), C.I. Newbold (Oxford),

R. Daniels (NIMR, London), N. Saunders (Oxford), A.R.M. Coates (St George's Hospital, London), D.A. Thorley-Lawson (USA), D.J. Pickup (Duke University, USA), P.J. Farrell (Imperial College School of Medicine, London), M. Kotb (Memphis, USA), H. Acha-Orbea (Lausanne, Switzerland).

Open Papers. The format of this meeting is somewhat different from usual Virus Group activities in that Open Papers on topics that are within the theme of the main symposium will be included together with the plenary lectures throughout the symposium. In addition there will be an Open Papers session on other aspects of virology on the Tuesday morning before the symposium starts. Those wishing to present an Open Paper in either the Main Symposium or during the general Open Papers session should send the title, authors and their affiliation (indicating who will present the paper and whether they are eligible for the Promega Prize), and an abstract of not more than 150 words to the Convener **before 20 December 1998**. All Open Papers will be considered for the Promega Prize if the speaker is eligible (see above).

Workshops. On Monday and Tuesday evenings there will be two workshops. On Monday these will be on *Reversiviruses* [being organized by A.M.L. Lever, Department of Medicine, University of Cambridge (amll1@mole.bio.cam.ac.uk) and Mark Harris, Department of Microbiology, University of Leeds (m.harris@leeds.ac.uk)] and *Herpesviruses* [(being organized by J.P. Stewart, Department of Veterinary Medicine, University of Edinburgh (james.stewart@ed.ac.uk)]. On Tuesday there will be workshops on *Hepatitis C Virus* [being organized by Professor D.J. Rowlands, Department of Microbiology, University of Leeds (d.j.rowlands@leeds.ac.uk)] and *Iridoviruses, Baculoviruses, Poxviruses and African Swine Fever Virus* [being organized by R. Possee, NERC Institute of Virology and Environmental Microbiology, Mansfield Road, Oxford (rpossee@worf.molbiol.ox.ac.uk) and L.K. Dixon, Institute of Animal Health, Pirbright Laboratory, Ash Road, Pirbright (linda.dixon@bbsrc.ac.uk)]. Those wishing to contribute to a workshop should contact the organizers **before 1 March 1999**.

University of Surrey, 5–7 January 2000

The Virus Group together with the Clinical Virology Group is organizing a symposium on *Virus Infection: Life or Death for a Cell.* There will also be Open Papers and workshops on *Influenza* and *Exotic Viruses.*

Warwick, 10–14 April 2000

There will be a three-day symposium on *Virus Entry and Exit.* Open paper sessions and workshops are planned.

Glasgow, 17–21 September 2000

Third European Virology Meeting. A major virology meeting involving the Virus and Clinical Virology Groups of the SGM and other clinical and non-clinical microbiology societies from many other European countries is being planned.

Committee Membership

Members who are retiring from the Virus Group committee at the end of this year are Nigel D. Stow (Council representative), John W. McCauley (Compton), Clive Sweet (Birmingham) and S. Louise Cosby (Belfast). On behalf of the committee, the Convener expresses sincere thanks to them all for their hard work. Six candidates were nominated for four vacancies and following a postal ballot John K. Fazakerley (Edinburgh), David J. Evans (Reading, but Glasgow from 1999), Elizabeth Hoey (Belfast) and Ian Brierley (Cambridge) were elected to the committee to serve for 3 years.

Book Reviews

Genetics of Streptococci, Enterococci and Lactococci. Developments in Biological Standardization, Vol. 85

Edited by J.J. Ferretti, M.S. Gilmore, T.R. Klaenhammer & F. Brown.
Published by S. Karger AG, Basel (1995).

SFr420.00/DM503.00/US$365.25
pp. 666 *ISBN: 3-8055-6207-1*

This book represents the proceedings of the *4th International Conference on Streptococcal Genetics*, held in Sante Fe, New Mexico in 1994. As such it really represents a collection of specialist 'short communication'-type articles covering the area. The book is divided into five sections, each of which will be of interest to the specialists in that area. The book is not a 'sit-down-and-read' piece of work, but will serve as a reference to the state of knowledge in streptococcal genetics as it stood in 1994. With the rapid pace of research in molecular biology and genetics, especially in the area of genomic sequencing and analysis, parts of this book are now out of date. The book contains a single keynote lecture and is therefore not a good source of reviews of the area. This book will appeal to the specialist audience and should find a place on the shelf of laboratories engaged in research into the genetics of streptococci.

Tim Mitchell, University of Glasgow

Flow Cytometry Protocols. Methods in Molecular Biology, Vol. 91

Edited by M.J. Jaroszeski & R. Heller.
Published by Humana Press (1997).

US$64.50 *pp. 272* *ISBN: 0-89603-538-7*

Methods in Molecular Biology is an excellent series of which this is the latest addition. From the outset, I cannot recommend this book to the microbiology community as it specializes in eukaryotic cell analyses, particularly tumour cells. Flow cytometry has an established role in microbiology and further developments are inevitable. Some will come from technology transfer from eukaryotic studies. As a consequence, those microbiologists working with cytometric analyses may find some interest in the concepts described in this book. However, it is really aimed at specialists outside the topic of microbiology. This does not detract from the fact that it is a well-presented book with a variety of detailed protocols complemented by clear figures and legends. I would recommend that microbiologists seeking an introduction to flow cytometry be directed toward some of the more relevant publications that are available.

Roger Pickup, Institute of Freshwater Ecology

Streptococci and the Host. Advances in Experimental Medicine and Biology, Vol. 418

Edited by T. Horaud, A. Bouvet, R. Leclercq, H. de Montclos & M. Sicard.
Published by Plenum Publishing Corporation (1997).

US$195.00 *pp. 1064* *ISBN: 0-306-45603-6*

This weighty tome has arisen from the XIIIth Lancefield International Symposium on *Streptococci and Streptococcal Diseases*, held in Paris during September 1996. Of the 390 presentations made at the symposium, 260 were submitted as manuscripts and 249 of these were included within this volume. Even for a volume of this size the result is inevitably a collection of very short papers that effectively act as little more than a bound set of posters for the amount of written information that they contain. However, posters can be very informative and are often previews for what may well be a very significant piece of work. On the other hand the information within such a presentation may be more repetitive than novel. For those not familiar with the Lancefield Symposium it is, perhaps not surprisingly, dominated by presentations on *Streptococcus pyogenes*. Although this is also the case for the majority of the presentations within this volume, the slightly longer introductory talks do give informed, historical perspectives on the wider field of streptococcal research. There are also a number of good leading presentations to the 11 different symposium topics. The book is a snapshot of streptococcal research; however, like holiday photos the whole picture is not always in the frame and for those particularly interested in the diversity of current research into *S. pneumoniae* this is not the place to visit. It does, however, provide an excellent list of activities being undertaken by an enormously diverse collection of research groups. From that point it is a potentially very useful reference list, though, at the price, not one that I would be willing to buy for myself.

Christopher G. Dowson, University of Warwick

Multimedia Methods in Molecular Biology, Second Edition (CD-ROM)

Edited by T. Partridge, P. Jones & D. Rickwood.
Published by Chapman & Hall Electronic Publishing Division (1998).

£199.00 *ISBN: 0-412-82900-2*

To justify the use of CD-ROM a publication of this kind should provide more than a list of protocols in computer-readable format. Indeed this publication does just that. Two hundred protocols are presented along with animated graphics and video clips to explain the background and demonstrate the finer points of some techniques. Protocols are indexed into related systems (animals, plants, bacteria, fungi or viruses) and further divided into topic areas (e.g. cloning, DNA analysis, RNA analysis, protein analysis). Methods can also be selected by searching for keywords. Useful support information, such as hints and tips, interactive trouble-shooting guides, chemical hazard information and editable recipe tables, accompanies each protocol.

A nice feature of this software allows users to write and store their own favourite protocols which can be password-protected to be viewed solely by the author or shared among a group of users.

Barry Vipond, Public Health Laboratory, Bristol

Practical Approach on CD-ROM

By B.D. Hames & D. Rickwood.
Published by IRL Press at Oxford University Press (1997).

£699.13 *ISBN: 0-19-268370-5*

Our laboratory uses a relatively restricted range of techniques, but we tend to use them in a plethora of minor variations. The breadth of coverage on this CD is enormous, but so much of it is of limited value. The chapters on, for example PCR, contained a few solid, basic protocols but contained little by way of the fine-tuning modifications that are the day-to-day stuff of getting reactions to work at the bench.

The CD was painless to install and ran without problems on a single machine. The review copy could not be networked. In practice, picking up a paper book to carry into the prep room was preferable to the need to select and print out details from the CD.

For the money, this might be useful for a large institute when mounted centrally. It is very much less useful for specialist groups, which probably account for most people in the field.

David Horner, The Natural History Museum

Book Reviews

Aquatic Photosynthesis

By P.G. Falkowski & J.A. Raven.
Published by Blackwell Science (1997).

£39.50 *pp. 375* *ISBN: 0-86542-387-3*

This book fills a long-standing gap on the shelves of those interested in photosynthetic processes in the marine and freshwater environments. The fundamental molecular processes of photosynthesis are presented extremely clearly in the context of their underlying physics and chemistry, but in a way that is still accessible to those of limited numeracy. These process details are closely integrated with the ecology of the organisms involved and inevitably reflect the enormous diversity of aquatic phototrophs. The book will be of interest to all those whose research involves any aspect of aquatic photosynthesis and will be invaluable for advanced undergraduates and postgraduates entering this area. Two particularly attractive features are the frequent explanatory footnotes and the informative parenthetical commentaries.

Nick Mann, University of Warwick

Mycobacteria I: Basic Aspects & Mycobacteria II: Chemotherapy

Edited by P.R.J. Gangadharam & P.A. Jenkins.
Published by Chapman & Hall (1997).

Vol. 1	*£69.00*	*pp. 400*	*ISBN: 0-412-05451-5*
Vol. 2	*£69.00*	*pp. 436*	*ISBN: 0-412-05441-8*
2-volume set	*£120.00*		*ISBN: 0-412-980-41X*

In their preface to the second of these volumes the Editors make the point that tuberculosis could by now have been largely eliminated had the existing information been properly used. Yet the disease persists as a desperate problem in developing countries and threatens to become important once again in developed ones. The whole of the second volume deals with the management of tuberculosis and other mycobacterial diseases (which need radically different approaches from tuberculosis), primarily by chemotherapy. This makes it valuable for anyone concerned with treating such diseases and to any institution where such matters are taught. The first volume is more diverse, but is also slanted towards a clinical readership, though some of the reviews have more general interest. Some of them show signs of age, presumably because of delays in publication. There is fascinating material here, but not the basic grounding in mycobacteriology implied by the title.

Philip Draper, NIMR, London

Nitric Oxide Protocols. Methods in Molecular Biology, Vol. 100

Edited by M.A. Titheradge.
Published by Humana Press (1997).

US$99.50 *pp. 300* *ISBN: 0-89603-537-9*

NO plays an essential role in diverse biological processes – signalling in the vascular and immune systems, neural communication and many pathological situations. Microbiologists will encounter NO as an intermediate in denitrification and a component of the anti-bacterial arsenal produced by activated macrophages. Another remarkable feature of this apparently simple molecule is the many potential pitfalls in its study by the uninitiated. This book is a pot-pourri of protocols, including several useful warnings on, for example preparation and storage of NO solutions, 'NO donors' and the assay of NO and related reactive species. There is nothing overtly microbiological here and more than half the book is devoted to NO synthases (NOS, which have been discovered in only two bacteria so far). Nevertheless, the book should be useful in many laboratories, but would be more so if the index were much better and the contents logically ordered.

Robert Poole, University of Sheffield

Methods in Biotechnology

Edited by H.-P. Schmauder (translated by L.M. Schweizer).
Published by Taylor & Francis (1997).

£19.95 *pp. 264* *ISBN: 0-7484-0430-9*

This is not just another methods book, but is very much a teaching and self-help text which is unusual in that its suggested experiments cover not only traditional microbiology, fermentation and tissue culture but also biochemical and molecular biological investigations. Experiments which I have tried all work, although some fermentations were scaled down to cope with financial limitations. Safety is considered with clear warnings and instructions about ethidium bromide and emphasis on the value of using non-isotopic labels. The translation from German has been well worthwhile as the review copy has been well-thumbed by project students. An affordable highly recommended purchase.

Martin A. Collins, The Queen's University of Belfast

Oxford Dictionary of Biochemistry and Molecular Biology

Edited by A.D. Smith, S.P. Datta, G. Howard Smith, P.N. Campbell, R. Bentley & H.A. McKenzie.
Published by Oxford University Press (1997).

£34.95 *pp. 752* *ISBN: 0-19-854768-4*

This easy-to-browse, well-cross-referenced dictionary provides a wealth of useful and interesting information. In amongst the standard entries are structural chemical diagrams, biochemical equations, database codes for proteins and brief biographical details of famous biochemists. Five appendices give additional information, from the traditional lists of Greek characters and restriction enzymes to a section on bioinformatics and even an unashamedly basic introduction to the Internet, including useful web addresses. So, if you want to know the active ingredient of henna, are wondering what a snurp is, are interested in the primary translation products of HIV-1 or vaccines against hepatitis viruses (although this book does not pretend to contain an exhaustive list of virus names), are dying to know when Leonor Michaelis was born, need to know the basics of flow cytometry, or simply need to look up an unfamiliar term, perhaps this is the book for you.

Deborah Ollman, JGV Editorial Office

The Coronaviridae. The Viruses Series

Edited by S.G. Siddell.
Published by Plenum Press (1995).

US$89.50 *pp. 418* *ISBN: 0-306-44972-2*

The monographs in *The Viruses* series usually provide a thorough overview of their subject and this is no exception. The book attempts, and largely succeeds, to present a balance between the molecular understanding of the coronaviruses, with a review of the pathogenic consequences of infection by certain example viruses. Coverage includes the related Toroviruses and the Arteriviruses. There is a thorough dissection of the structure/function of the structural proteins and a briefer overview of the non-structural proteins, reflecting the current balance of understanding. The remaining chapters review coronavirus infection and pathogenesis, which in the case of the chapters on TGEV and Porcine coronavirus pathogenesis duplicate results presented elsewhere in the book. The index is rather poor, using only a series of generic headings. Notwithstanding these minor criticisms, this book provides a fine overview of the Coronaviridae, including historical aspects of their study, and is recommended.

David Evans, University of Reading

Book Reviews

Molecular Diagnosis of Infectious Diseases. Methods in Molecular Medicine, Vol. 13

Edited by U. Reischl.
Published by Humana Press (1998).
£55.00/US$69.50 *pp. 629* *ISBN: 0-89603-398-8*

This is an interesting and comprehensive collection of molecular methods which may be applied to the diagnosis of infectious diseases. The chapter format is good with an introduction, followed by a detailed description of methods, concluding with an advisory notes section and a full list of references. However, there are few very recent references, which could be a disadvantage as a book of this kind rapidly becomes outdated.

Unfortunately, not many microbiological examples are mentioned throughout the chapters and, with the exception of *Escherichia coli*, there are no entries for specific bacteria in the index. This will be disappointing for the target audience and those that will benefit the most from the book will need a basic understanding of the application of the methodology.

At £55.00 it is reasonably expensive, especially when several of the figures are of poor quality. Because of the above limitations, it would probably be recommended only for research institutions.

Adrian Eley, University of Sheffield

Molecular Genetics of Bacteria

By L. Snyder & W. Champness.
Published by ASM Press (1997).
£60.00 *pp. 504* *ISBN: 1-55581-102-7*

This excellent book sets itself apart from some other recent books on bacterial genetics. The book has a modern approach in that it includes genetic systems from bacteria other than *Escherichia coli*. Additional information to the basic principles is provided in boxes and is interesting and relevant and also often includes 'non-*coli*' systems. The level of detail is extremely satisfying as both the molecular mechanisms and (usually) the genetic evidence are described. Throughout the book the information is largely accurate and up-to-date. Whilst the book is probably too expensive for undergraduate students to buy, I recommend that every library buys several copies for reference. It is an invaluable source for teachers of microbial genetics courses and as a basic text which should be in every bacterial genetics laboratory for use by graduate students and research assistants.

Maggie Smith, Queen's Medical Centre, Nottingham

Plague, Pox & Pestilence. Disease in History

Edited by K.F. Kiple.
Published by Weidenfeld & Nicolson (1997).
£25.00 *pp. 176* *ISBN: 0-297-82254-3*

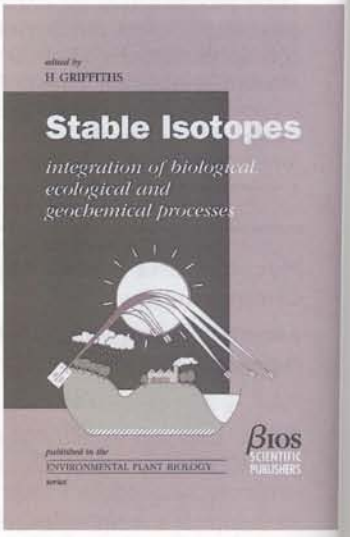
This book is a fascinating and thorough survey of diseases and epidemics that have occurred in history. Written by a historian, the book is packed with detailed information which puts the development of epidemics into the context of developing societies. Snippets of contemporary reports are scattered throughout the text and suggest the enormous impact that many of the epidemics had at the height of their outbreaks. The book is beautifully and lavishly illustrated with drawings, engravings and photographs gleaned from many sources, some of which date back as far as the 15th century. Although not a 'hard' science book, it should be of enormous interest to all microbiologists. Its size and appearance suggest that the book is aimed at the 'coffee table' to which it would be an interesting if somewhat gruesome addition.

Jane Westwell, External Relations Office, SGM

Stable Isotopes: Integration of Biological, Ecological and Geochemical Processes. Environmental Plant Biology Series

By H. Griffiths.
Published by BIOS Scientific Publishers Ltd (1997).
£75.00 *pp. 464* *ISBN: 1-85996-135-5*

There are few analytical systems where the caveat 'the devil is in the detail' can be more aptly applied than interpreting isotope analysis results. This excellent book provides the interested reader with the tools to make an informed assessment of published results: for the practitioner, it will be a rich source of references. The state-of-the-art at present rarely extends beyond primary utilization of an isotopic mixture. How the resulting enrichment is affected by subsequent trophic interactions is probably statistically inaccessible with present levels of understanding. Nevertheless, this methodology remains probably our most powerful approach to the *in situ* processes occurring in complicated systems. For the microbiologist there is a bias towards higher plants, but there are also chapters dealing with the fundamentals of the methods, soils and marine systems. This is a splendid review which, if you are interested in ecological processes, is well worth the read.



Dave Roberts, The Natural History Museum

Slide Atlas of Fungal Infection – The Set: Subcutaneous and Unusual Fungal Infections; Systemic Fungal Infections; Superficial Fungal Infections

By M.D. Richardson, D.W. Warnock & C.K. Campbell.
Published by Blackwell Science Ltd (1995).
£195.00 *150 slides* *ISBN: 0-86542-896-4*

Fungi are becoming increasingly important as human pathogens. Most medical microbiologists are familiar with the clinical and laboratory features of the dermatophytes and the opportunistic fungi *Candida* and *Aspergillus*, but we are now being confronted with an expanding spectrum of pathogens, including some that might be encountered as imported infections. These latter groups are far less familiar to physicians and microbiologists alike. The authors, who are experienced mycologists, have produced a collection of slides that illustrates both the clinical and mycological features of a representative selection of mycoses. The three sections contain approximately 50 slides each. Overall quality is good, although some of the clinical pictures have lost out in reproduction. The slides would best be reviewed in conjunction with the book *Fungal Infection: Diagnosis and Management* written by two of the authors and produced by the same publisher. The most appreciative users are likely to be medical microbiologists and biomedical scientists, but non-clinical microbiologists and mycologists should find the clinical material of interest. Furthermore, dermatologists, oncologists and infectious diseases specialists should find reference to the collection of value. The set is expensive, presumably because of the slide production costs, which might limit availability to libraries.

Tom Rogers, Imperial College School of Medicine

Book Reviews

Plant Virology Protocols: From Virus Isolation to Transgenic Resistance. Methods in Molecular Biology, Vol. 81

Edited by G.D. Foster & S.C. Taylor.
Published by Humana Press (1998).

US$89.50 *pp. 588* *ISBN: 0-89603-385-6*

The scope of this book, indicated in the sub-title, is limited to methods that might be needed along the pathway from virus isolation to transgenic resistance. Moreover, the focus is on coat-protein-mediated resistance. Oddly though, the chapter on gemini-viruses fails to mention that coat-protein-mediated resistance does not work with this group of viruses. The essential background virology is covered in three introductory chapters and each chapter of protocols explains the background to the methods and the main alternatives available. The protocols themselves are clearly described and there are extensive notes and references which should help with troubleshooting or adaptation to differing circumstances. I could find only a few obvious mistakes, including some irritating errors in cross-references between sections, and one or two chapters are too sketchy to be useful. However, any group working in this area will find something useful in this book.

David J. Robinson, Scottish Crop Research Institute

Forensic DNA Profiling Protocols. Methods in Molecular Biology, Vol. 98

Edited by P.J. Lincoln & J. Thomson.
Published by Humana Press (1998).

US$79.50 *pp. 320* *ISBN: 0-89603-443-7*

Unless you are contemplating a sideline in forensic identification, then this latest *Methods* text is probably not going to be of direct relevance. Forensic molecular biology tends to deal with unique, and often bizarre, samples and the methods used to analyse these sources of DNA are also specific to the problem of producing individual identification. Despite the narrow target audience, the text itself provides a thorough coverage of the techniques used to produce DNA profiles from (mostly) human biological 'stains' and remains, with excellent explanatory notes attached to each chapter, providing helpful hints and anecdotal information. Worth a look if you are a budding forensic scientist or are trying to extract DNA from biological stains and non-standard tissue samples.

Jeremy Austin, The Natural History Museum, London

Forest Products Biotechnology

Edited by A. Bruce & J.W. Palfreyman.
Published by Taylor & Francis (1997).

£49.95 *pp. 304* *ISBN: 0-7484-0415-5*

Trees from the Wood – I had forgotten how diverse and substantial the area of what used to be timber technology has become. The area of wood decay is one of the most interesting to microbiologists currently and it gets apparently thorough treatment, but comparison of the chapter describing white and brown rot decay of wood with Kurt Messner's chapter on biopulping shows the former to be unreasonably selective and not up-to-date. This is a pity as there is much of interest elsewhere in the book, such as tannin-based adhesives and mushroom cultivation from wood wastes. The chapter on transgenic trees is a particular eye-opener for microbiologists and the chapter on drugs from plants is a surprise inclusion (as most of the plants involved aren't trees) given the title of the volume. Over all, the amount and diversity of material represents good value for money and a good purchase for the library.

Chris Thurston, King's College London

Microbial Diversity and Genetics of Biodegradation

Edited by K. Horikoshi, M. Fukuda & T. Kudo.
Published by S. Karger AG, Basel (1997).

SFr246.00/DM295.00/US$214.00
pp. 210 *ISBN: 3-8055-6589-5*

The title of this book might lead the reader to expect a comprehensive treatise addressing the latest developments in our understanding of biodegradation. However, the publication focuses primarily on aerobic pathways of PCB and 2,4-D degradation. The quality of the individual chapters is highly variable. They include reports on the isolation of novel bacterial strains that lack the detail required to judge the work objectively and broader ranging articles providing an excellent review of current understanding on catabolic pathway evolution. The audience for the book is likely to be somewhat specialized and it would not necessarily make a worthwhile library purchase. For anyone working on 2,4-D or PCB degradation, catabolic pathway evolution or related disciplines, the better quality chapters are well worth reading and provide some information that is currently unavailable from other sources. Nonetheless, at a cost of US$214.00 it certainly does not represent good value for money.

Ian Head, University of Newcastle

Genes VI

By Benjamin Lewin.
Published by Oxford University Press (1997).

£29.95 *pp. 1280* *ISBN: 0-19-857778-8*

The latest edition of *Genes* is up-dated whilst retaining its distinct style and useful graphics, many of which now appear in colour. The book is divided into parts giving equal prominence to prokaryotic and eukaryotic gene expression. This makes it a useful text for a variety of programmes and modules. As a teacher of mainly prokaryotic molecular biology, I was particularly pleased with the chapter on recombination. Given the maturity of DNA technology as a field, it is fitting that elements of DNA technology are integrated into the main body of the text and do not form a separate section, although I felt that some techniques (e.g. PCR) were under-emphasized. A positive feature of this book is the way it aims to set the functions of genes into cellular contexts and this will make it relevant to programmes in cell biology as well as molecular biology, microbiology and genetics.

Helen O'Sullivan, Liverpool Hope University College

Membrane Protein Transport. A Multi-Volume Treatise, Vol. 3

Edited by S.S. Rothman.
Published by JAI Press Inc (1996).

£82.50/US$128.50 *pp. 312* *ISBN: 1-55938-989-3*

This third volume of *A Multi-Volume Treatise* contains nine reviews of transport of proteins across various membranes, most of which are in bacteria or yeast, including those of the nucleus, mitochondria, peroxisomes, vacuoles and bacteria (periplasmic and outer), the final review being by the Editor on transport across the plasma membrane of pancreatic secretory cells. Each review is compiled by experts who mainly consider their own work. Reading it from cover to cover, as a reviewer should, I found the excessive abbreviations confusing (no lists are provided), the index was minimal and the quality of some of the large-grained, high-contrast pictures is the worst I have seen in a serious book for many years; a few are literally useless. However, this volume makes an excellent starting point for any of the topics covered and the bibliographies with full titles are excellent.

Chris Anthony, University of Southampton

Book Reviews

Genetic Engineering with PCR

Edited by R.M. Horton & R.C. Tait.
Published by Horizon Scientific Press (1997).
£34.99 *pp. 235* *ISBN: 1-898486-05-0*

For those who consider PCR only to be an analytical tool then think again. This book explores technical aspects of DNA manipulation using PCR rather than traditional cloning methods. Topics include mutagenesis (targeted and random), recombination, splicing, selection of functional nucleic acids, antibody and phage display libraries and viroid synthesis. Additionally, a chapter about controlling *Taq*-induced errors is essential reading for those wanting to reduce or maintain the sequence fidelity of the final product. The concept of rapid PCR (30 cycles in 15 minutes) using hot-air cyclers also features. PCR-mediated genetic engineering can have advantages over traditional cloning methods. The whole process can be carried out *in vitro* without need to amplify constructs *in vivo*. Consequently there are significant time savings and an ability to generate constructs that would otherwise be toxic, unstable or unclonable previously. An excellent read for those familiar with traditional molecular biology.

Barry Vipond, Public Health Laboratory, Bristol.

Rumen Microbes and Digestive Physiology in Ruminants

Edited by R. Onodera, H. Itabashi, K. Ushida, H. Yano & Y. Sasaki.
Published by S. Karger AG, Basel (1997).
SFr256.00/DM307.00/US$222.75
pp. 260 *ISBN: 3-8055-6588-7*

Ruminants provide the bulk of the industrial world's protein. However, as the world population increases, the burden on the food industry to satisfy demands also increases, a challenge which is difficult to meet in an age which is becoming ecologically aware.

This book, written by noted experts in the area of ruminant nutrition and biochemistry, provides an up-to-date overview of the role of micro-organisms in ruminant nutrition, and the technological advances and future directions of improving animal productivity. All the major areas of nutrition are covered and the sections are clearly defined which make it relatively easy to find the topics of specific interest to the reader. The references used are up-to-date and there are some excellent reviews, particularly in the area of energy metabolism.

This book will prove a valuable reference source for those interested in ruminant nutrition but its price will ultimately limit it to those who are actively working in this area.

Nigel Yarlett, Pace University, Haskins Laboratories, New York

Biotechnology in the Sustainable Environment. Environmental Science Research, Vol. 54

Edited by G.S. Sayler, J. Sanseverino & K.L. Davis.
Published by Plenum Publishing Corporation (1997).
US$120.00 *pp. 389* *ISBN: 0-306-45717-2*

This book reports the proceedings of a conference (Tennessee, 1996): the information is predominantly North American but with input from Europe, Japan, Mexico and Russia. This international 'buffet' can be dipped into, as each chapter stands alone within a themed section. Economic, legal and social issues such as Environmentally Acceptable Endpoints ('How clean is clean?') are addressed and put the science into real-life context ('What will it cost?'). Many chapters include an overview of the topic presenting good background material as well as the current status and future potential; some include data of case studies, e.g. biological nutrient removal from wastewater. Some contributors stretch the 'green' imagination, e.g. the environmentally friendly use of amylase in delaying bread staleness, thus saving costs on the six billion loaves produced annually in the USA!

It is well-referenced, with microbiology being strongly represented. The index displays the scope of the book: *Alcaligenes* lies with Air Pollution Control, *Phanerochaete* with Petroleum, and xylene with *Zoogloea*.

This inter-disciplinary publication is of interest to all concerned with environmental biotechnology. I recommend it for the bookshelves of lecturers/researchers and libraries for undergraduate use.

Ann P. Wood, King's College London

Mathematical Modelling in Microbial Ecology. Microbiology Series

Edited by A.L. Koch, J.A. Robinson & G.A. Milliken.
Published by Chapman & Hall (1997).
£75.00/US$99.95 *pp. 273* *ISBN: 0-412-03511-1*

In his introduction, Arthur Koch stresses that the key to understanding ecological processes involves measuring spatially changing relationships. I agree, but the central problem, yet to be cracked, is the gathering of sufficient high-quality, particularly spatially resolved, data. The exponential growth of mathematical microbial ecology turned into stationary phase in the 1970s because microbial ecosystems are complicated, containing huge numbers of interconnected variables, which means that the deterministic models became rapidly over-parameterized when applied to real ecosystems.

The Editors believe that advances in data-gathering skills have us poised on the verge of a new exponential phase, although I found little in the book to support this assertion. Nonetheless, the book is good and an excellent introduction to the issues. Like the Editors, I hope this summary of the state of play will enthuse a new generation of mathematically inclined microbial ecologists. It deserves to be widely read.

Dave Roberts, The Natural History Museum

Micro-organisms in Foods, Vol. 6: Microbial Ecology of Food Commodities

By International Commission on Microbiological Specifications for Foods (ICMSF).
Published by Blackie A & P (1997).
£125.00 *pp. 615* *ISBN: 0-7514-0430-6*

Recognizing developments in food processing and packaging, new product ranges, and emerging food-borne pathogens, this book updates *Microbial Ecology of Foods, Volume 2: Food Commodities* (1980). Aimed primarily at those interested in applied food microbiology, it comprises 17 chapters, each covering (i) important properties of the food commodity affecting its microbiological content; (ii) initial microflora present at slaughter or harvest; (iii) effects of harvesting, transportation, processing and storage on the microbial content; and (iv) means of controlling specific processes and the microbial content present. Each chapter is extremely comprehensive and informative in content, with key data being tabulated, and extensive references lists being provided. An index aiding location of information on specific pathogens would, however, have been a useful addition. Despite being expensive, this book is undoubtedly the most detailed of its kind around, making it good value for money, and a much needed addition to the bookshelf of every food microbiologist!

Craig A. Davidson, Food Safety Research Group, UWIC

Book Reviews

DNA Damage and Repair, Vol. 1: DNA Repair in Prokaryotes and Lower Eukaryotes. Contemporary Cancer Research Series

Edited by J.A. Nickoloff & M.F. Hoekstra.
Published by Humana Press (1998).
US$125.00 *pp. 640* *ISBN: 0-89603-356-2*

Knowledge about DNA repair is advancing rapidly and collections of authoritative summaries like this are essential. Students writing theses and researchers contemplating work on different biological systems will find it especially useful. Here is an ambitious mixture of approaches, from sections on individual repair pathways to overviews of particular organisms. Like many multi-author compilations, the quality of contributions varies but most are of high quality. The advantages and limitations of studying different species emerge clearly. Stand-out chapters include those about double-strand break repair and the oxidative stress response in bacteria, a review on the incredibly radioresistant *Deinococcus radiodurans* and the summaries concerning budding yeast and plants. Several chapters are too focussed on the work of the contributors, and there is significant overlap between some sections. Clear figures and tables are most useful, but not every chapter has them. The production, editing and reference lists are otherwise generally excellent.

Rick Wood, ICRF, Clare Hall Laboratories, South Mimms

Protein Protocols on CD-ROM

Edited by J.M. Walker.
Published by Humana Press (1998).
US$395.00/10% discount on prepaid orders
(30 day free trial US orders only) *ISBN:0-89603-514-X*

Protein Protocols on CD-ROM is an ambitious and impressive project which has brought together vast amounts of information on widely different experimental methods. One can hardly think of a technique that is not represented in this collection. It spans the whole spectrum of protein research, presenting in the same 'book' sophisticated genetic engineering as well as highly specialized physical and chemical methods. This makes *Protein Protocols on CD-ROM* a unique and comprehensive reference source.

Given the enormous scope of this collection, it meets many expectations, providing introduction to the techniques, useful step-by-step protocols and references. For the most part, techniques are state-of-the-art. As a whole this collection achieves good balance between comprehensive background coverage and specialized detail. Some chapters are rather wordy, page restrictions obviously being less stringent in the CD-ROM format. In addition, there are overlaps in some common techniques. It is perhaps inevitable for such an encyclopaedia of techniques that details often outweigh inspiration and perspective.

There is a heavy emphasis on physical and chemical methods, some highly specialized. The content of these chapters is very detailed, the coverage of instrumentation and theory is comprehensive. However, on many occasions, the reading is very hard-going for the uninitiated.

The browser is easy and intuitive to use with quick access to different sections and references. I found the search function a little primitive. Some drawings and diagrams lack sufficient quality which makes them difficult to follow on the computer screen.

Protein Protocols on CD-ROM is targeted at a very large audience, but some parts are too specialized for the general molecular biology audience. This collection would be best suited as an excellent reference source for libraries as well as for large research institutions with particular emphasis on protein work.

Irina Tsaneva, University College London

PCR in Bioanalysis. Methods in Molecular Biology, Vol. 92

Edited by S.J. Meltzer.
Published by Humana Press (1998).
US$69.50 *pp. 292* *ISBN: 0-89603-497-6*

Although at first sight the title suggests a general book about PCR, the emphasis is on the applications of PCR in clinical diagnostic microbiology. As with other books in this series, each chapter contains detailed protocols, making this volume a useful addition to libraries of clinical laboratories, as well as being an excellent reference work for students of microbiology. As one might expect from an edited text, there is some variation in the quality and length of contributions. In most chapters the protocols are supported by an introduction, some excellent figures, notes and reference lists. Some chapters were, for me, slightly marred by the presence of some editorial errors.

On the whole this book is excellent and will be invaluable to all institutions and laboratories using PCR for clinical diagnosis.

Anne Kaukas, The Natural History Museum

Combinatorial Peptide Library Protocols. Methods in Molecular Biology, Vol. 87

Edited by S. Cabilly.
Published by Humana Press (1997).
US$74.50 *pp. 312* *ISBN: 0-89603-392-9*

This book is an excellent overview of the most commonly used methods for the design, preparation and screening of combinatorial peptide libraries. Each topic is succinctly introduced and summarized without unnecessary detail, but for those readers requiring more in-depth knowledge, the key publications in the area are referenced. Both chemical and biological peptide libraries (e.g. phage display) and their use are described. The protocols are set out in an easy to follow step-wise manner, with the apparatus required and the suppliers of materials used also conveniently listed. A key part of the protocols is the notes section in which useful tips gained through the experience of the authors are passed onto the reader. These points make this book ideally suited to researchers entering the field for the first time. The book would be an ideal purchase for institutions involved in peptide-based research.

David Horwell & Jennifer Raphy, Cambridge University

Structure and Dynamics of Membranes: From Cells to Vesicles. Handbook of Biological Physics, Vol. 1.

Edited by R. Lipowsky & E. Sackmann.
Published by Elsevier Science (1995).
Dfl. 545.00/US$320.50 *pp. 1028* *ISBN: 0-444-81975-4*

This is the first in a series devoted to biological physics. The emphasis is very much on the insights that can be gained by an approach to biology through physics rather than by the more usual approach through chemistry. The Editors of this first volume are well known for their own contributions to the study of the physical properties of biological membranes and they have brought together an interesting set of contributions in this general area. Many of the topics covered here, such as the role of surface tension, the physical basis of the interactions between surfaces and the electrostatic properties of membranes, have not been extensively reviewed elsewhere. Thus whilst it is rather unlikely that this first volume will be of direct interest to many microbiologists, for those with a more general interest in the properties of membranes, the volume will provide excellent coverage of a less familiar literature. But, be warned, many of the contributions are fairly mathematical.

Anthony Lee, University of Southampton

Book Reviews

Antisense Technology. A Practical Approach. The Practical Approach Series No. 185

Edited by C. Lichtenstein & W. Nellen.
Published by IRL Press at Oxford University Press (1997).
£27.95 *pp. 326* *ISBN: 0-19-963583-8*

Inhibition of protein synthesis by antisense sequences may have been invented by bacteria but, experimentally, it is used more widely in eukaryotic studies where gene deletions are more complex to achieve. Consequently, none of the examples in this book relates to prokaryotic systems and its relevance to microbiologists may be limited. That aside, this volume reaches the standard we have come to expect from the *Practical Approach* series. The standard of presentation reflects the expertise of the authors and the protocols are described clearly with useful practical notes. The subjects of the chapters follow a sensible sequence and a number of ancillary areas are covered in addition to the basic antisense approaches. Some of these, such as the chapters on nucleic acid structures, design and use of oligonucleotides and *in vitro* RNA synthesis are sufficiently useful for reference even in molecular-biology-oriented laboratories where antisense is unlikely to be used.

Glenn Matthews, Queen Elizabeth Hospital, University of Birmingham

Veterinary Vaccinology

Edited by P.-P. Pastoret, J. Blancou, P. Vannier & C. Verschueren.
Published by Elsevier Science (1997).
NLG325.00/US$200.75 *pp. 882* *ISBN: 0-444-81968-1*

Vaccinology is a multidisciplinary science incorporating scientific disciplines such as immunology, microbiology, parasitology and pathogenesis but also involving socio-political factors such as regulation, licensing and ethical considerations. Veterinary vaccinology has the additional complication of addressing a multitude of different animal species and their attendant diseases.

The Editors of this timely book set themselves the objective of covering all the various aspects of vaccines and vaccination in the global animal health sector and, while it is not completely comprehensive, it is a highly informative and wide-ranging review. There is duplication as similar vaccines are discussed in the context of each animal species and again in relation to the target pathogen. I found the sections on wildlife vaccination particularly engrossing where the detailed information brings home the magnitude of the problems facing researchers.

This is a book I would recommend to everybody involved in vaccine development from students to project managers.

Willie Donachie, Moredun Research Institute

Drug–DNA Interaction Protocols. Methods in Molecular Biology, Vol. 90

Edited by K.R. Fox.
Published by Humana Press (1997).
US$69.50 *pp. 288* *ISBN: 0-89603-447-X*

With recent advances in sequence-specific recognition, DNA now represents a fascinating target for all medicinal chemists, not just those working in cancer chemotherapy. Consequently, an increasing number of laboratories wish to pick up the techniques of drug–DNA interaction analysis. This volume represents an ideal source of such information. For those entering the field it provides an overview of the plethora of current investigational methods and so the opportunity to choose the approach most suited to their particular problem. For those already involved in the study of drug–DNA interactions, it provides an opportunity to consider alternative methods that could be added to their repertoire to maximize and cross-validate the information obtained from their investigations.

The relatively uniform chapter style aids the comparison of alternative methods; though the amount of detail provided is rather variable and not all the bibliographies are particularly extensive; most cover the literature up to about 1996.

Charlie Laughton, University of Nottingham

Neuroinflammation: Mechanisms and Management

Edited by Paul L. Wood.
Published by Humana Press (1997).
US$145.00 *pp. 384* *ISBN: 0-89603-416-X*

Being impaired in priming immune responses, the brain mounts very strong inflammatory responses to either microbes, or brain cell death. Neurodegeneration occurs in many diseases and is accompanied by strong inflammation. This book reviews cellular (i.e. microglia) and biochemical mediators (i.e. cytokines, growth factors), and examines their roles in individual diseases (e.g. Alzheimer's, head injury, multiple sclerosis and stroke). Excellent chapters concentrate on the role of the microglia, IL-1, complement, oxygen radicals, nitric oxide, COX-2 and cell adhesion molecules. Sadly, some mediators are not covered in much detail (i.e. TNFa). Crucial outstanding questions are highlighted, e.g. is microglial activation a cause of neurodegeneration, or its result, and does microglia play a damaging or protective role in neurodegeneration?

All chapters provide comprehensive tables, and exhaustive references. Thus this book provides a thorough overview of cells and mechanisms of brain inflammation, their role in disease and future therapeutic avenues to overcome it.

Pedro Lowenstein, University of Manchester

Volvox. Molecular-Genetic Origins of Multicellularity and Cellular Differentiation

By D.L. Kirk.
Published by Cambridge University Press (1998).
£60.00/US$85.00 *pp. 381* *ISBN: 0-521-45207-4*

David Kirk, the renowned expert and tireless promoter of *Volvox* (*carteri*) as a tool for studying cytodifferentiation and developmental programming, took the baton of Volvocology from Richard Starr. In this authoritatively written, impressively illustrated and excellently produced monograph he has collected anything of interest on Volvocales, including the most current papers. Nobody who ever ploughed the field will miss their name; the data and controversies are critically reviewed and even-handedly discussed. The reader gets a topical status report on *Volvox* biology from ecology via cytology to pheromonal sex-induction; from molecular probing into the genetic program of labour-sharing to perspectives into the past from which *Volvox* evolved.

This volume should find library readers among cell biologists, geneticists and molecular biologists of any colour, and also general microbiologists, to induce them to join the hard-core Volvocologists to answer the open questions. This book will be the source to scoop plentifully for a long time.

Lothar Jaenicke, Cologne

Book Reviews

Rickettsial Infection and Immunity

Edited by B. Anderson, H. Friedman & M. Bendinelli.
Published by Plenum Press (1997).
US$79.50 *pp. 245* *ISBN: 0-306-45528-5*

This new volume in the series *Infectious Agents and Pathogenesis* presents a comprehensive survey of the current knowledge of rickettsiae and rickettsiae-like organisms, including the six new species which have been identified in the last decade. The advent of modern molecular biology techniques has greatly facilitated the study of these intracellular pathogens. These methods have also made it possible to define the new species avoiding cumbersome cultivation.

The text covers a broad range of questions of issue concerning antigens and virulence factors of the rickettsial agents, host–parasite interactions and the host responses to infections. The volume points to the diverse mechanisms of immunity and pathogenesis found among the rickettsial organisms.

I would recommend this book to a wide audience. The interesting selection of chapters will provide a useful resource for novices in the field as well as for experts.

Lena Norlander, Umeå, Sweden

Applications of PCR in Mycology

Edited by P.D. Bridge, D.K. Arora, C.A. Reddy & R.P. Elander.
Published by CAB International (1998).
£60/US$110 *pp. 376* *ISBN 0-85199-233-1*

This book gives an insight into PCR methodology used in mycology. This has been a neglected area of research and this book tries to redress the balance by giving an overview of work being carried out. The layout of the book is easy to follow with a clear introduction of PCR in mycology. It then goes on to give details of the applications PCR has in a wide variety of mycological areas such as taxonomy, gene cloning and expression, and medical mycology. It does lack any clear methodologies, but this is compensated for by the ease by which this book can be read and is a good starting text for further research. This a must buy for teaching and research institutions. Postgraduate researchers and molecular biologists will find it very interesting as a reference text, though the price makes it excessive for private use.

Andrew Hockin, G.U. Partnership, Watford

Biofilms: Community Interactions and Control

Edited by J. Wimpenny, P. Handley, P. Gilbert, H. Lappin-Scott & M. Jones.
Published by BioLine for the British Biofilm Club (1997).
UK £21.00/Europe £23.00/Rest of World £25.00
pp. 304 *ISBN: 0-9520432-5-4*

This book reports the proceedings of the third biennial meeting of the Biofilm Club. The text covers the contributions made to the meeting through the 36 papers presented by 93 authors from throughout the world. The breadth of topics is fascinating, the quality of the research being reported is outstanding and the diversity of biofilms being examined (from teeth to drains!) defy a review such as this. Suffice to say that the whole is certainly as good as the sum of the individual parts. J.M. Whistler, when asked, "For two days' labour, you ask two hundred guineas?", replied "No, I ask it for the knowledge of a lifetime." This book captures the current state of biofilm research and as such certainly contains the knowledge of several lifetimes. A must on the shelves of anyone working in the field whether they are just starting out or are already well-established.

Donald Reid, The Robert Gordon University

Plant Pathology and Plant Pathogens. Third Edition

By J.A. Lucas.
Published by Blackwell Science (1998).
£22.50 *pp. 274* *ISBN: 0-632-03046-1*

This is the third edition of the standard plant pathology textbook first published in 1977. The text has been updated in a number of key areas in reflection of recent advances in molecular techniques used to study host–pathogen interactions and advances in the control of plant pathogens. There are large numbers of figures and photographs which makes the text easy to understand, whilst for the more astute students there are up-to-date reference and further reading lists for each chapter. However, the author only briefly skims over the possibilities of genetically engineered plants and microbes for the control of disease, an extremely topical subject over recent years. As an introductory text for students of biology, botany and agriculture the book is well-written and informative and allows the reader to establish a solid base in the fundamental principles of plant pathology.

David Naseby, University of Surrey

Clinical Applications of PCR. Methods in Molecular Medicine, Vol. 16

Edited by Y.M.D. Lo.
Published by Humana Press (1998).
US$69.00 *pp. 368* *ISBN: 0-89603-359-7*

This book, in the Humana Press series *Methods in Molecular Medicine*, is divided into three parts: an introductory section, one on general methodology and a final section on clinical applications. The book is presented in a standard ring-bound format which makes it easy to use on the laboratory bench. The chapters are well-written but I was surprised at the lack of specific chapters on microbiological topics. The title suggests an all-encompassing tome on PCR in clinical medicine. This is not achieved. For microbiology it addresses only two specific areas, HCV and *Mycobacterium tuberculosis*. However, there are redeeming chapters on specific protocols such as sequencing of PCR products and RT-PCR. I cannot recommend this as a standard textbook for microbiologists but others with a broader interest might find it useful.

Hugh O'Neill, Regional Virus Laboratory, The Royal Hospitals Trust, Belfast

Modern Mycology, Third Edition

By J.W. Deacon.
Published by Blackwell Science (1997).
£21.50 *pp. 303* *ISBN: 0-632-03077-1*

This long-awaited third edition and successor to *Introduction to Modern Mycology* (1980, 1984) follows the same style and format as the second edition, down to the same number of chapters, with similar titles and sub-headings. Some new figures (including colour plates) complement the many original line drawings and photographs retained from the second edition, though there appears to be a reduction in quality of some photographs. Information on all areas (particularly fungal metabolism and genetics) has been extended and updated, with more extensive lists of references at the ends of chapters. While I would certainly recommend this text for institutional and personal purchase, undergraduates are advised to 'shop around'. Although *Modern Mycology* is an excellent and well-established text, which offers undergraduates a comprehensive introduction to fungi, during its absence in recent years other texts have entered the market, some of which may represent better value for money.

Vicki Tariq, The Queen's University of Belfast

Book Reviews

Signal Transduction – Single Cell Techniques

Edited by B. Van Duijn & A. Wiltink.
Published by Springer-Verlag GmbH & Co. KG (1998).
DM128.00/öS934.40/SFr116.50/£49.00/US$84.95
pp. 468 *ISBN: 3-540-62563-1*

This laboratory manual provides a basic grounding in some of the techniques used to study single cells. The individual chapters are for the most part clearly written and would be useful for postgraduate students and newcomers to the field. There are some omissions in terms of the techniques, for instance the nucleated patch and perforated vesicle variants of patch-clamp and two-photon excitation techniques for imaging. However, these build on the basic techniques and could be developed using literature sources. A surprising omission, considering the signal transduction emphasis, was flash photolysis. Analysis of the data is only partly dealt with and choice of equipment and software for particular approaches can only be inferred from the protocols. Nevertheless, using this manual, someone with no prior experience of the techniques should be able to get to grips with patch-clamping, imaging and flow cytometry, and produce publishable data.

Hugh Pearson, University of Leeds

Polyamine Protocols. Methods in Molecular Biology, Vol. 79

Edited by D.M.L. Morgan.
Published by Humana Press (1997).
US $59.50 *pp. 192* *ISBN: 0-89603-448-8*

This book will go a long way towards providing us with reliable methods for working with polyamines. Each experimental chapter gives some background to the method, details the equipment and reagents required, describes the method and follows this up with handy notes, dealing with commonly encountered problems and how to avoid them. Although the book deals fairly comprehensively with methods used for determination of polyamines, assaying the activities of enzymes of polyamine biosynthesis, catabolism and interconversion, and even covers polyamine transport, I was a bit disappointed that there were no methods for assaying arginine decarboxylase or for the determination of polyamine conjugates from plant tissues. This quibble aside, I would certainly expect the book to be of interest to plant and animal biochemists, physiologists, cell biologists, microbiologists, pharmacologists and oncologists. I will certainly recommend it to my library and at $59.50 it represents good value.

Dale Walters, Scottish Agricultural College, Auchincruive

Protein Modules in Signal Transduction. Current Topics in Microbiology and Immunology, Vol. 228

Edited by A.J. Pawson.
Published by Springer-Verlag GmbH & Co. KG (1998).
DM285.00/öS2081.00/SFr257.00/£109.50/US$179.00
pp. 368 *ISBN: 3-540-63396-0*

The last decade has seen an explosion in our understanding of the roles of protein domains in signal transduction, and the pace of discovery in this dynamic area of research shows little sign of slowing. While there is a danger that volumes reviewing such rapidly changing fields soon become outdated, I think that the present book will escape such a fate because of its quality and authority. Its generally well-written chapters cover not only established areas such as SH_2 domains, but also more recently discovered protein modules, such that its overall coverage is pretty comprehensive. As a clear, well-referenced overview of the field it should not only be of great value to advanced undergraduate and postgraduate students, but will provide an authoritative resource for researchers in this area. I found it a very stimulating read and recommend it as an excellent purchase for institutional libraries and for signal transduction laboratories.

Steve Baldwin, University of Leeds

Antigen Presentation. Current Topics in Microbiology and Immunology, Vol. 232

Edited by J.L. Whitton.
Published by Springer-Verlag GmbH & Co. KG (1998).
DM215.00/öS1570.00/SFr194.00/£82.50/US$140.00
pp. 244 *ISBN: 3-540-63813-X*

This book provides a broad-ranging introduction to the important topic of antigen presentation. Consisting of a compilation of 10 chapters, each from experts in different areas of the field, it covers molecular, biochemical and pharmacological aspects of the subject. It describes how endogenous peptides are generated in the cell and transported to the endoplasmic reticulum, and how complexes are then assembled and transported to the cell membrane. Class I MHC structure and expression, and the MHC class II pathway are reviewed. Two chapters are devoted to the interplay between the host and particular viral pathogens (adenoviruses and the herpes viruses). The chapters include some very good figures and illustrations. The book is likely to appeal particularly to those working at the interface of viral infections and immunology, and those involved in the development of vaccines to these pathogens.

Ruth Matthews, Manchester Royal Infirmary

Viral Zoonoses and Food of Animal Origin. A Re-Evaluation of Possible Hazards for Human Health

Edited by O.-R. Kaaden, C.-P. Czerny & W. Eichhorn.
Published by Springer-Verlag GmbH & Co. KG (1997).
öS1736.00/DM248.00/US$159.00
pp. 256 *ISBN: 3-211-82927-X*

My first reaction on reading the rather curious title was puzzlement as to the likely coverage. This was not alleviated on reading the book, which turns out to be the proceedings of the 9th Munich Symposium on Microbiology. It provides a useful collection of papers on viral zoonoses, but is certainly not a comprehensive treatise on the subject. Indeed it does not confine itself to viruses, to zoonoses or to food-borne infections. It is heavily weighted towards a German viewpoint, with a few respected names from elsewhere. Individually, many of the papers are excellent, providing an introduction for those new to the particular subjects, but they are unlikely to have much appeal to experts in fields as diverse as rabies, lymphocystis, cowpox and rotavirus. The book could have had a wider appeal by adopting a more rigorous editorial policy. However, as it stands it is likely to be quickly consigned to the reference shelf in the library.

Steven Edwards, Veterinary Laboratories Agency, Addlestone

Advances in Microbial Ecology, Vol. 15

Edited by J. Gwynfryn Jones.
Published by Plenum Press (1997).
US$110.00 *pp. 359* *ISBN: 0-306-45559-5*

This collection of papers is a worthy contribution to an excellent series. Teachers and researchers in microbial ecology will find plenty in this book to stir the imagination and suggest new lines of enquiry. Seven chapters cover a wide range within the subject

Book Reviews

area. The reader will discover topics that touch upon the research models we use. Darwin's treatment of bacterial communities and ecosystems, the effects of solar radiation on aquatic habitats, groundwater bioremediation, the ecological significance of phototrophic sulfur bacteria, the ecology of terrestrial fungal entomopathogens and the importance of submicron particles and colloids in marine environments. Students in these areas are provided with a comprehensive list of supporting references. Microbial ecology has made enormous steps forward in recent years and any book has the fault of not being sufficiently comprehensive. However, I am sure that most readers will be pleased with the balance in this volume.

Hilary Lappin-Scott, University of Exeter

Bacterial Infection: Close Encounters at the Host Pathogen Interface. Current Topics in Microbiology and Immunology, Vol. 225

Edited by P.K. Vogt & M.J. Mahan.
Published by Springer-Verlag GmbH & Co. KG (1998).
DM198.00/öS1445.40/SFr179.00/£76.00/US$139.00
pp. 169 *ISBN: 3-540-63260-3*

I opened this book with anticipation. The eight contributions are quite diverse dealing with *in vivo* gene expression, urinary tract infections, Fe(III) transporters, *Legionella pneumophila*, *Clostridium perfringens* enterotoxin, staphylococcal and streptococcal superantigens, anthrax pathogenesis and virulence determinants in pathogenic mycobacteria. While the title of the book invites the reader, it seems somewhat misleading given the contents. Nonetheless, the reviews on *in vivo* gene expression and on the genetics and regulation of expression of enterotoxin in *C. perfringens* were timely and welcome. Of particular usefulness to me were the reviews on anthrax, *L. pneumophila* and pathogenic mycobacteria. Unfortunately, staphylococcal and streptococcal superantigens have been over-reviewed in recent years. This is a valuable reference book for advanced undergraduate and postgraduate courses as well as an educational volume for those of us who no longer have the time to read all we would wish.

Cyril J. Smyth, Moyne Institute of Preventive Medicine, Trinity College Dublin

Bioluminescence Methods and Protocols. Methods in Molecular Biology, Vol. 102

Edited by R.A. LaRossa.
Published by Humana Press (1998).
US$79.50 *pp. 320* *ISBN: 0-89603-520-4*

Bioluminescence research integrates genetic, biochemical, molecular, biological and metabolic concepts, with the material of this volume representing the latest developments in these areas. Each of the 24 chapters has been included in one of five sections covering Bioluminescence basics, Analytical biochemistry, Molecular biology, Cell-based assays and Environmental applications. The content of each chapter is presented in an easy-to-follow format, with much of the text being in bullet point form. Excellent use has been made of diagrams and photographic material. Extensive reference lists are provided at the end of each chapter, with a detailed index at the end. This book leaves the reader with no unanswered questions. A useful addition within the Environmental applications section would have been a chapter on Hygiene monitoring using ATP. For the bioluminescence specialist it represents an excellent 'update' on current developments, and for those being introduced to the subject for the first time, a valuable, easy to follow introduction.

Craig A. Davidson, UWIC, Cardiff

Protein Targeting Protocols. Methods in Molecular Biology, Vol. 88

Edited by R.A. Clegg.
Published by Humana Press (1998).
US$79.50 *pp. 336* *ISBN: 0-89603-450-X*

This collection of protocols is perhaps misleadingly titled, as it covers the range of techniques used over the past decade to dissect signal transduction pathways by characterizing intracellular protein–protein interactions and protein localization. The techniques range from molecular genetics and cell biology approaches, to those in which proteins are expressed, purified and analysed. Membrane targetting modifications are particularly well-addressed. Each chapter contains an introduction to the method, a detailed (and usually narrative) protocol and ample references. Most outline a generic approach, but several are case-specific. Diagrams are well-used to describe principles and illustrate results. Although some of the methods require sophisticated and expensive equipment, the majority do not. This manual is thus appropriate for scientists who may have heard of these approaches and wish to apply them within their own labs.

Robert Cooke, GlaxoWellcome, Stevenage

Origins of Algae and their Plastids. Plant Systematics and Evolution Supplement 11

Edited by D. Bhattacharya.
Published by Springer-Verlag GmbH & Co. KG (1997).
£84.00 *pp. 287* *ISBN: 3-211-83035-9*

The algae, as this splendid volume illustrates, is not a monophyletic group, but an unrelated collection of organisms that all happen to photosynthesize. The volume under review is a superb account of the various origins of these different 'algal' groups, mostly from the molecular point of view. Two issues spring immediately to mind when perusing this volume: the question of classification versus phylogeny and the issue of the usefulness of morphological data. Had phycologists recognized the connection between classification and phylogeny, such paradoxes as the 'origin of the algae' would not have occurred and it would be evident that morphological data did address pertinent issues. However, this volume brings together a good deal of the current molecular data and presents conclusions in clear, well-written accounts. I would certainly recommend this book to anyone with an interest in the evolution of lower eukaryotes, photosynthetic or otherwise.

David Williams, The Natural History Museum, London

Herpes Simplex Virus Protocols. Methods in Molecular Medicine, Vol. 10

Edited by S.M. Brown & A.R. MacLean.
Published by Humana Press (1997).
£60.00/US$79.50 *pp. 419* *ISBN: 0-89603-347-3*

This book contains 26 chapters covering, in detail, a wide range of biological, biochemical and molecular techniques in herpes virology. The fact that it is written specifically with herpes simplex virus in mind is both a strength and a weakness, being particularly useful to those working with the virus, but likely to be overlooked by those who do not. Commercial kits are now available for so many of the procedures but it is evident, for example from PhD vivas, that many students do not always have a basic understanding of the methods involved; this book will certainly help to remedy that. It will be of particular use to new workers in herpes virology even though so many laboratories tend to have their own slightly individual methodologies. The book is not cheap for the individual but would be a very useful reference book to have in any herpesvirus laboratory.

Ian Halliburton, University of Leeds

Book Reviews

Practical Skills in Biomolecular Sciences

By R. Reed, D. Holmes, J. Weyers & A. Jones.
Published by Addison Wesley Longman Higher Education (1998).
£17.99 *pp. 338* *ISBN: 0-582-29826-1*

This text is aimed at the undergraduate market and appears most suitable for first year students who may want a skeletal understanding of techniques used in the biomolecular sciences. To the uninitiated the text provides a useful lead into many laboratory techniques and explains briefly the scientific basis behind them. I applaud the sections on basic principles such as the preparation of molar solutions and correct use of autopipettors. However, to extend the knowledge base to Fast Atom Bombardment-Mass Spectrometry is far too steep a learning curve for a book of this size! Many of the skills described lacked detailed description and I was particularly disappointed with the lack of reference to more comprehensive texts on particular techniques. These points apart, the text is well-written and there are numerous excellent diagrams and illustrations. At the price I would consider this a good buy for a first year undergraduate.

Glyn Hobbs, Liverpool John Moores University

The Centromere

By K.H. Andy Choo.
Published by Oxford University Press (1997).
£22.50 *pp. 318* *ISBN: 0-19-857780-X*

This book is an excellent review of recent advances in the understanding of both the structure and function of the centromere. It is clearly written with good illustrations throughout. Although this is clearly an excellent reference work for the specialist, it is sufficiently simply explained that it would also be good for non-specialists and students. Chapters are fairly self-contained, with relevant references at the end of each one. Chapters on the centromeres of two single-cell eukaryotes allow comparison of these simple eukaryotes. Later chapters concentrate on higher eukaryotes and, in particular, the structural components of centromeres. Complementing this, the book closes with a chapter on some of the practical applications of the study of centromeres. This is a well-written and researched book about the centromere which should be in the library of any university or laboratory involved with research or teaching of cytogenetics.

Anne Kaukas, The Natural History Museum, London

Biotechnology & Genetic Engineering Reviews, Vol. 15

Edited by M.P. Tombs.
Published by Intercept (1998).
£99.50/US$169.00 *pp. 533* *ISBN: 1-898298-54-8*

This book is the latest volume in a series of reviews edited by Professor Tombs covering all aspects of biotechnology. The series is very much for the library shelf since there is no specific theme to each volume and each chapter represents a detailed review of a specialized topic. Nonetheless, all 18 chapters of the current volume are well-presented by leading researchers and very readable. I particularly enjoyed the reviews of plant biotechnology and the manipulation of crops such as bananas and grapes. The chapter on recombinant protein production in the milk of livestock provides excellent (and much needed!) material for updating my undergraduate lectures on this subject and the discussion of patenting in biotechnology gives the clearest explanation I have yet read of the legal issues surrounding the patenting of DNA. Looking through the whole series, I found it to be a treasure-trove of fascinating articles and a great resource for both teaching and research. It should have a place in every science library.

Saul Purton, University College London

ATPases. Biomembranes. A Multi-Volume Treatise, Vol. 5

Edited by A.G. Lee.
Published by JAI Press Inc (1996).
£82.50/US$128.50 *pp. 440* *ISBN: 1-55938-662-2*

This multi-author volume of the *Biomembrane* series contains, out of a total of 14, chapters on the Mg^{2+}-ATPases of *Salmonella typhimurium*, the Na^{+}/Mg^{2+}-ATPase of *Acholeplasma laidlawii* and the KDP-ATPase of *Escherichia coli*. Three other chapters contain information about some fungal ATPases. The chapters are generally well-written, with full referencing and reasonably up-to-date (but note that the book was published in 1996). There is plenty of detail about the structure of the ATPases and would provide a very sound basis for consideration of their physiological function. From a microbiologist's viewpoint, it is a pity that there is little mention of yeast and no chapter on bacterial H^{+}-ATPase. Therefore, it is likely that the book will only find use as a reference for selected aspects of some ATPases of relevance to microbiologists and recommendation for purchase by your library would be a marginal decision.

Nick Russell & Rhodri Evans, Wye College, University of London

Retinoid Protocols. Methods in Molecular Biology, Vol. 89

Edited by C.P.F. Redfern.
Published by Humana Press (1998).
US$79.50 *pp. 448* *ISBN: 0-89603-438-0*

This is an incredibly wide-ranging book of protocols on the ever-expanding subject of retinoids which is very thoughtfully put together. The topics extend all the way from synthesis, extraction and identification of retinoids at one end, to differential display, the yeast two-hybrid system and gene targeting of the retinoid receptors at the other. Obviously, few people will require all that this book can give, but it is essential so that one can dip in, as required, to specific chapters for complete and detailed methodologies on how to perform virtually anything in the retinoid field. The contributors are leading lights in retinoids who have often made highly significant contributions to the field and so, in a sense, this is also an interesting historical text as one can follow step-by-step how their contributions were made. The book is another in the extremely valuable *Methods* series and should undoubtedly be purchased by all researchers in the retinoid field as a lab book and by institutions for their students and researchers. It is one of those books that won't stay on the library shelf for long!

Malcolm Maden, The Randall Institute, King's College London

Emerging Infections, Vol. 1

Edited by W.M. Scheld, D. Armstrong & J.M. Hughes.
Published by ASM Press (1998).
£35.00 *pp. 277* *ISBN: 1-55581-121-3*

In the foreword, Joshua Lederberg states "we have contrived a world that is safer for bugs than ever before, with instantaneous travel, mass production and transport of foodstuffs, and crowded and sharply stratified urban populations", thereby providing conditions in our global village for the emergence of pathogens as "the dark side of co-evolution". The contributors focus on a variety of infections which have either re-emerged as a current problem or have been identified in more recent times. Five of the chapters deal with virus infections from dengue to rabies, and nine deal with bacterial agents, e.g., *Helicobacter pylori*, *Ehrlichia* and *Escherichia coli* O157:H7. Individual chapters cover emerging fungal infections and enteric pathogens. The final two chapters deal with societal determinants for

Book Reviews

emerging infections and strategies for their prevention and control. This book brings together much of interest to final year undergraduates, medical microbiologists and researchers. Cover-to-cover the book is a fascinating read!

Cyril J. Smyth, Moyne Institute of Preventive Medicine, Trinity College Dublin

Phospholipid Signaling Protocols. Methods in Molecular Biology, Vol. 105

Edited by I.M. Bird.
Published by Humana Press (1998).
US$79.50 *pp. 380* *ISBN: 0-89603-491-7*

This is an excellent monograph written entirely as a hands-on approach to assaying the various enzymes and cellular components involved in phospholipid-derived cell signalling pathways. This is now the 105th volume of what is justifiably a very popular series. There are some 24 chapters from a number of key experts in the field together with a final seven chapters on monitoring the changes in key signalling pathway proteins and associated mRNA. Although heavily orientated towards animal-based systems, the book is going to be extremely useful (dare one say 'an absolute must'?) for anyone working with these materials, no matter what cells they are using. Microbiologists will just have to remember about the necessity of rapidly inactivating lipases and phospholipases to avoid spurious hydrolysis of lipids before beginning their own analyses, which is a note of caution seemingly absent in this book. There are, though, a myriad of tips about avoiding other pitfalls for the first-time investigator that it is difficult to believe that anyone could go seriously wrong in following these protocols. Highly recommended for the specialist.

Colin Ratledge, University of Hull

Molecular Bacteriology: Protocols and Clinical Applications. Methods in Molecular Medicine, Vol. 15

Edited by N. Woodford & A.P. Johnson.
Published by Humana Press (1998).
US$99.50 *pp. 675* *ISBN 0-89603-498-4*

This book aims to bridge the gap between molecular biology and clinical microbiology and in this it succeeds very well. There are 31 chapters, the first seven of which present an insight into general molecular methods and provide the theoretical basis for later chapters. The remaining chapters, as the book title suggests, present accurate and detailed methods for a molecular approach to bacterial diseases and antimicrobial therapy. All the most common and important disease-causing bacteria are covered in a well-written and concise manner. The book is one of a few that applies current molecular biology to clinical diagnostic microbiology in a detailed, yet highly readable format. This book should find a place in all clinical diagnostic laboratories, particularly in view of the fact that many molecular techniques will find their way into routine diagnostic microbiology in the near future.

Stuart C. Clarke, University of Leicester

Molecular Virology, Second Edition

By D.R. Harper, with a contribution from P.R. Kinchington.
Published by BIOS Scientific Publishers (1998).
£19.95 *pp. 200* *ISBN: 1-85996-246-7*

Molecular Virology provides most of classical virology in the first chapter and then outlines other areas such as viruses and the immune system, the development of molecular diagnostics, antiviral drugs, gene therapy, vaccines and emerging viruses. A short reference section ends each chapter and a list of Internet addresses to sites with related information. The book is a readable romp through the subject but inevitably has some repetition where the same agent is used to illustrate different points in different chapters. Similarly, with so compact a style, the virology may be lost whilst necessary background is given. But these are small quibbles in a book that provides a good grounding for £20. Students may read it hoping to cram the essentials in one go but, although the book is an excellent start, it should be used alongside a larger reference work to be consulted as and when curiosity or confusion dictate.

Ian Jones, NERC Institute of Virology

Take-all Disease of Cereals: A Regional Perspective

By D. Hornby, incorporating contributions from G.L. Bateman, R.J. Gutteridge, P. Lucas, A.E. Osbourn, E. Ward & D.J. Yarham.
Published by CAB International (1998).
£65.00/US$120.00 *pp. 400* *ISBN: 0-85199-124-6*

This book is well-timed since take-all was severe throughout the UK in 1998. It contains a wealth of useful information to improve our understanding of take-all and helps answer practical questions about these cereal root diseases.

Information on take-all decline is particularly useful and includes aerial photographs of a cereal field over five seasons. Other practical aspects are well-documented, including differences in susceptibility of host plants, the importance of manganese deficiency and appropriate timing of couch grass control.

The photographs are excellent, but many of the tables and diagrams are confusing – too many numbers and not enough explanation. For students interested in take-all research, the references are well-laid out into a range of subject areas.

Comments about future funding detract from the main subject, and are aimed at research funding bodies rather than students, researchers and advisory plant pathologists who will find this book useful.

Simon Oxley, Scottish Agricultural College, Edinburgh

Transmembrane Signaling Protocols. Methods in Molecular Biology, Vol. 84

Edited by D. Bar-Sagi.
Published by Humana Press (1997).
US$64.50 *pp. 320* *ISBN 0-89603-432-1*

The elucidation of transmembrane and intracellular signalling pathways has been one of the major landmarks in molecular and cell biology in the last decade. This is an area in which viruses and lower eukaryotic microbes played a significant role as many of the chapters in this useful book bear witness. The products of certain viral oncogenes (particularly *src* and *vas*) figure strongly in three useful introductory overview chapters which focus on protein–protein interactions in signalling, receptor oligomerization and a very comprehensive review of conserved protein motifs involved in signalling. These chapters provide an excellent introduction to the field for the non-specialist. The remaining 18 chapters provide extensive protocols for studying this subject, ranging through molecular (phage display, antisense RNAs), cellular (oocyte microinjection, yeast two-hybrid assays) and electrophysiological (patch-clamp) approaches.

Overall this is a good book for a non-specialist entering the field and specialists looking for well-described techniques.

G.E. Blair, University of Leeds

Book Reviews

Essential Procedures for Clinical Microbiology

Edited by H.D. Isenberg.
Published by ASM Press (1998) (d/b Blackwell Science).
£50.00 *pp. 833* *ISBN: 1-55581-125-6*

Although intended for use as a bench book for clinical microbiology, this volume may also serve as a useful reference for those teaching medical or microbiology students. Numerous tables provide concise information on a range of topics such as diseases or syndromes associated with specific pathogens, the taxonomy of micro-organisms of medical importance and the clinical use and mode of action of antimicrobial agents. There are also attractive diagrams and pictures dealing with, for example the structure of parasites. As the book has been produced by American authors, there is a strong bias towards the use of NCCLS methods and interpretative criteria, which may not suit readers in countries such as the UK, where these methods are little used. However, the sections on the clinical application of molecular methods are unaffected by such geographical considerations. This is a useful book for institutions where clinical microbiology is practised or taught.

Alan Johnson, Central Public Health Laboratory, Colindale

The Scientist as Consultant: Building New Career Opportunities

By C.J. Sindermann & T.K. Sawyer.
Published by Plenum Publishing Corporation (1997).
US$29.95 *pp. 340* *ISBN: 0-306-45637-0*

As the age of the accountant grinds on, scientists will continue to be victims of privatization, rationalization, downsizing and mergers, not forgetting 'early retirement'. With jobs less secure than they were, many scientists must have thought about going it alone. After all, consultants make lots of money, don't they? This substantial book gives both sides of the consultancy coin. For example it offers the chilling fact that the majority of consultancies that fail are run by those who had lost their jobs or taken early retirement. It also recommends taking a year to plan before starting out, which is not always possible these days. The book has one flaw. It is very American and gives no guidance on the European market, especially with regard to setting up a business and the joys of health insurance, VAT and income tax for the self-employed. Nevertheless, this book is recommended reading for anybody considering taking the plunge or fearing being pushed into working for themselves.

Mike Hurst, Watermark Consultancy

Glycoanalysis Protocols, Second Edition. Methods in Molecular Biology, Vol. 76

Edited by E.F. Hounsell.
Published by Humana Press (1998).
US$64.50 *pp. 300* *ISBN: 0-89603-355-4*

This book makes a useful addition to the series. The authors, who are experts in their fields, give step-by-step instructions for many of the techniques which are currently used in glycosylation analysis. It deals with all the major forms of post-translational modifications which involve sugars and includes sections on the analysis of O-GlcNAc glycoproteins, proteoglycans, glycosphingolipids and mucins. The emphasis is on the use of methods such as HPLC, gel electrophoresis and mass spectrometry which are broadly applicable. This collection of practical methods and comprehensive references should prove to be a useful starting point to those unfamiliar with the specialized methodology used in this field. It would certainly be valuable as a resource to institutions engaged in the field of glycobiology. However, it should be borne in mind that glycan analysis is an area in which technology is developing very rapidly at the present time and constant improvements are being made. The book effectively summarizes and complements the literature, but does not replace the need to follow original publications in scientific journals.

Pauline M. Rudd, The Glycobiology Institute, Oxford

DNA Vaccination/Genetic Vaccination. Current Topics in Microbiology and Immunology, Vol. 226

Edited by H. Koprowski & D.B. Weiner.
Published by Springer-Verlag (1998).
DM198.00/öS1,446.00/SFr179.00/£76.00/US$129.00
pp. 198 *ISBN 3-540-63392-8*

In the last 5 years there has been an explosion of work on the use of naked DNA for vaccination and in the treatment for cancer. It is now about time that a book was produced that summarized this emerging topic to enable the *non-cognoscenti* to appreciate what all the fuss is about. This small book contains 11 short reviews and all but one deal with animal models of human disease. On the positive side, each article is of excellent quality with a good bibliography. On the downside, there is repetition. Many of the introductions say the same thing. There are also too many duplicate articles; one each on cancer, HSV and HIV/SIV is sufficient. I would probably buy this book for myself and definitely recommend it to the library. However, I would also read the reviews, by many of the same authors in *Springer Seminars in Immunopathology, Vol. 19.*

John Hopkins, Faculty of Veterinary Medicine, University of Edinburgh

G Proteins, Receptors, and Disease. Contemporary Endocrinology Series

Edited by A.M. Spiegel.
Published by Humana Press (1998).
US$135.00 *pp. 336* *ISBN: 0-89603-430-5*

Any volume such as this is destined to become rapidly out-of-date, but it is valuable to have such a 'milestone' publication, that succinctly pulls together current observations and provides a coherent framework for them. Chapter 1 (by Spiegel) provides an accessible introduction to G-protein-linked signalling. This includes an overview of the structure and function of GPCRs and G-proteins, their key structural features and effects of loss- and gain-of-function mutations. The subsequent chapters deal with a range of disorders and pathologies resulting from mutations within the various GPCRs and G-proteins. A useful inclusion might have been a chapter drawing on this information and putting it in context. I doubt whether this volume will have an audience much outside of its target niche, but it is an essential acquisition for the science/medical library.

Paul Millner, University of Leeds

Introduction to the Cellular and Molecular Biology of Cancer, Third Edition

Edited by L.M. Franks & N.M. Teich.
Published by Oxford University Press (1997).
£27.50 *pp. 480* *ISBN: 0-19-854854-0*

This is an excellent book that sets the molecular basis of cancer in its cellular, tissue, organ, whole organism and population contexts. As one who teaches cancer genetics among other things, I greatly welcome a source to which one can recommend students (for instance, second or third year undergraduates) as an antidote to predominantly molecular studies. Areas that may be unfamiliar to microbiologists, among others, are sketched in briefly but deftly: for instance the section on basic endocrinology in the chapter by Parker & Franks. Despite the large number of contributors, the style

Book Reviews

and approach have been kept reasonably uniform and readable throughout. The excellent chapter on Viruses and Cancer is probably the one of most direct relevance to microbiologists (but see the three pages on *Helicobacter pylori* and stomach cancer); nevertheless, the value of the book is in its global approach. A fascinating read for everyone with an interest (morbid or not) in the subject.

Simon Baumberg, University of Leeds

Morel Tales: The Culture of Mushrooming

By G.A. Fine.
Published by Harvard University Press (1998).
£23.50 *pp. 324* *ISBN: 0-674-08935-9*

A delightful ethnographic analysis of the culture of field mycologists (mushroomers) as a paradigm of the customs of naturalists in general (birdwatchers, ramblers, botany clubs, etc.). Fine argues that 'Nature' is not real *per se* but is, instead, a collective human interpretation of the external world. From the vantage point of having been an active member of the Minnesota Mycological Society he examines how individuals experience the natural environment, how amateurs think and talk about the mushrooms they collect, the social features of foraying and consuming mushrooms, the social colloquy involved in 'naturework', how nature-pursuit organizations are experienced and how field mycologists view and interact with the general public, commercial collectors and professional mycologists. This book is strongly recommended to all introspective naturalists, particularly field mycologists and their professional colleagues, and should be a priority acquisition for any library (public, secondary school, college, university) with a natural history collection.

Royall T. Moore, University of Ulster (Editor *Mycologist*)

Affinity Biosensors: Techniques and Protocols. Methods in Biotechnology, Vol. 7

Edited by K.R. Rogers & A. Mulchandani.
Published by Humana Press (1998).
US$69.50 *pp. 264* *ISBN: 0-89603-539-5*

On the whole the Editors have put together a useful book containing contributions from many leading laboratories which will be of considerable value for researchers active in the field and those looking towards applying biosensor technology to new areas. Most chapters are clear and concise with excellent illustrative material and highly informative detailed practical procedures. One puzzling aspect is that, although the authors recognize that affinity-based sensors based on electrochemical detection have been the best characterized, they have not included any contribution on direct or indirect amperometric immunosensors. A recognized difficulty in producing a textbook in a rapidly developing field is that it can become dated before it is published. However, with the notable exception of the first two contributions to the Biosensor-related techniques section, which contain very few references from the 1990s, this is not really the case – a fact that is both surprising and very welcome.

Calum McNeil, University of Newcastle upon Tyne

Bacterial Biogeochemistry: The Ecophysiology of Mineral Cycling, Second Edition

By T. Fenchel, G.M. King & T.H. Blackburn.
Published by Academic Press Inc (1998).
US$64.95/£45.00 *pp. 307* *ISBN: 0-12-103455-0*

Biogeochemistry is a discipline that draws much of its strength from the integration of several diverse yet complementary research areas. A concise but thorough review of such a diverse discipline requires a synthesis of the these varied knowledge threads into a coherent whole. The authors of this book have succeeded with such a synthesis by creating a current, accurate and lucid review of bacterial biogeochemistry. The 10 chapters of this book describe, in logical order, the myriad of biogeochemical reactions in soils, aqueous systems and the atmosphere that are mediated by prokaryotic organisms. Throughout each chapter the fundamentals of microbial processes are presented in a way that allows for easy extrapolation to applied problems, including environmental concerns. This book would serve as a valuable resource for all those, students (with some biochemical background) to professionals, who require an accurate, current, yet broadly based review of this rapidly evolving discipline.

Eva Valsami-Jones & Bill Dubbin, The Natural History Museum

Practical Skills in Biology. Second Edition

By A. Jones, R. Reed & J. Weyers.
Published by Addison Wesley Longman Higher Education (1998).
£16.99 *pp. 292* *ISBN: 0-582-29885-7*

The first edition of this book was designed to provide support to students and tutors at every stage of a practical class. Capitalizing on the well-deserved success of its predecessor, the second edition focuses on a broad range of biological techniques, from microbiology to ecology. It provides concise and user-friendly information to guide students through the basic to the more advanced practical approach. As students are increasingly from diverse academic backgrounds, this is an excellent book to help them refresh or acquire core practical skills. The new sections on project planning and IT will help students to tackle experimental problems with confidence and improve their performance. I recommend this book to fellow academics, it is an excellent compendium to supplement classroom teaching. I also encourage biology students to take a look at this book; it covers a range of skills that would benefit them throughout their undergraduate studies and beyond.

Diane Purchase, Middlesex University

Books Received

Thermus Species. Biotechnology Handbooks, Vol. 9

Edited by R. Sharp & R. Williams.
Published by Plenum Publishing Corporation (1995).
US$75.00 *pp. 233* *ISBN: 0-306-44925-0*

The Search for an Aids Vaccine. Ethical Issues in the Development and Testing of a Preventive HIV Vaccine

By C. Grady.
Published by Indiana University Press (1995).
H/B £20.95 *pp. 193* *ISBN: 0-253-32619-2*

Computer Methods for Macromolecular Sequence Analysis. Methods in Enzymology, Vol. 266

Edited by R.F. Doolittle.
Published by Academic Press Inc (1996).
US$110.00 *pp. 711* *ISBN: 0-12-182167-6*

Comprehensive Reports on Technical Items Presented to the International Committee or to Regional Commissions 1996

Published by Office International Des Epizooties (1997).
FrF150.00/US$30.00 *pp. 345* *ISBN: 92-9044-424-X*

Free Radical and Antioxidant Protocols. Methods in Molecular Biology, Vol. 108

Edited by D. Armstrong.
Published by Humana Press (1998).
US$79.50 *pp. 300* *ISBN: 0-89603-472-0*

DIARY

Diary

SGM MEETINGS

Behaviour of Pathogens in the Environment
University of Warwick
5–7 January 1999

Microbial Signalling and Communication
University of Edinburgh
12–16 April 1999

How Do Molecules Cross Microbial Membranes?
University of Leeds
7–9 September 1999

Clinical Virology and Virus Groups:
Virus Infection: Life or Death of a Cell
University of Surrey, Guildford
5–7 January 2000

Fighting Infection in the 21st Century
University of Warwick
10–14 April 2000

Contact: Meetings Administrator, SGM, Marlborough House, Basingstoke Road, Spencers Wood, Reading RG7 1AE (Tel. 0118 988 1805; Fax 0118 988 5656; e-mail meetings@socgenmicrobiol.org.uk; http://www.socgenmicrobiol.org.uk/meetings.htm)

See pp. 158–164.

DECEMBER 1998

Advanced Course on Microbial Physiology and Fermentation Technology
Delft University of Technology
7–18 December 1998
Contact: Dr L.A. van der Meer-Lerk, Institute for Biotechnology Studies Delft Leiden (BODL), Kluyver Laboratory, Julianalaan 67, 2628 BC Delft, The Netherlands (Tel. +31 15 2781922; Fax 31 15 2782355; e-mail bodl@stm.tudelft.nl; http://www.kluyver.stmm.tudelft.nl/BODL/ACS.htm)

JANUARY 1999

ESACT-UK Annual Meeting 1999
Oxford Brookes University
4–5 January 1999
Contact: Prof. L.A. King, Meetings Secretary ESACT-UK, School of Biological and Molecular Sciences, Oxford Brookes University, Gipsy Lane Campus, Oxford OX3 0BP (Tel. 01865 483240; Fax 01865 483242; e-mail laking@brookes.ac.uk)

HIV Vaccine Development: Opportunities and Challenges
Silverthorne, Colorado, USA
7–13 January 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

AIDS Pathogenesis
Silverthorne, Colorado, USA
7–13 January 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

Archaea: Bridging the Gap Between Bacteria and Eukarya
Taos, 9–14 January 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

MARCH 1999

Fifth ASM Conference on *Candida* and Candidiasis
The Mills House, Charleston South Carolina, USA
1–4 March 1999
Contact: ASM Meetings Department, 1325 Massachusetts Avenue NW, Washington, DC 20005, USA (Tel. +1 202 942 9248; Fax +1 202 942 9340; e-mail meetingsInfo@asmusa.org; http://www.asmusa.org)

Infections of the Nervous System: Host–Pathogen Interactions
Taos, 9–14 March 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

Industrial Crops. Fourth European Symposium on Industrial Crops and Products, together with Sixth Symposium on Renewable Resources for the Chemical Industry
Bonn, Germany, 23–25 March 1999
Contact: Sarah Wilkinson, Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB (Tel. 01865 843691; Fax 01865 843958; e-mail sm.wilkinson@elsevier.co.uk; http://www.elsevier.nl/locate/icp99)

Second Annual Conference on Vaccine Research
Hyatt Regency, Bethesda, Maryland
28-30 March 1999
Contact: Kip Kantelo; 4733 Bethesda Avenue, Suite 750, Bethesda, MD 20814-5528 USA (Tel. +1 301 656 0003 ext.19; Fax +1 301 907 0878; e-mail kkantelo@aol.com; http://www.nfid.org/conferences/vaccine99)

British Section of the Society of Protozoologists – Annual Meeting. Special Topics: 'The Induction of Host Cell Genes by *Theileria* Parasites' and 'Protozoa from Extreme Environments'
Reading University
29–31 March 1999
Contact: Dr Harriet Jones, Centre for Population Biology, Imperial College at Silwood Park, Ascot, Berks SL5 7PY (e-mail h.l.jones@ic.ac.uk)

MARCH–APRIL 1999

Molecular Biology Update: A four-day laboratory course
Hatfield, Herts
29 March–1 April 1999
Contact: Prof. John Walker, Dept of Biosciences, University of Hertfordshire, College Lane, Hatfield AL10 9AB (Tel. 01707 284546; Fax 01707 284510; e-mail j.m.walker@herts.ac.uk; http://www.herts.ac.uk/natsci/STC)

APRIL 1999

VIIth International Plant Virus Epidemiology Symposium. Plant Virus Epidemiology: current status and future prospects
Aguadulce, Spain
11–16 April 1999
Contact: Dr Alberto Fereres, Conference Organizer, CSIC, Centro de Ciencias Medioambientales, Serrano 115 dpdo, Madrid 28006, Spain (Fax +34 1 5640800; e-mail ebvaf22@fresno.csic.es)

DNA Vaccines: Immune Responses, Mechanisms, and Manipulating Antigen Processing
Snowbird, USA, 12–17 April 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

Molecular Approaches to Human Viral Vaccines
Snowbird, USA, 12–17 April 1999
Contact: Keystone Symposia, Drawer 1630, Silverthorne, CO 80498, USA (Tel. +1 800 253 0685 or +1 970 262 1230; Fax +1 970 262 1525; e-mail keystone@symposi.com; http://www.colorado.net/symposia)

WAM 99 – Wessex Applied Microbiologists Seventh Symposium
Novotel, Southampton
16–18 April 1999
Contact: Jane Pike, 10 Fairlawn Close, Rownhams, Southampton SO16 8DT (Tel. 01703 902619)

MAY–JUNE 1999

99th General Meeting of the American Society for Microbiology
Chicago, Illinois, USA
30 May–3 June 1999
Contact: ASM Meetings Department, 1325 Massachusetts Avenue, NW, Washington DC 20005, USA (Tel. +1 202 942 9356; http://www.asmusa.org/mtgsrc)

JULY 1999

African International Environmental Protection Symposium (AiEPS '99)
Pietermaritzburg, South Africa
4–8 July 1999
Contact: Secretariat, AiEPS '99, Suite 101, Postnet X6, Cascades 3202, South Africa (e-mail soil&pol@sprs.co.za; http://www.sprs.co.za)

RNA Extraction and Analysis: A one-day laboratory/lecture course
Hatfield, Herts, 6 July 1999
Contact: Dr Ralph Rapley, Dept of Biosciences, University of Hertfordshire, College Lane, Hatfield AL10 9AB (Tel. 01707 285097; Fax 01707 286137; e-mail r.rapley@herts.ac.uk; http://www.herts.ac.uk/natsci/STC)

PCR Methods and Applications: A one-day laboratory/lecture course
Hatfield, Herts, 7 or 8 July 1999
Contact: Dr Ralph Rapley, Dept of Biosciences, University of Hertfordshire, College Lane, Hatfield AL10 9AB (Tel. 01707 285097; Fax 01707 286137; e-mail r.rapley@herts.ac.uk; http://www.herts.ac.uk/natsci/STC)

The American Society for Virology 18th Annual Scientific Meeting
University of Massachusetts Amherst, Massachusetts, USA
10–14 July 1999
Contact: Dr Sidney E. Grossberg, Secretary-Treasurer, American Society for Virology, Dept of Microbiology and Molecular Genetics, Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, WI 53226-0509, USA (Tel. +1 414 456 8104; Fax +1 414 456 6566; e-mail segrossb@mcw.edu)

An Introduction to Bioinformatics: A two-day computer/lecture course
Hatfield, Herts, 12–13 July 1999
Contact: Dr Henry Brzeski, Dept of Biosciences, University of Hertfordshire, College Lane, Hatfield AL10 9AB (Tel. 01707 284554; Fax 01707 286137; e-mail h.brzeski@herts.ac.uk; http://www.herts.ac.uk/natsci/STC)

NOVEMBER 1999

Dental Plaque Revisited: Oral Biofilms in Health and Disease
London, 3–5 November 1999
Contact: Prof. M. Wilson, Dept of Microbiology, Eastman Dental Institute, University College London, 256 Grays Inn Road, London WC1X 8LD (e-mail m.wilson@eastman.ucl.ac.uk)

JULY 2000

The American Society for Virology 19th Annual Scientific Meeting
Colorado State University, Fort Collins, Colorado, USA
8–12 July 2000
Contact: Dr Sidney E. Grossberg, Secretary-Treasurer, American Society for Virology, Dept of Microbiology and Molecular Genetics, Medical College of Wisconsin, 8701 Watertown Plank Road, Milwaukee, WI 53226-0509, USA (Tel. +1 414 456 8104; Fax +1 414 456 6566; e-mail segrossb@mcw.edu)