We have also papers on lung aerodynamics, lung dynamics at medium altitudes, uptake of soluble gases by the bronchial walls and trachea-noise feedback in asthma.

Special topics discussed include the study of the fluid dynamics of the eye, arteriovenous fistula of the brain, medical effects of magnetic fluids and the role of synovial fluids in knee joints.

A number of experimental investigations on rats and other animals of considerable biomedical interest have been reported. These include aggregate formation mechanisms by laser light, effect of feeding hydrogenated fat and cholesterol, effects of different drugs on circulatory system and clinical urodynamic study.

The book thus covers a wide spectrum of problems on physiological fluid dynamics such as blood flow in arteries, biotransport, haemodialysis, microcirculation, biorheology, haemorheology, hypercholesterolemia, lung aerodynamics, fluid flow through eyes and joints, elastic effects of muscles, effects of drugs, etc.

The book should be of great interest to all applied mathematicians, biomedical engineers and physiologists. It can be used for supplementary reading for courses on biomechanics and theoretical physiology. As in volume I, this volume also contains excellent as well as routine papers.

Even before these two International Conferences, a very successful International Symposium on Physiological Fluid Dynamics was held at IIT, New Delhi. It is hoped that these International Conferences will be held at least once in every four years so that research workers can benefit from these conferences and their proceedings which could represent distinct milestones in man's endeavour to understand the functioning of his own body.

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NEWS

WHO CARES?*

Sir Kenneth Durham, President of the British Association for the Advancement of Science (BA) and former Chairman of Unilever, is a worried man. Too few people care about science, so there is no incentive for politicians to take any notice of it, he told this summer's meeting of the BA in Belfast. During the recent election, he said, 'there was no talk about caring for science, just about "caring", whatever that might mean'. The impact of science and technology on the economy are not seen as important by the general public: 'frankly, they just don't seem to understand or care'.

Durham claimed that his belief in science was not coloured by emotion or by its cultural value, but his increasing conviction that new technology is the determinant for economic recovery and growth over the next decade and more. 'If the UK does not grasp the opportunities it will become a second- or third-class nation', he said, despite the economic predictions of the politicians on the hustings. Durham observed that no political party talked of research except in general terms, 'although there were a few mentions of the need for more investment in development; missing entirely the point that development is dependent on fundamental research'.

Not surprisingly, Durham — like his predecessor Sir George Porter (now President of the Royal Society) — believes in increasing the public understanding of science as a defensive measure. If the public is interested, politicians will take notice — and they certainly should be taking notice of the technical elements in public issues: 'Awareness and, where possible, understanding of these elements is vital if, in our legislative bodies, proper debate is to be held and if sensible policy decisions are to be taken'.

Pride and prejudice

But the BA, along with other bodies, has been saying this for years. The realisation is growing that

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it is not enough to support science education for all and to exhort scientists to talk to people. There is something deep in British culture that needs to be changed. Indeed, the British Association was founded in 1831 because of a dissatisfaction with government support for R & D, and a century ago educationists complained that new classics-oriented public and grammar schools proudly ignored science. Many people equate science with industry, and British society is resolutely anti-industrial. 'Prejudice and precedent', Durham complained, 'are two formidable sentinels guarding the gateway to change and progress'.

To many people, much of the blame for this state of affairs rests with 'the media': Durham said that they 'had done little to tell the public about the dangers of their apathy to science' and may by neglect have contributed to that apathy. Medical science and technological disasters are well covered in newspapers and broadcasting, but Durham said that 'editors ought to be sensitive to developments in areas such as solid state physics, astrophysics, colloid science, molecular biology, transmission of stimuli along nerve fibres' and other areas that will profoundly affect us in the future. Some hope, when a few scientists are familiar with more than one of these subjects! Yet if scientists do not attempt to make these subjects accessible to each other and to professional communicators, then they have only themselves to blame for the public's apathy. Scientists should learn to ignore rigid disciplinary frontiers (as Durham puts it, 'in all my years in food research I never came across a bacterium which recognised the difference between a bacteriologist and a physical chemist!')

But that is not the whole story, and Durham also had hard things to say about teachers. 'I still hear strong criticism of the profit motive from many people in the teaching profession. The argument is that, in making a profit, we are exploiting someone and that is wrong. It is not surprising that children and parents develop an anti-industrial feeling, when such views prevail in quite a few schools'. 'The teaching profession has been obsessed over the past 18 months by pay, status and negotiating conditions. They may feel under-privileged and underpaid — and I consider there is some justice in their claim — but I also consider we have a right to expect that they can still examine with others, in a detached way what are the fundamental educational needs of this country into the 21st century'. Durham welcomed the educational debate initiated by Lord Joseph, but Britain is 'hidebound by tradition', and it will take 'a lot of effort, even in the dramatic and changing atmosphere of the late 1980s, to overcome these long-held prejudices'.

What can the BA do?

For years the BA has gone through a session of soul-searching at each annual meeting, 'Whither the BA?' is a headline that editors might as well have set up in type for use every year. Partly this repetition is because the direction of the association at any given time is determined by the interests of the president — in recent years we have seen the themes of respectability for science (Sir Alastair Pilkington), satellite conferences to increase the scientific respectability of the BA (Sir John Mason), industrial links (Sir Hans Kornberg), and public understanding (Sir George Porter). Partly also it is because the BA has not really identified its role. This year something seems to have gelled; Durham, with his industrial background, has overseen the production of a corporate plan with clearer objectives drawn up for the association.

At the same time the 'parliament of science' aspect of the BA has been given some teeth with the decision to raise the association's political profile. Durham and a number of other senior scientists and educationists on the BA council have put their names to an open letter to the prime minister welcoming the government's response to the House of Lords report on civil R & D (*Chem. Br.*, 1987, **23**, 814). But the letter warns that the new arrangements will only be supported if they 'lead to change in those factors which have caused such a decline in the morale of the scientific community in recent years'. This means additional resources for R & D and a commitment by the prime minister to take the new advisory body ACOST seriously. As Lord Dainton, one of the signatories, told a press conference, the feeling was 'fine, but where's the lolly?' The omens have not been good: 'the government's refusal to provide more than minimal funding for the British space programme has done little to engender confidence', the letter stated.

Durham's view is that industry should fund big 'D', which is the most expensive part of the R & D spectrum, while government should concentrate on those 'R' projects likely to be important to the country but unlikely to be funded by industry in their early stages. To present this case, scientists need that public support which politicians respond to, and the BA must 'try to emulate the Chinese water torture, in which we drip on the media and the public at regular intervals'.

CHEMILUMINESCENT FINGERPRINTS, CROSSED BEAMS AND THE CHEMICAL LASER

In their early experiments Polanyi and Cashion obtained indications that reactions might give rise to 'population inversion', in which more of the products would be present in high states of excitation than low ones. Light passed through such a medium will be amplified. 'We realised that you could actually get lasing action by extraordinarily simple means: you could just heat a gas and then quickly cool it. The first thing to cool is rotation. You would be left with a gas that was vibrationally hotter than it was rotationally hot. Under these conditions you don't need an overall population inversion to get lasing, you can get inversion relative to a particular emitting transition — "partial population inversion" as we called it'.

This was around 1960, before the first working electronic laser had appeared. 'This sort of lasing is very easy to get. We used to get it accidentally: when we traced our spectra there would be spikes that irritated us — these were lasing action!' It was not until 1965 that George Pimentel and J. V. V. Kasper demonstrated the first chemical laser.

Meanwhile, Polanyi and his collaborators were wrestling with their spectra, trying to make sense of their findings. 'The question was how to communicate them to people. It wasn't much good handing them a table of the vibrational, rotational and translational energy distributions in the products, because they were quite difficult to grasp. So we had to think of some way of exhibiting them'. What emerged were triangle plots with contours of 'equal detailed rate constants' for specified states within the reaction. These give graphic 'fingerprints' of given reactions. In order to interpret these experimental fingerprints the equations of motion for all the particles involved, moving in three dimensions, had to be solved and understood: 'this part was very hard work — nature was very begrudging and seldom offered us anything as a gift. Eventually we groped our way from these plodding descriptions of the physics to a broader degree of understanding of the choreography of chemical reaction'.

In parallel with Polanyi's group using infrared emission spectroscopy, Herschbach and Lee at Berkeley and Harvard were using crossed molecular beams to answer the same sort of questions. While spectroscopy measures vibrational and rotational motion, from which the speed of the particles can be calculated, Herschbach and Lee's method measures the angle and speed of the products directly, from which vibratational motion can be inferred.

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ERRATUM

CHANGE OF AUTHORSHIP

As requested by the authors of paper published in Vol. 56, No. 24, Page 1294, the authorship of K. R. Krishna has been deleted from the paper.

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