FOCUS
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PROFILE: THE ADMIRAL
TEACHING UNDER REVIEW
STUDENT PROTEST
This publication is intended for members of the University of Sussex. Extracts from it should not be published without the editor's permission.

While every effort is made to ensure the accuracy of the information which is passed on, readers will appreciate that this is a news magazine and not an official publication.

Correspondence relating to Focus Magazine should be addressed to the editor, Essex House.
Vacation Grants

Local Education Authorities are under heavy Government Pressure. Having been asked to make savings, it is hardly surprising that they should be looking with some apprehension at the amount of money they pay out for vacation grants. As things stand, vacation grants represent an open-ended commitment for LEA's. They are required by statute to meet all recommendations made for grants by the Universities, and this sum is increasing.

Take the case of this University. Last year 1307 applications for vacation grants were approved and it is estimated that the cost to LEA's - who pay the grant direct to students - was over £22,000.

The Department of Education and Science, whose relationship with the LEA's has been strained through Government-imposed cuts, is anxious to show the LEA's it appreciates their financial difficulties.

It has suggested to the Universities that vac. grants be limited other than 'in exceptional circumstances' to five weeks per student per year. Furthermore it proposes that in future the Universities should receive £4 for each award-holder as a fixed sum out of which the Universities would distribute vacation grants.

While in principle the proposal that Universities should administer the system themselves has some advantages, it is, from a financial point, quite unsatisfactory. On the above basis, Sussex, with 2300 award-holders, would have under £10,000 at its disposal, less than half the sum made available over the last academic year. The Universities are required to give their answer to the suggestion by the end of June. Meanwhile the immediate result is that, for this summer, vac. grant applications are under greater than usual scrutiny.

So what can the Universities do? For once the UGC, the traditional buffer between the Universities and the Government, is playing no part in the discussions. If the Universities, thus exposed, decline to take over responsibility for vac. grants on a per capita basis, the LEA's certainly would be prepared to do it for them.

What must be stressed - and it is an issue on which both students and faculty should be united - is the utter inadequacy of the proposed £4 figure. The policy of this University always has been to regard the vacations as an integral part of the academic year.

Courses are planned accordingly and considerable difficulties already exist in squeezing a full degree course into three years. A Working Group, which includes the Registrar, the Senior Tutor and the President of the Union, is at present examining the DES proposals.

They must make it quite clear that academic standards are involved; that for every student who finds himself without a vac. grant, or an inadequate one, the risk exists of a cut in his academic achievement.

The dangers are obvious, but they must be pointed out forcibly to the Government. The net result of saving some money could lead to the waste of a great deal more.
Survey of personal tutors approved

Dr. P. J. McEwan, Director of the Social Research Unit, is to undertake a survey among tutors and students aimed at eliciting information on the effectiveness of the University’s Personal Tutoring system.

The survey - a suggestion for it was made in the March issue of Focus - arises from the Working Party on Counselling report, which stated that there was insufficient evidence on how Personal Tutoring worked in practice.

How often do Personal Tutors meet their students? How satisfied are students with the service? How accessible is the Personal Tutor? What do Personal Tutors think of their own performance?

The survey, which will take the form of interviews with a selected sample of tutors and students whose identity would remain anonymous, will be seeking to establish answers to questions on the above lines.

Planning Committee has approved the expenditure of £250.

New links with hospitals

Closer links are to be established between members of faculty with medical interests, and local hospital groups. Six members of the University and six representatives from hospital authorities have formed a Medical Consultative Group, whose chairman is Dr. P. J. McEwan.

Two meetings already have been held, and possibilities discussed for offering members of faculty honorary appointments with local hospitals which would entitle them to go into hospitals for research purposes.

In return, the University would hold occasional lectures and symposia for local hospital staffs.

Meanwhile, Professor E. M. Eppel, who is himself a member of the Consultative Group, is planning courses for medical practitioners and recently qualified doctors on behalf of the University’s Continuing Education Programme, of which he is Director.

Union Hustings

Face to face with a somewhat ribald audience, candidates for the Union Presidency state their policies at the hustings in Falmer Court.

The Staff Suggestions Scheme, which was introduced last year, has made a cautious start. Among suggestions received:
- That secretarial staff should be able to take unpaid leave during the summer vacation. This is in fact, already University policy;
- That more term-time-only staff should be employed in the Schools. Schools already employ considerable numbers of term-time-only staff, but the suggestion was passed to the Arts and Science areas to say that the practice probably could be extended;
- That the University should sell its waste paper. This was referred to the Supplies Officer. He said that a pilot scheme had been tried out, but that the cost of operating it was greater than the income;
- That typists in the Science Schools should be provided with manuals of mathematical typing. This was referred to the Schools who have funds available for making such purchases.

All members of staff are invited to write at any time to the Registrar with any suggestion they may have for improving the running of the University or for cutting costs.

Suggestions for improvements in all areas are welcome, but it is pointed out that other channels exist for raising personal grievances and welfare matters which are not the subject of this scheme.

LSE Petition

Eighty-eight members of faculty earlier this term signed a petition which was sent to the Director of the London School of Economics, asking him to draw it to the attention of the School’s Governors.

The petition, organised after the dismissal of L. S. E. lecturers Robin Blackburn and Nicolas Bateson, read as follows:

"We, the undersigned members of staff of Sussex University, protest against the recent dismissals on inadequate grounds, of staff from the London School of Economics.

Although we do not all necessarily prescribe to their views, we believe that the expression of these views should not be grounds for dismissal, least of all when they refer to past events."

One of the organisers of the petition, Mr. C. J. Arthur, Lecturer in Philosophy, believes that many more faculty would have signed had not the petition been sent off after being circulated for only two days.
The May issue of Focus reported the conference on teaching held at Haywards Heath by faculty and students. Since then Planning Committee has discussed points raised at that meeting, and the Vice-Chancellor has undertaken to put to Planning Committee this month proposals for structuring a University-wide debate on teaching. It is hoped that within this framework, which will include assessment of priorities, identification of problems, and the establishment of projects, a full and systematic discussion of the issues will take place. Meanwhile, in an article below, Norman MacKenzie, Director of the Centre for Educational Technology, gives a personal view on the Haywards Heath conference and looks ahead at points that might merit specific debate in the far-ranging review now being planned.

Examining the Teaching Process

The Haywards Heath conference raised very many important issues, which need a lot more discussion. It is clearly impossible to deal with all of them. Some raise at present unanswerable questions about the effectiveness of teaching, learning and assessment. Others cannot be dealt with given present resources. The University should endeavour to identify those which are priorities and can be tackled; and then to establish some systematic procedure for dealing with them. There is a considerable risk that by this type of open-ended discussion, we could start more harems than we can possibly chase. If we do so, the result will be that much time will be wasted, that frustration will occur, and that we shall end up with much talk and little action.

The first step, in my opinion, is to distinguish clearly between problems we wish to solve, and solutions that we already favour. Much of the discussion seems to be similar to the debates that went on in the first years of the University when we were seeking to establish a style of teaching, on the basis of certain assumptions about the learning process. While the general goals of the University remain, it is necessary to recognise that the situation is now different; and that it is likely to become more radically different between now and 1975. We now have sufficient experience and knowledge to recognise that we have problems, and, hopefully, enough maturity to realise that some of our previously favoured solutions may not be working successfully. If we proceed mainly in the belief that what is needed is to make these solutions work, we may be avoiding some of the toughest problems — and, incidentally, creating a good many new ones in the process.

The second step is to distinguish between changes in organisation and administration, on the one hand, and changes in teaching and learning methods on the other. In the period of expansion, much stress was rightly laid on the former; the time has come to redress the balance. But the discussions at Haywards Heath (like those that have been going on in various Schools this year) still put a lot of emphasis on the means whereby student motivation and participation may be improved, without any clear analysis of the educational objectives concerned. Unless this issue can be raised more sharply in future, there is a risk that we shall proliferate more committees (and more meetings) without giving them specific and manageable tasks which will improve teaching or learning, or make better use of the University's scarce resources.

Thirdly, the motives for change appear to be very mixed and they need to be more clearly distinguished.

There is, of course, a considerable and unavoidable overlap, but we can identify a number of them.

(a) The need to consider factors related to student participation;

(b) The need to design courses which adequately deal with the subject matter of the University's syllabus, and to

POINTS TO CONSIDER:

- STUDENT PARTICIPATION
- DESIGN OF COURSES
- TEACHING METHODS
- ASSESSMENT AND EXAMINATION
- EFFICIENT USE OF RESOURCES

make the character and coverage of their courses more clearly understood by students;

(c) The need to improve teaching methods employed by faculty, to enhance motivation and assist learning on the part of students;

(d) The need to improve the learning situations offered by the University, with special reference to the differing backgrounds, achievements and learning styles of students;

(e) The need to review methods of assessment and examination, not merely to bring these into line with the ways students actually learn and behave, but also to secure suitable feedback which permits effective revision of course content, teaching methods and performance. The care for concurrent assessment rests as much on its potential value for faculty as on its attractiveness to students;

(f) The need to examine new methods of teaching and learning which may enable the University to use its resources more efficiently, both academically and logistically, and prepare for the demands that will
THE TEACHING REVIEW cont.

certainly be made upon it in the next quinquennium. Finally, it is necessary to distinguish between changes which can be effectively administered and assessed, and those where only general or subjective indicators can be used.

We have to recognise the gaps in the present state of knowledge about teaching and learning, and accept that much research remains to be done.

The view that we can do little until there is research evidence available, is one which we do not have the time to accept; it is the case that if that view had been accepted in 1961, our curricula and teaching methods would have followed traditional patterns. If money can be raised, we do need to organise research in this field, but we must proceed with change in advance of that research, clearly, where possible. careful controls or observation should be used and where this is not possible, we should be very cautious about expecting too much from innovations that are by their nature open-ended and value-loaded.

CONCERNS

I think a number of immediate concerns were expressed at the Haywards Heath meeting. The most important of these were:-

(a) Can anything be done to improve teaching methods?
   By this was meant courses or other forms of help for faculty on ways of:-
   (i) Preparing and presenting lectures and demonstrations;
   (ii) Conducting seminars and classes;
   (iii) Conducting tutorials;
   (iv) Giving students better counselling on study methods, or access to resources (library etc.) and materials. by practical work and research techniques;
   (v) Increasing the resources available to faculty for teaching (video and sound tapes, films, graphics etc.);
   (vi) Encouraging faculty to engage in team-teaching, and of involving students in team-learning;
   (vii) Enabling each individual member of faculty to assess his effectiveness as a teacher in each of several teaching methods.

(b) Can anything be done to improve learning methods?
   It was felt that many students have acquired habits of learning that are rigid and limited. While considerable benefits might be obtained by improved teaching, it is clear that students need (and wish) to play a more active role in learning. We should attempt to meet this need:-
   (i) By involving students more actively in discussions about the way courses are presented and conducted;
   (ii) By creating suitable means for feedback on student problems in learning, related to specific courses;

(iii) By reconsidering the forms of student work (e.g. less formal essay writing, more team-work projects, more problem-solving activity);
(iv) By developing, with student co-operation, more self-instructional materials;
(v) By experimenting, with student co-operation, in new learning situations (games, simulation, course designs, assessment techniques, and team learning).

It is more difficult to move in such directions – which involve much greater initiative and flexibility on the part of both faculty and students – than it would be to tackle more formal teaching problems. Nevertheless, this is the emerging pattern in higher education, and I think we should be well-advised to attempt some pilot schemes of this type in the near future.

(c) Can anything be done to alter work-loads (or the pattern of teaching and learning) that would enable faculty and other resources to be used more effectively, yet offer students at least as much support and encouragement as they receive at present?

It was proposed at the Haywards Heath conference that a course-by-course review of commitments should be undertaken by each School/Subject Group. Something of this kind is needed if we are to move beyond generalisation.

As a major matter of policy the University should now begin a review of its own methods of curriculum renewal......

Equally, the information on faculty loads, course commitments etc. needs to be collected and analysed as a basis for discussion. Without the proposed course-by-course review and without analysis of logistic facts and consequences, no more than generalised discussion can occur on this issue.

(d) Can anything be done to improve the way courses are designed?

While a general and positive answer can be given to this question, it raises such fundamental issues that it requires separate and extensive treatment. It can be said, however, that many of the present problems have arisen because the procedure for designing, presenting and assessing courses has been inadequate in the past, and much time has been given to methods which are habitual, arbitrary and unsystematic. As a major matter of policy, it seems desirable that the University should now begin a review of its own methods of curriculum renewal and assessment.
Pre-packed lectures, 'mind-expanding' drugs, 35,000 cars and student labour in the canteens, that's life on one AMERICAN CAMPUS......

Tom Hopkinson, Senior Fellow in Press Studies at Sussex, recently returned from a six-month teaching stint at the University of Minnesota, where everything - including the problems - happens on the grand scale. Most students take paid employment, and faculty parking - for those lucky enough to find it - costs £120 a year.

What is a university?
If our own modest beginning is a university - what is the university of California, with nine campuses, some nearly 600 miles apart, and around 90,000 students? Is it sensible to apply the same term to both institutions? I lately spent six months working in the University of Minnesota. Its faculty is much larger than the whole manpower of our university. There are also 42,000 students and a daily parking problem of 35,000 cars.

Professors and lecturers wait as much as four years to secure a reserved parking space, which can cost them £120 a year. Lacking such reservations, some would turn up at the university at 8.00 a.m., even if they had no lecture before 10.00 a.m., simply to secure themselves a space.

Most universities or colleges are closely linked to their own states. The State Legislature is a main source of both operating and capital expenditures. Grants are made on a two-year basis, and top administration spends a great deal of its time trying to keep State Legislatures happy and reassured - an extremely difficult task in an age of take-overs and sit-ins - so that grants will be sufficiently increased. Many universities accept students from their own states on lower terms than outsiders and, in the University of Minnesota, two-thirds of all students live at home.

This fact, coupled with the huge size of so many universities and colleges, means that social life within a university is minimal, as are what might be called 'cultural contacts'. University life is thus a matter of 8.00 a.m. to 6.00 p.m., and almost all the knowledge a student requires has to be gained in class, since he has little opportunity to gain it in any other way. This puts a premium on the 'package hand-out' type of lecture - which may well be one reason why students are taking to 'mind-expanding', 'mind-opening', 'consciousness-expanding' drugs, since the effect of the package hand-out must be to reduce interest in the world, not to expand it.

GRANTS

Though it is much easier for an American boy or girl than for his British counterpart to get to college - and much harder for him or her to be thrown out - there is an aspect of their life which is less agreeable. Grants and awards are not so readily available, and are based on the expectation that a student will do a good deal to pay his or her own way. The University of Southern Illinois has a rule that no job in the university which can be done by students is to be done by outside labour. Almost all students work from 10-20 hours a week in the canteens, cafeterias or kitchens; as gardeners or outdoor staff; doing domestic or clerical work, or in some form of paid employment in the town. When I reproached a talented girl student for constantly falling asleep, she explained that it was not chiefly the dullness of the course, but the fact that lectures began at eight, and she worked as a waitress in an all-night cafe, four nights a week. When I suggested this was a shortsighted use of her time, she agreed, but added that she had not only to pay her own fees, but to send a contribution to her parents every month, and this was the only way she had so far found of doing this.

The enormous numbers of students passing through the machine - and the huge gap in mental level between best and worst - imposes a great strain on the faculty. My impression of the few dozen with whom I had contact was that they all worked far too hard. Few could read anything
outside their immediate subject. In the whole six months I was there, it was only possible for the faculty of the School of Journalism to meet once for an informal discussion of common problems. Most Schools just continue to take on more and more students and put them through their traditional routine. The accepted measure of success is the increase in numbers, justifying increased grants to take in still more.

There is also a tendency - to my mind dismaying - for students to stay on and on in universities, accumulating degrees, with little or no practical experience in the fields in which they are becoming ever more highly qualified. Indeed, I heard it seriously argued in one university where I spent a short time as a visitor, that practical experience in any activity is a handicap, since it wastes time that might be devoted to academic progress, and tends to limit the free-ranging mind to what is immediately practicable. The background to this tendency to move on from B.A. to M.A. to D.Phil., and to extend the stay at university from four to nine or ten years, is that teaching is at the moment a vast, expanding industry, and that, from a financial point of view, five years spent accumulating letters in return for some teaching help, will prove a sound investment.

QUESTION

The question I wanted to ask the faculty was "When do you do your idling?" The usual answer to this was a puzzled smile. The question I wanted to ask the growing horde of graduate students was "When do you get out of here?" The regular answer was "As soon as I'm qualified to teach somewhere else."

Occasionally, the factory-like routine would be violently interrupted. Students had occupied the main administrative building and were refusing to move out. Some were tearing up the records on which the careers of past students and their own contemporaries might depend. In the University of Minnesota, tactful handling restored calm after a few thousand pounds' worth of physical damage had been done - but at potentially a much higher cost in curtailed grants from the State Legislature.

IMPRESSION

My personal impression was that there are three main factors involved in American student uprisings:--
(i) Impotence to affect issues - such as the war in Vietnam - which affects them vitally. This is one of the first generation of students to confront these issues directly. They see on television every night the war in which they will be expected to take part.
(ii) The current race situation arouses rage in the black man and guilt in the white. Both these feelings are discharged in violence against authority.
(iii) The academic situation in which students feel they are being handed instruction when they want opportunities for education. A contributing factor is that prestige in America is attached to success outside the university, far more than hard work in it. Two remarks stay in my mind. First, of a professor about whom I had enquired, the deprecating reply "Oh, I think he's quite good at teaching." Meaning, he doesn't appear on television or write books. And the answer from a lecturer whom I had asked, rather naively, what he lectured on: "I'm not here to give lectures. I'm here to get articles into quarterlies. That's much more important for the standing of this School."

So, what is a university?

THE PRESSURE
LINK-UP, or the art of prodding officialdom into action

Room 93 in Essex House is one of the larger cubby-holes. In fact it was, until recently, lying fallow as a possible office for a possible Deputy Vice-Chancellor.

As no such appointment is now visualised within this quinquennium - for financial reasons - Room 93, with its uninterrupted view of the Arts Building, now has been occupied by Link-Up.

As a growing pressure group which, in four years, has exerted influence out of all proportion to its age, Link-Up probably deserves an office considered ample enough for even a shadow Deputy Vice-Chancellor.

Over 200 students in the University are members of Link-Up, which is essentially a social service organisation run by student volunteers. One of its earliest successes was the construction of an adventure playground in Moulsecoomb Estate, a Brighton problem area.

The prodding of officialdom and the whipping-up of community support that was instrumental in getting the playground built is characteristic of Link-Up strategy.

First, the local residents were inspired to organise a petition concerning the lack of play facilities in the area.

Playleader

Next, a group of teachers and students, in co-operation with Brighton Parks Committee, constructed the playground. Soon afterwards, a working committee for the playground, which consisted mainly of students, decided that a full-time play leader was necessary, and eventually an appointment was made.

The Brighton Archway Scheme, which was started in the Spring of 1967, again owed much of its inspiration to students and faculty involved in the Link-Up organisation. Aimed at providing sleeping facilities and an information centre for young people who converged on Brighton at Bank Holiday weekends, the scheme was supported by a Government grant of £15,000 over a three-year period. However, when the grant period ended, Brighton Council decided to take away the premises for other uses, and the venture collapsed.

Nevertheless, moves are afoot, according to Murray Watson of the School of Educational Studies. Link-Up's co-ordinator in the University, to get the scheme going again.

Murray Watson, who mans Room 93 at lunch-times, dispensing information amid a plethora of hand-outs, posters and publications, is now busy raising funds for a Brighton Hostel intended to provide accommodation for the town's itinerant homeless population.
Moulsecoombe Adventure Playground: getting the hang of it

He visualises a hostel with perhaps 12-15 beds which would take in all manner of vagrants, and men recently discharged from prisons and mental hospitals. A café in the hostel is planned, serving "very cheap" food and beverages, and Murray Watson believes that enough money will be available in the near future to start the scheme.

Link-Up's aptitude for focusing attention on the underprivileged and the short-comings of the Welfare State has not, perhaps, made them friends in all quarters, but no pressure group concerned with exposing short-comings of any kind can expect to be universally popular.

Apart from major projects, Link-Up members regularly visit the elderly and housebound in the Brighton area, providing help with decorating, gardening, a library service, and often just plain companionship. In conjunction with Brighton Exchange, the Corporation's youth voluntary service organising body, Link-Up is planning a new adventure playground at Downsview, the local school for handicapped children.

In coping with the problems of others, Link-Up faces a problem of its own. The entire area of voluntary social activities suffers from a lack of communication and direction among the various organisations involved. Those who deal with the socially isolated are themselves isolated from each other.

The result is often an unnecessary duplication of effort and a degree of frustration.

To meet this problem, Link-Up is pressing for a full-time co-ordinator in the University, and it now seems likely that such an appointment will be made in the autumn. In addition to an administrative function, the co-ordinator would undertake a research role into community work.

Link-Up, in its relatively short history, has a considerable record of achievement. Less easily definable but of equal value, is its impact on town-gown relationships. Its activities may not please all the people all the time. The involvement of some of its members on an individual basis in the Brighton Rents Project in which empty buildings have been occupied, is bound to provoke a certain amount of reaction.

Yet on balance, what matters is the willingness of members of the University to play an active part in the life of the local community. It is, furthermore, a constructive participation; protest with a purpose. As such, Link-Up's activities may not always succeed, but they are rightly proud even of their failures.
REGISTRATION: MORE JAZZ FEWER QUEUES

This year, for the first time, new undergraduates will be arriving at the University before the beginning of the Autumn Term. They will be taking up residence in the Park Houses and Guest Houses on Monday, 29th September. Initially sparked off by the impossibility of concentrating all registration procedures into three days now that the session begins on a Wednesday, the Admissions Office has taken the first steps towards developing a full programme of events to inform new students fully about the facilities which the Union and the University offer.

Symbol

Co-operating in the programme, apart from the Union proper, will be the Sportcentre and the Arts Centre, both of which intend to produce programmes specifically aimed at freshers. The Film Society and Jazz and Folk Clubs have also been asked to contribute, and a Freshers' Debate is planned. On the formal side, the formalities for registration have been improved and streamlined in an effort to rid the University of that inglorious symbol of the affluent society, the queue. If the new arrangements fail to do this, Professor Parkinson will have experimental proof of his theories.

Choice

960 new undergraduates are expected, 460 of them in Arts and Social Studies, 500 in Science. In addition, there will be some 500 new post-graduates and professional course students. Arrangements for registering post-graduates and returning students are concentrated at present into the first three days of term, although these arrangements are not final in Arts and Social Studies, where the incidence of School Examinations may require the postponement of formal registration and cheque collection.

The elimination of queues at this event is not guaranteed, since the experience of previous years points to the tendency of returners not only to ignore the published timetable, but also to use registration as a major social happening. The choice, however, is essentially theirs.

A NEW BREED OF COP?

Mr. Alan McKnight, who was until last autumn Inspector General of the International Atomic Energy Agency at its Vienna headquarters, is now working with the Science Policy Research Unit at Sussex.

Last month he flew to New York to attend a ten-day gathering of ambassadors and technical advisors at the United Nations, in order to give an interim report of his research into methods of international inspection. Mr. McKnight, a forthright 51-year old Australian, is being sponsored in his study programme by the United Nations Institute for Training and Research. In Vienna, he had a staff of twenty inspectors, and what he considered a very small budget of $800,000 a year to ensure that signatories to the Nuclear Non-Proliferation Treaty were not manufacturing atomic weapons on the quiet.

After he quit the Agency, he was offered research facilities by Chris Freeman, Director of the Science Policy Research Unit. Mr. McKnight, hopefully seeing himself as the forerunner of a new breed of policeman, who would have the world as his manor, anticipates an International Civil Service of Inspectors, permanently stationed in every country.

"The confusion over safety regulations that led the Florida Customs to stop the Cunard liner "Carmenilla" sailing, would never have happened if there had been an international expert on the spot to interpret the regulations," he says. He believes that chemical and biological warfare and atmospheric pollution will one day be the subjects of international treaties along with atomic energy. "But treaties must have adequate inspector backing," he says. "The politicians have got to be prepared to pay as well as sign."

FACULTY PAY AWARDS

A committee has been set up in the University to examine criteria for discretionary payments that may now be made to faculty under proposals made by the Prices and Incomes Board Report. A sum of around £16,000 is available, half of which is to be set aside for Professors and the remainder for Lecturers, Senior Lecturers and Readers.

The committee, whose members are the Vice-Chancellor, the Chairman of Council, the Chairmen of Arts and Social Studies and of Science, Professor Sung and Mr. Arnold Goldman, Lecturer in English, will not be discussing individual cases.

It will examine only criteria for making payments in the light of recommendations from the P. I. B. In a letter to the University, the U. G. C. states that there are "no hard and fast rules" but that the general criteria proposed by the P. I. B. should be followed. These suggest that awards to Professors should be for those who have shown "outstanding merit in establishing the running of teaching departments."

Discretionary payments for other faculty may be considered for "excellence and volume of teaching; for initiative in devising new courses and for difficulty in courses."

In addition, library and administrative staff involved in teaching may qualify for awards. The committee hopes to have reached decisions as to how awards will be made by the end of this term. They will be back-paid to April 1st, 1969.
Brian Easton (pictured left) was asked by the B. A. Prelim. Working Party to formulate proposals for a Mathematics course for all Arts and Social Studies students. Focus asked Mr. Easton, Lecturer in Economics and Social Statistics, to outline how he sees the content of such a course, on which the final decision will be taken by a Working Party.

It was natural that the Arts Prelim. Working Party should have proposed mathematics as a new prelim. for Arts and Social Studies students. Science has long accepted that mathematics is one of those "fundamental means by which man pursues knowledge and understanding."

This is easily illustrated by the fact that mathematics will be the only common prelim. of the Science Schools in future. However, in Social Science and even in Arts, this fundamentality of mathematics has become increasingly recognised in recent years. Indeed, it was the Professor of English on the Working Party that referred back to those happy days when every cultured man was presumed to have a working knowledge of the mathematics of his day.

But while it is one matter to agree on a title for a course, it is quite a separate matter to develop the course content, teaching, and examining. The Working Party therefore asked me to present proposals indicating the sort of course that might be offered, and in their Report recommended that a course like my proposals should be adopted, but that a Working Party should be set up to make the final decision.

Tentative

Thus, the following proposals are tentative, but there is an exorable logic to them, because of the following three constraints:

Firstly, it has always been accepted that the so-called University prelims. should be available to all the entrants, irrespective of ability or attainment. There is a very wide spread of mathematical ability among the arts entrants - much wider, for instance, than the spread of general intelligence. Further, students with the same mathematical ability can have very different attainments, usually varying between one O-level mathematics course to three A-level mathematics courses. However, unless we make a very substantial change in prelim. policy, we have to construct a course which will provide a worthwhile challenge to the good mathematics student on one hand, and yet be a not intolerable burden to the weak mathematics student on the other.

Policy

The second constraint is the policy decision that the prelims. should emphasise the differences between secondary school and university. Thus, a subject such as history, which is taught at school, is taught very differently in the prelims., so much so that a student with a good A-level pass in history will still find the history prelim challenging.

Thus, in approach, teaching method and even examination, the mathematics course should be different from the conventional one of a secondary school.

The third important constraint is time. Hardly any of the mathematics which I took (right through to post-graduate level) has not been useful to me as a social scientist. Even some of the most irridite parts of pure mathematics have had the damnest habit of turning up in my own research work.

Thus we cannot teach all the mathematics that an undergraduate may want, and the optimum strategy would seem to be to teach the students basic concepts of mathematics rather than particular techniques. (This will be jargon to most readers, but the sort of things I have in mind include the concepts of existence and uniqueness theorems, the difference between a proof and an algorithm, the ideas of transformation and operator, and how we can represent algebra by geometry. These come easily to the graduate mathematician, but I have found when teaching mathematics that most undergraduates do appreciate them, and this seriously handicaps presentation). If the students can grasp these concepts, then they should be able to learn most of the mathematics they need, by using teaching aids at the proposed Quantitive Services Centre.

To meet these constraints, I have proposed that the course should confine itself to what, in the jargon, is called "Finite Mathematics" (such as the algebra of sets and relations, probability, algebra of matrices and recurrence relations). This is not taught extensively in secondary schools, so that all students should start off at a similar level of attainment and will find it rather different from their school experiences. Furthermore, it will be simple to introduce the mathematical concepts which I spoke of earlier, and more and more use is being made of these techniques in the Arts and Social Sciences.

Examples

It would seem appropriate not to teach these techniques in the abstract, as one might for the professional mathematician, but to illustrate their use from examples taken from, say, the social sciences, philosophy, and even the natural sciences. This would make it possible to introduce the students to another critical and growing field - the methodology of applied mathematics.

The above remarks should not be read to suggest that there are no controversial problems associated with the new course. Mathematics teaching is undergoing a revolution, partly arising from the possibilities of using programmed texts, audio-visual aids and other forms of educational technology, and partly from the increasing demands for teaching by students who under no circumstances could be thought of as becoming professional mathematicians. The new mathematics prelim. will be a part of this revolution.
"All right, keep quiet. I'm the Admiral and when I wave to you, stand up for the Vice-Chancellor." Unfortunately for Howard Clifford Brewer, Head Porter of the University, the Vice-Chancellor had scurried into the room and was already motioning people to their seats before Mr. Brewer had finished.

As it happened, this slight contretemps occurred at the first occasion Professor Briggs addressed the Freshers. The Admiral was unperturbed. The one thing you need in this job is a sense of humour," he says. "You have to be philosophical." His philosophy has been put to the test more than once. There was the time a bed appeared on top of Sir Basil Spence's twin pillars in front of the Arts Buildings. Again, there was the morning that he arrived at work to find a car on the landing in Falmer House. He had it spirited away even before John Carter, the University photographer, acting on information received, arrived to record the event for posterity.

Admiral Brewer takes comfort in the thought that the young are only young once. He accepts high spirits, but draws the line at violence. Having experienced and come to terms with naval discipline himself, he sees the need for it but after 23 years working in universities, his outlook is tempered by tolerance.

Mr. Brewer was born near Merthyr where, after a number of years at a Grammar School, he was forced to enter the mines, as his relatives could not afford to keep him any longer at school. "Of course I wish I could have gone on with my formal education," he says. "But times were hard and the education I had was to be useful in the Navy." Forced out of work in 1926, he followed the example of many of his countrymen and joined the forces. "I decided that if I was going to be a sailor, I would be a bloody good 'un, and in fact I made Chief Petty Officer in six years." By this time, no stranger to industrial disputes Mr. Brewer found himself in the centre of a minor mutiny in 1929. The Labour Government had decided to cut all government pay by 10% which, in the Navy, did not affect the Admirals much, but reduced a sailor's pay to almost nothing. "We held a few meetings at Invergordon, and the

Mr Brewer: 23 years in universities

"In this job you need to be philosophic.

ringleaders were given ninety days, but then it died out very quickly," he recalls. Most of his service career up until 1938 was spent in the East, broken only by short leaves every two-and-a-half years in England. "I enjoyed the life, although it was very hard. There was always the sailor's girl in every port, and when I met my wife in 1932, I only had two days before I was away for another two-and-a-half year spell. We corresponded, and on my next leave I married her." As an engineer, Mr. Brewer drove a train in Palestine in the thirties, and later during the Spanish Civil War, sailed up and down the Spanish coast picking up any survivors he could find. "I delivered a hell of a lot of babies on those runs in and out of Gibraltar," he says.
"I was about to leave the Navy in 1939 when, following Munich, we were all mobilised again. And on the day war broke out, my ship sank the first German sub, 14 miles off Beachy Head.

"We all cheered like mad when war was declared."

Certainly, he was to take a very full part in that war. He was to ferry soldiers from Dunkirk until the destroyer he was in was hit; convoy planes during winter to Archangel; search abortively for the Scharnhorst, and occasionally work on Atlantic convoys. In 1942, Mr. Brewer left the hunted and became a hunter - a convoy raider in the Far East. This activity in submarines led to his capture by the Japanese for three days. "I was in charge of a small boat picking up commandos from the Burma coast, and returning them to the submarine. They didn't turn up, but the Japs did, and we were captured for three days until a surprise British attack released us."

The war over. CPO Brewer applied for and got the job of Head Porter at Aberystwyth. "It was a question of watering discipline with sugar," he says, recalling those days when he was first dubbed Admiral by the officer undergraduates at Aberystwyth. "I had to persuade rather than order."

"By 1962, I was wanting change, and suddenly heard about the new universities. So I applied for the Brighton job."

When Mr. Brewer arrived at the end of the first academic year, all he had to preside over was Falmer House, one Physics building and the Terrapins near the present Sportacentre which were the Arts Building. "I wanted to start off fresh with a new university. Aberystwyth was more of a family, and it would have been impossible to import their ideas."

In the last few years, Admiral Brewer and his staff have seen a new turn in student revolt and protest, but appear totally unworried about it. "Last term's sit-in was no inconvenience," he says, after a night in which he moved around the campus without much sleep. "Of course they're wasting their time. If active students protested about things that actually affected them, they would get a lot further. Why don't they press for higher grants, for example? The cost of living keeps going up, and faculty have had a rise."

He enjoys his job, and although he might have bettered himself financially by moving into engineering, for which he would have been qualified, he has no regrets. Of course, Sussex has changed dramatically since he came in 1962. "I sometimes think that the University has grown too quickly," he says. "Of course these are very personal opinions, but we haven't had time to absorb the new students adequately.

"My satisfaction in working in universities is seeing students' success - and when I write my memoirs, as I might well do, I shall have plenty to write about."

R.H.
SECRETARIES:

A NUMBER OF PROPOSALS

Recommendations affecting the organisation of secretarial services within the University are to be considered by the Planning Committee on June 11th.

The proposals, relating to numbers and deployment of staff, and also to the structure and grading of salary scales, result from an investigation carried out by the Southern Universities O. and M. Unit.

The Unit, set up in 1967, was asked to investigate, as its first task, secretarial services in the University of Sussex. The University spends some £100,000, a year on these services, a large amount compared with other universities. However, despite this expenditure it still has not been possible to satisfy all requests for secretarial assistance.

A review was therefore suggested in order to establish whether the University could make better use of its existing resources in this field.

Mr. Robin Hunter, the Director of the O. and M. Unit, spent some time between June and November 1968 collecting data at the University, and his report was submitted in February of this year.

It contains 78 recommendations applicable to different sections of the University, and 13 more applicable to the University as a whole.

Since February, the University has been examining the report, and statements will be placed before the Planning Committee on 11th June 1969 of the action taken and proposed.

Most of the recommendations relate to the organisation of secretarial work in different sections of the University, including the numbers of staff required in various offices, and a number of changes have already been taken place (for example by replacing a full-time secretarial assistant by a term-time only one.) But the report also recommends that the structure and grading of secretarial services (which is the same as the structure of the clerical and library assistant services) shall be revised. Discussions about this have been taking place with the Staff Association and others, and final proposals are being placed before the Planning Committee and the Council in June.

If the salary scales are changed, this will probably mean that there will be two separate sets of salary scales: the existing ones and the revised ones. The revised scales would, of course, be used for new appointments in the future, but existing members of staff would stay on the existing scales unless and until transferred or promoted to the revised scales.

An undertaking has been given that any change in the salary structure will not adversely affect the grades of existing members of staff, and this means that staff will not be transferred to a revised scale with a lower maximum point. The future prospects of existing members of staff on their existing salary scales are thus fully safeguarded, while it is hoped that any changes will increase staff incentives and lead to the more effective use of our resources.

ASTRONOMY:

A NUMBER OF OBSERVATIONS

Shortly after the University was set up, it was decided that it would be appropriate to set up an astronomy group in the University which would work in close collaboration with the Royal Greenwich Observatory at Herstmonceux. The intention was that the University group would mainly consist of theoretical astronomers, and that it would therefore complement the activities of the Royal Observatory. The group was set up with the aid of a grant from the Science Research Council.

Now, after nearly four years, there are ten faculty members in astronomy, including those supported by the U.G.C. and the S.R.C., and members of the Royal Observatory staff holding visiting posts. In addition, there are postdoctoral fellows and about twenty-five students working for higher degrees. There are no undergraduate majors in astronomy, because it is felt that a large background of mathematics and physics is required before astronomy can be studied seriously. There is, however, an optional course in astronomy for third-year mathematicians and physicists.

The collaboration with the Royal Greenwich Observatory has proved very fruitful. The visiting faculty from Herstmonceux have taken a full part in the post-graduate teaching of the Centre, and indeed, they started the M.Sc. course before the University had appointed any full-time astronomy faculty. By arrangement with the Astronomer Royal, students can be admitted to the University to study for higher degrees in observational astronomy, and can do their research at Herstmonceux. In addition, the creation of the University group has enabled members of the Herstmonceux staff to study for Sussex degrees as external students, and about forty per cent of the graduate students are Herstmonceux employees.

The Astronomy Centre has rapidly become one of the largest university astronomy groups in the country. Applications for post-graduate places are received from many universities and countries; at one time, graduates of twenty-three universities were registered for Sussex degrees.

Prof. R.J. Tayler
STUDENT PROTEST
UNIVERSITIES TODAY-
INDUSTRY TOMORROW?

By EDWIN COX Admissions Officer of Sussex

Students as such, a phrase well-known to those who were students in the 'fifties before incipient revolution appeared on the scene in our universities, no longer exist. Their passing has been mourned by university academics and administrators, ministers and back benchers, industrialists and farmers, aristocrats and artisans. Yet it is scarcely strange that, in a nation which once upon a time taught the whole world lessons in political freedom, but insisted on fighting holy wars in Europe and unholy ones in the rest of the world to impose on others its particular definition of freedom, there should be solid opposition to attempts by students to suggest that all is not, after all, for the best. Books, beer, the traditional pre-occupations of students, have been replaced by criticism and confrontation. There is nothing new in this. All that has changed is the identity of the despised. Even in comparatively recent history, we have swept away or severely limited the powers of feudal barons, rotten boroughs, the Crown, the Roman Catholic Church, the Germans, the House of Lords, factory overseers, and the Lord Chamberlain. Now it may be the turn of the owner and controller of capital, for it is he who is seen by students, in increasing numbers, as the real barrier in the path of progress.

REFORMS

What has also changed, however, is the scope of the reforms which many students are demanding. The aim of the protesting student, even a few years ago, was often limited to a small degree of democratisation within his institution, or those institutions closely connected with it. The upshot of this was usually the obtaining of committee representation, although in some recalcitrant institutions even this was resisted. The rationalisation of the desire to democratise universities and similar institutions, and the creation of a philosophy which is applicable to the whole of our society, is a later development. "Participation", at first contrasted with paternalism, becomes identified with the concept of workers' control, and students begin to see themselves in the role of artisans within industry, controlled through a hierarchical system which serves interests which are not their interests. This is felt with passion and with some justification.- The traditional concept of a university - an institution which collected, sophisticated, and then passed to its members the knowledge accumulated over the years - is a conservative concept, and those who feel the need for reform, perhaps not as small a minority as many of us would wish to believe, can scarcely be impressed by it. Yet it is of no use to say that such individuals should be excluded from our universities. To do this, or to do as the authorities at Manchester once wished, and persuade Local Authorities to remove financial support from such students, simply makes the students' basic point for them; that they are ordered and controlled from above, that their opportunity for self-expression is curtailed simply because the "capitalist" or "boss" does not approve of what they say or do, and that the authority which thinks and behaves in this way is, like Charles I and Romeo, failing to adapt to a real situation. The philosophy, although some would deny one's right to use that word of what Professor Beloff calls "callow and often dimly-grasped notions about society and education", is in my view at least self-consistent. If one accepts that democracy, to mean anything at all, means the opportunity to affect decision-making, and that this is at odds both with the structure of most of our public system of education, and with our political and social institutions, it follows that reform is necessary, and that, because of the almost complete degree of control held by the upper reaches of the various hierarchies, reform is impossible unless the system is overturned. Some sections of the student community, with a greater or lesser degree of justification, depending on the particular institution to which they belong, will go one step further and say that because of the recalcitrance of those who wield power, they have only violence open to them as a means of persuasion.
PROTEST: THE CASE FOR ACCOMODATING STUDENT DEMANDS

Outside the universities much the same is held to apply. The university hierarchy is represented by the Board of Directors or the proprietor, the students become the shop-floor workers, and the university teachers, at least those of them who are over 30, become the foremen and junior managers who may superficially sympathise with the artisans, but are privately more interested in joining the bosses. Whilst the analogy may not be exact, it is often persuasive.

Two questions need to be asked. First, whether the premises which provide the springboard for student militancy are valid. Second, whether the answer lies in accommodating student demands or in resisting them. The first question requires some note to be taken of the origins of unrest. These are probably to be found in a combination of three developments which have occurred largely since 1945. The first is very much larger universities arising out of a mass-education movement which followed the extension of free education. This has almost certainly resulted in diminished loyalty to the institution (one can scarcely be loyal to a lecture theatre of 300 students sitting in rows), the suspicion that universities are becoming huge factories geared to the needs of employers and government rather than those of students, and an increased divergence of views, and therefore increased friction, in the student body. The second and third are closely linked with the first. We now live in a society where the young are a much more highly educated group than the rest, and this, together with the advertisers, has identified them as a group of importance; and the very much increased study of Social Sciences has encouraged the educated to examine the structure of our society very much more closely and critically.

SLOGANS

That the individual has little say in the way the nation (or the university) is run, can scarcely be denied. That the right to vote (whether for Parliament or the Senate) is a nonsense if the right to adequate information is denied, or rendered so complex that only the chosen few can grasp its significance, is presumably an acceptable proposition. That the attempt (shared by students, shop-stewards and politicians alike) to reduce even a complex issue to a five-word slogan is difficult to resist, is all too apparent, but probably inevitable.

What now? I firmly believe in the necessity of accommodating student demands. Anything else would spell either disaster or atrophy for our universities. Indeed, it is far from ridiculous to say that if the kinds of demand now made by students had not been made, it would be the faculty who would be making them five years hence, and the politicians a little later.

Accommodation will not be achieved unless there is a far greater willingness amongst the faculty at some universities and amongst the public at large, to listen, and to understand the student position. There is at present, even amongst Vice-Chancellors, too great a tendency to resist, rather than to think when faced by unfamiliar requests. Those who wish to appear liberal arrange for student voting rights on committees, the rest simply wait for their offices to be invaded. Neither has actually gone very far, since five or even twenty votes on the Senate are of little use when most Senators never actually vote. But the former has at least created a dialogue. The latter has merely isolated himself from his students. There have been in our history many individuals and movements that were first despised, then in turn abused, tolerated, respected, supported, canonised; the Chartists and the Suffragettes were at least as radical as, and no better led than, the protest movement which has developed amongst students in such a short time. The supporting philosophy may take a little longer yet, but it's coming along nicely. Ultimately, if we allow Greene peasants and Nebraska farmers to elect Presidents of France and the United States, it would be strange to deny undergraduates some influence in the running of our universities.

TRANSIORY

The student state is, of course, for the vast majority, a transitory one. What happens next? Would it not also be strange to deny the present generation of students their voice in the organisation of Industry? Most of them would want to play a part - many of them to rise to the top. Their objectives will clearly be different; however, the current generation of managers may, in five or ten years, feel rather like the current generation of Vice-Chancellors. Today's university graduates may, as managers, continue the role traditionally fulfilled at that level; but many of them, if they carry their philosophy to its logical conclusion, will identify much more readily with the shop-floor worker. If they do, the whole structure of our economy may in due course change; some form of workers' control might really be on the cards. There would be little room for the profit motive in such a structure, unless it were clear that the worker benefited from the profits rather than the shareholder, regarded by many students - and not just those on the extreme Left - as leading a parasitic existence. This is scarcely what Conservative politicians mean by "giving the people a stake in British industry", but in the minds of many students, provided they have the courage of their present convictions, it will be a very acceptable alternative. Perhaps the employers should now begin their own dialogue?

The above article is reprinted by kind permission of GRAC, the Journal of the Careers Research and Advisory Centre, in which it originally appeared.

READING WEEKS

The Science Committee, at its meeting held on 23rd April, 1969, agreed the following dates for 1969-70:

<table>
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<tr>
<th>Term</th>
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<tr>
<td>Autumn Term 1969</td>
<td>1st October - 13th December 1969</td>
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<tr>
<td>All Years</td>
<td>1st three days of term 1st-4th Oct.</td>
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<td>6th complete week of term 10th-15th Nov.</td>
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<tr>
<td>Spring Term 1970</td>
<td>12th January-21st March 1970</td>
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<td>10 weeks (8 teaching weeks)</td>
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<td>First Year</td>
<td>9th week of term 9th-14th March</td>
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<td>10th week of term 16th-21st March</td>
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<td>Second and Third Years</td>
<td>1st week of term 12th-17th Jan.</td>
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<td>6th week of term 16th-21st Feb.</td>
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<td>Summer Term 1970</td>
<td>20th April - 1st June 1970</td>
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<td>8½ weeks (7 teaching weeks)</td>
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<td>First Year</td>
<td>1st two days of term 20th-21st April</td>
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<td>5th week of term 18th-23rd May</td>
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<td>last two days of term 17th-18th June</td>
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<td>Second Year</td>
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<td>last four days of term 15th-18th June</td>
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<td>Third Year</td>
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Prof Bayley and team show how to cool it....

The Royal Aeronautical Society has honoured Professor Fred Bayley and Dr. Alan Turner of the School of Applied Sciences for their work on the cooling of turbine engine blades which, ultimately, could result in the production of a much more efficient aircraft engine.

Behind the award - the £80. Akroyd-Stuart Prize - is the story of a research project with far-reaching possibilities for the aviation industry. The Sussex team has established what Professor Bayley believes to be a considerable lead over American researchers working on the same problem.

Indeed, Dr. Turner, a three-handicap golfer, was last year offered membership of a Cincinnati American golf-club as part of an inducement to carry on his work with an American company, General Electric.

"It was an attractive offer with much more money, but I turned it down," says Dr. Turner.

Nevertheless, the intense interest shown in Dr. Turner's work by the Americans is an indication of just how high the stakes are. Professor Bayley explains: "The next generation of gas turbine engines may incorporate the cooling system we have developed at Sussex. It could lead to an increased efficiency in engines of between 25% and 35%.

"We have been experimenting with a porous metal blade which is cooled by having air forced through the blade surface rather than over and around it as in present cooling methods. The hotter the engine can run, the more efficient it is. But at the moment the maximum temperature of a gas turbine is 1230 degrees C. Above that, the blades will fail. However, we visualise an engine with the porous blade cooling system being able to run at up to 1730 degrees C." In practical terms, this means that a plane like the Concorde, using the new type of engine cooling, would need to carry a third less fuel, and so increase its payload by a corresponding amount. 

"Of course a great deal of development work still needs to be done," says Professor Bayley, "but we feel that a real breakthrough has been made."

At Sea

Professor Bayley, who came to Sussex from Newcastle University in 1966, is Professor of Mechanical Engineering. He has spent a large part of his career in the study of gas turbine engines. Dr. Turner was a pupil of his at Newcastle.

After graduating in 1965 - he obtained a first in Engineering - Dr. Turner spent some time at sea as a marine engineer. "It was a useful experience - and very tough," he recalls. "Four hours on and eight hours off, sometimes eight on and four off."

Then, in 1966, Professor Bayley invited Dr. Turner to join him at Sussex. An invitation also went to Mike Owen, also a Newcastle first-class honours graduate and marine engineer, and a former student under Professor Bayley.

Mike Owen, now another member of Professor Bayley's team at Sussex, is working on a different aspect of turbine engines. He is concerned with the cooling of the turbine disc to which the blades are fixed. His particular research is sponsored by Rolls Royce, and it was his test rig that was destroyed by a fire in the Applied Sciences Laboratory earlier this year. Over £10,000, worth of damage was done, and the programme received a six-months setback.

The work of Professor Bayley and Dr. Turner is being sponsored by the Ministry of Technology.

Technicians

"We are only a small unit, without the vast resources of the aero-engine industry," says Professor Bayley. "But it gives me great pleasure that our contribution has been recognised. I should like also to emphasise that without the support of our team of technicians and their highly-skilled engineering work, we would never have achieved what we have."
Finding out why inventions fail

More than half of all inventions on which industry spends millions of pounds in developing, have to be written off as commercial failures. It is in order to try to save industry some of this money that Andrew Robertson, of the Science Policy Research Unit at Sussex is investigating the whole question of why it is that some inventions are successful and that others, quite similar, fail.

By comparing one money-making invention in a particular field with a less successful rival invention in the same field, he hopes to establish where and how the invention process goes wrong and ultimately, to suggest some kind of blueprint for industry that would be, as he puts it, a "model innovation sequence."

Mr. Robertson, whose two-year research programme is being sponsored by the Science Research Council, is asking companies in the chemical and scientific instrument fields to provide him with details on some of their inventions so that he can "pair off" innovations for comparison purposes.

Pitfalls

What are the major pitfalls that prevent British inventions from being more successful in markets both at home and, particularly important for our balance of payments, abroad? Mr. Robertson believes that the Americans, who often beat our inventors to the punch in direct competition, pay much much more attention to consumer research.

"It's no good producing a marvellous machine if nobody wants to use it," he says. "Every inventor and every company must ask: 'Who needs it?' And is there something cheaper or similar already on the market?"

As an example of the value of extensive market research, he cites the case of the American Du Pont Company, which beat all its competitors - British and American - in producing a synthetic leather for shoes called Corfam. Before they began production, Du Pont's had 20,000 synthetic shoes made in 200 factories, and then gave them away free for customers to walk about in for a year.

Mr. Robertson's research could help industry reduce its failure rate in invention, and save enormous amounts of the time and money at present wasted on ideas that offer no chance of lasting commercial success.

Cancer and blood analysis: improving assay methods

One of the most massive cancer research programmes ever undertaken, involved thousands of women on the island of Guernsey in the Channel Islands.

For the past six years, 5,000 women between the ages of 35 and 55 have been providing samples of urine for analysis. The samples were stored at 20°C and flown to the London laboratories of the Imperial Cancer Research Fund. There, they were analysed, and by determining the amounts of androgen hormone in the urine, scientists were able to calculate whether in some cases the androgen was not being produced.

The object of this vast survey was to establish whether any connection existed between hormone abnormality and subsequent development of breast cancer.

What happened in Guernsey was that 19 women developed breast cancer over the period of the study, and statistical evidence emerged to suggest that a link did exist between this particular hormone abnormality and breast cancer.

Clearly, the possibility existed that some kind of "early-warning system" might well be effective if a way could be found of assaying the androgen level in the bloodstream which would be more convenient and reliable than the urine assay. It might be possible to establish whether a woman was at risk. Steps could be taken to keep her under much closer surveillance and, if she did develop breast cancer, to diagnose the disease in its earliest stage, when the chance of successful treatment is at its greatest.

However, the practical difficulty lies in the process of analysis. The amounts of hormone involved are microscopically small - one part in 30,000 million - and enormous amounts of blood taken over a substantial period of time would have to be assayed in order to determine accurately the quantities of hormone present.

It is with this area of research that Dr. David Walton and Mr. Alan Holden, a post-graduate student, are concerned.

In the laboratories of the School of Molecular Sciences, they are investigating ways of improving the blood analysis process.

A piece of equipment called a gas chromatograph is being used. In this process, modified samples of the hormone are vapourised and passed at high temperature over a liquid which selectively absorbs the various compounds, so acting as a filter.

Quantity

This method of assay is highly sensitive, and well-suited to the task of identifying the minute amounts of hormone present. The Sussex team has succeeded in reducing the quantity of blood necessary to make an effective analysis, but their work continues. Further advances still need to be made before hormone abnormalities suspected of having a connection with breast cancer can be determined by a test as useful as the cervical smear.
RESEARCH
A personal view on how it works and how it could be further improved

To use a familiar cliché "we live in a scientific age". It is important for the ordinary man to learn about the organisation and control of science. This article gives an account of some aspects of pure research in Britain, and some personal views.

1. General Finance
All the pure research being done in this country is either
(i) Financed directly by the S.R.C. (Science Research Council);
(ii) Done by a university (in which case a number of agencies may be involved, S.R.C. perhaps providing part, the U.G.C. providing money for the university as a whole, and various types of contract research may be done);
(iii) Research may, under certain circumstances, be financed by an outside body.

N.A.S.A provides some money for space and plasma research, and the U.S. military provide grants for fundamental research in many areas. A lot of this research is very pure, and is absolutely nothing to do with military matters, contrary to what is often supposed.

by Ian Parker, postgraduate in MAPS

What is Pure Research?
The dividing line between "pure" and "applied" research is not clear. All research (except perhaps elementary particles and astronomy) purports to have some economic value, and equally, applied research does serve to increase knowledge.

Questions such as:
(i) Whether research is for free publication or not;
(ii) How many fields are affected by this research;
(iii) How direct is the route to an application.
are very meaningful economically. If the answer to (i) is "yes", then we can say that although we benefit from the research, other people benefit too, and we benefit to the same extent when research is done abroad. Of course, there are arguments about "weight pulling". Research for free publication then should be considered as part of our contribution to the international community. How great, and in what form Britain should make her contribution is an independent question, although I think it is now a consensus position that relative renunciation is necessary.

(ii) and (iii) of course, go a certain distance towards giving economic criteria of assessment. Economists are increasingly using input/output matrices to evaluate the economic contribution of individual sectors, and to evaluate the changes resulting from the alteration of single sectors. So-called "pure" research is characterised by application in a wide area. Pure research is relatively cheap in economic terms, even though the cost might be greater when the quantities of high-level scientific manpower used are taken into account, i.e. the marginal utility of the workers could be greater in other fields (or if organised differently). The S.R.C. is watching the manpower situation carefully.

In international co-operation on the large scale projects, our experience has so far been rather unfortunate. The supply of money fluctuates greatly according to political considerations. Viz., the decision of the government to cancel its contribution to the CERN GeV machine, and the resulting row. My own view is:-
(i) Probably the decision was right on our own balance of resources position;

Research: Electron microscope at Sussex

(ii) Britain's international position should not have been jeopardised for a matter of £4 million per annum (plus, of course, the inevitable escalation in cost which occurs) and having made a decision to cancel, we should have offered to give the money saved to some other project. The cost is not great when compared with a lot of prestige projects. On ERSO, similar arguments apply, although with perhaps less force. On the microscope, however, co-operation between individual scientists of different nations rather than the nations themselves, is much better. Recently, a research organisation for molecular biology has been formed with Britain contributing a sizeable share. This development I applaud, and I hope and believe it will be extended in the future. Papers are freely published and read by all, and at
scientific conferences there is an atmosphere of cordiality and goodwill. Perhaps it would be better if scientists and not politicians made the decisions!

Research on computers and allied fields
The S.R.C. is now concentrating on applied research, and is supporting some interesting work. However, questions may be asked as to whether HMG is the appropriate body to carry it out.

I accept that there are two kinds of research which only the government can do:

(i) Very fundamental research such as astronomy, in which there are no short or medium term commercial gains;

(ii) Projects such as Concorde or atomic power, where the amount of risk capital is too great for one industry to finance.

It would seem that the reason why the government finances the above projects is simply that it believes it knows better than industry. My own personal scientific judgement is that the government is right scientifically, although this answer really begs the question.

Checking
University research as described above is, of course, "free" research, and there is little internal checking of efficiency or anything else. Few, if any, research students are satisfied with the present methods of carrying out university research. Most of the complaints centre round the poor workshop facilities, the long waits to obtain pieces of equipment, and the frequent disinterest of supervisors in their research students. There are a number of points about the triviality and irrelevance of many research topics. My own estimation is that the university research is 50% efficient. Better facilities and organisation (more money) would mean that the desired research results would come faster. In fairness to members of faculty, it must be remembered that they often have a considerable teaching burden. The recent Price and Incomes report on teachers' pay advocated more emphasis on teaching. From one point of view, there is logic in this case. However, I do not believe that more emphasis on teaching will improve leadership in the field of research.

It is also true to say that many post-graduates lack judgement. This is, of course, an understandable result of youth. This makes a certain amount of supervision, either individually, or in a group, inevitable, and I would advocate group working wherever possible. I agree entirely with the PIB report recommending greater investigation of the efficiency of teaching. In the universities at any rate, the amount of time spent in committees and in preparing new lecture courses would seem excessive. More standardisation, and the recording of good lecture material would seem appropriate (this has been noted by McKinsey for the case of Sussex.)

Finance
I feel that if industry were to take a greater share in the finance and responsibility for universities and university research, things would happen.

(i) There would be a greater supply of finance all told, with consequent increases in efficiency;

(ii) The exchequer would be relieved of a sizeable amount of money;

(iii) The research would in general be more relevant, with a sizeable fraction being devoted to directly relevant aspects;

(iv) The applications would take place with a shorter time lag.

What are the main barriers to this? In the older universities there are well-established (and rather isolationist) academic traditions which tend to preclude closer links with the community. In the newer universities there are leaving movements which create trouble at any suggestion of links with industry. In all there is a tendency to discourage rather than encourage consultation. On the industrial side, a certain amount of prejudice remains, but this will be dealt with later. The question of undergraduate grants is not really relevant here, but it may be pointed out that with undergraduates, government financed, and research financed by other sources, there will inevitably be a conflict of interest between the government and industry. The tasks of government in this area, as I see it, are twofold:-

(i) Education and training of managers and other responsible personnel in industry;

(ii) The encouragement by financial and other means of a less isolationist attitude in our universities.

I would advocate the setting-up of a committee in the Department of Education and Science to investigate the way in which this problem might be tackled.

Duplication of Research
A certain amount of duplication of research is inevitable, and is not altogether a bad thing. Different workers pursue different approaches, and the fact of different approaches means a certain amount of competition and a lot of genuinely new ideas which would not otherwise be considered. However, in recent years, there has been too high a degree of duplication, too many individual research workers (often of dubious ability) duplicating each other's efforts, not generally using new approaches and making the literature considerably fatter. I would advocate more research groups tackling specific problems and pooling resources.

Contact
If ideas arise which are of interest to other groups (as does happen), the correct approach is to get in contact with the other groups, and, if necessary, for the individual to change his place of work. It is not for the individual to go off in a corner and do another person's work badly. I would advocate:-

(i) Easier conveyancing and transfer of houses (this is not, of course, only relevant in research!);

(ii) Standardisation of salaries in the U.K. and as far as possible within Europe;

(iii) That all European countries (and we are the worst offenders in this) should endeavour to abolish exchange controls;

(iv) The salary structure of university research workers should reflect merit, instead of at present, where increments are automatic. Remuneration should be increased by doing consultation work with industry rather than in the form of a general rise.

I would suggest, finally, that there be less individual research and more team research. That more emphasis should be on "applied" research, and that industry and university should enter closer co-operation on the lines given earlier. I think that managers should be educated to appreciate the value of research as with other advanced techniques, and that ideally the impetus should come from industry.
Faculty Rats snitch the Cup

Maybe it wasn't Wembley, but it was as near to Wembley as they were ever likely to get. On the evening of Tuesday, May 20th, the Faculty Rats, continuing their masquerade as a seven-a-side soccer team, faced Crumpets Anonymous in the final of the competition.

As the tension mounted - Brian Easton, the Rats' goalkeeper was heard muttering repeatedly "I am Gordon Banks, I am Gordon Banks" - the teams were presented to Miss Eleanor Milburn, the Vice-Chancellor's Secretary, who had offered to turn up when it was learned that the Queen had a previous engagement.

From the kick-off, the pattern of play became clear. Rats belted the ball towards the Crumpets goal and rushed after it. These tactics puzzled the opposition, and for most of the first half, the faculty side dominated what may loosely be described as the play.

SPORTS (?) FOCUS

Occasionally Crumpets threatened to break out, but so intent were they on trying to play football, that they rarely troubled the Rats defence.

True, Brian Johnson for the Crumpets was a bit of a menace, but he found his way to goal barred by Fred Newman, the biased author of this report who, in line with his duties as Information Officer, was giving little away. He never knew when he was beaten, which was, in the circumstances, just as well.

Then, shortly before half-time, amid cries of disbelief, Rats went ahead with a goal from a scorching 25-yard drive (that's how they usually describe it, isn't it?) from Sportcentre Superintendent Brian Barnett.

Seconds after the restart, Crumpets missed their best chance when one of their forwards headed over from close-in. Mike Banks, for the Rats, was there, there and everywhere, all over the place, you might say, tasking like a demon, and moving into space like an astronaut.

With ten minutes to go Rats scored their second, skilfully prodded in by Mel Welch after a goal-mouth scramble. But with Rats running out of puff, Crumpets came more into the game, and Stewart Ward pulled one back with a shot from 12 yards that Brian Easton could only watch. "What a lovely sight," he sighed.

Michael Clark, Dermot Flaherty and Brian Johnson piled on the pressure. One past the post. Another over the bar. The referee blew his whistle. It was all over. Faculty Rats had won the cup for the first time in their history.


FAIR PLAY: Insufficient data available.

CROWD RATING: Loud and lewd.

NOW IT'S OFFICIAL

Virginia Wade, Britain's top-ranking tennis player and a graduate of Sussex, returned to the University last month for the official opening ceremony of the Sportcentre.

After a buffet lunch, attended by University members, sporting celebrities and representatives from local authorities, the guests, who included architect Sir Basil Spence and Alan Weekes of the B.B.C., made their way to the Sportcentre.

There Miss Wade unveiled a plaque, and recalled the indulgence shown to her while she was reading mathematics at Sussex. The timing of one examination, in particular, had been altered so that she could play in the Wightman cup.

The Sportcentre, which opened for use on January 13th, has been heavily used by a wide variety of both "professional" and strictly amateur enthusiasts. For the Spring term, 9,669 attendance units were recorded.

The most popular activity was badminton, followed by basketball, table tennis, indoor soccer, trampoline and Children's Club.
The following took up their appointments with the University during the month of May, 1969:-

M. B. Clowes, B.Sc., Ph.D. - Senior Research Fellow, Experimental Biology.
N. H. R. Cooper, B.Sc.(Eng.) - Chief Programmer, Computing Centre, Physics.
R. M. T. Lacey, M.A. - Research Officer (Visiting), Institute of Development Studies, Stanmer House.

The following took up their appointments in April 1969 or earlier, but have not previously been announced:-

Miss L. D. Gilkes, B.Sc. - Research Assistant, Experimental Psychology.
Miss S. M. Jones - Secretarial Assistant, Bursar's Office, Essex House.
S. Lall - Research Officer, Institute of Development Studies, Stanmer House.

Miss S. M. A. Pedroza - Clerk, Science Office.
A. Peeling - Temporary Junior Technician, Chemistry.
Dr. K. Collins Bosser - Visiting Fellow, Institute of Development Studies, Stanmer House.

The following were appointed during April 1969, but did not, in fact, accept the posts:-


The following have left the University:-

M. A. Bush, B.Sc. - Research Fellow, Chemistry.
Mrs. V. J. Bush - Technician, Chemistry.
Mrs. D. J. Broad - Clerk Typist, Arts.
Mrs. J. Cheele - Accounts Clerk/Typist, Science Office.
I. H. Humphreys, B.A. - Administrative Assistant, Science Office.
Miss K. Lilenberg - Technician, Chemistry.
Miss B. A. Little - Secretary, School of Educational Studies, Arts.
Miss L. S. Patton - Secretarial Assistant, Essex House.
Miss R. Rogers - Secretarial Assistant, Appointments Advisory Service.
Miss L. A. Rowell - Research Assistant, Centre for Contemporary European Studies, Arts.
Mrs. M. Shillaker - Senior Clerk, Conferences, Essex House.
J. W. Moore, M.Sc. - Research Fellow, Physics.

The following appointments are announced and will be taken up at the beginning of session 1969/70:-

W. Y. Arms, B.A. (Oxon), M.Sc. (London), Ast. Lecturer, Operational Research.
Mrs. J. W. Burgess, M.A. (Edinburgh), Ast. Lecturer, Education (Philosophy).
Miss I. N. Carr, M.A. (Cantab.), Assistant Lecturer, History and Theory of Art.
J. W. M. Chapman, M.A. (St. Andrews), D. Phil. (Oxon), Lecturer, International Relations.
T. F. Mars, B.A. (Witwatersand), M.Sc. (London), Assistant Lecturer, Politics.
W. K. Orwin, B.A. (Birmingham), Assistant Lecturer, Psychology (Social).