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OFFICE OF NAVAL RESEARCH
LONDON

EUROPEAN SCIENTIFIC NOTES

No. 20 - 4
18 April 1966

Distributed by the
Office of Naval Research Branch Office,
London

OFFICE OF NAVAL RESEARCH
LONDON

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THE NEW UNIVERSITIES OF BRITAIN

Observers of the educational scene will agree almost unanimously that, of all the European national educational systems, that of Britain is undergoing the most searching examination, rapid expansion, and violent upheaval. This remark applies to all phases of British education, from kindergarten through the universities. It appears safe to ascribe this dramatic and vital development to a pair of fundamental causes: steadily increasing pressures for greater equality of educational opportunity, and Britain's need to adjust herself to a change in international status from that of an imperial center to that of a political and economic power of secondary rank, facing a desperate future if she does not succeed in rapidly improving her competitive position.

A number of the scientists based at ONR London have taken a particular interest in at least one major phase of recent educational developments in Britain - the expansion of its university system. A portion of this issue of ESN is devoted to a set of articles dealing with this subject. These articles can at best give only a very incomplete picture of a rapidly changing situation; nevertheless, it is surely worthwhile to bring to the attention of the portion of the American scientific community which reads ESN some facts and opinions dealing with a matter of vital importance to a nation whose future is so closely tied to our own.

A special note of thanks is due to Mrs. Victoria Hewitson, who suggested the preparation of this set of articles.
(B. Epstein)

Britain's Need for New Universities

At the present time, there are some thirty-odd universities in Britain. About a third of them were not in existence five years ago. New institutions of higher education are currently being granted the Royal Charter at a rate of several a year, making them full-fledged universities with the privilege of awarding degrees.

The rapid pace at which the program is proceeding is one of the reasons why part of this issue of ESN is devoted to the new universities in Britain. Programs for expanding the facilities of academic education are going on in almost all of the European countries, for more or less the same reasons and born out of identical needs. As far as numbers and the ratio to the existing facilities go, Britain's program is almost certainly more ambitious than that of any of its neighbors. Britain has been further behind, but is catching up quickly.

Numbers and ratios and rates of growth, however, are not the real reason why the British program is more interesting than that of any other European country. In most of the other countries, starting a new university is more or less a matter of reproducing the existing ones with slight modification. In Britain, starting a new university is a revolutionary undertaking. A new university is not merely a modernized replica of Oxford or Cambridge with their 700-year-old traditions, rather it represents an active challenge in defiance of a set image.

Most of the readers of this article will have asked themselves: "Over thirty British universities? Why - aren't there only Oxford and Cambridge? And possibly the University of London? And there must be one in Manchester, because Joe Smith used to be there." These readers are in excellent company. A Gallup poll taken among American college graduates in 1960 under the sponsorship of the British Broadcasting Corporation gave this result: 80% had heard of Oxford and Cambridge, 50% of London University, but only 8% could name some other British university.

This frustrating result explains in large part why these articles are dedicated to the universities in Britain and not of any other country. This result speaks not so much of the ignorance of American college graduates (they were able to name quite a number of universities in other European countries), but about the very peculiar educational situation in Britain, which the new universities will certainly succeed in improving. If seen against the backdrop of the exalted status of Oxford and Cambridge, with its discouraging effect upon the other British universities, the project of starting new universities merits greater interest than would similar efforts elsewhere. Representing a counterforce to the dominant institutions, these new schools will stimulate more discussion, more controversy, more emotion than would a routine process of reproduction initiated merely by the necessity to increase numbers.

In order to see clearly what this upcoming revolution is directed against, it is necessary to know what the British system of education was like in the very recent past. It is further necessary to know in what way the existing facilities are not only outgrown as to size but also outdated as to spirit, purpose and final accomplishment. What, in other words, are the shortcomings and handicaps of this previous system of education and what are the motives behind the intended change? This lead article will try to answer these questions and give a bird's-eye view of how the new schools will improve on the present situation, in which respects they will be alike and in which different.

It is actually a misnomer to speak of a British system of education, if by "system is meant a consciously coordinated organization. Nowhere have the British passion for letting institutions just grow, and the British distaste for centralized control, been more evident (and more disastrous) than in the educational system. Yet education is the main instrument for change, and the latter is something that is almost frowned upon in Britain. It is the schools that mold the future attitudes of society and the universities that lay the foundations of future skills and adaptability. Part of the neglect of this powerful instrument can be explained in terms of Britain's history during the last century. The industrial revolution, the expansion of trade, and the building of the Empire - three of the most solid pillars of Britain's contributions to this last century - had all happened without much help from the universities. After these accomplishments, cheap labor and materials kept rolling in, maintaining Britain's supremacy without compelling her to draw on intellectual resources too heavily. It was only after WWII that Britain began to seriously take stock of her situation and, as a vital part of this stock-taking, to take a hard look at her educational needs. New questions as to what kind of country Britain should be and what kind of schooling was needed to help her move in the desired direction were asked, studied, and discussed as never before. Describing this transition with unsurpassed conciseness, Winston Churchill said at that time: "The new Empires are the Empires of the Mind."

In order to understand what British educational institutions were like at the time of this transition, one must first realize the basic distinction between Europe's educational scheme and the large, comprehensive arrangements which are found in the US, where over a third, and in some states close to a half, of the age group enters higher education in the vast assortment of state, church, and private universities and colleges of varying degrees of academic standing. In western Europe, with which Britain has some structural features in common, universities tend to be sharply distinguished from other educational institutions. Less than 10% of the age group enter these universities for full-time higher education, their level of study being comparable to that of US graduate schools.

The astonishing feature of Britain's universities - and this sets them aside from the rest of Europe - is that one gets the impression that there are actually only two universities in the country - and then there are the rest. This pronounced division is demonstrated in the popular names for these two groups: "Oxbridge" and "Redbricks," the latter name applying to the 15 provincial civic universities, so called because, until modern buildings of glass and steel began to rise on their campuses, they were housed mostly in dreary structures of red brick. Most of them go back to the Victorian era, when they were founded to accommodate the poorer boys and the religious dissenters from the provinces, since Oxford and Cambridge were strictly and unwaveringly Anglican. The Scottish universities have avoided more or less this rift of religion and classes.

It is rather easy to prove that in many sections of science and sociology, and even in some of the arts, many of the Redbricks are actually superior to either Cambridge or Oxford. But this factual equality or even superiority will, for decades to come, probably not be acknowledged by a substantial part of the population - including even many of the Redbricks' teachers and students.

A strong argument can be made for the claim that this rift has had a far-reaching and detrimental influence on British life, in particular that Britain has failed to exploit effectively the vast pool of talent that has always existed outside the privileged precincts of Oxbridge. These two universities provide an inordinately large fraction of Britain's leadership, thereby imposing their own rules - effectively if not formally - on the selection of new generations of leaders and managers. In this writer's opinion, the words: "... they are hothouses of snobbery where citizens are brought up with a sense of superiority, making the rest of the country suffer from the kind of image of Britain which they have helped to create," although stated (in a parliamentary debate, February 1966) with reference to the public schools, apply with equal force to Oxbridge.

It is this publicly assumed distinction of supremacy which is responsible for filling most of the influential jobs in Britain with graduates of Oxford or Cambridge. Far less than 1% of the British population go to either one of these universities, yet in 1961 Oxbridge provided 87% of the government's permanent secretaries, 40% of all members of parliament, 71% of the vice-chancellors of all universities (a position comparable to that of president of an American university). Seventy-six successful candidates for the senior civil service and the foreign service from Oxbridge were balanced by only 17 from all the other universities.

The trouble with this system is its tendency to be self-perpetuating. Any commission supervising the entrance examinations for any kind of elevated service will undoubtedly be staffed with graduates from Oxbridge, and while they may intend to judge fairly the Red-brick graduate, they will probably, with subconscious bias, finally select the Oxbridge product. This, then, is just the last step of a selection process which started very early in childhood with enrollment in one of the so-called "public schools." To be fair, it must be acknowledged that admission to Oxford or Cambridge is not exclusively a question of class. Many members of the Labour cabinet of Harold Wilson, who pride themselves on their start from lower-middle or working-class level, have graduated from Oxford or Cambridge. But to have the right kind of parents helps immensely. In 1961, 54% of all Oxbridge graduates came from public schools, but, according to one carefully considered estimate, less than 7% of the public can afford to send their children to these schools. This latter figure is most certainly over-optimistic, because the definition of a public school is somewhat flexible, so that things are probably much more out of proportion. There are 218 public schools altogether, financially quite independent of government support and subject only to rather undemanding government standards and supervision. Of these 218, the British, with a fine sense of discrimination, usually refer to only 20 as "public schools." The others are "minor public schools," and their graduates, while presumably not doomed to secondary status for their entire adult lives, do start out with some handicap vis-a-vis the graduates of the top 20 schools. Even among the preferred 20, there are only seven - Eton, Harrow, Winchester, Rugby, Charterhouse, Westminster and Shrewsbury - which are considered the elite of the elite. The insidious element of their particular and distinctively different accent unifies their graduates in almost every minute of their lives, or, to put it in Bernard Shaw's words: "It is impossible for an Englishman to open his mouth without making some other Englishman despise him."

It is particularly the public school and the well-defined line of subsequent selection from the same group which demonstrates that the British system of education is founded on the principle that all Englishmen are not created equal. An important and frankly acknowledged function of the school system is to distinguish the superior from the inferior intellect, but to a certain extent a socio-economic bias is manifested at the same time. The widely-held American notion that all children regardless of economic and social class are entitled to the same education as a matter of right begins only slowly to appeal to most Englishmen, and equal education for all still appears to be far from adoption as the national policy.

It must be said in all fairness that once a pupil makes it past the ill-famed "eleven-plus" examination, which supposedly separates at a tender age the intellectual chaff from the grain, and is the subject of much controversy these days, Britain takes good care of him. The one youngster in four who passes the eleven-plus gets the education he can qualify for regardless of the financial status of his parents. Education in the pre-university "grammar school" is free up to the age of 18. Parents of university students must meet a "means test" and pay accordingly a share of the expenses, if they are deemed able to do so. Scholarships and governmental funds make it possible, at least in theory, for everyone to receive all the higher education that he is intellectually able to absorb. The method of determining who is qualified and at what age is controversial, the subject of much discussion, and far from infallible. Gradually the old question "which school did you go to?" shifts to "which university did you go to?" or "did you go to any university at all?" The strong dependence of the universities (even the famous two) upon government funds and government scholarships makes this more and more a question of intellectual rather than social qualification. This tendency is supported by a rising consciousness at a social level which previously considered an academic training as out of the question. The pressures of an expanding demand for higher education centers on the universities, and the concept of selective education is under the severest strain, as more and more young Englishmen from the previously under-educated groups come to regard a university education as their right.

The counter-pressures are not less heavy, however. There is the old argument that most children are not equipped to profit from a university education and that they will best serve themselves and the country by leaving school at an early age and going to work. Even worse, according to this line of reasoning, enlarging the existing facilities and granting admission to larger groups will result in irreversibly lowering the standards of higher education. "More means worse," to cite a slogan of the adherents of this philosophy.

In 1961 the Prime Minister appointed a committee, headed by Lord Robbins, to study the problems of higher education in Britain. The final report, issued in 1963, and which is the source of most of our figures in this article, states clearly, however: "We believe it is highly misleading to suppose that one can determine an upper limit to the number of people who could benefit from higher education, given favorable circumstances." And it goes on: "Fears that expansion would lead to a lowering of the average ability of students in higher education have proved unfounded Recent increases in numbers have not been accompanied by an increase in wastage and the measured ability of students appears to be as high as ever."

If this is so, the following questions come up with high urgency: Should only a tiny fraction of the age group have privileged education, cut off from their contemporaries at an early age? Should parents be allowed to choose how their children are being educated? Is it beneficial to withdraw the most gifted children from society and rob society of the stimulating presence of these children in the classroom of the average children? To cite the Robbins Report on the later stages of the educational process: "It is not a good thing that Oxford and Cambridge should attract too high a proportion of the country's best brains and become more and more exclusively composed of a certain kind of intellectual elite. We should rather make the most of first class ability wherever it exists." An attemped remedy to this early separation of the academic sheep from the goats and the cut-off of any cross-fertilization is an experiment called the "Comprehensive School," in which about 7% of all British children are presently enrolled. It presents a close analogy to the American type high school. The children are not in one stream, and no decisions are made prematurely. There exists a grammar-school class, leading to university, but classes and streams can be changed according to performance and individual development. Out of class, of course, all children mix with schoolmates of varied abilities. As promising as these comprehensive schools are, they encounter fierce opposition from the traditional grammar-schools, which cling to their privilege of seeing children through the pre-university period in their own old-fashioned way and try, still more or less successfully, to cream off the elite.

Up to this point we have tried to deal with one of the reasons why the present facilities of higher education in Britain are considered to be in need of a change. It is the reason which has its roots in the exclusiveness and selectivity of the present system. Let us summarize with a citation from the Robbins Report: "If it is true that certain differences of level and function must be expected to persist among institutions, it is also true that such a structure can only be morally acceptable if there are opportunities for the transfer of a student from one institution to another when this is appropriate to his or her intellectual attainments and educational needs. We attach great importance to this."

There is, however, a larger vacuum for the new universities to fill. The exclusiveness and selectivity of the old schools are complemented by their refusal to adapt to the change in demand. Justified in the past by Britain's mostly administrative role at the center of a big empire, they more or less cater to the gentlemen's professions of the last century - law, civil and foreign service, etc. The powerful disciplines which nowadays largely control society and a nation's standing have been permitted to deteriorate at Oxbridge, while the Redbricks, in contrast, have emphasized them. "It must be recognized that in our own times, progress and the maintenance of a competitive position depends to a much greater extent than ever before on skills demanding special training. A good general education, valuable as it may be, is frequently less than we need to solve many of our most pressing problems. It is this that the world of affairs demands of the world of learning." (Robbins Report) Here is the most exciting challenge to the new universities, which may have huge repercussions on the pattern of Britain's life.

Possibly the strongest motivation for a change in the previous structure of higher education is a marked change in the position which education holds among the aspirations of a modern society. Citing the Robbins Report again: "Conceiving education as a means, we do not believe that modern societies can achieve their aims of economic growth and higher cultural standards without making the most of the talents of their citizens. This is obviously necessary if we are to compete with other highly developed countries in an era of rapid technological and social advance. But, even if there were not the spur of international standards, it would still be true that to realize the aspirations of a modern community as regards both wealth and culture a fully educated population is necessary." It is the growing realization of Britain's economic dependence upon the education of its population that has led to the questioning of the adequacy of the present arrangements. Unless higher education is speedily reformed, it is argued, there is little hope that this densely populated island can maintain an adequate position in the fiercely competitive world of the future.

Whatever happens, educational change is the slowest to take effect and its results may not be seen for decades. But things are on the move, and the question of education seems, at last, to have been removed from the otherwise less dynamic overall situation of post-war Britain.
(B.O. Seraphin)

Some Information Concerning Britain's Universities

It may be helpful to present here some information concerning Britain universities. The most convenient single source of such information (as of 1963) is the Robbins Report, published in October 1963 under the title "Higher Education," by Her Majesty's Stationery Office.

Britain's university system covers England, Scotland, and Wales; Northern Ireland possesses a separate Ministry of Education which maintains the Queen's University of Belfast and is planning to establish a new university in Coleraine.

The Robbins Report presents a historical classification of Britain's universities into seven categories:

(a) Cambridge and Oxford, with roots deep in the middle ages.

(b) The ancient Scottish universities (St. Andrews, Glasgow, Aberdeen and Edinburgh), founded in the 15th and 16th centuries. The Queen's University of Dundee has alternated between periods of attachment to St. Andrews and periods of independence; it is now independent.

(c) The University of London, a vast and loosely connected grouping of colleges (some of which, such as Imperial College and University College, are virtually universities in themselves). This University, by far the largest in Britain, was not chartered until 1836, many centuries after its only two English predecessors.

(d) The older civic universities: Durham, Manchester, Birmingham, Liverpool, Leeds, Sheffield, and Bristol. The University of Newcastle, although separately chartered only in 1963, has been a highly autonomous branch of the University of Durham for about a century.

(e) The University of Wales, consisting of four independent branches (Aberystwyth, Bangor, Cardiff, and Swansea).

(f) The younger civic universities: Reading, Nottingham, Southampton, Hull, Exeter, and Leicester. Keele, a small rurally-located university, may also be listed here.

(g) The seven "new" universities, all of very recent date: Sussex, Canterbury, Essex, East Anglia, Warwick, Lancaster, and York. These have been built "from the ground up," without developing from earlier institutions, and the bulk of the funds for their establishment have come from the national government, supplemented by the local communities.

In addition, the ten "Cats" (Colleges of Advanced Technology) are all in some stage of advancement to university status. Of these, four are in the London area (Battersea, Brunel, Chelsea, Northampton); the remaining ones are at Birmingham, Bradford, Bristol, Cardiff, Loughborough, and Salford. Also, mention must be made of the former Royal College of Science and Technology of Glasgow, which was chartered in 1964 as Strathclyde University.

During the year 1961-62 the universities enrolled about 94,000 undergraduates and 19,000 graduate students; their full-time faculties numbered about 16,000. The "Cats" enrolled about 10,000 students (1962-63). In addition, there are a large number of "regional," "area," and "local" colleges providing both full-time and part-time work in teacher training, business, and engineering (tending toward the more practical aspects); in 1962-63 these institutions enrolled about 43,000 full-time and 108,000 part-time students.

Note that only about one-fourth of one percent of Britain's population attends institutions of university status (one-tenth of one percent in 1938-39); about three-fourths of the student population are men.

The following statistics refer to the year 1963-64:

Only in Oxford and Cambridge do more than 50% of students reside in university halls. The percentage living in university halls of residence is steadily increasing, being 31.1% in 1963-64. Of all students, 10.9% were from overseas; of these, 6% from within the Commonwealth and 4.9% from foreign countries.

18% were graduate students.

27.5% were first-year students, broken down into age groups as follows: 6.1% under 18, 47.2% 18-19, 30.0% 19-20, 16.7% 20 and over.

42.3% entered in science (pure or applied).

Expenditures (not including the "Colleges" at Cambridge and Oxford) £102,301,794 (about $286,500,000).

Graduate students in chemistry: 1,903

Graduate students in physics: 1,237

Graduate students in mathematics: 464

BSc Honours Degrees awarded in chemistry: 1,134

BSc Honours Degrees awarded in physics: 1,027

BSc Honours Degrees awarded in Mathematics: 634

(B. Epstein and S.Y. Tyree)

<u>University of Sussex</u>

The plan to establish a university at Brighton, on the channel coast, goes back over fifty years. Two world wars delayed the plan, and the Royal Charter was not received until 1961. At first it was planned to combine the university with the Brighton Technical College, which was already in existence, but these plans seem to have been dropped.

The University of Sussex, which is located in Falmer, a few miles outside of Brighton, is the first of the so-called "new universities" of England. It is still relatively small but is growing rapidly. In 1965-66 approximately 2000 students are in attendance, and by 1967-68 it is anticipated that this number will increase to 3000. In rather sharp contrast to the general English university pattern of 75% men and 25% women students, the ratio at Sussex is about 50-50. There is an air of feverish activity on the campus, with new buildings being erected at a rapid pace.

Sussex differs in several ways from the more traditional university structure. Perhaps the most interesting feature is the abolition of departments. The University is organized into schools, each school covering several allied disciplines, and organized under a dean. In science, there are four schools: Physical and Mathematical Sciences, Molecular Sciences, Biological Sciences and Applied Sciences. Each student is enrolled in a particular school and must take certain courses as required by that school. Ordinarily, all his courses will be taken within his own school, in which he will choose a field of specialization. The organization into schools rather than departments reflects a reaction against the traditional English practice of compelling the under-graduate to confine himself almost entirely to a single narrow field of study. Thus, in a sense, this represents a move toward the American liberal arts tradition. Furthermore, each science student is required, once during his BSc program, to prepare a paper on a liberal arts topic.

In addition to the four scientific schools listed above, the University currently includes the following schools: African and Asian Studies, Educational Studies, English and American Studies, European Studies and Social Studies.

At present, about 15% of the students at Sussex are at the graduate level. This will be raised to about 25% in 1967-68. For the students in the various scientific schools there exist an MSc degree and two research degrees, the M Phil and the D Phil. The MSc requires one year of course work beyond the BSc. It is not intended primarily as a preliminary qualification for a research degree, although those students who go directly from the BSc toward a research degree will pursue some of the same course work as the MSc students. A student who does not show a strong record as an undergraduate may be required to complete the MSc before he will be allowed to pursue a research degree. If a student is allowed to proceed directly from the BSc toward the D Phil, he will be required to take about one year of course work, and he can expect to earn the doctorate about three years after the BSc. Of course, at Sussex, as elsewhere, the amount of time required for the research degree, particularly in physics, has a tendency to lengthen out, and this is a matter of concern at the University.

The School of Molecular Sciences consists at present of five major areas of emphasis (roughly equivalent to departments): chemistry, theoretical chemistry, biochemistry, materials science, and physics. All undergraduates in the School of Molecular Sciences, no matter what their planned major emphasis, take a common program during the first year. The subjects presented are: structure and properties of matter, mathematics, and chemistry. After the first year, certain subjects are required, in accordance with the student's choice of specialization within the five major subject areas. For example, in materials science, the intention is to develop in the student a firm knowledge of the physics and chemistry of solids, the principal methods of preparing solids and of the analysis of crystal imperfections as a means of determining the properties of solids. In addition, some appreciation of electronic applications of solids is included. One might well describe the Materials Science major program as chemical physics with a heavy admixture of chemistry.

While physics is listed as one of the five major subjects within the School of Molecular Sciences, it is also listed as one of the major subjects in the School of Mathematical and Physical Sciences. In fact, it appears to this writer that physics is for all practical purposes entirely within the latter School. Therefore, the School of Molecular Sciences is in fact a large department of chemistry, including chemical physics and biochemistry as well as the normal complement of chemical interests that one might expect in a large, broad-spectrum chemistry department.

The chemistry building is being constructed in several stages, the first of which, already completed and occupied, comprises 45,000 ft^2. Stage two, nearly completed and about half occupied, provides an additional 32,000 ft^2. Stage three is in the planning phase only at the moment. With the existing facilities approximately 300 undergraduates, 100 in each of the three undergraduate years, are being handled.

At present there are approximately 30 faculty members, approximately 20 postdoctoral fellows, and about 50 graduate students. There are four professors in the department at the moment, C. Eaborn, J. Chatt, J.N. Murrell, and A.E. Scott. In addition, there is a Reader, Dr. M.F. Lappert, who is the senior man in the area of inorganic chemistry. This requires some explanation, since J. Chatt has been listed above as a Professor. However, Chatt actually has a rather unusual faculty status. The Agricultural Research Council of the British government has established a research group on the problem of nitrogen fixation, to be located in a building contiguous to the chemistry building. Chatt is the Director of this group. For the moment he and his staff are housed in the stage-two part of the chemistry facilities. Chatt does not do any undergraduate teaching, but will direct the research of some graduate students in the School. He has associated with him five postdoctoral fellows, four of whom are working in the field of inorganic chemistry. Thus, while Chatt holds the rank of professor, it is Lappert who is actually in charge of the organization of instruction in inorganic chemistry at the School. The arrangement seems to be a very amicable one for all concerned. In addition to Lappert, Chatt and the latter's five colleagues, there are four other staff members in the field of inorganic chemistry: Drs. M.G. Brown, M.H. Ford-Smith, A. Pidcock, and J.D. Smith. Thus, the establishment of the nitrogen fixation research laboratory has brought to Sussex a very large group in inorganic chemistry.

Chatt's interests are well known in the field of transition-metal chemistry, with particular emphasis on the chemistry of nitrido-, hydrido-, organo- and phosphine-complexes. Lappert's interest continues in the field of boron chemistry, with special reference to boron-halogens and organo-boron compounds. In addition, he has in recent years developed interests in organometallic derivatives of group IV elements. Ford-Smith is a student of the kinetics and mechanisms of inorganic redox reactions. Pidcock is primarily responsible for nuclear magnetic resonance in the inorganic group, studying reaction kinetics and bond types in transition metal-phosphine complexes. Smith is interested in aluminum-nitrogen and aluminum-phosphorus compounds and reactions of transition metal organometallic compounds. Brown studies the transition metals in decarbonylation reactions.

Facilities are excellent, both with respect to classical chemical apparatus and the modern instrumental approach to chemistry. Most major items of modern physical equipment are available. They include nmr, infrared, ultra-violet, and mass spectrometers; X-ray structure determination apparatus, optical rotatory dispersion apparatus, etc. In fact, no difference can be detected between the facilities in this School and those one would see in one of the large, well-equipped chemistry departments in the US.

The School of Physical and Mathematical Sciences is led by its Dean, Professor R.J. Blin-Stoyle, a distinguished nuclear theorist. There are four sub-divisions within the school: mathematics, physics, mathematical physics, and philosophy and theory of science. Particular emphasis is placed on the link between mathematics and physics, and also upon the philosophical implications of these subjects.

The School is housed in a building which is quite crowded, but new wings which are planned for the immediate future will give adequate room. The shop facilities are impressive.

The undergraduate program leading to the BSc degree takes three years of three terms each. After the first two terms, during which all students of the School are required to take much the same course-load, a preliminary examination is given whose successful completion is required before specialization can commence. One of the required courses of the first year is "Structure and Properties of Matter," which integrates, from the microscopic point of view, topics in nuclear structure, atomic structure, molecular structure, the chemical bond, the mechanical, electrical and thermal properties of solids and gases, living organisms, and the structure of the universe. The student is not required to elect a field of specialization until after the preliminary examination. The teaching is divided into lectures, tutorials and experimental work.

Blin-Stoyle has been building a strong group of physicists, including Prof. J.P. Elliott, an outstanding nuclear structure theorist, and Prof. K.F. Smith, who directs the experimental physics programs. Research is being conducted in nuclear structure, solid state physics, low-temperatures, plasma physics and spectroscopy. Some astronomy is being started in cooperation with the astronomical observatory at Herstmonceaux, Sussex.

No attempt has been made to obtain nuclear accelerators. The emphasis in nuclear physics is on table-top research such as precise beta-spectrometry. Blin-Stoyle leads a theoretical nuclear structure group, well known for its work on magnetic moments of nuclei and on beta-decay theory. Presently, members of this group are working out the implications of the Conserved Vector Current hypothesis and the conservation of G-parity in beta decay. Dr. M. Delves is continuing the work which he did with J. Blatt on the properties of the three-body nuclei. The problem here is to see whether it is possible to obtain the correct bound state of the three-body nuclei by performing a variational calculation. The potentials are those which seem to be required from two-body scattering data and from general meson-theoretic considerations. Dr. Phillips is studying the three-body problem also, but approaching it from the point of view of Lovelace, Fadeev, Amado, etc. - namely, a set of integro-differential equations which describe three-body interactions in terms of separable two-body interactions. The greatest emphasis in the experimental program at Sussex seems to be in low-temperature physics.

Sussex, at least when viewed from the physics "angle", should become a strong and healthy university. Certain projects, such as those in plasma physics, are bringing physics and applied physics together in a way which is not characteristic of the older British universities. Such cross-disciplinary efforts are badly needed.

The mathematical staff, which constitutes one of the four parts of the School of Physical and Mathematical Sciences, numbers over 25, and the research interests cover a broad spectrum. Prof. D.B. Scott, an algebraic geometer, serves as the equivalent of a department chairman. Three other "chairs" (professorships) are held by G.N. Ward (fluid mechanics), W. Ledermann (algebra), and J.F.C. Kingman (probability and statistics).

It appears that Sussex, being the first of the "new universities" to get "off the ground," has exerted a powerful attraction on faculty people as well as on prospective students. If it can maintain the remarkable start which it has made, it will be one of the largest and most significant mathematical centers in Britain. However, the recent loss of the excellent algebraist J.A. Green to Warwick suggests the likelihood that, so long as a serious shortage of qualified mathematicians exists, "raiding" is likely to be commonplace, with questionable benefit to the overall situation.

The buildings of the University are being constructed on a very pleasant, rolling green area of about 200 acres. Beyond this, there are at least another 1,000 acres which, while not being available as a construction site for the University, are to be maintained as open land in perpetuity. The architect for the building program is Sir Basil Spence. Those buildings which have either been built or are in various stages of completion share a uniform, modern, functional appearance throughout.

Since the School is located in the country, it is intended to have a residential campus, with dormitory accommodations and recreational facilities quite similar to the American campus tradition. Thus far, four halls of residence exist, one of which is in the last stages of completion but not yet occupied, a second of which is being temporarily used as housing for the administrative personnel of the University, while the other two are being used as a male and a female student residence, respectively. The men's residence hall houses 96 students while the women's hall accommodates 120. Thus, only 10% of the current student population are in fact in residence. The remainder live in hostels in Brighton, leased during the academic year by the University. Since Brighton is a summer resort, the hostel facilities are in great demand during the summer months by the general public for vacation purposes. Therefore, the academic year at Sussex is completed toward the end of June, about a month earlier than at other British universities. This is accomplished by shortening the between-semesters holidays.

The organization of the existing student halls of residence is a relatively novel one for English universities. The two-story buildings are in the shape of a rectangle with a center quadrangle. The buildings are divided into a number of blocks, each housing 12 students. Each student has his own well-furnished room measuring approximately 12 ft x 14 ft, one entire wall being a window overlooking green country. Each block has adequate communal facilities, including a kitchen and dining area. Complete laundry facilities are also available.

While a faculty member occupies a residential suite within the hall, the students have been given virtually complete responsibility for any disciplinary matters arising in the living unit. Thus, for example, students may have visitors of any age and of either sex in their rooms until midnight on any day of the week. Matters of discipline in the halls have, so far, been handled successfully by elected student committees. Living conditions appear to be both pleasant and conducive to serious study. Lounges and other small recreational rooms are also incorporated as a part of each hall.

One of the first buildings to be completed was the Student Union. It is a very spacious building, with most of the external walls being of glass, so that from almost any room one can see out-of-doors clearly. The Union has lounge rooms, casual reading rooms, many small conference rooms, a refectory, and a senior refectory where both faculty members and students may dine, the latter in small groups after having made prior reservation. In addition there are a general-purpose kiosk and a bar at which beverages of <u>all</u> kinds may be obtained.
(J.G. Brennan, S.Y. Tyree and B. Epstein)

The New University at Bath

The high caliber of the Departments of Physics and Chemistry of the University of Bristol is well known to scientists in these fields. Not far from Bristol is located the city of Bath, at which a new major university is soon to be established. Actually, this new university has its origins in Bristol, for it will result from an enlargement of the Bristol College of Science and Technology. If all goes well, this College will receive its university charter sometime in 1966. Actually, the College, as it becomes a university, will be removed to Bath, where land has been set aside. The first building of the new campus has already been constructed, and plans are currently under way for the chemistry building. It is anticipated that the School of Chemistry will take in 40 first-year students annually. In addition, there will be a School of Chemical Engineering and Material Science. There is already a degree program in metallurgical engineering, which takes in about 20 new students a year, as well as a School of Biological Sciences.
(S.Y. Tyree)

The University of Essex

This University is located in the heart of "Constable country" at Wivenhoe Park, two miles east of the town of Colchester and about 50 miles northeast of London. Instruction began in the fall of 1964, and total enrollment is still quite small - about 400 during the current academic year. An enrollment of 6000 within a decade is anticipated, but the overall development plan, which has 200 acres at its disposal, can allow for as many as 20,000 students.

A striking feature of the design is the set of five platforms, constructed over the service road which will carry all vehicular traffic through the campus. The teaching and research buildings will span, in a zig-zag fashion, the valley traversed by the road. They will be accessible at the lower level from the road and from the higher level from the platforms, which, by connecting sets of steps, will constitute a pedestrian "high-street." In addition to the academic buildings, social rooms, coffee shops and other amenities will cluster around the platforms.

Halls of residence, two of which are already in use, will be located some distance from the "high street." While only a small fraction of the students will ever reside in these halls, the University plans that those students who reside in rooming houses will have the use of a non-resident study room; these accommodations are intended to be so convenient and attractive that students will prefer to stay from morning to evening at the University.

Like many of the other new universities, Essex is divided into schools, and these in turn are divided into departments; a student is admitted to a school and takes a prescribed curriculum during the first year, after which he specializes within his school. In contrast to some of the other new universities, Essex intends to encourage students to take work outside their schools. In particular, the Department of Mathematics, in the School of Physical Sciences, anticipates a close working arrangement with the Department of Economics, in the School of Social Studies.

At present there are three Schools: Comparative Studies, Social Studies, and Physical Sciences. The latter consists of Departments of Chemistry, Mathematics, and Physics, and offers five fields of specialization: chemistry, chemical physics, mathematics, physics, theoretical physics. Professor A.F. Gibson serves as Dean of this School and as Chairman of the Department of Physics, while Professor I. Proudman doubles as Chairman of the Department of Mathematics and Dean of Students.

Continuum mechanics and statistics are particularly well represented in the Department of Mathematics. Proudman, who is one of the outstanding of Britain's younger fluid dynamicists, is supported by two capable young lecturers, R.W. Bray and I.B. Duncan, while I.T Cook, a senior lecturer, is active in elasticity and plasticity. The second professorship in the Department is held by G.A. Barnard, who formerly held a chair at Imperial College.

A small computer center, separate from all three Schools, has been operating since October 1965. Built around an ICT 1909, it will for the present constitute a service facility for the entire University rather than a department of research and instruction. However, it is hoped to appoint a highly competent computer-oriented numerical analyst (a rare and precious commodity) to a combined position of professor and director.

The entering freshman in the School of Physical Sciences has two options for his first year -- "mathematical studies" or "physical sciences." Under the former scheme, the student takes courses about equally divided among physics, mathematics, and social studies, and is examined accordingly at the end of the year. If successful, he may during the remaining two years pursue a program of studies in mathematics and one or more of the social sciences, or he may choose to specialize in mathematics, physics, or theoretical physics. Under the "physical sciences" option, the student divides his first year about equally between chemistry, mathematics, and physics, and then chooses one of these three subjects (with "physics" again supplemented by "theoretical physics") as a field of specialization for the remaining two years. Thus, the entering student has considerable opportunity to "find himself" during the first year.

On the graduate level, MSc programs are offered in continuum mechanics, quantum electronics, and chemical kinetics. These subjects clearly reflect the particular competence of the rather small staff, and will undoubtedly be expanded as the size of faculty and student body increases.

An interesting item in the regulations of the School of Physical Sciences is a requirement that all students attend an intensive course in German or Russian. This appears to be a radical innovation in Britain, deserving emphatic commendation. (B. Epstein)

The New University of Lancaster

North of Manchester and south of Carlisle, on the west coast of England, is located the city of Lancaster. In November 1961 the British government announced that a university would be founded there. In the fall of 1964 the new University of Lancaster accepted its first students, approximately 300 undergraduates and 40 graduate students.

Up to the present time the University is operating largely in temporary quarters within the city of Lancaster. For example, chemistry is presently being taught in a portion of a building which has been completely transformed from its former state, that of a disused furniture factory, into laboratories, lecture rooms, library, workshops, etc. However, plans call for the University to be developed on 200 acres of land at Bailrigg, about three miles south of the city. A residential type of university, accommodating approximately 7,000 students, is planned.

In the fall of 1965 the University accepted its second undergraduate class and its first students majoring in science. The Chemistry Department, for example, has a staff of six faculty members, nine research students, and about six technical assistants (technicians).

The undergraduate curriculum for science students is divided into two parts. During the first year the student is expected to take three equally important subjects. Part two of the curriculum encompasses the last two years and is the period during which the

student concentrates on his specialty. Interestingly enough, at this new university it will be possible for an undergraduate science major to choose a non-scientific subject for one of his three first-year courses. This is, at least within my experience, unique in England. In return, the science departments are going to offer courses at similar levels for students majoring in non-science departments. (Shades of a liberal education!)
(S.Y. Tyree)

The New University of Surrey

Battersea College of Technology will become the University of Surrey sometime in 1966. Plans are complete for the removal of the new university from its present old and widely-scattered facilities in the Battersea section of London to a new campus at Guildford (about 20 miles southwest of the city of London) . The cost of the construction of the new campus is estimated at between 16 and 20 million dollars, and about 275 acres have been made available for the campus.

At the present time the academic staff consists of about 200 full-time members, divided among 12 academic departments: Chemical, Civil, Electrical & Control, and Mechanical Engineering; Metallurgy & Materials Technology; Chemistry; Mathematics; Physics; Spectroscopy & Chemical Physics; Biological & Health Studies; Hotel & Catering Management; Humanities & Social Sciences.

At least in chemistry, Battersea has been conferring graduate as well as undergraduate degrees for many years. At the present time there are about 30 research students in the Chemistry Department, which has a permanent staff of 27. Thirteen PhD theses were accepted during the 1963-64 academic year. J.E. Salmon is Professor and Head of the Department.

About two years ago the section of spectroscopy and chemical physics was separated from the Chemistry Department and established as a separate department. V.S. Griffiths is Professor and Head of this new Department, which now has eight senior staff members. This new Department is, in a sense, a second chemistry department. Its research interests and curricula are largely in the realm of spectroscopy, although most of the staff members come to this area with a background in chemistry rather than physics.

The undergraduate curriculum in the Chemistry Department itself is more or less typical of the standard BSc-degree course in English universities. The undergraduate curriculum in the Department of Spectroscopy and Chemical Physics is a radical departure from tradition and is similar to the curricula being tried at several of the "new" English universities. It is based upon the premise that much of chemistry and physics have such a common basis that they should be combined into one curriculum, called Physical Sciences.
(S.Y. Tyree)

The University of Warwick

The new University of Warwick is located on the southern outskirts of Coventry, about 2½ miles from the center of the city. A very large site of open rolling land has been made available for the new university. Permanent buildings are now in the process of construction, but at the present time virtually the entire institution is operating in temporary buildings. However, a visitor may form the impression that these temporary buildings are apt to become "permanent." In fact, they are excellently designed and can well serve in some capacity or other for many years to come.

Science education at the University of Warwick is at present divided among schools called Molecular Sciences, Physics, and Mathematics. A School of Life Sciences is also planned, but has not yet been sufficiently well organized to accept its first students. As if in answer to one of the most commonly voiced criticisms of the English university system, the University has decided that all science students should spend their first year studying three science subjects at comparable levels. Thus, the first two terms of the first year are spent roughly as follows:

	Physics	Molecular Sciences	Mathematics
Lecture hours	3	4	3
Tutorial hours	1	1	1
Lab hours	6	6	0

The material taught under the name of molecular sciences during these first two terms consists largely of physical and inorganic chemistry of a rather theoretical sort. At the end of the first year undergraduates are expected to choose that school of science in which they wish to continue. Those who decide to continue in molecular sciences will take courses of lectures and laboratory in chemistry (molecular sciences) during their second year.

In addition these students will take some courses in mathematics throughout the second year. The courses taken during the second year will provide a more sophisticated treatment of physical chemistry and liberal doses of organic chemistry, crystallography, and biochemistry. In the third year these students will study only chemistry, and will elect from among a fairly wide selection of courses.

Perhaps the best way to give the philosophy of this new School of Molecular Sciences is to quote from the prospectus: "The study of phenomena at the molecular level can be regarded as a broad single discipline lying between physics on the one hand and biology on the other .... Our prime aim is to produce in students an attitude of mind leading to a confident, critical appraisal of chemical and biochemical situations based on the sound knowledge of fundamentals and an active imagination." While the School is as yet too young to have developed a real flavor, two strong influences are already detectable. They are: the application of physical and organic chemical techniques to the problems which have commonly come to be known as molecular biology; the second is a strong interest in a broad range of spectroscopic techniques as applied to structural problems. Thus, the School is already very well equipped with a wide variety of spectroscopic instrumentation. Room has already been set aside and equipment has been ordered for a complete X-ray crystal structure determination laboratory.

It is anticipated that the School of Molecular Sciences will occupy its permanent building within a year. Understandably, operations are in a rather confused atmosphere at this time, the inevitable result of having just received the first class of undergraduate students, having temporary facilities, constantly receiving new scientific instruments and putting them to work in temporary quarters, while planning the move to the permanent site.

In light of its distance from the center of Coventry, the University plans to have its campus ultimately a residential one, that is to say, to have halls of residence for the majority of its students. Ample land is available upon which these can be constructed. On the other hand, present policies of the British government are not sufficiently well defined to enable accurate estimates of when such halls will be built. Meanwhile, students live in Coventry and reach the University by bus.

The academic staff of the School of Molecular Sciences is as follows. Professors: V.M. Clark, formerly University Lecturer in organic chemistry at Cambridge; T.C. Waddington, formerly University Lecturer in inorganic chemistry at Cambridge. Readers: D.E. Griffiths, formerly Lecturer in biochemistry at Oxford; J.A.S. Smith, formerly Lecturer in inorganic and structural chemistry at the University of Leeds. Lecturers: D.W. Hutchinson, formerly Research Fellow in the Department of Organic and Inorganic Chemistry at Cambridge; G.B. Robertson, formerly Senior Research Associate and Crystallographer at the University of Sheffield. Assistant Lecturers: D.M. Hirst, theoretical chemistry; T.J. Kemp, radiochemistry; P. Moore, inorganic chemistry; J. Stevenson, biochemistry; and T.J. Stone.

To promote better liaison with industrial and government research laboratories and institutions, the University has inaugurated a scheme of Associate Professorships, novel in England. The title of Associate Professor is accorded to distinguished scientists in industrial or government establishments who are willing to undertake some teaching at the University and to supervise research students for higher degrees. The first such Associate Professor in the School of Molecular Sciences is Dr. T.M. Sugden, Director of the Shell Research Center in Cheshire.

The School also enjoys the assistance of approximately 15 technical aides, about half of whom are full-fledged technicians and the others apprentices - that is to say, young boys in their late teens who can earn full technician status by several years' apprenticeship. Also, the School has six full-time secretaries.

A severe shortage of graduate students exists in the School of Molecular Sciences at the moment, due to the fact that the School has not yet graduated its first BSc class, it being the common practice in England for students to undertake graduate work in the same department in which they receive their undergraduate degrees.

Mathematics is represented very strongly at Warwick. During the current academic year, 70 of the 350 freshmen (the first undergraduates at the University) and 30 of the 100 graduate students are "reading" mathematics.

Professor E.C. Zeeman, a prominent topologist who left Cambridge to assume charge of Warwick's mathematical fortunes, has acted quickly and effectively in establishing an active and enthusiastic group of faculty members and graduate students. In addition to a faculty of seven, which includes the algebraist J.A. Green and the topologists D.B.A. Epstein and R.L.E. Schwarzenberger, Zeeman has been conducting a year-long research program. With the aid of a £10,000 government grant, he has invited about 30 topologists, mostly from overseas, to visit Warwick for periods varying from several weeks to the entire academic year. A similar program, this time in algebra, is planned for the year 1966-67.

At present the research interests of the School are confined rather narrowly to algebra and topology. Although this writer feels serious concern at the absence in the curriculum of a sufficient amount of analysis, Zeeman and his colleagues appear to feel very strongly that their students will not be handicapped by the ultra-purist attitude of the faculty. In fact, the engineering faculty has begun a program of graduate instruction and research in applied mathematics, with emphasis on various phases of automatic control theory, mechanical vibrations, and fluid mechanics.
(S.Y. Tyree and B. Epstein)

BIOLOGICAL SCIENCES

January Meeting of the Physiological Society

A meeting of the Physiological Society was held 21-22 January at the Department of Physiology, Middlesex Hospital Medical School, London. The program included 12 demonstrations and 23 communications, some of which are reviewed below.

J.H. Green and P.F. Heffron (Departments of Physiology and Pharmacology, Middlesex Hospital Medical School, London) demonstrated a beautiful preparation in which simultaneous recordings were made of baroceptor and sympathetic postganglionic nerve activity under the influence of pulsatile and non-pulsatile carotid artery pressures. A carotid sinus preparation was made according to the Moissejeff technique. With this preparation it is possible to adjust the mean pressure in the sinus to any desired level and to superimpose on it a pressure wave of adjustable amplitude. Electroneurographic recordings were made of baroceptor activity in the common carotid baroceptor nerve and of postg glionic sympathetic activity in the right inferior cardiac nerve. The two vagus nerves and the left sinus nerve were sectioned to reduce interference from other baroceptor areas. Nerve fiber activity in both recordings are synchronous with the pulse wave when the sinus preparation is open to the circulation. When the common carotid artery is occluded above the point of baroceptor nerve recording, activity in the baroceptor nerve becomes continuous and varies directly with the mean pressure in the system. Sympathetic activity at this time is also continuous, irregular and varies inversely with baroceptor activity. Superimposition of a pulse curve on this occluded preparation restores the pulse-synchronicity in both nerve recordings.

B. Vaughan Hudson (Department of Physiology, Middlesex Hospital Medical School, London) demonstrated a rat diaphragm-phrenic nerve preparation for studying the afferent nerve discharge produced by stretch. The preparation consists of the left half of the diaphragm and the left phrenic nerve, the cut end of which is placed on stimulating electrodes. Small filaments of the nerve are dissected free between the cut end of the nerve and the diaphragm for recording of afferent nerve activity. The entire preparation is mounted in a bath containing Ringer's solution and is aerated with 95% O_2 - 5% CO_2. The tendon of the diaphragm is connected to a movable ratchet through which the muscle can be subjected to mechanical stretch. Activity in the afferent fiber was recorded during muscular contraction induced by stimulation of the phrenic nerve, and during stretch of the muscle by means of the ratchet. The discharge characteristics of most of the fibers studied were shown to be similar to those of Ia and Ib fibers from skeletal muscle spindles, stretch producing increased discharge and contraction producing electrical silence. In one experiment where punctate stimulation of the diaphragm caused a characteristic nerve discharge, histological examination of the specific piece of muscle revealed a typical muscle spindle.

Interesting experiments on a lung inflation - vasodilator reflex were described by M. de Burgh Daly, J.L. Hazzledine and A. Ungar (Dept. of Physiology, St. Bartholomew's Hospital Medical School, London). Inflation of the lungs in open-chest dogs produced an average fall in systemic arterial perfusion pressure of 24 mm Hg, which represented a mean decrease of 17% in pulmonary vascular resistance. This pulmonary vasodilatator was not dependent on the composition of the respired gas mixture nor on spontaneously induced diaphragmatic and rib movements caused by the resulting activation of the Hering-Breuer reflex. The magnitude of the systemic arterial depressor response, however, was directly related to the increase in lung volume. Section of the thoracic vagosympathetic nerves or of their pulmonary branches just above the lungs abolished the vascular responses. Division of these nerves below the lungs had no effect on the vasodilator reflex. In six of eight animals the responses were also abolished by cutting the cervical vagosympathetic nerves or by cooling them to 4-7°C. In the other two animals, responses were reduced but not abolished. The vascular responses were not affected by administration of atropine, but were blocked by hexamethonium, bretylium and guanethidine.

Anatomical evidence exists for the presence of pulmonary arterial chemoreceptors in fetal kittens. The presence of functional receptors of this type in the adult animal is still an open question. H. Coleridge, J.C.G. Coleridge and A. Howe (Depts. of Physiology, Royal Free Hospital School of Medicine and Chelsea College of Science and Technology, London) presented results which bear on this question. The pulmonary and systemic circulations were injected with gelatin masses of contrasting colors in 48 young kittens (1-38 days old). Subsequent microscopic examination of the aortic-pulmonary region indicated that the pulmonary artery in each case supplied an arterial branch to some of the aortico-pulmonary bodies. This vessel becomes occluded in the early post-natal period, the earliest time observed being nine days after birth. Between 20 and 38 days, occlusion had occurred in 16 of 18 kittens, with the systemic circulation taking over the arterial supply to the aortic bodies. In 41 of 43 adult cats, no evidence of a pulmonary artery supply to glomus tissue was found. In the other two cats, a small patent branch arising near the pulmonary artery bifurcation was found, and in one of these specimens it was demonstrated to supply a histologically confirmed aortic body. This anatomical evidence was essentially confirmed by physiological studies in which afferent impulses were recorded from the cervical and/or thoracic vagus nerve in response to drug stimulation of the chemoreceptors. It was concluded that pulmonary artery blood supply to chemoreceptors in the adult cat is a rare occurrence, and when present is due to abnormal persistence of a fetal condition.

A.H. Sykes (Wye College, Ashford, Kent) reported on the phenomenon of submersion anuria in the duck. This study is a logical follow-up to recent work indicating the occurrence of apnea, bradycardia and splanchnic vasoconstriction in the duck during diving. When the head of an adult unanesthetized duck is submerged for 3-4 minutes, urine flow is suppressed immediately under normal conditions and under conditions of a previously imposed water or mannitol diuresis. The anuria is maintained for about 2 minutes after emersion of the head, after which a marked diuresis occurs. Anuria can also be induced by asphyxia alone, but under these conditions there is a delayed onset and a greatly reduced phase of diuresis following emersion of the head.

E.K. Matthews (Dept. of Pharmacology, Cambridge Univ.) presented some interesting data on membrane potentials of cells in the adrenal gland. Measurements from cortical cells of three different kinds of animal indicate a small species difference, the actual mean values being 65.3 mv (rabbit), 70.5 mv (rat) and 71.4 mv (kitten). As is the case in other types of cell, the membrane potential of the cortical cell is dependent on external potassium concentration, $(K)_0$. A tenfold increase in $(K)_0$ results in a 41-mv decrease in membrane potential. Adrenal medullary cells have a much lower membrane potential in all three species, the mean values being 24.2 mv (rabbit), 20.4 mv (rat) and 31.7 mv (kitten). The membrane potential of cells from the adrenal medulla appears to be relatively independent of $(K)_0$.

K. Martin and T.I. Shaw (Laboratory of the Marine Biological Association, Plymouth) described some exquisite experiments which demonstrate the synthesis of ATP by perfused axons of Loligo. Axons were extruded and then perfused with a solution containing AMP, inorganic phosphate Mg^{++} and an extract of firefly lanterns, the latter containing the luciferin-luciferinase system which is a sensitive detector of ATP. The axons were mounted in front of a photomultiplier tube for measurement of light production. Initial entry of the perfusion fluid into the axon causes a light flash that persists for 1-3 minutes. This initial light flash is caused by ATP in the remaining axoplasm present after extrusion. After the initial light flash has terminated, perfusion is stopped, leaving the axon filled with a volume of the perfusion fluid. Light emission increases for the next 30 minutes or longer, presumably due to the continuous formation of ATP. The reaction is dependent on the presence of a suitable substrate (glutamate or aspartate), and is greatest when additional AMP is added to the perfusate. The reaction can be totally inhibited by cyanide, which has no effect on the luminescence produced when ATP is added to the luciferin-luciferinase system.

Experiments correlating nerve discharge in the splanchnic preganglionic nerve with brain stem stimulation were reported by E. Mills (Dept. of Pharmacology, Columbia Univ. College of Physicians and Surgeons). These experiments were performed on bilaterally vagotomized cats with mid-collicular decerebration. Recordings were made of nerve activity in the left greater splanchnic nerve after it had been cut central to the coeliac ganglion. Three types of evoked response to stimulation of the medulla oblongata were found: (1) Sustained splanchnic activation occurred when points in the dorsolateral reticular formation were stimulated. This includes an area 1-3 mm rostral to the obex and 2-3 mm lateral to the midline. In those cases where similar pressor responses were obtained from either side of the medulla, splanchnic nerve activity was greater when the ipsilateral side was stimulated. (2) From points outside this reactive area, unsustained splanchnic activation was observed. Nerve activity increased immediately and then declined as the stimulation was continued and as blood pressure rose 60-80 mm Hg. This response was attributed to the influence of baroceptor afferents, since the decline in nerve activity was minimized by clamping the carotid arteries prior to stimulation.
(3) Stimulation in the ventromedial and ventrilateral reticular formation, and dorsally in the midline, produced inhibition of splanchnic activity which was usually associated with 20-40 mm Hg decrease in blood pressure. This inhibition was effective even when initial splanchnic activity was elevated by prior occlusion of the carotid arteries.
(C.N. Peiss)

Mycoplasma Pneumonia Infections in UK Citizens

An interesting paper describing an epidemic of M. pneumoniae infection was recently presented at a section meeting of the Royal Society of Medicine, London. The clinical description emphasized the severity of the complaint of general malaise, all out of proportion to the apparent objective illness, and, in general, it was not unlike the clinical picture reported from US studies. A total of 113 patients, 80% from the practice of a rural general practitioner, and the remainder from a hospitalized population suffering from acute respiratory disease, were included in the study. Isolation of the organism was not attempted, but serological studies confirmed the diagnosis. The criteria for recent M. pneumoniae infection were: (1) a four-fold or greater rise in successive complement fixation (CF) titers: or (2) a single CF titer of 1/64 with an accompanying high (unspecified) cold agglutinin titer. A probable recent infection would be tabulated on the basis of a single M. pneumoniae CF titer of 1/64 or a four-fold or greater fall in titer over 6-9 months.

The authors reported a correlation between positive M. pneumoniae serology and a positive direct Coombs test and that reticulocyte counts were significantly elevated among patients with M. pneumoniae infections. It was also interesting that 29% of patients with these infections revealed various muco-cutaneous lesions, whereas only 13% of patients with other infections exhibited them (Herpes simplex lesions and measles excluded).

There were two other communications relating to the role of Mycoplasma in human disease.

As further evidence of the increasing attention being directed toward this group of organisms, the British Postgraduate Medical Federation two months earlier sponsored a formal review lecture on the role of Mycoplasmas in Human Disease.

Much progress has been made in recent years. The total percentage of laboratory-diagnosed respiratory disease has increased since the diagnostic battery has included tests for M. pneumoniae. Several investigators have isolated different Mycoplasma from human tumors, especially leukemia, and other human diseases, but much caution is indicated in assigning causal relationships. With competent investigators of many laboratories working on this problem, the real dangers to man will ultimately be determined and defeated.
(C.H. Miller)

MATERIALS SCIENCES

Fuel Cell Work at Admiralty Materials Laboratory

The Admiralty Materials Laboratory at Holton Heath (near Poole), Dorset, has recently established a special group within the Chemical Engineering Division to perform research on fuel cells and apposite technology. The group, consisting of some eight professional people, is headed by Dr. R.G.H. Watson, who worked with F.T. Bacon during the time the latter developed his original cell at Cambridge, and also for some time following that in the Office of the Director of Material Research in the Admiralty.

Watson's group, organized as recently as October 1965, will review the work done in several private laboratories in the UK in the fuel cell field, and will concentrate on testing of components and devices, standardizing where possible, and developing practical applications. Their work will be broadly based, but will accent low-temperature applications.

Chemical problems to be investigated at AML will include the selection of the various construction materials, study of electrode catalysts for oxygen electrode, causes of life-limiting deterioration in cells during operation, and fuel and oxidant chemistry. In the chemical engineering field effort will be devoted to expanding work in hand on mass- and heat-transfer in cells.

It is believed that if the electrochemical problems of cell activity can be solved, then power density will be limited by fuel and oxidant transport rates to the reacting zones in the cell and by the rate at which waste heat and exhaust products can be removed. The study of these limitations will help achieve the much higher power intensities. Finally, the testing and evaluation of cells, cell batteries, and power plants will form an essential part of the engineering research effort. This will be directed toward determining how cell performance varies with testing procedures, so that these may be standardized, and how the development of cells and auxiliaries can be improved by engineering rationalization.

AML is currently evaluating and testing a 4-kw fuel cell power plant developed by the Thronton Research Center of Shell Research. This plant is operated on methanol and air, using PVC electrodes and a KOH electrolyte.

A smaller 300-w version, operating on bottles of H_2 and O_2, is used to power a dinghy at AML. The author lays claim to being the first and still the only US naval officer to have sailed -- in fact to have commanded -- a fuel-cell-operated boat! (Challenges to this claim should be sent by registered mail postmarked no later than midnight 31 May 1966. All entries become the property of ONRL and none can be returned.)
(B.I. Edelson)

The Institute of Macromolecular Chemistry of the Czechoslovak Academy of Sciences

In the first few years after WWII, Czechoslovak research activities in the field of macromolecular compounds were limited to uncoordinated work in several minor laboratories attached to institutions of higher education and in industrial enterprises. This state of affairs did not change until the first nurseries of the new polymer science were set up in the early fifties -- the Department for Plastics at the Technical University, the Laboratory for Physical Chemistry of Biopolymers and the Laboratory of Macromolecular Compounds at the Chemical Institute of the Academy, and some research institutes of the Ministry of Chemical Industry. In view of the urgent need to create a center of theoretical research into macromolecular compounds, the Academy was charged by the government in 1956 with the establishment of an Institute of Macromolecular Chemistry.

The initial building-up period saw the gradual concentration of a corps of research workers which had previously been employed in various laboratories and institutions. The IUPAC International Symposium on Macromolecular Chemistry, held in Prague in September 1957, became an important step on this road: The working team which was responsible for the organization of this gathering took up the preparations, in 1958, for the construction of "their own" institute. Together with a steadily expanding staff of collaborators, they worked out the full long-term plan of the Institute, to be realized in several stages. Temporary laboratories were set up, the plan of the Institute building was designed, and by 1960 construction was begun.

Gradually, more research workers were won over from other institutes of the Academy, institutions of higher education and industrial laboratories; plans were drawn up for the education of new young research workers, specialized working teams were organized, instruments and equipment procured, and new working methods introduced. Step by step the main thematic trends of the Institute's work emerged and were defined.

In the autumn of 1962, the first research workers moved into the new home of the Institute, although building continued throughout 1963. The year 1964 was devoted to the normalization and consolidation of the working routine. It seems rather symbolic that the termination of the Institute's initial period should be marked by another IUPAC International Symposium, held again in Prague (1965).

The Institute of Macromolecular Chemistry comes under the Czechoslovak Academy of Sciences, the supreme scientific institution of the country, which is responsible for basic research in all fields and -- together with the schools of university level -- for the systematic education of scientific workers. The Institute is headed by Prof. O. Wichterle; his deputy is J. Hnídek. The Chemical Department is directed by D. Lím, and the Physical Department by B. Sedláček, who is also the Scientific Secretary of the Institute.

The Institute is organized as follows:

1. The Staff Division includes the Scientific and Organizational Management, the Director's office and his organizational staff, as well as the library and scientific information service.

The Technical Section is mainly concerned with the construction of new laboratory instruments and installations and with the maintenance or adaptation of the existing equipment. It includes a designing office, electrical-engineering and mechanical-engineering workshops, glass-blowing and grinding shops.

The Administrative Section deals with economic and administrative matters.

2. The Chemical Department. Thematical and methodological criteria tend to overlap somewhat. The scientific activities of this Department comprise the preparation of new types of polymers as well as work on new aspects of known instances of polymer formation and transformations. The nine laboratories of this Department investigate a wide variety of problems, including, among others, such subjects as alkaline polymerization of lactams, kinetics and mechanism of cationic polymerization, anionic polymerization, radical polymerization of dienes, precipitation polymerization, and degradation reactions.

3. The Physical Department also maintains nine laboratories. Among the subjects investigated are: mechanical and other physical properties of polymers, structure and properties of crystalline and oriented regions in macromolecular compounds, molecular structure and properties of macromolecular compounds, electronic phenomena, properties of macromolecular compounds in solution, and thermodynamic behavior.

The scientific program of the Institute is concentrated in two main thematic groups: Mechanism of the formation and transformation of macromolecular substances and systems; and structure and properties of macromolecular compounds, their systems and models.

The long-term aim of this theoretical research is to gain knowledge of the laws governing the properties of matter in its macromolecular level of organization. Other research work, derived from these leading trends, is formulated according to objects (polymer compounds), principles and phenomena; the problems are treated in the relevant thematic groups, such as polyamides, vinyl polymers, gels, elastomers, polyconjugated polymers. The aims of these researches, although in the theoretical field, are concretely formulated with regard to practical aspects. The individual research targets are defined in the scientific plan of the Institute, which is revised and supplemented every year.

The thematic groups are also an expression of the interdisciplinary control of scientific work at the Institute: they cross-link and coordinate the work of the individual teams and laboratories of the Chemical and Physical Departments. The organization of these groups thus facilitates effective cooperation within the Institute and beyond its confines as well as concentration on the given objectives. (B. Bartocha)

IUPAC International Symposium on Macromolecular Chemistry

The Symposium took place 30 August - 4 September 1965 in Prague, Czechoslovakia, and was attended by 1,788 scientists from 29 countries.

In addition to the sections discussing the conventional subjects -- Section I on the mechanisms of the formation and transformations of macromolecular substances, and Section II treating the structure and properties of macromolecular compounds and systems -- there were two more sections on "objects" and "methods," respectively. In the former, selected polymers and systems, functional principles or phenomena were fully treated from every possible angle, while the section on the theory and practice of methods discussed ways and means of research which by now largely constitute separate disciplines, as, for instance, diffractometry, spectrometry, molecular hydrodynamics, and others.

Of the 650 scientific communications, only the five Symposium lectures and the main lectures were read in full. Of the rest, just a short synopsis was given, lasting no longer than five minutes. A number of papers were combined in thematic sets for simultaneous discussion, and there should have been ample time for the preparation of arguments or special points of interest since preprints of the papers had been distributed to participants prior to the meeting. Although it had been announced previously that no translators would be available, the lack of them caused most discussions to be less than vigorous.

It was also hoped that these group discussions would provide an opportunity to the authors to give the latest results, to stress points that may have escaped the readers' attention, and to emphasize promising trends. This was certainly a well-meant approach in order to facilitate as many contributions as possible. The outcome, however, was of dubious value at best. Perhaps one should write off these procedures as another attempt to cope somehow with an ever-increasing flood of scientific information. As such, it was a failure. There seems to be no simple solution.

It is planned to publish the main lectures in Pure and Applied Chemistry, the official journal of the IUPAC (Butterworth & Company Ltd, London, W.C.2.), and the papers and discussions, as usual, are scheduled for publication in the Journal of Polymer Science.

Professor František Šorm, President of the Czechoslovak Academy of Sciences, opened the meeting in the presence of a large number of dignitaries of the Czechoslovak Government. He emphasized that the Government of the CSSR was particularly pleased to support undertakings that further the exchange of scientific data, and that they were pleased that Prague had been selected as the site of the Symposium.

The opening lecture, "The Future Pattern of Polymer Science," read by Sir Harry W. Melville (Chairman, Science Research Council, London), was a critical review of the directions which macromolecular chemistry and physics may be expected to take in the future.

The lecture of Prof. H.F. Mark (Polymer Research Institute, Polytechnic Institute of Brooklyn), entitled "New Polymers, New Uses," dealt in detail with carbonized ladder polymers and their applications. It was the hit of the meeting, attracting much attention and an audience that spilled over into two adjacent lecture theaters.

Unfortunately, the lecture "Light Scattering as a Tool," which had been anticipated with uncommon interest, had to be omitted because of Prof. P. Debye's illness. Prof. V.A. Kargin's (Moscow M.V. Lomonosov State Univ.) lecture in plenary session was on "Structural Effects in Preparation, Modification, and Processing of Polymers." The Symposium lectures delivered by Prof. Ch. Sadron (Centre de Recherches sur les Macromolecules, Strasbourg) and Prof. G.V. Schulz (Institut für Physikalische Chemie der Universität Mainz) provided a discussion of properties of natural and synthetic polymers.

During the Symposium, the participants had opportunities to visit various research institutes, including the recently built Institute of Macromolecular Chemistry, and to become acquainted with their work.

On the occasion of the Symposium, Prague's time-honored Charles University conferred honorary degrees on Profs. Mark and Semyonov. The formal ceremony honoring Prof. Debye had to be postponed because of his illness. (B. Bartocha)

MISCELLANEOUS

French Division Head Aches from Underwork

Louis Bublens, a 58-year-old divisional head in the French Social Security, is suing the government for $25,000 damages because he has nothing to do. An $11,000-a-year civil service employee, he claims to have suffered a nervous breakdown, extending over a two-year-period, as a result of his employer's refusal to abolish the post at which he now spends a half-hour per day. At the moment he has a private secretary and a staff of three, but insists that during the four years he has held the job there has been no need for him to come to work.

Up to the present time, the government's sole reaction has been to reprimand him. In the course of the present hearings, his employers have stressed the importance of maintaining that job "for tired civil servants who had become unfit for active duties!"
(E.H. Weinberg)

Uncertainties of Death

I remember an adage: "Nothing is sure in this world but death and taxes, and sometimes even death fools you." This has certainly been true in a couple of local instances.

A retired lighthouse keeper, who had but recently buried his wife, visited the grave one day, only to find it covered with wreaths and flowers in memory of another woman since buried in the same grave. Agitated inquiry revealed the fact that this was indeed a "common grave," and it was the practice to fill up such graves before digging new ones. He offered to buy exclusive rights to the grave so as to evict the intruder, but was not allowed to do so in view of the fait accompli. Furthermore, according to local practice such common graves cannot be marked or memorialized in any way, perhaps to avoid observations such as the one made by a passer-by who, on seeing a grave marked "Here lies a lawyer and an honest man," remarked that he wouldn't have thought it could hold two men.

The lighthouse keeper had to put up with the situation and we are left wondering about the whole matter. Space must indeed be arriving at a premium, and many a person has begrudged that occupied by graveyards, feeling that cremation is both more sanitary and more economical.
But beware!

For even cremation presents its difficulties, such as that of the man who was cremated by mistake at Plaistow Hospital. Oh yes, he was dead, all right, but by some unexplained error two bodies, both properly marked, registered and signed, became interchanged and the wrong one went up in smoke. All without consent of the victim, you may be assured. How would you have felt under the circumstances? Probably even more agitated than the lighthouse keeper.

Of course, the really important consideration is found in the statement that "the management committee would accept responsibility for any additional expense the family had been put to."
(N.W. Rakestraw)

PHYSICAL SCIENCES

British Communications Satellite Activity

The Royal Navy, Army and Air Force are all looking forward to participating in the research and development phase of the US Initial Defense Communications Satellite Project during 1966. An agreement has been signed by the UK Minister of Defence, Mr. Denis Healey, and Secretary McNamara, under the terms of which the UK and US will develop different types of ground terminals for use with a system of satellites to be launched by the US in nearly synchronous equatorial orbits later this year. All the terminals will be compatible and interoperable.

The Ministry of Aviation, acting as a development and procurement agent for MOD, has contracted with the Marconi Co., Ltd., of Chelmsford, to provide three air-transportable ground terminals employing 40-ft diameter parabolic antennas. These terminals, to be completed this spring, will be deployed to British bases throughout the world and operated by three service teams. The Admiralty Surface Weapons Establishment has contracted with Plessey Radar to develop a small shipboard terminal for Navy use. A Satellite Communications Control Center will be located at the Signal Research and Development Establishment, Christchurch, England.

The global commercial communications satellite system has also excited interest in the UK. The large Goonhilly terminal in Cornwall, previously operated by the General Post Office with the Telstar and Relay satellites, has more recently been carrying commercial traffic via Early Bird. Plans are in preparation to double the size of this terminal in order to permit it to work effectively with the larger 1200-voice channel commercial satellites to be launched in 1968.

In addition, the Marconi Company has been building for installation on Ascension Island a large terminal mounting an 85-ft parabolic antenna to serve as a link in the worldwide communications network for the Apollo lunar landing program.
(B.I. Edelson)

New Program for Sir Robert Watson-Watt

According to the Daily Telegraph, Sir Robert Watson-Watt, 73, was quietly married in London on 10 March 1966 to Dame Katherine Jane Trefusis Forbes, 65, first Director of the Women's Auxiliary Air Force. Sir Robert is well known for his pioneering work in radar and for his activities as Deputy Chairman of the Radio Board of the War Cabinet during WWII. He was knighted in 1942, and included among his many honors is the US Medal of Merit.

In 1934, Sir Robert, a Scottish physicist who was then head of the Radio Department of the National Physical Laboratory, prepared a plan for the detection of aircraft via a pulsed technique. The first experimental radar system of the type he suggested was set up in 1935, and by the end of that year the main features of the British home chain of early warning stations had been outlined. In November 1938 a position-finding apparatus, intended for the control of anti-aircraft guns and searchlights, had been built by the US Army Signal Corps Laboratories and tested by the Coast Artillery Board. In early 1939 a radar set built by the US Naval Research Laboratory had been subjected to extensive sea trials.

The word "radar" (radiodetection and ranging) was officially adopted by the US Navy in 1940 as the designation for what was previously called, among other things, radio echo equipment. The Signal Corps referred to the technique as "radio precision finding" until 1942. The British originally called the technique RDS. In France it was known as REM, and in Germany radar was called Funkmessgerät. Today the technique is universally known as radar.

During 1940 the work on radar of British and US laboratories was combined by means of an agreement between the two governments for the exchange of technical information. There has been close cooperation in radar between the two countries since that time.
(M.W. Long)

Physics Exhibition 1966

Fiftieth in the series started by the Physical Society in 1905, the 1966 Exhibition included displays from 100 commercial firms, 21 government establishments, 24 educational institutions and 26 publishers. Extending over a four-day period, 28-31 March, the entire exhibit was accommodated under one roof (the Alexandra Palace Great Hall) for the first time since 1955.

By way of contrast, the 1905 exhibit was held at Imperial College, was open for three hours on one evening, and featured 17 exhibitors. Some of these were still represented at the 1966 show, and some of the 1905 exhibits were shown again in a special historical section. (It is not true that certain exhibits simply had not been changed since 1905, as was implied by one emigrating British physicist.)

Highlighting the program, and providing as well a comfortable place to sit for an hour, were three lectures, as follows:

"Elementary" Particles by Prof. P.T. Matthews (Imperial College, London), who reviewed in ever-accelerating pace the history of nuclear physics, beginning with Atom and Eve (Curie) and concluding with SU-12 symmetries. While it seemed to us that some overemphasis was placed on British contributions (e.g., Dirac for spin, without mention of Goudsmit and Uhlenbeck; Maxwell on statistics, without Boltzman, etc.), Matthews did a good job overall, bringing the completely filled lecture hall at least up to the level of similar presentations of the Scientific American variety, and remaining afterwards to field casual questions in this difficult and controversial subject. (I well remember George Uhlenbeck remarking in 1952 or 1953 that all the nuclear physicists had to go on was "faith, hope, and parity," and, quite prophetically, he doubted that the last would be around much longer.)

Physics in Time Measurement by Dr. F.A.B. Ward (Science Museum, London) and Fifty Years of Temperature Measurement by J.A. Hall (Bureau International des Poids et Mésures) completed the trilogy, but, as we attended only on the day on which Matthews spoke, we cannot report their content.

To return briefly to the 1905 exhibits - a special brochure, reproducing the catalog from 1905, was published for distribution. Among those items of special interest in 1905 was the Einthoven String Galvanometer, with which cardiograms were shown; an Electrolytic Prepayment Meter in which the inserted coins allow a definite length of copper anode to be immersed in the solution, the circuit breaking when this amount is dissolved; and an Apparatus for Teaching the Law of Helical Springs.

While not every exhibitor chose to display all his wares, there were at least eight identifiable laser displays. (One company representative, when asked about some of its laser products which were not on display, commented that these had been shown a year and a half ago and therefore needn't be displayed again!) In general, He-Ne and semiconductor lasers formed the bulk of the exhibits, sometimes "jazzed up" a bit by an argon laser with its belated St. Patrick's green, or accompanied by a hologram offering the no-longer-novel opportunity of viewing a slide in monochromatic 3-D. St. Andrew's University exhibited a pulsed oxygen laser - also green.

G. & E. Bradley claimed to have on display the largest laser ever shown publicly in Europe. Employing a four-leaf-clover elliptical cavity, the apparatus discharges 30,000 joules through the four flashlamps, furnishing a claimed maximum output of 300 joules. Several Q-switches are available for the 6½" x 5/8" water-cooled ruby.

Meanwhile, out on the terrace Bradley also had on display its laser radar, intended for upper atmosphere research. The usual lidar system is employed with a 1-joule output and a claimed return from altitudes up to 100 km. For most of the English year, it seems to us that the problem would be more one of getting up through the first few thousand feet of fog and cloud, but, of course, Bradley did not claim to have made its measurements in the UK.

While probably one of the most interesting items on display was a transistorized ignition system designed by R.A. Fitch of AWRE and patented by Fitch and International Research and Developments Ltd., the television cameras, in their infinite wisdom, chose to enlighten the late-hour viewer with a film showing a radar-driven toy train moving slowly down the track.

All in all, it was a worthwhile show, combining some of the features of the API and AAPT exhibitions in the US with a sort of "inventor's congress." Notably lacking from this gathering point for the UK's physicists was any group of scientific recruiting agents or any recruiting posters, so familiar at all stateside meetings. Also sadly missing were the equally familiar Private Rooms to which innumerable scientific and publishing companies are wont to invite thirsty scientists at the close of the day. Ah well, English tea is really fine, and far better for the drive home afterwards!
(E.H. Weinberg)

NEWS AND NOTES

From Pork to Fish

Those interested in the exploitation of marine resources are about to come up with a new one! "Fish sausage" has passed its first consumer acceptability trials and will presently appear on menus. Market research experts have already worked out the percentage of housewives likely to buy the new delicacy, but they haven't revealed that information yet.
(N.W. Rakestraw)

More Offshore Oil

For some time it has been known that oil exists in the offshore areas of the Coromandel coast of India, but only recently have detailed surveys been started. A Russian ship with seismic equipment is reported to be taking part in this exploration.
(N.W. Rakestraw)

University Capital Grants Down

It has been known for some time that next year's British budget would cut grants to universities for capital purposes. It now appears that this cut will amount to about Ŀ5m. Grants for recurrent expenditures are up somewhat, however, including that for the relatively new Natural Environment Research Council, within which oceanography is included. Direct grants to students are down almost a million pounds, although those to graduate students are up a little. Finally, it will not appear inconsistent to Americans that the appropriation to the Football Association is still Ŀ140,000.

Notwithstanding the capital cut, Newcastle University has announced two new building projects, one of which is for two residence halls, to cost Ŀ1,800,000.
(N.W. Rakestraw)

Storks

The stork is a curious bird; he (or would it be she?) builds a nest on the top of a tall chimney. In view of the part that this bird is reputed to play in the population explosion one wonders why anyone should want to encourage its advent. But the British apparently do, for imitation chimneys have been constructed by the London Zoo upon which four stork nests have already appeared. All the Zoo officials say is: "We hope the storks will lay eggs and hatch them." Sounds consistent.
(N.W. Rakestraw)

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The Univ. of Sheffield's new metallurgy building was formally opened on 31 March by Prof. W. Hume-Rothery, FRS, Isaac Wolfson Professor of Metallurgy at Oxford Univ., who said it "houses a metallurgical department which is far and away the best in the country."

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The general board of Cambridge Univ. has recommended the establishment of an Institute of Theoretical Astronomy with Prof. Fred Hoyle as its Director. A provisional site has been allocated in the area now occupied by the university observatories in west Cambridge, and the sum of Ŀ175,000 has been offered by the Wolfson Foundation for the capital cost of a building. The Nuffield Foundation will contribute two-fifths of the recurrent costs for the first seven years, the Science Research Council a further two-fifths (not exceeding Ŀ375,000), and the University the remaining fifth. The news would appear to allay earlier rumors that Hoyle might emigrate to the US because of lack of facilities provided for him in the UK.

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Britain's budget estimates for education and science, which announced a cut of Ŀ5 million in grants towards capital expenditure by universities and colleges for 1966-67 (see above), also allow for an increase in Britain's subscription to the European Organization for Nuclear Research of nearly L1 million and to the European Organization for Space Research of over L2 million. The estimate of the Dept. of Education and Science is increased by about L6 million to L144.5m.

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The Science Research Council has made a grant of L23,610 towards the cost of an investigation into rocket studies of the winter anomaly in ionospheric absorption and strat-warms, under the direction of Prof. W.J.G. Beynon, Professor of Physics at the University College of Wales, Aberystwyth. Other grants awarded by the Council to the Univ. of East Anglia are an increase to Prof. Katritzky and Prof. Sheppard to aid research in high resolution nuclear magnetic resonance, and one to Prof. Cusack of the School of Mathematics and Physics for an investigation entitled "Critical point of a metal."

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Fellows of the Royal Society

The following have been elected Fellows of the Royal Society: Prof. Alan Rushton (Prof. of Organic Chemistry, Liverpool Univ.); Dr. T. Brooke Benjamin (Asst. Director of Research, Dept. of Engineering and Dept. of Applied Math. and Theoretical Physics, Cambridge Univ.); Dr. K.G. Budden (Lecturer in Physics, Cavendish Laboratory, Cambridge Univ.); Prof. R.E. Davies (Prof. of Biochemistry and Chairman of the Dept. of Animal Biology, Univ. of Pennsylvania, School of Veterinary Medicine, Phila.); Dr. W.R.S. Doll (Director of the Medical Research Council's Statistical Research Unit and Lecturer in Medical Statistics and Epidemiology, University College Hospital Medical School, London); Prof. S.F. Edwards (Prof. of Theoretical Physics, Manchester Univ.); Dr. J.S. Forrest,(Director of the Central Electricity Research Laboratories Leatherhead, Surrey); Dr. F.C. Fraser (Keeper of Zoology and Deputy Chief Scientific Officer at the British Museum of Natural History, London); Prof. Harry Harris (Galton Prof. of Human Genetics, Head of Dept. and Director of the Galton Laboratory at University College, London); Prof. D.O. Hebb (Prof. of Experimental Psychology, McGill Univ., Montreal); Sir William Hutchison (Deputy Chairman, Gas Council, London); Dr. Alick Isaacs (National Institute for Medical Research, London); Dr. Basil Kassanis (Senior Principal Scientific Officer, Dept. of Plant Pathology, Rothamsted Experimental Station, Harpenden, England); Dr. R.A. Kekwick (Reader in Chemical Biophysics and Head of the Dept., Lister Institute of Preventive Medicine, Univ. of London); Dr. Percy E. Kent (Chief Geologist, British Petroleum Co.); Dr. D.G. King-Hele (Senior Principal Scientific Officer, Royal Aircraft Establishment, Farnborough); Sir Francis G.W. Knowles (Reader in Comparative Endocrinology, Medical School, Univ. of Birmingham); Prof. Georg Kreisel (Prof. of Mathematics, Dépt. de Mathematiques at the Sorbonne); Dr. C.E. Lucas (Director of Fisheries Research for Scotland, Dept. of Agriculture and Fisheries for Scotland, and Director of the Marine Laboratory, Aberdeen); Prof. J.D. McGee (Prof. of Applied Physics, Imperial College of Science and Technology, London); Dr. J.W. Menter (Director of Research & Development, Tube Investments Ltd., Hinxton, Cambridge); Dr. A.E. Mourant (Director, Medical Research Council's Serological Population Genetics Unit, St. Bartholomew's Hospital, London); Prof. Egon Pearson (Emeritus Prof. of Statistics, Univ. College, London); Prof. D.H. Perkins (Prof. of Elementary Particle Physics, Oxford); Dr. Lillian M. Pickford (Reader in Physiology, Edinburgh); Prof. H.O. Schild (Prof. of Pharmacology, Univ. College, London); Dr. H.M. Stanley (Director and Controller of Research and Development Division, Distillers Co. Ltd., London); Prof. B. Stocker (Prof. of Medical Microbiology, Stanford Univ., Calif.); Prof. John Sutton (Prof. of Geology and Head of the Dept., Imperial College, London); Prof. Michael Szwarc (Research Prof. and Director of Polymer Research, State Univ. College of Forestry, Syracuse Univ, New York); Dr. D.H. Whiffen (Deputy Chief Scientific Officer, Basic Physics Division, National Physical Laboratory, Teddington); Sir Frederick White (Chairman of the Commonwealth Scientific and Industrial Research Organization, Canberra).

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PERSONAL NEWS

Ernest J. Vaughan, CBE, MSc, relinquishes the post of Director of Materials Research (Navy), Ministry of Defence, when he retires from the Royal Naval Scientific Service this year. Mr. Vaughan, a good friend of the Office of Naval Research London, has held the DMR post for eight years. He will complete 41 years of government service, 39 of which were with the Admiralty. Mr. Vaughan graduated from the Royal College of Science and joined the Staff of the War Department as a chemist in 1925. He began his career with the Admiralty at HM Dockyard Portsmouth in 1927. In 1949 Vaughan was appointed Assistant Director of Aeronautical and Engineering Research at RNSS headquarters in London, and in 1958, following the retirement of Colonel Kerrison, became the Director, which post, subsequently renamed the Director of Materials Research, he occupies up to his retirement. He and his wife are looking forward to retiring to a house on the south coast, preferably with a not-too-large garden, and not too far from a rail link with London where he hopes to maintain his present association with the Royal Institute of Chemistry. All his colleagues, both within and without the service, will wish them both very many happy years in that period of life upon which they are about to embark.
(B.I. Edelson)

Dr. Keith Tocher, Head of the Department of Operational Research at the United Steel Companies, Sheffield, has been appointed visiting Professor of Mathematics at the University of Lancaster. He will devote one day a week to lecturing, conducting seminars, and discussing research problems with students and staff members of the University's Departments of Mathematics, Operational Research, Systems Engineering, Economics, and Politics. His appointment was described by the University as the beginning of "a real liaison between university staff and students on the one hand and industrial scientists and mathematicians on the other."

John Steven Watson, the historian and Fellow of Christ Church, Oxford, has been appointed Principal of the Univ. of St. Andrews, in succession to Sir Thomas Knox who retires on 30 Sept. For the past two years he has been a member of the Franks Commission, studying the future of Oxford University.

Prof. D.T. Donovan, Prof. of Geology at Hull Univ., has been appointed to the Yates-Goldsmid Chair of Geology at Univ. College, London, from 1 Oct 1966.

Dr. R.H. Gorrill has had the title of Prof. of Bacteriology conferred upon him in respect of his post at Guy's Hospital Medical School, London.

Dr. C.H. Kilmister has had the title of Prof. of Mathematics conferred upon him in respect of his post at King's College, London.

D.S. Butler, Reader, has been appointed to the newly created Chair of Numerical Analysis at the Univ. of Strathclyde.

Dr. D.W. Mathieson, Reader in Pharmaceutical Chemistry at London Univ., has been appointed Prof. in Pharmaceutical Chemistry at Bradford Institute of Technology.

Prof. G.A. Sim, Prof. of Physical Chemistry at the Univ. of Illinois, has been appointed Prof. of Chemistry (X-ray Crystallography) at the Univ. of Sussex.

Dr. A.W. Ingleton, Fellow of New College, Oxford, has been appointed Prof. of Pure Mathematics at the University College of South Wales and Monmouthshire.

John Oliver, Senior Lecturer in the Department of Geography, has been appointed to the newly established second Chair of Geography in the Dept. of Geography at Swansea Univ.

Prof. G.J. Hoijtink, Prof. of Chemistry in the Univ. of Amsterdam, has been appointed to the Chair of Physical Chemistry at the Univ. of Sheffield.

Prof. R. McWeeny, Prof. of Theoretical Chemistry in Keele Univ., has been appointed to the Chair of Theoretical Chemistry at the Univ. of Sheffield.

Prof. J.K. Royle has been appointed Head of the Dept. of Mechanical Engineering at the Univ. of Sheffield. He previously occupied the second Chair of Mechanical Engineering at Sheffield.

Dr. G. Horrocks, Reader in Liverpool Univ., has been appointed Professor of Pure Mathematics at the Univ. of Newcastle.

Dr. J.W. Tomlinson of the Nuffield Research Group in Extraction Metallurgy at Imperial College, London, has been appointed to the Chair of Physical Chemistry at Victoria University of Wellington, New Zealand.

Dr. C.C. Booth, Senior Lecturer in Medicine at the Postgraduate Medical School of London, has been appointed to the Chair of Medicine at that School.

Dr. Martin Bott has been appointed Prof. of Geophysics at the Univ. of Durham.

Mr. R.G. Voysey has been appointed Director of the United Kingdom Scientific Mission in Washington and Counsellor (Scientific) at the British Embassy. He replaces Dr. J.A. Saxton who is returning to the UK after holding the post for the past two years.

Dr. K.J. Ivin, Reader in Physical Chemistry at Leeds Univ., has been appointed to the Chair of Physical Chemistry at Belfast Univ.

Dr. F.R. Jevons, Lecturer in Biological Chemistry, has been appointed to a newly established Chair of Liberal Studies in Science at the Univ. of Manchester.

Dr. K. Hoselitz has been appointed to the first visiting professorship at the Battersea College of Technology, while remaining deputy director of Mullard Research Laboratories. He will be associated with the work of the Solid State Physics Group, which recently received a grant of £25,000 from the Science Research Council for work on the structure and chemical properties of crystalline polymers.

Dr. G.B.B. Chaplin, Chief Scientist at Plessey-UK, Ltd., has been appointed to the Chair of Electrical Engineering Science at the University of Essex.

Dr. W. Ritchie Russell is appointed to the new Chair of Clinical Neurology which has been endowed at Oxford Univ. by the National Fund for Research into Poliomyelitis and Other Crippling Diseases.

Dr. M.B. Waldron, Group Leader in Physical Metallurgy at the Atomic Energy Research Establishment, Harwell, has been appointed to the Chair in and the Headship of the Dept. of Metallurgy and Materials Technology, Battersea College of Technology, London.

Dr. H.K. King, Dept. of Biochemistry at Liverpool Univ., has been appointed to the Chair of Biochemistry and Agricultural Biochemistry at the University College of Wales.

Prof. W.R. Hawthorne, FRS, has been appointed Chairman of the Advisory Council on Scientific Research and Technical Development, in succession to Sir Charles Dodds.

Prof. S. Gill, Prof. of Computing Science, Dept. of Electrical Engineering, Imperial College, and W.S. Elliott, Assistant Director of Research, Cambridge Univ. Engineering Laboratory, have been appointed part-time consultants on computers at the Ministry of Technology.

Dr. A. Carrington, Assistant Director of Research in Organic and Inorganic Chemistry, Cambridge Univ., has been appointed to the fourth Chair in the Department of Chemistry, from 1 Oct 1967.

TECHNICAL REPORTS OF ONRL

The following reports have recently been issued by ONRL. Copies may be obtained gratis by Defense Dept. and other US Government personnel, ONR contractors, and other American scientists who have a legitimate interest. However, because of the frequent content of proprietary and prepublication information, the reports cannot be sent to libraries or to citizens of foreign countries. Requests for ONRL reports should be addressed to: Commanding Officer, Office of Naval Research Branch Office, Box 39, Fleet Post Office, New York, New York 09510.

ONRL-10-66 Lasers in the UK. Part IV. Some Government Laboratories, A Collection of Miscellany, by E.H. Weinberg

ONRL-11-66 Notes on Certain Military Aviation Medical Activities in Europe, Part II, by S.C. Dunn

ONRL-12-66 Some Inorganic Chemistry in France, by S.Y. Tyree

ONRL-13-66 The Department of Physiology, University of Goteborg, Sweden, by C.N. Peiss

The following conference reports are releasable to European scientists:

ONRL-C-4-66 AGARD Lecture Series on Bionics, by C.N. Peiss

ONRL-C-5-66 February (1966) Meeting of the Physiological Society, by C.N. Peiss

Prepared by the Scientific Staff
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UNCLASSIFIED

Security Classification

DOCUMENT CONTROL DATA - R&D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Office of Naval Research, Branch Office London, England	2a. REPORT SECURITY CLASSIFICATION 2b. GROUP

3. REPORT TITLE

European Scientific Notes

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

N.A.

5. AUTHOR(S) (Last name, first name, initial)

Epstein, Bernard and Hewitson, Victoria, ed.

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
	22	

8a. CONTRACT OR GRANT NO. N.A.	9a. ORIGINATOR'S REPORT NUMBER(S) ESN-20-4
b. PROJECT NO.	
c. N.A.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) N.A.
d.	

10. AVAILABILITY/LIMITATION NOTICES This document is subject to special export controls & each transmittal to foreign governments or foreign nationals may be made only with prior approval of the Office of Naval Research Branch Office, Box 39, FPO, New York 09510.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
N.A.	N.A.

13. ABSTRACT

This is a monthly publication presenting brief articles concerning recent developments in European scientific research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to both American and European scientisits by disclosing interesting information well in advance of the usual scientific publications.

The articles are written by members of the scientific staff of ONRL, with an occasiona' article contributed by a visiting stateside scientist.

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
British Universities, Sussex, Bath, Essex, Lancaster Surrey and Warwick						
Biological Sciences						
Materials Sciences						
Physical Sciences						

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