

## U.S. NATIONAL ACADEMY OF SCIENCES

## MEDALS AND AWARDS

THE following awards by the U.S. National Academy of Sciences have been announced: The James Craig Watson Medal, to Prof. Yusuke Hagihara, formerly professor of astronomy in the University of Tokyo and director of the Tokyo Astronomical Observatory and later professor in Tohoku University, a post from which he has just retired. Prof. Hagihara is best known for his original contributions to the field of celestial mechanics, the study of celestial bodies in motion. Perhaps his most significant work has been his paradigms for the general problem of the stability of motion—a basic question in celestial mechanics. Prof. Hagihara's mathematical talents have also been turned to one of astronomy's most vexing puzzles—the restricted problem of three bodies. Astronomers have long sought, without complete success, to calculate the relative motions of three bodies when given the positions and motions of the bodies at a point in time. Celestial mechanics is not the only astronomical field of interest in which Prof. Hagihara has gained distinction. He has also made original contributions to theoretical astrophysics, the theory of relativity, and solar eclipses. A prodigious scientific author, he has published more than twenty-five papers and monographs on celestial mechanics alone, and is the author of ten books on various astronomical subjects.

The Agassiz Medal, in recognition of original contributions to the field of oceanography, to Dr. Anton Frederik Bruun, of the University of Copenhagen. Dr. Bruun is a leading authority on life in the deep sea, and has won similar distinction as an effective leader of oceanographic expeditions. In addition to the many expeditions in which he has participated, Dr. Bruun led an expedition during 1945–46 to tropical West African waters, and, during 1950–52, headed the *Galathea* expedition that circled the globe in a study of the ocean depths. At present, he is directing an expedition to the South China Sea, sponsored jointly by the Scripps Institution of Oceanography and the International Co-operation Administration. It was the *Galathea* expedition that earned Dr. Bruun especial acclaim for his ability to enlist scientists from many nations in a co-operative research programme. Although a voluminous series of reports has already resulted from the *Galathea* findings, it is anticipated that additional reports will be published for many years to come. One of the expedition's most significant achievements was its trawling of the approximately 34,500-ft. deep Philippine Trench, just east of the Islands.

Most dramatic finding of the *Galathea* expedition was the discovery of a 'living fossil', the mollusc *Neopilina*, the nearest relatives of which were thought to have become extinct some three hundred million years ago (*Nature*, 179, 413; 1957). During 1926–33, Dr. Bruun was engaged in oceanographical research as a member of the Danish Fisheries Commission. In 1933 he was appointed curator of molluscs in the Zoological Museum of the University of Copenhagen. He has also held appointments at the Carlsberg Laboratory, the Marine Biological Laboratory, and the Danish Aquarium.

The Kimber Genetics Award, to Prof. George Wells Beadle, professor of biology and chairman of the division of biology at the California Institute of Technology. Prof. Beadle's specific research interests have been, successively, the genetics and cytology of maize; the genetics of *Drosophila melanogaster*; the chemistry and the biology of eye pigment in *Drosophila*; and the chemical genetics of *Neurospora crassa*, or red bread mould. Perhaps the most significant result of his work has been the finding of new ways to trace the action of genes. The best-known of these techniques is the use of *Neurospora* to follow the steps by which genes influence the synthesis of vitamins, amino-acids, and other basic ingredients of life. This simple and ingenious tool was developed by Dr. Beadle in collaboration with Dr. Edward L. Tatum and others. Prof. Beadle has occupied his present chair at the California Institute of Technology since 1946. Previously, he was professor of biology at Stanford University during 1937–46, and assistant professor of genetics at Harvard University during 1936–37. Prof. Beadle has been elected a foreign member of the Royal Society of London this year.

The J. Lawrence Smith Medal, for outstanding investigations of meteoric bodies, has been awarded to Dr. E. J. Öpik (*Nature*, April 23, p. 280).

The Public Welfare Medal of the National Academy of Sciences has been awarded for "eminence in the application of science to the public welfare" to Dr. Alan T. Waterman, director of the National Science Foundation. Established in 1913 by Mrs. Helen Hartley Jenkins in honour of her father, Marcellus Hartley, the Public Welfare Medal is considered to be the most distinguished of the Academy's medals. It is unique among them in that it is awarded for outstanding public service in the uses of science, rather than for achievements within a particular scientific discipline.

## SIXTH-FORM SCIENCE AS A PREPARATION FOR UNIVERSITY WORK

IN March 1958 the Senate and Council of the University of Birmingham approved a proposal for an inquiry to be held into the suitability of the General Certificate of Education (Advanced Level) syllabuses in science as a preparation for direct entry into first-degree courses in the Faculty of Science.

This useful report, now published, was financed by the Gulbenkian Trustees. The subjects under consideration were biology, chemistry, geography and geology, mathematics and physics. The Panel began its work by considering what sixth-form training would be most valuable to a pupil who

proposed to enter a first-degree course in a biological subject\*.

It was felt to be essential, in view of the increasing emphasis on the experimental aspects of biology, that such pupils should acquire an understanding of the basic sciences—chemistry, mathematics and physics. They should preferably study biology, but the Panel would not exclude from a university course those whose only background was a sixth-form knowledge of the three other subjects. "Intending biology students should be taught to practise the scientific discipline of observation and deduction, and to despise that pointless accumulation of facts and terms which sometimes passes for scientific education and they should be given training in clear, purposeful and accurate descriptive writing in their own language". The Panel was impelled by two main considerations to pronounce against botany and zoology and the current biology, and in favour of a single, revised course in biology, which should stress the underlying principles of the subject and show the fundamental similarities of living things as well as the fundamental differences between plant and animal.

The present chaotic system of examinations at Ordinary, Advanced and Scholarship levels, with different requirements from each Board, is critically considered, and so useful proposals are made towards a more rational system. The approach of the teacher to the syllabus is largely determined by the type of examination paper which is set. Although the marking of a large number of scripts by many examiners is not easy, and this has led to the use of questions which can be marked quickly and precisely, these questions may not be of the type best suited to selecting the best candidates.

At present, selection for entry to university is made on the basis of Advanced-level performance, supplemented by an interview. The latter occasionally reveals that a student with good marks depends on a particularly good memory and that this kind of entrant usually fails to maintain his performance in the university. It was felt that the introduction of

\* University of Birmingham. Report of an Enquiry into the Suitability of the General Certificate of Education Advanced Level Syllabuses in Science as a Preparation for Direct Entry into First Degree Courses in the Faculty of Science. Pp. v+212. (Birmingham: The University, 1959.)

Scholarship-type questions would enable a distinction to be made between the fundamentally sound pupil and the 'memory-man'. In general, there is a remarkable parallelism between the weaknesses, difficulties and suggested remedies in all the subjects. Very useful suggestions are made towards the teaching of fundamental principles, and the eschewing of the unintelligent learning of masses of factual snippets. The report of the Panel is so detailed and yet succinct that further summary is not possible.

This report throws into relief the need for other investigations. Each university can have its own pre-requisites for entry to its courses, and, in this matter, there are differences in standard and scope between science subjects. This makes difficulties for the sixth-former who, in the hope of securing entrance to a university, applies to a number of them. While it is impossible, and if it were possible it would be undesirable, to secure uniformity in this matter, much wastage of effort (even clerical effort), confusion and disappointment result.

It is hoped that other universities will issue similar reports, for the matter is both socially important and urgent. Although it is outside the terms of reference of the present report, there is a more general problem of a parallel nature which is receiving some attention in an inquiry of which the results are awaited. Too many sixth-form students, who seem to promise much, fail to do well at the university. This is a source of disillusion, a wastage of brain-power and money, and a failure to meet social needs, which needs careful investigation and, if possible, a remedy.

There are other matters which should be considered, though these are outside the scope of the present report. For example, there is the failure of the less-than-brilliant sixth-form student to adjust himself quickly enough when he comes to the university with its short terms and social temptations presented by the Students' Union, the failures to use the vacations adequately and the early dates of the examinations in the last undergraduate year. The shortages of good sixth-form teachers, particularly of science and mathematics, and even of good examiners are other, but nevertheless important, matters.

W. L. SUMNER

## THE NEEDS OF UNIVERSITY STUDENTS

IN a memorandum submitted to the University Grants Committee, the National Union of Students describes its attitudes to the problems involved in university expansion. Because of their direct experience, the views of the National Union of Students are likely to be of greatest significance where it discusses the needs of students. It has recently suggested, for example, that if adequate and suitable accommodation, which may be of many different kinds, cannot be provided near at hand for the whole student population, then neither the expansion of an existing university nor the establishment of a new one should be allowed (Memorandum to the University Grants Committee on the Expansion of University Education, 1960-1970. Pp. 12. London: National Union of Students of England, Wales, and Northern Ireland, 1960). Insufficient attention has been paid to this problem in the past, with con-

sequent harmful effects on the undergraduate, as a person and as a student, and upon the community of which he is a member.

While there is a variety of different types of accommodation which fulfil the needs of students, great benefit is derived from time spent in residence. Ideally, halls of residence should be composed of comparatively small units of ten to fifteen rooms, each providing a small kitchen and a discussion room. The units are often well arranged on staircases with small groups of rooms on each floor. There might be three such units on each of three or four sides of a small court, so that each block provided accommodation for some 150 students. There is, however, a considerable range of ways in which good residential accommodation can be provided; the student flats at King's College, Newcastle, and the Studentenhaus at West Berlin University are examples of such