The Battelle Institute undertakes research for the sole benefit of each client and hands over all results, including patents, the work being carried out on a completely confidential basis. At Geneva, research is being done in physics, chemistry and metallurgy by the staff of eighty-five people. Serious consideration is given to new fields of research as industry demands them, so that, like the Columbus and Frankfurt Laboratories, the Geneva Laboratory is a dynamic rather than a static organization. Each project receives the full attention of the Institute's entire research facilities in the United States and Europe. The volume of research already achieved makes it evident that the Battelle Institute can be as helpful in Europe as it has been in the country of its origin.

THE COLOMBO PLAN: TECHNICAL CO-OPERATION SCHEME

UNDER the Technical Co-operation Scheme of the Colombo Plan, which completed its fourth year in June 1954 (The Colombo Plan. Technical Co-operation Scheme. Report for 1953-54 by the Council for Technical Co-operation in South and South-East Asia. Colombo, July 1954. London: H.M.S.O., 1954. 1s. net), training was arranged in 1953 for 608 persons as against 538 in 1952, and 1,653 places have now been provided in all, mostly for graduates with a background of experience which enables them to benefit from their specialist training abroad in various fields of economic development. By June 30, 1954, the largest group (268) went abroad for training in food and agriculture; of the others, training in government administration claimed 266, engineering 192, medicine and health 168, education 135, transport and communications 132, industry and trade 131, and power and fuel 123. The United Kingdom provided facilities for 638 trainees, including 211 from India, 195 from Ceylon and 157 from Pakistan. Of Australia's 487 trainees, 116 came from India, 91 from Pakistan, 80 from Indonesia and 79 from Ceylon. Canada has taken 210 trainees (93 from Pakistan and 92 from India), New Zealand, 170 (45 from Ceylon, 39 from Malaya, 35 from India and 32 from Pakistan), while India has taken 137 trainees, including 67 from Ceylon and 23 from Pakistan. The figures indicate that while Pakistan and Indonesia are concentrating on training in administration, India and Ceylon are concentrating on training facilities in food and agriculture.

The demand for experts has been heaviest in the field of medicine and health. The 58 experts provided in 1953 (compared with 90 in 1952 and 45 in 1951) brought the total provided to 263 as against 502 applied for; and of these, 69 are in medicine and health, 36 in transport and communication, 33 in engineering, 33 in food, agriculture and forestry, 25 in education and 23 in industry and trade. Of the 115 experts provided by the United Kingdom, both India and Ceylon took fifty. Of 45 supplied by Canada, 22 went to Ceylon, 10 to Pakistan and 9 to Malaya. Of New Zealand's 30 experts, 12 went to Pakistan. Although 239 requests were outstanding, offers are still awaited against only 133.

Requests for equipment for use by experts or for training and research institutions since the beginning

of the Scheme have totalled £1.5 million, against which equipment to the value of £1 million has been supplied or offered. Requests totalling £714,500 have been received from Pakistan, £591,700 from India and £171,000 from Ceylon. Equipment supplied or agreed in principle by the United Kingdom includes £14,000 worth for the Technical High School, Karachi, and £155,000 for nine new technical high-schools in Pakistan, £50,000 worth for the Mercantile Marine Academy, Pakistan, and £82,000 for the Pakistan Department of Scientific and Industrial Research, £139,000 for the Textile Training Centre, Lyallpur, £70,000 for the National Metallurgical Laboratory, Jamshedpur, £24,000 for the Central Testing and Standards Laboratories at Karachi and Dacca, £37,500 for the Central Water Power, Irrigation and Navigation Research Station, Poona, £12,380 for the Bengal Engineering College, Calcutta, £18,300 for the Research Laboratory of the Forest and Education Branch of the Ceylon Forest Department, £25,000 for the Central Science Teaching Centre, Bandung, and Teacher Training Centres at Djogjakarta and Surabaya.

BIOLOGY AND A GENERAL UNIVERSITY EDUCATION

A CONFERENCE on "Biology and a General University Education", organized by the Institute of Biology, was held at the University College of North Staffordshire, Keele, on December 20-21. Most of those attending were paying their first visit to Keele, and it was clear from what was said at dinner-table and in common rooms that they generally liked what they saw and heard of the College. There was appreciation, too, of the inclusion in the general education for which North Staffordshire stands, not only of biology but also of those traditional academic graces which are so conspicuously lacking in some of the universities born of the industrial revolution.

In the first session, under the chairmanship of Prof. S. Zuckerman, three speakers described biology courses for arts students that are already in existence. Prof. A. R. Gemmell dealt with biology as one alternative for the compulsory natural science subject for students of the humanities or social sciences at Keele. He tries to give his students an insight into the scientist's approach and some knowledge of the nature of laboratory work, to relate the science to the student's own background of knowledge, and to stimulate him to think. The centre of the course is man, and there are fifty-two lectures, on mammalian physiology and anatomy, parasitism and disease, genetics and agriculture. There is a three-hour practical class each week, including dissection of the rabbit and some work with *Drosophila*. Dr. J. Hutchens (Chicago) then described biology as a part of the general education course at his university. Here physical science is studied as well, and before biology, and the students include those who will later specialize in sciences as well as the humanities. The emphasis in the biology course is on the physiology of man; but the laboratory course begins with microscopy—pond water, blood cells and so on—a practice of which Dr. Hutchens does not approve. There are differences of approach in different parts of the course, some stressing details and others general principles. For the most part, the teaching in general education is done by a separate staff from

that of the divisions which deal with higher degrees; this frees research workers whose chief interest is the multiplication of published papers from work which will not lead to their academic advancement, but has the unfortunate effect of making the others, whose job is teaching rather than research, feel somewhat second-class.

Dr. C. Gordon dealt with a course in social biology which he gives to social science students at Edinburgh; this is complementary to one in anatomy and physiology given by a physician. The biology is academic and vocational and includes topics such as man's place in the animal kingdom, the effects of heredity and environment, and some discussion of physiology and vital statistics. The students take an examination at the end of the course, and their answers are on the whole well written but show no evidence of any ability to interpret data. This is partly because the students are frightened of mathematics, but may also be due to the absence of any practical work, which the scientists have not yet been able to induce the board of studies to impose.

In the subsequent discussion, a number of speakers said that they could give a better education if they had students for four years instead of three; but there was no general agreement on the meaning of a fourth year or on what to do with it. For some, it seemed to mean ignoring what the students had done at school or teaching them again what they had already had the opportunity of learning there; for others it meant the possibility of lengthening and strengthening the course for an honours degree. The sense of the meeting was probably that it is a good thing to have a specialist staff to teach science to arts students; but that its members should also take part in straightforward research, and that some form of practical work is desirable.

In the afternoon Prof. Gemmell took the chair, and the conference heard three professors at North Staffordshire say how useful his biology course was for their students. Prof. S. Finer (social science) found its advantage to be that it taught them the background of knowledge of human ecology necessary for their practical work; Prof. W. C. Stewart (education) welcomed it for its aid in the understanding of child development; and Prof. J. Blake (history) liked its broadening of outlook and its development of a different aspect of truth from those with which the historian and philosopher deal. In the absence through illness of Mr. L. J. F. Brimble, Mr. W. B. Yapp (Birmingham) gave the only other set paper in this session, which had the title "Biology for Arts Students—Is it worthwhile?" He suggested that in order for such courses to be justified, there had to be a successful solution of the problem of language, careful selection of topics which are wide in scope but deep in the demands which they make on the students' understanding, and even more careful selection of the teacher. Referring to the theory of organic evolution as probably the best single topic, both on theoretical grounds and in practice, he said that those who taught it to arts students should have a wide background of knowledge and in particular ought to have read "The Origin of Species". This divided the audience, or at least the vocal part of it, fairly evenly into those who had read the book and agreed with the speaker, and those who had not and thought it unnecessary to do so. In the rest of the discussion Prof. T. A. Bennet-Clark (King's College, London) voiced the disappointment of many of the biologists when he

said that the three Keele speakers had all spoken chiefly of the value of biology on vocational grounds.

The final session, with Prof. O. E. Lowenstein in the chair, was on "Biology in a General Science Education". Prof. Bennet-Clark defended it as suitable for third-class and pass-degree men who would enter commerce, and felt that a training in science gives a better education, in A. N. Whitehead's sense of "a habitual vision of greatness", than is now possible for the humanities. Prof. F. W. R. Brambell (Bangor) put the case against general science by arguing for the virtues of specialization on educational grounds. He recommended opportunism in the choice of advanced courses, and the pursuit of them to the forefront of knowledge according to the interests of the staff available. Among points raised in the general discussion were the difficulty that early study of the basic sciences often lays down special interests at school (Dr. Gordon); the need for courses not leading to a professional career in biology (Dr. Hutchens); the advantage of an encyclopædic knowledge (Prof. Lowenstein); the importance of knowing when one is ignorant (Mrs. Riddiford); and the value of a biological training in teaching one to deal with complex situations. There seemed in the end to be a greater measure of agreement between the two principal speakers than at first appeared. Both wanted as much specialization as possible for those who could profit from it, and both held that biology had more to offer than its mere vocational value for those who would use it in after life. One of the most pleasing aspects of the conference was the general feeling that a university training in biology can be one of the best preparations for entry to those careers in administration and leadership for which we have not yet designed precise undergraduate courses. Biology, in fact, might well take part of the place so long occupied by the classics but for which they are no longer fitted. One would like to see a full and reasoned statement of this view, which was implicit rather than openly said in much that passed at the conference.

W. B. YAPP

GASEOUS ELECTRONICS

CONFERENCE IN NEW YORK

THE Gaseous Electronics Conference has now become an annual meeting in the United States which is greatly looked forward to by all those interested in the subject. The 1954 Conference was sponsored by the Division of Electron Physics of the American Physical Society, and the host institution was the College of Engineering of New York University, which is celebrating its centenary. The meetings were held in New York City during October 14–16, and were attended by about 240 members from all over the United States and Canada. More than a third of the forty-five papers (forty-one contributed and four invited) came from universities, the rest coming from the great industrial laboratories and government establishments, representing in all twenty-seven different organizations. Members of the Conference were entertained at a banquet at which the guest speakers were Dr. T. E. Allibone, of Associated Electrical Industries, Aldermaston, who described current work in England on gaseous electronics, and Dr. W. Finkelburg, of Siemens-Schuckert, Erlangen, who described present-day