SCIENCE IN BERLIN

DURING the seven days beginning May 24, a scientific conference was held in Berlin and was attended by delegates from many parts of the world. It was held under the patronage of the Burgomaster of Berlin, Prof. Ernst Reuter; the Senate of the City of Berlin; and the Plenipotentiary of the German Federal Republic, Dr. Heinrich Vockel. The Conference was organized with the support of the Gesellschaft Deutscher Chemiker, and its president, Prof. K. Ziegler, paid tribute to Prof. J. D'Ans who, as president of the Berlin branch of the Gesellschaft, had been largely responsible for the idea of holding the Conference and for its organization. The bodies which acted as hosts were: the Freie Universität Berlin, the Technische Universität Berlin, the Deutsche Forschungshochschule Berlin-Dahlem, the Ortsverband der Gesellschaft Deutscher Chemiker and the Berliner Physikalische Gesellschaft.

The Conference demonstrated very clearly that Berlin again has an important part to play in academic and scientific affairs, and it provided a valuable occasion for Berlin scientific workers to meet their colleagues from other parts of Germany and to discuss their scientific problems. It was the first major scientific conference to have been held in Berlin after the War, since most of the recent conferences have been held in the Federal Republic of Western Germany. It was attended by students of the Berlin Universities, including the Humboldt University in the Eastern Sector. Nearly 2,500 tickets were sold to participants, about 800 of these to residents of the Eastern Zone of Germany or the Eastern Sector of Berlin.

The scientific papers were formally divided into two main groups: the first on chemical problems in living processes; the second on problems of atomic physics, molecular physics and cosmogony. The large number of papers contributed at the Conference (some sixty or so in number) covered a wide range of chemistry, physics and physical techniques; eight of the papers were from the Eastern Zone of Germany and four from the Eastern Sector of Berlin.

The visiting foreign men of science, many of whom read papers, were: Prof. H. J. Hildebrand, University of California; Dr. J. R. Johnson, Cornell University; Dr. Miller, Minnesota Mining and Metallurgical Corporation; Prof. P. Niggli, Technische Hochschule, Zurich; Prof. J. A. Hedvall, Göteborg; Prof. R. Domenjoz, Saarbrücken; H. Nitschmann, Bern; Prof. H. S. W. Massey, London; Dr. F. P. Bowden, Cambridge; Prof. Chrétien, Paris.

The Conference was held in the premises of the Technical University (Berlin-Charlottenburg), and at the ceremonial gathering the rector, Prof. W. Pflaum, laid stress on the important part that the fundamental and exact sciences play in technology. Dr. Vockel said that he envied the natural scientists their comparatively simple task of discovering the natural laws which govern the physical world. He appealed for their understanding of, and sympathy for, the politician who is attempting the difficult and urgent task of discovering the laws which govern the social order. Dr. Tiburtius, as Senator for Education in the City of Berlin, spoke of the attitude of the State towards science, which should not be to harness it for political ends, but to co-operate with scientific workers and to assist them in the free pursuit of their researches. The other speakers were Prof. M. von Laue, president of the Kaiser-Wilhelm-Institut, Berlin-Dahlem; Prof. Ziegler; Prof. Hans von Kress, rector of the Free University. Prof. C. Ramsauer, president of the Berlin Physical Society, gave an account of the part which Berlin scientific men have played, particularly in modern physics and chemistry. Measured by any yardstick this is impressive, and it was interesting to note that of the total of thirty-four Nobel Prizes which have been awarded to German physicists and chemists, eleven were gained by Berlin scientific workers. Prof. P. Niggli (Switzerland) spoke on behalf of the foreign men of science and paid tribute to Berlin's record in the natural sciences.

The first session began with a paper on photosynthesis by Prof. O. Warburg, and the physics session on radioactivity, which was under the chairmanship of Prof. J. D'Ans and Prof. M. von Laue, was opened with a paper from Prof. O. Hahn. This opening session was attended by Major-General G. K. Bourne, General Officer Commanding Berlin (British Sector), by Dr. Vockel, and by representatives of the British, American and French Scientific Research Divisions.

Those attending the Conference worked hard during the day, and in the evenings were entertained at various social functions, both official and private. These included a reception given by Dr. Vockel; an evening at the ballet "Abraxas", followed by a reception given by the Senator for Education, the Rector of the Technical University and the Rector of the Free University. At this reception a presentation was made to Herr Werner Egk, composer of the ballet. A reception was also given by the Mayor and Senate of Berlin. In addition to this, there were student gatherings and entertainments. Visits were paid to various research laboratories, many of which are admirably equipped and which are carrying out work of a high standard.

The Conference was held in an atmosphere of lively interest and enthusiasm, and it was impressive to see how science can transcend all political difficulties. The attendance was very large; in the physics session, for example, it was well over a thousand, a big proportion being students. The whole Conference was admirably organized, and it reflects great credit on Prof. D'Ans and the organizing committees. It is clear that science in Berlin is very much alive, and tribute must be paid to the devotion and courage of those who have built it up under such difficult conditions.

F. P. BOWDEN

A CENTURY OF DEVELOPMENTS IN ENGINEERING

A "JOINT Engineering Conference, 1951", organized by the Institutions of Civil, Mechanical, and Electrical Engineers, was held in London during June 4–15. A large number of papers reviewing the development of different branches of engineering during the past hundred years were read.

One group of papers dealt with mechanical engineering developments in the mercantile marine, on the railways, in the gas industry, in electricity power stations, in road transport vehicles and in the iron and steel industry. Mr. R. A. Crowe outlined the

development of ship propulsion from the day when the naval "Seamanship Manual" stated categorically that "there is no greater fallacy than to suppose that ships can be navigated on long voyages without masts and sails", to the most recent developments in the application of gas turbines to marine propulsion. He believes that for many years to come the steam turbine is likely to remain unchallenged for the propulsion of large passenger liners. Mr. R. A. Riddles reviewed progress in railway mechanical engineering from the early pioneering days of the Stockton and Darlington Railway, the first public railway to employ locomotive traction, to the many attempts to improve the thermal efficiency of steam traction which have been made during the first half of the present century. Mr. F. M. Birks dealt with technical advances in the gas industry. He explained the advances from manually charged retorts to the successfully developed Glover–West and Woodall–Duckham systems of continuous vertical retorts, which are now responsible for about one-half of the gas output of the industry. A ton of Durham coal now yields 74 therms of gas, 20 therms of tar and 165 therms of saleable coke, the total products for sale having 86 per cent of the thermal value of the coal. Mr. Birks thinks that, economically, the gas industry has a promising future, as it is able to convert thermal energy for cooking purposes at a capital cost considerably less than half that required by any other system of distributed energy. Mr. Bask, in discussing mechanical plant for electricity power stations, said that fifty-three new power stations have been designed in Great Britain to come into operation during the period 1946–56. Anxiety about the rate of extraction of coal, oil and natural gases is giving a special impetus to the use of water-power resources and the more efficient use of other sources of power. Economic studies appear to justify the use of heat from atomic piles for base-load stations, and it seems that atomic piles in association with steam plant may become practicable in the near future.

Another group of papers dealt with hydro-electric power schemes and power station design and construction, the generation, transmission and distribution of electricity, applications of electricity to sea transport, the development and use of gas-pressure cables for high-voltage systems in Great Britain, electric traction and signalling, telecommunications, air radio, electrical measuring instruments, the British television service, radio masts and towers and progress in electric lighting.

Sir John Hacking, in his paper on the generation, transmission and distribution of electricity, said he believes that during the next twenty years there will be more development in the use of water power than in the use of any other kind of energy for electrical generation. Tidal power schemes such as the Severn Barrage have been investigated, but they suffer from the disadvantage that it is not possible to obtain a reliable output during peak-load hours without some system of energy storage. On the other hand, the use of gas turbines would have the advantage that they can be started up rapidly for use during peak hours; they are not likely to become competitive in Great Britain until pulverized coal can be used as a fuel in the place of oil. Experiments are also being carried out at the present time to make use of wind power.

Mr. J. E. Goodall and Mr. D. B. Irving described the development of gas-pressure cables for high-voltage systems. The first experimental installation using high gas-pressure to suppress ionization, or the reaction involving re-combination of ions, passed its tests in November 1931, and the first commercial installation of this type of cable in the world was carried out in the following year in London. The main mechanical difficulties were encountered in sealing the ends; but these have now been largely overcome, and different manufacturers are standardizing the details of these cables.

Sir Stanley Angwin traced the development of telecommunications during the past hundred years, Air Commodore Cadell and Dr. O'Kane discussed the use of radio aids in flying, and Sir Archibald Gill described the ever-increasing use made of electrical devices on board ship. Sir Stanley Angwin pointed out that the electric telegraph handled 48,600 messages during the year 1851, whereas in 1948 that number had increased by more than a thousand times. The comparable figures for the telephone service show that the first exchange with eight subscribers was opened in 1879, the total number of subscribers increasing to 3,300,000 in 1939 and 5,200,000 at the present time. Dr. S. Whitehead reviewed the development of electrical measuring instruments. He pointed out that the early history of electrical measurements is virtually the history of physical science. Electrical measurements made many of the discoveries possible, which in turn led to better instruments. With the development of the electrical industry came a further great demand for reliable electrical measurements, until to-day there are very few measurements in which electricity does not or could not play a part. Sir Noel Ashbridge described the developments that led to the establishment of the British television service. He recalled that, in 1908, A. A. Campbell Swinton, in a letter in *Nature*, outlined a proposed method of television strikingly similar to that now in use. Sir Noel discussed the difficulties in the siting of television transmitters, and, turning to the future, thought that the reasons which militated against stereoscopic cinematography operate even more strongly against stereoscopic television. Colour transmission, on the other hand, presents an attractive field for development. It is now possible to transmit a satisfying picture of adequate detail in colour within the same spectrum space as a picture of apparently similar detail in monochrome.

Mr. R. D. Ackerley outlined the development of electric lighting from the discovery of the electric arc by Sir Humphry Davy to the construction of the largest light source in the world, a 4,000-amp. 600-kW. arc lamp for anti-aircraft use in the Second World War. The greatly improved efficiencies of modern lamps were mentioned, and Mr. Ackerley foresees developments in high-pressure mercury vapour lamps for better street lighting, and an increase in efficiency and a fall in the cost of fluorescent lamps. Mr. C. O. Boyse, in his paper on radio masts and towers, described the co-operation between the radio engineer and the structural engineer which is necessary in the design of these structures. He considers that the installation at Rugby, which was built in 1923 and consists of a dozen 820-ft. high masts, is still one of the outstanding achievements in this field.

Yet another group of papers dealt with permanent-way developments, underground-railway planning and railway bridges, ports, harbours and dry docks, road planning and safety, a number of public-health topics and the development and design of aircraft

structures, and planning and construction of airfields. Mr. Everard, Mr. Anderson and Mr. Sutherland Campbell, the authors of the first of these papers, pointed out that underground railways provide a second plane of traffic with the highest known capacity for handling large crowds. They can handle more than 100,000 people per rush hour in two directions of traffic at an average speed of 20–25 m.p.h. The figures of journeys by public transport per year per head of population were given as: Paris 400, New York 462, London 500. No large-span railway bridge has been built in Great Britain since the Forth Bridge (1890). The greatest problem in connexion with railway bridges in Britain is their maintenance, the railway executive being responsible for a total of more than sixty-two thousand bridges. Mr. Leighton and Mr. Guthrie Brown discussed the port facilities of Britain and the great contribution engineers have also made to the handling of bulk cargoes like grain, seeds, coal and petroleum. There are now thirty-two major dry docks in the world, ten of which are within the British Commonwealth. Any forecast of future dry docks is linked with the average increase in the size of commercial vessels, particularly if the tendency of an increasing ratio of beam to length continues. Mr. G. T. Bennett, in his paper on road safety and planning, quoted an estimate that the total cost to Great Britain of road accidents was £100 millions in 1946, without accounting for losses due to delay on the roads. He pointed out that Great Britain depends for prosperity largely upon the exploitation of its geographical position, the short distances between ports and centres of industry favouring entrepot trade and exports. He advocated strongly the investment of capital in road improvement to cheapen production costs.

Mr. H. J. B. Manzoni, Mr. H. F. Cronin and Mr. D. M. Watson read three papers on the related topics of public-health engineering, water supplies and sewage disposal. Mr. Manzoni reviewed the insanitary state of most towns and cities in the early part of the last century and the great advances which have been made since then. He gave an indication of the magnitude of the problem of refuse disposal by quoting the figure of 14 million tons as the annual quantity of refuse collected by local authorities in England and Wales just before the Second World War. He also referred to the problem of district heating. This is the most economical method for a large estate of houses in which the whole of each house is heated; the cost is greater, however, than the cost of coal fires to heat only one, or at most two, of the rooms in each house.

Papers on engineering education and training which were read at the Conference have already been reviewed separately in *Nature* of July 7, p. 14.

E. K. Frankl

THE MUSEUMS ASSOCIATION

ANNUAL CONFERENCE

THE fifty-seventh annual conference of the Museums Association was held in Belfast during June 18–22 under the presidency of Mr. S. D. Cleveland, deputy director, City Art Gallery, Manchester. The theme of the Conference in this Festival Year was "The Museum as Mirror of British Achievement in Art and Science". About three hundred delegates attended, including representatives of the French museum movement, and others from Unesco, and from Australia, Canada, Mauritius, Egypt and the United States.

The presidential address, on "Association Reflections", was a survey of the activities of the Association since 1939. Mr. Cleveland reviewed in some detail the work carried out by museums and art galleries during the difficult war years, and felt that, despite the handicaps, the period was a stimulating one in the museum movement. With regard to the future, Mr. Cleveland considered that, in adopting a constitution more in keeping with the present policy of the Association as primarily a professional organization, the present standards of curatorship necessary for a public service would be maintained and indeed improved.

Mr. J. A. S. Stendall, director of the Museum and Art Gallery, Belfast, after outlining the history of museums in Northern Ireland, described the modern display methods adopted at Belfast during the past few years. The material has been re-arranged so as to tell a story, colour effects have been used lavishly, and fluorescent lighting is combined with the earlier tungsten lamps. Reference was made to the projected museum of Ulster life and tradition which is to be established in the grounds of Belfast Castle.

Dr. D. Dilwyn John, director of the National Museum of Wales, recalling the theme of the Conference, reminded the audience that "a mirror reflects things outside itself and thus museums do mirror British achievements which are not in themselves museum achievements". As an example he took a specimen of *Glossopteris*, a fossil fern from the Antarctic, collected at the side of the Beardmore Glacier by Wilson when returning with Scott from the South Pole. Eventually the specimens were found and shown in the British Museum (Natural History). The fern proved the existence in former times of a great southern continent. But the fossil has another value, for it reflects and mirrors a great British achievement.

Dividing the work of museums into display, curatorial activity and study, Dr. John showed how present display methods consist of starting with the familiar and gradually passing step by step to the less well-known. The safety and preservation of rare specimens are among the most important of curatorial activities, while from the study of great natural history collections springs new knowledge and understanding. Dr. John stressed that a museum man, working in a natural history museum, may be led on from his fundamental work to considerations of the widest interest and to problems which are world wide.

Dr. F. Sherwood Taylor, director of the Science Museum, London, considered that local museums should show illustrations of the physical sciences even if only as temporary displays. He considered that experiments are preferable to static apparatus and stressed that museums should not attempt what has already been demonstrated in schools. He also felt it more desirable to illustrate local industries rather than the simple laws of physical sciences.

The Conference was of particular importance in that it not only reflected the continued progress of museums in their recovery from war damage and reorganization, but also demonstrated the new aims and ideas, techniques and activities which are now evident, and which have greatly stimulated popular interest in, and change of outlook towards, the function of public museums and art galleries.