

the essential basis of most work in industry. Still dealing with potential leaders of the profession, there seemed to be agreement that the present arrangement by which the student who hopes ultimately to pass into industry remains in the university for one or two years for research work has much to commend it. The novice in research is bound to make mistakes (that, of course, is the way in which he learns), and it is much better that he should make his mistakes in the friendly company of his professors and fellow students than in the research department of a large works or research institution, where mistakes are not regarded as an inevitable part of the general order of things.

Side by side with the training of the pioneer research physicist, there must be suitable provision for the education and training of the no less important class of men with practical ability who, whether from their turn of mind or personal interests, do not fit suitably into the university scheme of things; men, for example, who will occupy the posts of physicists of the second and third classes, carrying the ideas from the research department into actual production and overcoming the difficulties which occur when the article gets 'on the belt'. For these, it would appear that a course through the junior technical schools leading to more advanced courses in the technical colleges would prove most useful. Some of these courses might very well be part-time courses, after the man has actually joined industry. In that case, however, it was strongly urged, a youth could not be expected to make adequate progress unless his employers are prepared to grant him very appreciable facilities in the firm's time, corresponding at least to one full day a week. Teachers in technical colleges spoke very highly of the ability of men of this type to master subjects connected with their daily work, and one head of a large industrial research laboratory went so far as to describe them as the salt of the earth. It was pointed out that many of these men, owing possibly to not having reached intermediate or even matriculation standard before leaving school, would not be able to take an external university degree, and in fact a university degree might not be their most suitable aim. There was strong support for the suggestion that the time has now arrived when one or more National Certificates in Physics should be instituted, and that if possible the highest of these should be of such good standing that it might be accepted for associate membership of the Institute of Physics.

The characteristics demanded of a candidate for industrial work were stated in very much the same terms as in the conference held by the Institute in 1936: "Honesty and integrity of outlook, intelligence and quick-wittedness, co-operativeness, tactfulness and charm of manner, drive, good health and energy, and a sense of real values which is the antidote to swelled head or side". Presumably some knowledge of his subject is also desirable. This is a formidable catalogue, and clearly implies that the candidate must have had a wide education for living, in addition to his specialized studies. In fact, the need for broadening the education of the physicist might be described as the dominant note in the Conference. This broadness of education and wideness of outlook are equally essential whether the man goes by way of the university or the technical college, and it was gratifying to hear that the more modern of technical colleges of Great Britain are in fact providing the necessary facilities in ever ampler measure.

One final point. It was strongly urged that at no stage in his career should the physicist feel that his education is complete. There was a very steady and unanimous demand for more and more postgraduate courses both in pure and applied physics; some perhaps part-time and others perhaps short refresher courses of from two to three months. Both the universities and technical colleges can, in fact must, play their part in providing such facilities; and many of these courses could with mutual advantage be given by men who have made their mark on the industrial life of the country.

The discussion as a whole reached a very high level and showed a considerable consensus of opinion on some extremely practical points. It has provided a valuable compendium of suggestions and evidence on which it is hoped the Planning Committee, which arranged the Conference, will be able to base a report for presentation to the Board of the Institute of Physics in due course. J. A. CROWTHER.

OBITUARIES

Prof. Carl Oppenheimer

ON December 24, 1941, Prof. Carl Oppenheimer died in exile at The Hague, after a prolonged illness. The second son of a liberal rabbi, he was born on February 21, 1874, in Berlin. His elder brother Franz is the well-known economist. Carl Oppenheimer was educated in Berlin, where he obtained the Ph.D. in chemistry in 1894 and the M.D. in 1898, and also spent a short time at the University of Erlangen. He worked as assistant to the famous physiologist, R. Zuntz, at the Landwirtschaftliche Hochschule in Berlin and became a university teacher. He married in 1904 and had two sons. The elder, Chanan, is now at Rehovot Agricultural Research Station in Palestine, and the younger, Ernest, has joined the South African Army.

Carl Oppenheimer was one of the most prolific scientific writers, whose everyday language made the most difficult problems of science easily understandable. While still a student, he wrote a little text-book on inorganic and organic chemistry which was to become the most popular chemistry text-book for medical students all over the world; it went through many editions and was translated into several languages, but not into English. His comprehensive text-book of chemistry, written in 1923 in collaboration with Matula, is a good example of Oppenheimer's presentation of the problems of science to a wider public and of his desire to show the connexion of chemistry with natural science and industry.

This connexion between the various branches of science, and still more the central importance of the study of the living organism, was one of Oppenheimer's leading ideas through all his life. By his research in chemistry as well as physiology, he was soon led to see that a study of the living organism could not be successful from the medical point of view only, but that the more exact branches of science would have to be called upon for this purpose. He may thus justly be claimed to be one of the founders of biochemistry. This is to-day a generally accepted branch of science—a fact mainly due to Carl Oppenheimer. The conception of these ideas and their continuous propagation through all his lifetime must be regarded as Oppenheimer's greatest contribution to science and human progress. In

1912 he laid down the basic principles of his conceptions in text-book form in "Grundriss der Biochemie", a more modern presentation of which he gave in his last work "Einführung in die allgemeine Biochemie" (Leyden, 1936). More ambitious was the "Handbuch der Biochemie" (1909). The second edition and its supplement, written by Oppenheimer in collaboration with many distinguished specialists, forms a comprehensive standard work of biochemistry. In order to enable biologists to refer to exact figures, Oppenheimer created in 1925, in collaboration with L. Pincussen, the "Tabulæ Biologicæ". He also gave biochemistry its abstracting journal, *Biochemisches Centralblatt*, founded in 1910.

Oppenheimer is, however, better known to English men of science for his work on enzymology. His main work on enzymes is "Die Fermente und ihre Wirkungen". It passed through five editions (1905-1926) and in it he gave to enzymology its form and structure. In this work he not only recorded facts and classified them, but also drew new conclusions and made suggestions for further research. In each new edition he could proudly register to what extent his suggestions had led to successful discoveries. Knowing intimately every detail of practical and theoretical development, he was able to unify contradictory ideas and to suggest possible solutions. To keep abreast of the rapid growth of enzymology, Oppenheimer wrote a "Supplement" to the chapters on special enzymology. This work, written during 1935-1939, grew eventually to be a larger volume than the last edition of the main work. Oppenheimer frequently remarked to me during the course of our collaboration on this supplement that this form of publication was too slow for the rapid development of research in this field. Accordingly, in 1936 he founded a special international journal, *Enzymologia*, which could accomplish this purpose.

Great as were his achievements, Oppenheimer considered his work as by no means finished. He was full of plans and ideas to extend his different activities. The invasion of Holland in 1940, which brought his work to a standstill, he regarded certainly as only a temporary interruption, little knowing that he would not live to see its continuation. His death is a great loss not only to his family and his many personal friends but also to science as a whole.

W. ROMAN.

Prof. R. A. Gortner

WE regret to record the death on September 30 of Prof. Ross Aiken Gortner, chief of the Division of Biochemistry at the University of Minnesota, at the age of fifty-seven. Dr. Gortner was born at O'Neill, Nebraska, on March 20, 1885. After graduation from Nebraska Wesleyan University in 1907 he obtained his M.S. degree from the University of Toronto in 1908 and his Ph.D. degree from Columbia University in 1909. He went to the University of Minnesota in 1914 as associate professor in the Division of Soils from the Station for Experimental Evolution at Cold Spring Harbor, N.Y. He transferred to the Division of Biochemistry of the University of Minnesota in 1916 as associate professor and was made full professor and chief of that division in 1917, which position he held at his death.

Dr. Gortner's scientific interests were very broad. His contributions to scientific journals number more than three hundred. The chief fields covered in these papers are the black animal pigments, the melanins ;

proteins, especially the cereal proteins and their relation to the properties of flour and dough ; colloids, especially their physico-chemical properties and the role of water in living processes. One of his major contributions to scientific thought was his book "Outlines of Biochemistry", the second edition of which appeared in 1938. Another volume, "Selected Topics in Colloid Chemistry", contained the lectures which he gave at Cornell University in 1935-36 in connexion with the George Fisher Baker lectureship which he held, and a third volume prepared by him and colleagues in 1936, entitled "J. Arthur Harris, Botanist and Biometrician", was in honour of his close friend.

Prof. Gortner felt that his chief contribution to science was through his students. In recent years he delivered to many audiences his lecture on "Scientific Geneology". His intense enthusiasm for science and especially for the field of biochemistry, his exceptional fund of scientific knowledge in many fields, and his easy, familiar delivery made him an inspiring teacher. An increasing number of students were attracted to his classes and to his department for graduate work. He gave freely and liberally of his time and thought to the research problems of his own graduate students as well as to those of his colleagues both in the Division of Biochemistry and in other divisions of the University, and in the early days of the development of graduate work in the Division of Biochemistry spent many hours in the laboratory working with his students. During the twenty-five years of his service as chief of the Division, eighty-seven students were personally directed by Dr. Gortner in their graduate research, and during the academic years 1940-42 between sixty and seventy graduate students were in residence in the division. On the National Research Council he was serving at his death on committees on the chemistry of colloids, chemistry of proteins, organic chemical nomenclature for the American Society of Biological Chemists and the American Chemical Society. Last May he was awarded the Osborne Medal by the American Association of Cereal Chemists, given by that society for distinguished service in conducting research and training students in the field of cereal chemistry.

PROF. OSKAR KRAUS, formerly lecturer in philosophy at the German university of Prague, died in Oxford on September 26 at the age of seventy. He was an authority on Czech philosophy and had also written a number of works on the history of philosophy and science, emphasizing their significance in any scheme for promoting a lasting peace.

WE regret to announce the following deaths :

Prof. Ernest C. Bryant, emeritus professor of physics at Middlebury College, Vt., on September 7, aged seventy-five.

Lieut.-Colonel J. E. E. Craster, O.B.E., sometime lecturer in geography in the University of Cambridge, on November 8.

Dr. M. S. Farr, emeritus associate professor of geology and palaeontology of Princeton University, with which he had been associated since 1900, on August 27, aged seventy-two.

Sir Norman Walker, direct representative for Scotland, General Medical Council, during 1906-41, honorary fellow of the Royal Society of Medicine, on November 7, aged eighty.