

museums at present participating in the scheme are the Victoria and Albert, Horniman and Geffrye Museums. Dr. Malcolm, who was a research scholar in anthropology of Christ's College, Cambridge, and obtained his Ph.D. degree for a thesis on the history and development of medical museums, not only has a wide and varied experience of museum work, but he has also devoted much attention to the practical development of the museum collection as a part of the machinery of education. His work will be supported by a strong and informed committee of the County Council.

#### Research on Carcinogenic Compounds

THE thirty-first Bedson Lecture was delivered by Prof. J. W. Cook, of the Cancer Hospital, London, to the Bedson Club at Armstrong College, Newcastle-on-Tyne, on November 8. Prof. Cook took as his subject "The Synthesis and Biological Effects of Carcinogenic Hydrocarbons", and said it has long been known that certain forms of skin cancer are due to occupational causes, such cases being prevalent among workers in the coal-tar and allied industries, in the shale oil industry and among mule spinners in cotton mills. This is due to the action of a common constituent of coal tar, and shale and lubricating oil, the isolation and identification of which was successfully accomplished about three years ago in the research laboratories of the Cancer Hospital, London. A very valuable guide in the difficult task of separating this substance from the other constituents of the mixtures was provided by the fact that these tars and oils having carcinogenic properties are all strongly fluorescent. An investigation of the nature of this fluorescence spectrum directed attention to the benzantracene group of hydrocarbons. Many of these have been prepared artificially in the laboratory, and some have been shown capable of producing cancer in mice. The cancer-producing constituent of coal tar, etc., benzpyrene, belongs to this group. More recently, it has been found possible to bring about the artificial conversion of substances normally present in the human body, namely, cholic and deoxycholic acids, into a hydrocarbon of the benzantracene type, methylcholanthrene, and this was found to be more powerfully cancer-producing than any other substance yet investigated. The chemical changes by which it was obtained are of the type which are well known to occur in the body, and it may be that cancer in man is due to some such substance as a bile acid undergoing decomposition in an abnormal manner, with conversion into cancer-producing substances.

#### Chemistry in the Universities and Schools

"THE Teaching of Chemistry" was the subject chosen by Prof. Arthur Smithells, director of the Salters' Institute of Industrial Chemistry, for his Harrison Memorial Lecture to the Pharmaceutical Society on November 12. The chief difficulty of the university professor of chemistry lies in dealing with a subject in which the advance has been of unparalleled rapidity and, most recently, in changes on the

theoretical side which have not only led to the acquisition of tracts of new knowledge, but also have affected science at its very base. Prof. Smithells believes that these advances have placed a great burden on the student, and especially on his memory. The reduction and emendation of the curriculum would result in a gain far exceeding in importance any possible loss in its range. Passing to the teaching of chemistry to those whose dominant interest is its application to some particular calling, reference was made to students of medicine as an example. Prof. Smithells himself had placed such students in a course apart, where he had striven, without any intellectual sacrifice, to invest the teaching throughout with facts and illustrations connected with the medical calling. The teaching of chemistry in schools, after a period of rapid growth, became a mere small-scale replica in contents and form of the early chemical course of a university. This teaching led to the revolt, headed by Prof. H. E. Armstrong, who from then to the present day has stood as the great campaigner against all that has seemed unsound in chemical education, wherever it has appeared, but, above all, in its earlier stages. The influence exerted inevitably by the university teacher has been far beyond what is warranted. Relief of the crowded curriculum has been sought by relegating to the schools so much higher work in science that there is a real danger existing of just that kind of over-balance of one kind of subject, as was the case with classics when science first sought admission to the curriculum.

#### Weights and Balances in Ancient Egypt

At the Friday evening discourse at the Royal Institution on November 8, Prof. S. R. K. Glanville discussed "Weights and Balances in Ancient Egypt". The actual weights recovered from Ancient Egypt divide into eight main standards, derived from a much larger number in very early times. What we have to go back to prehistoric times and show a gradual fusion of the standards, a process which is completed by the seventh century B.C. The balance may be traced from the Old Kingdom, with a possible example of a balance beam from pre-dynastic times. The New Kingdom balance, which lasted at any rate until the Ptolemaic period, was very efficient, and shows a greater accuracy in its design than the small Roman balance which succeeded it. There is evidence of a standard of exchange in ordinary transactions from the Old Kingdom, though whether this standard was a piece of metal, which could be passed between buyer and seller, is questionable at this period. The explanation of the lack of evidence for such mediums of exchange is probably in the nature of the organisation of the country in earliest times as a huge estate owned by the king, and later as a number of big estates controlled by governors and priesthoods, a condition which to some extent exists to-day. These estates being largely self-sufficing, it was possible to conduct their economic affairs without resort to anything approaching currency. There is, however, evidence of the use in the Middle Kingdom of copper pieces, and of a much more frequent use in the New



Kingdom of silver pieces which gave way to copper as the State grew poorer, the whole standard being backed by gold. It is difficult to decide how far the balance was used for general purposes, as its representation on tomb paintings is almost confined to the weighing of gold, silver and precious stones, either domestically for distribution to the metal workers on private or public estates, or as a registration of income or taxes from within the State or of 'tribute' or prizes of war from abroad.

#### Sewage Purification

MR. JOHN D. WATSON, in his presidential address delivered on November 5 to the Institution of Civil Engineers, dealt with the phases of public works which have engaged his attention for more than half a century, and showed how the development of sanitation and improved water-supplies has brought about a very considerable reduction in the death-rate. He spoke of the Iddesleigh Commission, the reports of which showed that the disposal of sewage into an adequate volume of clean water—either salt or fresh—is sound and proper, not only on the grounds of efficiency and economy, but also on strictly scientific principles. As a matter of principle, purification by land-irrigation is sound and still fairly popular. Percolating filters are now popular, and while this method of purification has a direct relationship to the contact-bed method, it produces a more consistently uniform effluent, is more generally reliable and the operating costs are less. Although almost unknown twenty years ago, bio-aeration or activated sludge is now established beyond question as one of the most useful methods of sewage purification. It has proved itself to be scientifically sound, and, when the plant is well designed, it is economical and freer from nuisance than any method yet discovered. Having stated the most desirable lines for future development and discussed several noteworthy schemes, Mr. Watson emphasised the extent of loss resulting from lack of co-operation, and concluded his address by pointing out that, while the nation owes a great deal to the Ministry of Health, there is still much to be done before the goal is reached when there will be no river-pollution. In his opinion, a central authority is necessary, and this should be the Ministry of Health rather than the *ad hoc* body suggested by the Royal Commission, provided that power is given to set up a research department wide enough to include the excellent work which has been done in recent years by the Water Pollution Research Board.

#### South African Association for the Advancement of Science

THE South African Association for the Advancement of Science held its annual meeting at Paarl on July 1-6. On July 1, Prof. M. M. Rindl, professor of chemistry in Grey University College, Bloemfontein, president of the Association, delivered an address entitled "A Plea for the Establishment of a National Research Council and for the Limitation of a National Research Policy in South Africa". Replying to criticisms of the Association and its policy, Prof.

Rindl said that provision of funds for fostering research in the form of fellowships, scholarships and research grants in South Africa is not ungenerous. Much of this is directly attributable to the persistent agitation of the Association. In its early days, the Association and the Royal Society of South Africa were the only bodies providing research grants from their own funds. Furthermore, the annual award of the South Africa Medal and Grant to a prominent research worker in South Africa has done much to stimulate competition among investigators. As a result of the Association's action, a national committee of intellectual co-operation has been appointed, and it is hoped that the outcome will be the establishment of a National Research Council, and the inauguration of a national research policy on lines similar to those adopted in Great Britain, the Dominions and in many industrialised countries overseas. Another activity of the Association has been to appoint a committee to collect authentic data of the early history of scientific endeavour and industrial achievement in South Africa. With this end in view, the committee is approaching pioneers of science and industry to place on record their reminiscences and the history of the development in the industries which they founded, or with which they have been associated.

At the conclusion of his address, Prof. Rindl presented the South Africa Medal and Grant to Dr. Edwin Percy Phillips, and the British Association Medal and Grant to Miss Margaret Orford. His Excellency the Earl of Clarendon, Governor-General of the Union of South Africa, has graciously accepted the invitation of the Council to become the president of the Association for the year 1935-36. This will be the thirty-fourth annual session and will be held at Johannesburg. For this year the Association is departing from its normal procedure of meeting in July, and the Johannesburg session will be held on October 5-10. Members attending the meeting thus will have opportunity of visiting the Empire Exhibition, which is being staged for several months in Johannesburg.

#### Mellon Institute of Industrial Research

IN accepting the Chemical Industry Medal for 1935, at the meeting of the American Section of the Society of Chemical Industry, at the Chemists' Club, New York, on November 8, Dr. Edward R. Weidlein, director of the Mellon Institute of Industrial Research, Pittsburgh, Pa., described some of the scientific investigations at the Institute. The Mellon Institute is an industrial experiment station, a training school for industrial scientific workers, a centre for research in pure, as well as applied, chemistry, and a clearing-house on specific scientific information for the public. Dr. Weidlein said that the Mellon Institute has shown about 3,600 American companies, either as individuals or as members of industrial associations, that scientific research, properly carried out, is profitable to them. Most of the problems accepted for study during 1911-35 have been solved satisfactorily. The Institute has also