to lend his special skill with the polarizing microscope to workers in fields other than petrography, and this led, happily, to some work on the birefringence of nitrated cellulose and in turn to work on other explosives. Together with Henri Muraour he studied, and photographed under the microscope, the behaviour of single crystals of explosive substances, observing the products of the explosion, the light flash, and the shock waves. Later they extended their observations to the modifications in the shock waves when explosion took place in one of the heavier gases like argon, comparing these with the effects seen in atmospheres of lighter gases.

This work on explosives suggested to Michel-Lévy a way of synthesizing rock-forming minerals under pressure and in presence of water vapour. The materials for the synthesis were enclosed in a 'bomb' cleverly designed to accommodate also a small explosive charge. The 'bomb' could be heated in an electric furnace at first to a temperature of 200°, at which the explosive detonated, producing the high pressures required in the closed 'bomb'. This was then heated to higher temperatures and could be kept there for days or weeks as desired. The identification of the minerals synthesized in these experiments was made by means of X-rays by Jean Wyart, and in later experiments they had the collaboration of one of Michel-Lévy's daughters, now Mme. Mireille Christophe-Michel-Lévy, by whom the work is still being carried on.

Twice Michel-Lévy's scientific work was interrupted by wars. He came of a family devoted to the service of France. His grandfather had served in the Crimea as a surgeon and became a very distinguished officer in the French Army medical service. In the First World War Albert Michel-Lévy, *Capitaine de chasseurs à pied* and later *Chef de Bataillon*, was twice grievously wounded, and he ended the war as an officer on the General Staff. He was made a chevalier of the Légion d'Honneur, of which he became an officer in 1920, and commander in 1946. In the Second World War, after the fall of France, he was removed from his post at the Sorbonne because of his Jewish ancestry. Protests at his removal were eventually successful in having the interdiction withdrawn in January 1942, and he was able to resume his work, though not in his own laboratory. However, worse was in store. His only son, Roger, fighting in the resistance, was taken prisoner and shot in February 1944. The loss was irreparable. Michel-Lévy's health was never again very good and he retired from his professorship in 1946, though he continued work with Jean Wyart and his daughter until 1948. He died in Paris on May 2, 1955. He was made a professor of the Sorbonne in 1936, and was elected a member of the Academy of France on January 22, 1945.

W. CAMPBELL SMITH

Prof. Madison Bentley

PROF. MADISON BENTLEY died in California, U.S.A., on May 30. He was born at Clinton, Iowa, on June 18, 1870. His early training was at the University of Nebraska. He then went to Cornell University where, in 1898, he obtained the Ph.D. degree. At Cornell he remained, first as instructor and then as associate professor of psychology, until 1912. During 1912-28 he was professor of psychology and director of the Psychological Laboratory at the University of Illinois. In 1928 he succeeded Titchener

at Cornell as Sage professor of psychology, and there he remained until his retirement from official life. He became president of the American Psychological Association in 1925, he was a Fellow of the American Association for the Advancement of Science, chairman of the Division of Anthropology and Psychology in the National Research Council; and he was editor of the *Psychological Index* (1915-24), of the *Journal of Experimental Psychology* (1926-30) and co-editor for many years of the *American Journal of Psychology*.

Madison Bentley achieved a position of great influence in the relatively early days of experimental psychology in America. He was of a modest and friendly disposition, a man of complete intellectual honesty, yet willing to try to see something good in all the many systematic, and often highly dogmatic, approaches to psychology which characterized the end of the nineteenth and the beginning of the twentieth centuries. This temper of mind made him an admirable editor, and his successful editorial work, as he himself recorded, broadened his knowledge and increased his tolerance. He wrote widely but mostly in journals, or in books of the familiar American 'portmanteau' kind. There were two volumes of his own: "The Field of Psychology", published in 1924, and "The New Field of Psychology", which appeared about ten years later. In the second, Bentley showed himself rather surprisingly sympathetic to practical and applied developments of experimental psychology.

When Prof. Carl Murchison got the excellent idea of producing a series of volumes to be called "History of Psychology in Autobiography", Madison Bentley was naturally one of the people approached for an early contribution. He wrote a beautifully unassuming account of his intellectual development (Vol. 3, p. 53; 1936). He acknowledges his debt to Titchener, and it is characteristic that he should select one item of this debt as most important. He had "submitted a cherished manuscript" for criticism and got it back with these remarks: "Here it is. I don't think that I have ever told you that I thoroughly disliked anything that you had written. I do this. It is decidedly bad. Cut out your figures and have done with your fine writing". This, says Bentley, "was a major operation without anaesthetic. Recovery was slow, but it left my organism saner".

Whether or no this was the reason, it was the sanity and dependability of his judgment, as well as the wide range of his knowledge, that won for Bentley the deep respect and admiration of psychologists everywhere.

F. C. BARTLETT

Mr. G. W. Lines, C.B.E.

GEORGE WILLIAM LINES, director of agriculture, Sierra Leone, will be well remembered in West Africa and especially in agricultural circles of Nigeria and Sierra Leone, where he had a long and distinguished career. He died at his headquarters at Njala on February 11 in his fifty-second year.

After graduating from St. Catherine's College, Cambridge, in 1924, he obtained a Cambridge diploma in agricultural science before he joined the Colonial Agricultural Service in 1925. He spent the earlier part of his service in Nigeria, where he was noted for the enthusiasm and energy he put into his work and for his genial personality. He was particularly successful in obtaining the co-operation and confidence of the native farmers to a degree seldom attained by other officers in the Service.

Lines took a leading part in establishing the co-operative preparation and marketing of cocoa in the Western Region, and later he initiated the planting of improved oil palms to replace the wild palms on which the farmers relied. In Nigeria perhaps he will be best remembered in the Bida area where, during the War, he established a thriving local fibre industry which proved of lasting benefit to the farmers and met an urgent demand for materials previously imported and then practically unobtainable.

On his transfer to Sierra Leone in 1944, he gave outstanding service in the organization of supplies and later assisted in the improvement of production and quality of piassava, a product for which Sierra Leone is famous. He was promoted to principal agricultural officer in 1945, deputy director of agriculture in 1949 and to director in 1951. It was in

this latter post that he achieved his most outstanding success. Realizing the impossibility of increasing food production on the overworked and eroded uplands, he went boldly forward to apply mechanization to the cultivation of swamp rice on the vast areas of coastal and inland riverain swamps. The initial experiments met with immediate success, from which he evolved a policy which has led to the provision of a service with mechanized units over large areas of the country. In 1942 he was made an M.B.E. and advanced to C.B.E. in 1955.

By the death of G. W. Lines the Colonial Agricultural Service has lost an outstanding figure, and he leaves behind him many friends, Europeans and Africans alike. His enthusiasm was unbounding and infectious, his initiative exceptional and he gave unstinted encouragement to his staff from the most junior upwards.

T. N. GREEVES

NEWS and VIEWS

Imperial College of Science and Technology, London

THREE new chairs have recently been created at the Imperial College of Science and Technology, London, and the appointments to them are as follows: aeronautical structures, Dr. J. H. Argyris; applied science in the Mechanical Engineering Department, Prof. D. G. Christopherson; and light electrical engineering, Prof. A. Porter.

Prof. J. H. Argyris

UNTIL the appointment of Dr. J. H. Argyris to the new chair of aeronautical structures at Imperial College, all professors of aeronautics in British universities were primarily associated with aerodynamics. This has inevitably biased students of aeronautics in favour of aerodynamics and has had the result that too few graduates with a primary interest in structures have entered the aeronautical engineering profession. The formation of the present chair will help to change this somewhat unsatisfactory state of affairs. Prof. Argyris studied at Munich and Zurich. He spent some years on the technical staff of the Royal Aeronautical Society, during which period he wrote papers on tapered tubes (representing aeroplane wings), diffusion of loads and panel instability, and wrote an important contribution to the "Handbook of Aeronautics". In 1949 he joined the staff of Imperial College, and in the following year was appointed reader in aeronautical structures by the University of London. Since then, an aircraft structures laboratory, including equipment for the study of fatigue, has been built up at the College. Prof. Argyris's work and published papers since 1949 have been on energy theorems, approximate stress analysis, matrix formulation of structural analysis, instability of panels, experiments on open tubes, and fatigue investigations on bonded light alloys. He is working at present on the statics and dynamics of complex aeronautical systems with particular reference to the use of digital computers.

Prof. D. G. Christopherson

PROF. D. G. CHRISTOPHERSON was educated at Sherborne School and at University College, Oxford, graduating in engineering science in 1937. After a year at Harvard University as a Henry Fellow,

he became research assistant to Sir Richard Southwell and took his D.Phil. in 1940. During the Second World War he worked for the Research and Experiments Department of the Ministry of Home Security on the subject of airborne blast, underwater shock waves and other effects of explosions, and also on the design of structures to resist these effects. In the latter part of the War his work was not so much concerned with defence as with the selection of weapons for attack on specific objectives. After the War he became a lecturer in engineering in the University of Cambridge and a Fellow, later bursar, of Magdalene College. In 1949 he was appointed to the chair of mechanical engineering in the University of Leeds. Prof. Christopherson's research and publications have been mainly on three lines: lubrication, dynamic stress analysis and plasticity. The chair of applied science at Imperial College has been created as part of the expansion plans of the College. The new professor will be particularly concerned with the methods of teaching engineering students of all kinds during their first year at the College, as well as with his own research and postgraduate work.

Prof. A. Porter

PROF. ARTHUR PORTER is a graduate of the University of Manchester, where he became an assistant lecturer in physics. Before the Second World War he was a Commonwealth Fellow in physics and electrical engineering at the Massachusetts Institute of Technology, and during the War was engaged on special work for the Admiralty and Ministry of Supply. In 1946 he went to the National Physical Laboratory, Teddington, in charge of the Automatic Control Systems Laboratory in the Metrology Division, but soon moved on to become professor and head of the Department of Instrument Technology at the Military College of Science, Shrivenham. Since 1949 he has been in Canada as head of the Research Division at Ferranti Electric, Ltd., Toronto. Prof. Porter has published many papers in the fields of control systems, differential analysers and similar subjects, and is author of a monograph on servo-mechanisms. At the Imperial College he will work in close association with Prof. A. Tustin, the new head of the Department of Electrical Engineering (see *Nature*, January 22, p. 148).