

liquors from the recovery of natural potash at Kaiseroda and Borbach, from which on refrigeration Glauber's salt is obtained, yielding saltcake of high purity on suitable heat treatment.

The Weldon chlorine process had been displaced by the Deacon process as improved by Hasenclever. The production of 1 ton of bleaching powder by the Weldon process required 50 cwt. of salt; in the Deacon process appreciably less than 20 cwt. was used. Kynaston found that the undecomposed hydrochloric acid washed from the chlorine was almost free from arsenic and contained but little  $\text{SO}_3$ , so that this acid could be sold and the costly Hasenclever process, degassing the condensed acid for return to the decomposer, could be avoided. A revolution in the manufacture of hydrochloric acid came with the production of synthetic acid from the hydrogen and chlorine gases from the electrolytic cell, and a high proportion of the acid is now produced synthetically.

In the manufacture of bleaching powder, the use of the Hasenclever plant, in which mechanically hydrated lime is pushed through horizontal superimposed cylinders in counter current to the ascending chlorine, has been modified by the omission of the propelling blades and the use of a single enlarged rotating cylinder for the smaller units (Moore and Rudge). The chlorine from the electrolytic cells is diluted with air before use, and by suitable regulation of the process and control of temperature in particular zones of the cylinder by water cooling, a high strength bleaching powder possessed of stability in hot climates can be produced. Calcium hypochlorite containing more than 70 per cent available chlorine, and sodium hypochlorite solutions containing up to 15 per cent available chlorine are produced for water purification, sanitation, laundry work and other purposes.

The production and sale of liquid chlorine for

water purification and the preparation of intermediates in the dyestuffs industry is another notable achievement. Chlorate production is now also electrolytic and is carried out in countries such as Sweden and Canada where cheap water-power is available.

In the caustic soda industry, the carbonate from the ammonia soda process is causticised with lime, the calcium carbonate in granular form being removed by rotary filters and used as agricultural lime, in 'stone dusting' in coal mines and, when carefully dried and air-separated, in other industries. Regeneration of lime from the lime mud has more recently been accomplished. The caustic soda liquor is concentrated in multiple effect evaporators and further in steam-heated units, the product being of high strength, 70 per cent  $\text{Na}_2\text{O}$  being normally attained, whilst with the mercury electrolytic cell a product approximating to 100 per cent  $\text{NaOH}$  is obtainable. New forms of caustic soda known as flake, petal and powder, are made by breaking down thin sheet; they are easy to handle and much purer than the old stick form.

Purity of the modern products is due partly to the basic change of process, for example, contact process for sulphuric acid and synthesis of hydrochloric acid, and partly by the possibility of installing purification plant owing to economy resulting from greater output per unit of plant. Fuel economy has been largely effected by the development of the tubular boiler and the steam turbine. The use of control instruments and better working conditions on the plant, as well as the introduction of metals and alloys capable of resisting corrosive liquids and gases, have all played a part in the improvement of the industry. Dr. Conroy emphasised that the continuous high efficiency now ruling can only be maintained and ensured by continuous scientific control.

## Obituary

PROF. E. PATERNO

THE death of Emanuele Paternò removes a leading Italian chemist and a genial collaborator from the international councils of chemistry, where he regularly represented his country. Prof. Paternò passed away on January 18 in his native city of Palermo, where he was born on December 12, 1847. His father had to leave Sicily soon after his birth, having taken an active part in the revolt of 1848, and Emanuele spent his early years in exile, in Alexandria.

Having graduated in physics and chemistry, Paternò returned to Palermo, replacing in 1872 the famous chemist Cannizzaro, who had just left for Rome. In 1893 he was called to the chair of applied

chemistry in Rome, and on the death of Cannizzaro he became director of the Chemical Institute.

Paternò's scientific contributions over nearly half a century are numerous and varied. He began his scientific career with the discovery of dichloraldehyde, and made a special study of the halogen isomers of ethane, the synthesis of fluorobenzene, fluortoluene, etc. Passing on to physical methods, he made numerous cryoscopic studies in connexion with the determination of molecular weights, and later in life investigated colloidal phenomena and the influence of light upon chemical reactions.

Paternò was the first to point out, in 1889, the emulsion-like nature of colloidal solutions, and to note that a substance may be colloiddally dispersed

in one solvent and molecularly dispersed in another. In the photo-chemical field he obtained by elegant methods condensations of hydrocarbons with aldehydes and ketones; he succeeded in preparing a number of synthetic alkaloids and was able to throw light on the probable mechanism by which plants produce many of these compounds.

In addition to his research activities, Paternò excelled as an organiser. He founded and edited the *Gazzetta Chimica Italiana*. In Palermo he was both principal of the University and mayor of the City, and in Rome he occupied many Government positions. A gold medal was founded in 1923 in his honour, to be given every three years for the most notable discovery in chemistry, the first award being made in the same year to Dr. F. W. Aston. Prof. Paternò was elected an honorary fellow of the Chemical Society in 1920.

SIR WILLIAM MORRIS, K.C.M.G., C.B.

WE regret to record the death of Sir William G. Morris on February 26, in North Wales. He was a man beloved by all who had the privilege of knowing him. Born in 1847, he entered the Corps of Royal Engineers in 1867. After various home duties he went to Mauritius in 1871 and remained there until 1874, the year of the transit of Venus expedition to that island, with which the names of Lord Lindsay and Sir David Gill are so intimately associated. This appears to have marked the beginning of that collaboration with Gill which was later to have such useful results in South Africa; for after a spell of two years at the Staff College and later at home duties—particularly as assistant instructor in survey at the School of Military Engineering, Chatham, from 1877 until 1882—he was acting on special duty in 1882–83 under the Transit of Venus Committee at home and abroad.

At this juncture, Sir David Gill, who was then H.M. Astronomer at the Cape of Good Hope, had succeeded in persuading the Governments of Cape Colony and Natal to undertake a geodetic survey of their territories. To carry out this work Gill naturally turned to Morris, who after two months work on special duty under the Colonial Office, became the leader of the Geodetic Survey of the two Colonies, an undertaking which absorbed his energies for ten years. Officially he was noted for special duty under the Government of Natal, which was the first of the two Colonies to support Gill's proposal for the geodetic survey. This work, indissolubly associated with the names of Gill and Morris, was the beginning of the Great Arc of the 30th Meridian which last year was carried to the Belgian frontier of the two provinces of Ruanda and Urundi.

On his return home, Morris received the C.M.G. for his services on the geodetic survey of the Cape and Natal. He next went to Chatham and in the period 1895–98 was assistant commandant of the School of Military Engineering; but South Africa was calling, and he returned there in 1898 as Colonel on the Staff, C.R.E., acting as district engineer during the South African War (1899–1902). He was twice mentioned in dispatches and received various

honours and the C.B. After the war an occupation doubtless more congenial to his nature was in store for him: in 1902 he became officially superintendent of the Geodetic Survey of the new territories, and in 1906 completed the principal triangulation of the Orange River Colony (as it then was) and the Transvaal. He retired from the Army on half pay in 1904 and for the last thirty of his long spell of eighty-eight years lived very quietly on a mountain-side overlooking Bettws-y-Coed. Visiting him there about three years ago, the present writer found that his mind had apparently drifted beyond South Africa, the scene of his former triumphs.

Gill and Morris built up in South Africa a fine school of geodesy. Supported by able assistants, they established a tradition which has not been without effect on the world at large. Mr. Victor A. Lowinger, one of these assistants, writes: "Morris was devoted to his work and inspired all who worked under him with the value of thoroughness and accuracy. He chose his men carefully and trusted them to get on with the job, while at the same time he was always ready to resolve any difficulties that arose. He was of a very reserved nature and, though a little intolerant of human weaknesses, very just in his judgments—a man with whom one has been proud to have been associated in one of his great practical contributions to geodesy." G. T. M.

MR. M. V. PORTMAN

WE regret to record the death of Mr. Maurice Vidal Portman, which occurred at Axbridge, Somerset, on February 14, at the age of seventy-four years. Mr. Portman was well known as an authority on the natives of the Andaman Islands as they existed fifty years ago. He was appointed "Officer in charge of the Andamanese", with headquarters at Port Blair, in 1879, and remained in the Andamans until 1899, when he was sent home on account of ill-health. Throughout his term of duty he was in constant and intimate touch with the life of these tribes of shy, difficult and sometimes dangerous, little people. As a result of his care for them and his disregard for the risks he ran in getting into touch with them, he acquired knowledge of their customs and beliefs which made him the equal, if not indeed the superior, as an authority, of E. H. Man, although the latter won the wider reputation through his books. Mr. Portman was a contributor of papers on Andamanese matters to the publications of learned and scientific societies, and made a remarkable collection of photographs of the Andamanese and their articles of material culture.

WE regret to announce the following deaths:

Sir John Rose Bradford, K.C.M.G., C.B., C.B.E., F.R.S., emeritus professor of medicine in University College, London, president of the Royal College of Physicians in 1926–31, on April 7, aged seventy-one years.

Prof. E. Cannan, emeritus professor of political economy in the University of London, on April 8, aged seventy-four years.