

coveries will ultimately win the race at the expense of those which have been more neglectful in that respect. The possession by the latter of greater natural resources will only serve to stave off defeat for a time.

Moulds may be trained, under certain conditions, to produce various other compounds from sugar—for example, up to 50 per cent. of citric acid, also fumaric and pyruvic acids. Lactic acid and vinegar are, of course, largely manufactured by fermentation, but Mr. Chapman deplures the way in which these industries have neglected to apply modern scientific results. In the manufacture of vinegar, in particular, no real progress has been made since Pasteur's work of 1868.

We have been more successful with the production of acetone and butyl alcohol from starch, but this, too, originated in France in the experiments of Fernbach. Mr. Chapman discusses the process in some detail; in normal times its commercial success will depend on a means of utilising

the butyl alcohol, which is produced in twice the quantity of the acetone.

Other applications of micro-biology are to agriculture, bread-making, tanning, sewage disposal, and food-production. Brewers' yeast is almost a waste product to the extent of 50,000 or 60,000 tons per annum in the United Kingdom, but is being used more and more as a cattle food and, in the shape of an extract, for human consumption. "Mineral yeast" (not a true yeast) was grown in Germany as a war food.

Finally, Mr. Chapman reiterates his plea (already made in a paper to the Society of Chemical Industry) for the foundation of a National Institute of Industrial Micro-biology, which should provide for the systematic prosecution of industrial research, be a centre for specialised training, and maintain a complete collection of pure cultures. "For far too many years we have been content to act as middlemen and agents, when we ought to have been manufacturers."

Obituary.

G. W. WALKER, F.R.S.

BY the death of Mr. GEORGE WALKER WALKER, physical science has lost a brilliant exponent of its rigidly exact experimental side, which his high mathematical attainment and inventive capacity enabled him to develop with marked success.

Mr. Walker was the only son of Mr. John Walker, of Aberdeen, and was a founder of the Robert Gordon's College, Aberdeen. He started life as a practical engineer, but, not caring for this, he obtained an appointment with Messrs. C. & P. H. Chalmers, of Aberdeen, where he remained one year. His interest in science, however, led him to pursue its study in the evening classes of Gordon's College, where he received so much help and encouragement that he obtained a national scholarship, which brought him in 1892 to the Royal College of Science, South Kensington, where, in due time, he obtained his associateship. While at South Kensington he so impressed Sir Arthur Rücker with his mathematical ability that he urged him to go to Cambridge, where he obtained a Sizarship at Trinity College. He was fourth wrangler in 1897, and Smith's prizeman and Isaac Newton student in 1899, and was appointed a fellow of Trinity in 1900. In 1901 he studied at Göttingen. From 1903 to 1908 he was lecturer in physics at Glasgow University. He was then appointed superintendent of Eskdalemuir Observatory, for which his prior training at South Kensington so admirably fitted him. There he remained four years. From 1912 to 1915 he was engaged on the new magnetic survey of the British Isles. He was elected a fellow of the Royal Society in 1913. He assisted the Earl of Berkeley in his laboratory at Boar's Hill in 1915, and became Halley lecturer in 1916.

In May, 1918, Mr. Walker was appointed chief scientific worker at the Royal Naval Mining School,

Portsmouth, where the numerous and urgent problems connected with marine mines afforded abundant scope for his genius. His success in dealing with these was properly appreciated by the Superintendent of Mining and other naval officers, but this work, from its nature, is essentially confidential. In November, 1920, while engaged on experimental work at Falmouth, he contracted a chill, which developed into lung trouble and was the cause of an abscess, for which operation became necessary. He went into University College Hospital, Gower Street, in July last, where the shock due to two operations led to his death.

Besides his work on magnetic surveying, Mr. Walker was an authority on seismology, being also a warm admirer of Prince Galitzin. In 1904 he married the daughter of Mr. Gifford, of Aberdeen, who, with one son, survives him.

C. V. B.

DR. PETER COOPER HEWITT.

Dr. Peter Cooper Hewitt, who died in Paris on August 25 last, at the age of sixty years, was the son of a leading New York iron manufacturer and merchant well known as the promoter of many civic, educational, and philanthropic causes. His mother was the daughter of Peter Cooper, an inventor, manufacturer, and railroad builder, who presented New York with the Cooper Union for the advancement of art and science, now more usually known as Cooper Institute.

Dr. Cooper Hewitt was born on March 5, 1861, and was educated at the Stevens Institute of Technology at Hoboken, New Jersey, and at the Columbia University School of Mines. He early manifested a strong inclination towards mechanics, and his course of studies was directed towards the mechanical, chemical, and electrical sciences. One of his earliest inventions was in relation to improvements in the machinery em-

ployed in his grandfather's glue factory, and he followed this up with new forms of centrifugal machines, evaporators, and other devices for use in breweries. He made many experiments and a number of inventions in connection with motor vehicles and flying machines, and in later years devoted a considerable amount of time to the study of the helicopter.

About 1898 Dr. Cooper Hewitt directed his attention to electrical science, and became a contributor to scientific discovery in a diversity of fields, from wireless telegraphy and telephony to a special process for the electrical welding of steel. However, his name is probably best known in connection with his fundamental work relating to the mercury vapour arc which he brought into commercial use when he founded, in conjunction with the late Mr. George Westinghouse, the Cooper Hewitt Electric Company of New York, and the Westinghouse Cooper Hewitt Company, now known as Hewittic Electric Company, Limited, in England. His original work on the mercury vapour rectifier has been followed up until this apparatus has become a most useful adjunct to the

dynamo, not only in street lighting but also in the serious work of power distribution, and it has not yet been brought to its full industrial value. A generation hence the world will have begun to reap some of the larger benefits conferred by the discoveries of this notable scientific worker.

WE regret to learn of the death of MR. BINGHAM NEWLAND, an observant and original naturalist, author of "What is Instinct?", which was reviewed some time ago in these columns. Mr. Newland held very strong views in regard to the infallibility of the subconscious mind in animals, and thought of this as strangely detached from individual testing, experimenting, and learning. Perhaps what he was feeling towards was a theory of the germinal origin of new departures in instinctive behaviour. Another of his amiable heresies was a belief in "mind-blending" or telepathic communication in birds, by means of which effective co-operation is achieved. Mr. Newland's original and independent mind was handicapped by ill-health, but he had the reward of all those who read deeply in the book of Nature.

Notes.

WE much regret that the reference to the Calcutta munitions case in last week's NATURE, p. 160, did not accurately represent Sir Thomas Holland's position in the matter. It was Sir Thomas Holland himself who, acting on the highest motives and after consultation with two members of the Viceroy's Council, ordered the withdrawal of the prosecution, but when all the facts are published we believe that the real reason for his action will reveal more than the stated reason as to the harm that might be done to Indian industrial development if it succeeded. As the Government of India could not support the view publicly stated, Sir Thomas Holland's resignation of the post of Minister of Industries naturally followed. Later, however, it was officially announced that the prosecution would not be proceeded with because "widespread commercial and industrial interests would be seriously affected," though when the Advocate-General withdrew from the case on August 6 he declared that all the charges could be proved. This decision seems, therefore, to support Sir Thomas Holland's action; and, notwithstanding the suggestion that the Minister of Industries should have received legal training, his reputation as a scientific administrator is safe with all who realise what the building-up of the Indian Munitions Board during the stress of war meant for India, the Entente Powers, and the final victory.

IN memory of those lost in R38 and in previous airships, a decision to establish a fund for airship research has been made by the council of the Royal Aeronautical Society. It is believed that such a course of action would most nearly meet the wishes of those who have lost relatives and friends in the disaster.

It is important for the country that the lessons should not be lost, and the view of those most closely connected with airships is that analysis of the causes of the breaking of R38 in the air can give the foundation for a sound system of construction. Such a result would afford some comfort to the relatives of the officers and men who gave their lives for progress, and, in view of the well-known decision of the Air Ministry to cease all work on airships, it is desirable that others should take up the problems connected with their development. The memorial fund is to be devoted to this end. Over the signature of Lord Weir, the president of the society, an appeal for contributions has just been issued, with the suggestion that they should be sent to the Secretary, Royal Aeronautical Society, 7 Albemarle Street, London, W.1.

THE *Times* announces that Mr. Knud Rasmussen's ethnological expedition to the Canadian Arctic Archipelago left Godthaab, on the south-west coast of Greenland, on September 7 in the motor schooner *Sea King*. On his arrival in Greenland in the early summer Mr. Rasmussen went to Thule, near Cape York, to secure Eskimo, dogs, and furs for his expedition. Some delay was caused by pneumonia spreading among the Eskimo and causing two deaths. After a call on the coast of Labrador the *Sea King* will sail for Lyon Inlet, in the Melville Peninsula, which will be the base for the first winter. From there the little-known tribes around Fury and Hecla Strait will be visited by sledge journeys. In the spring of 1922 Mr. Rasmussen plans to move south to Chesterfield Inlet in order to pick up stores sent north by the Hudson Bay Co., and he will then visit tribes in the Barren Lands and along the shores