

College of Science, as well as King's College, showed that a striking increase in growth occurred when small amounts of this bacterised peat were added to the soil. This led to the chemical fractionation of such treated peat, the extract being used to test the stimulus to growth of the aquatic plant *Lemna*, and other plants, in culture solutions. It was found that 368 parts per million added to the culture solution gave in six weeks an increase in weight of 62 times the control plants. Other equally remarkable results were obtained. Various papers on the subject were published in *Proc. Roy. Soc.* and the *Annals of Botany*.

The method was patented, and in the early years of the war great hopes were entertained that peat deposits in many parts of the world could thus be made of direct service in stimulating food crop production. The controversies to which this commercialising of the process led, together with the loss of a son in the war, no doubt contributed to Prof. Bottomley's subsequent breakdown.

The discovery of auximones will remain a landmark in the long history of plant nutrition. These substances differ from vitamins in that they will withstand a temperature of 150° C., while the latter are largely destroyed by boiling. Moreover, unlike vitamins, auximones apparently have no effect on animals. They are probably derivatives of nucleic acid, and appear to be generated in soils through the activity of soil bacteria. Their presence indicates that these bacteria stand in somewhat the same relation to plants that plants do to animals; for the auximones appear to be bacterial products stimulating plant growth, while the vitamins are plant products which are essential for healthy animal development.

It is greatly to be hoped that these remarkable growth-stimulating substances can be isolated, their composition determined, and the method of their production standardised. They would then be of the utmost value to agriculture.

Prof. Bottomley was a member of the Council of the Royal Botanic Society, Regent's Park, where some of his experiments were carried out. He leaves a widow and two sons at Huddersfield, where the family removed from Hampstead a few months before his death.

R. R. G.

DR. H. N. DICKSON, C.B.E.

HENRY NEWTON DICKSON, born in Edinburgh in 1866, studied at the University of Edinburgh and came under the influence of the remarkable activities in experimental physics, meteorology, and oceanography directed by P. G. Tait and G. Chrystal in the University and by A. Buchan and John Murray outside. Like many other Edinburgh students of the later 'eighties of the last century Dickson seized the opportunity of acting as volunteer assistant in the work of the *Challenger* Commission, the Scottish Marine Station, and the Ben Nevis Observatory, and by this practical training in physiography he was fitted to take up the reviving study of geography on a basis of sound physical science. Thus, while his researches dealt exclusively with the special fields of meteorology and oceanography, his appointments were mainly in

the teaching or the application of geography in its wider aspects.

In 1891 Dickson was engaged at the Marine Biological Association's laboratory at Plymouth in investigations on the salinity and temperature of the English Channel, and on his removal to Oxford in 1893 he extended this work to the whole surface of the North Atlantic. The water-samples were obtained by the officers of Atlantic liners and analysed by Dickson in the University chemical laboratory. It took several years to bring the methods of collection and discussion to perfection, and finally, with the co-operation of the Meteorological Office, Dickson produced his most important work, "The Circulation of the Surface Waters of the North Atlantic Ocean," which appeared in the *Philosophical Transactions* for 1901, and included monthly maps of temperature and salinity for the two complete years 1896 and 1897. This won him the Oxford D.Sc. degree in physical geography.

At Oxford Dickson joined the lecturing staff of the School of Geography and was very successful as a teacher. He moved to Reading in 1906, where he acted as professor of geography in the University College until 1920. During the war he gave practically his whole time to work at the Intelligence Division of the Naval Staff, where, amongst other duties, he undertook the preparation of an important series of handbooks descriptive of regions in which military operations were being carried on or where they might occur. For this he was decorated with the C.B.E.

In 1893 Dr. Dickson published a small volume on "Elementary Meteorology," which showed originality in conception and presented the principles of weather study in a very attractive form. This was followed in 1912 by a little book on "Climate and Weather," which was equally happy. He also wrote a book on "Maps and Map Reading." Dickson devoted much time to the study of underground water in the chalk formations near London, and the outbreak of war interrupted a most important investigation on which he was engaged with regard to the evaporation from an exposed water-surface. For this purpose he devised an automatic recording evaporimeter, which, so far as can be ascertained, was never made available for general use.

For many years Dr. Dickson was regular in attending the meetings of the British Association, acting as Secretary and Recorder of Section E, and in 1913 he was President of the Section. He was also a member of Council of the Royal Meteorological Society for many years and was President of the Society for 1911-1912.

His last work was in the Editorial Department of the additional volumes of the "Encyclopædia Britannica" for the 12th edition. Into this, as into all his other work, he threw his whole heart, and probably the most remarkable feature of his character was his indefatigable energy in whatever he undertook. He was married in 1891, and leaves a widow, a son in the Royal Navy, and a daughter.

H. R. M.

WE much regret to learn from the Lister Institute that Mr. A. W. Bacot, head of the department of entomology, died at Cairo from typhus on April 12.