to the formation of monsters and teratomas which in the old days have often formed the subject of fairy tales and sagas. Giants and dwarfs are also described, or men with supernumerary or missing limbs, eyes and features. Each of these abnormalities is known to modern embryologists or pathologists as hyper- and hypo-genesis, including those malformations which, due to endocrine deficiencies, may turn up as late as in childhood or even later still.

All these disturbances of development have many features in common, in some yet incompletely recognized way, with disorders of cellular and tissue growth. Summarizing, it is permissible to speculate that they all derive basically from irregularities of cellular constitution or metabolism in the form of failures of normal protein or nucleic acid synthesis and thus enzyme or hormonal imbalance. Considering the possible primary causative agents and factors of abnormal growth and development, one can arrive tentatively at a diagram as shown in Fig. 1. In conclusion, one may state with Ingersoll: "In nature there are neither rewards nor punishment, only consequences".

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OBITUARY

Prof. T. G. Hill

THOMAS GEORGE HILL, emeritus professor of plant physiology in the University of London, died on June 25 at his home at Hambledon near Godalming in his seventy-ninth year.

Born in London in 1876 he was educated at St. Olave's Grammar School and the Royal College of Science. He was for a time demonstrator in biology at St. Thomas's Hospital and in later years seemed very proud of his early connexion with this Hospital. After holding various lectureships in the University of London he became, in 1912, reader in vegetable physiology at University College, London, and following F. W. Oliver's retirement in 1929, professor of plant physiology and head of the Department of Botany.

His Department was a very happy one; all students who entered it, and not only those reading special botany, were made to feel they were members of the Department. To undergraduates entering his Department for the first time 'T.G.' gave the appearance of being fierce and rather awe-inspiring. But as one got to know him better one realized that beneath the gruffness of manner he was a kindly gentleman—more than a little sentimental and not without his prejudices.

It is perhaps worth recording the advice 'T.G.' gave to one assistant lecturer he had appointed. "Prepare all your lectures carefully and thoroughly and always tear up your notes after you have given your lecture." His own lectures were models for any beginner to follow. He used few notes and spoke lucidly and fluently. It was a delight to listen to him build up an argument in a way that made the topic seem both logical and easy. The important points would be brought out by some telling phrase or striking analogy (generally far removed from botany). The result was a course of lectures which fifteen years later still remain vividly in the mind.

T. G. Hill's botanical researches fall into two parts. The first part of his researches was devoted to plant anatomy, and he never lost his interest in this field. His most important anatomical work was perhaps the series of papers published with Ethel de Fraine on seedling structure. The work was at first based on a phylogenetic point of view; but the final paper in the series (still worth reading) in the *Annals of Botany*, 1913, marked the end of an era. The point of view had changed; the varying structure of seedlings was not to be interpreted phylogenetically but physiologically; the investigation had become a study in causal anatomy.

The second part of Hill's researches concerned plant chemistry and metabolism and was carried out largely in collaboration with Dr. Paul Haas (then reader in plant chemistry). They were the first botanists in Great Britain to study an oxidation-reduction system, hermidin, from *Mercurialis perennis*. Later appeared a long series of biochemical papers on the metabolism of marine algae. This was pioneer work in a field the importance of which is only now being generally realized.

In 1913, with Dr. Haas, he wrote "The Chemistry of Plant Products", which became a standard work. It is now, of course, somewhat out of date, but Vol. 2 on "Metabolic Processes" can still be read by students with profit, for its dynamic method of approach and presentation. It must remain a matter of regret that the authors did not see fit to revise this work.

As a member of F. W. Oliver's Department, Hill paid many visits to Blakeney Point, Norfolk. One result of this was his paper (with J. H. Hanley) on "The Structure and Water Content of Shingle Beaches", as well as studies on the osmotic pressures of salt-marsh plants.

In 1915 he published "The Essentials of Illustration". This book was not without its effect upon the standard of illustrations in biological journals; but it never became well known and indeed was not noticed in any botanical journal. In later years 'T.G.' suggested that this might have been because some of the material he used for his illustrations was rather frivolous.

From 1911 T. G. Hill served in the University of London Officers' Training Corps. He was adjutant during the First World War, became major in 1917 and resigned his commission in 1919. During the Second World War he took his department to Bangor,

where he entered into the teaching and demonstrating with a zest which must at times have been a trial to his hosts. He was nearly seventy when he retired.

'T.G.'s retirement was spent at his home in Hambledon. He was well known and liked in the village and will be remembered for his kindness, especially to the children. He was a keen supporter (and critic) of the Hambledon Cricket Club and served as president. He was also at one time president of the now defunct Hambledon Garden Club.

During the post-war years he became a governor of Guildford Technical College, in which he took a great interest. Characteristically, he resigned a few months ago, when he was no longer able to get to the governors' meetings.

At University College 'T.G.' was well known and well liked in the smoking room. He will be remembered with respect and affection by many students and colleagues.

D. J. B. WHITE

NEWS and VIEWS

Biochemistry at Oxford :

Sir Rudolph Peters, F.R.S.

SIR RUDOLPH PETERS retires at the end of the present academic year from the Whitley professorship of biochemistry in the University of Oxford, a post he has held since 1923. Peters studied as an undergraduate at Caius College, Cambridge, of which he became Drosier Fellow and Tutor. He took his B.A. in 1911 and graduated M.B., B.Chir. in 1915. After research and lecturing in biochemistry at Cambridge he joined the R.A.M.C., being awarded the M.C. with bar during the First World War. In 1919 he gained the M.D. degree of Cambridge. At Oxford, from 1923 onwards, he built up a flourishing school of dynamic biochemistry and found the first clue to the mode of action of thiamine from a study of its *in vitro* effects on metabolic processes. In the Second World War the development of British Anti-Lewisite, a substance of usefulness in a wide range of metallic poisonings, was a delightful example of the practical outcome of theoretical considerations. More recently, Peters has investigated the toxic action of fluoroacetic acid and has elegantly demonstrated how the incorporation of this substance into constituents of the tricarboxylic acid cycle leads to toxic action.

Peters has earned many distinctions. He was elected a Fellow of the Royal Society in 1935, receiving a Royal Medal in 1949 and delivering the Croonian Lecture in 1951. Many honorary degrees and many distinguished lectureships have been held by him, including the Dunham Lectureship at Harvard University. During 1946-50 he was a member of the Medical Research Council. Caius College elected him an Honorary Fellow in 1951. Fortunately, he will not be lost to the world of science on his retirement from Oxford, since he takes up a post with the Agricultural Research Council at the Institute of Animal Physiology, Babraham.

Prof. H. A. Krebs, F.R.S.

PROF. H. A. KREBS has been appointed to succeed Sir Rudolph Peters as Whitley professor of biochemistry at Oxford. He has been professor of biochemistry in the University of Sheffield since 1945, and the award to him, jointly with Dr. F. Lipmann, of the Nobel Prize for Medicine for 1953, was noted

in these columns last year (*Nature*, 172, 837; 1953). Prof. Krebs was educated at the Universities of Göttingen, Freiburg i. B., Munich and Berlin, being assistant in the Department of Prof. Otto Warburg at Berlin-Dahlem during 1926-30. He went to Cambridge as a Rockefeller Research Student in 1933 and was appointed demonstrator in biochemistry in that University in the following year. In 1935 he was appointed lecturer in pharmacology in the University of Sheffield, a post which was afterwards converted to that of lecturer in biochemistry and then to professor. Since 1945 he has also been director of the Medical Research Council Unit for Research in Cell Metabolism at Sheffield.

Prof. Krebs's work has largely been concerned with the study of metabolic processes *in vitro*. In 1932, in collaboration with Henseleit, he proposed a mechanism for the formation of urea in the liver with the participation therein of ornithine, citrulline and arginine by means of a cyclical process, a theory that was afterwards the centre of controversy, although it is now widely accepted. In 1937 he put forward his now classical citric acid cycle as a pathway of oxidation of carbohydrate, and it has since become clear that this cycle is concerned not only with oxidation of carbohydrate but also with that of fat and of protein. Indeed, as the years have passed, the importance of the citric acid cycle has grown rapidly, and Krebs's original idea has been amplified rather than modified. More recently, Krebs and his colleagues have been especially interested in the movement of substances across membranes, and the significance of such movements in metabolic processes in general. His Medical Research Council Unit will accompany him to Oxford, and it is to be hoped that there will be no more than a slight interruption of research as the result of this move.

Evidence for the Antiproton

It is firmly believed by most theoretical physicists that the antiparticle to a proton can exist. Indeed, if the proton is to be described by a modification of the Dirac equation, the existence of negative energy states is required. This particle should bear the same relation to a proton as does the positron to an electron. Should it be possible to create such a particle