

Obituary.

PROF. T. B. WOOD, C.B.E., F.R.S.

WITH the death on Nov. 6, at the age of sixty years, of Thomas Barlow Wood, Drapers professor of agriculture in the University of Cambridge, has passed away one of the giants of agricultural research of the last quarter of a century. His scientific labours were begun at a time when British agriculturists were still under the spell of the brilliant researches of Lawes and Gilbert at Rothamsted. Despite the work of these pioneers, however, the science of animal nutrition was in its infancy. The stockbreeder still fed his animals according to the time-honoured methods of his ancestors, and such terms as 'balanced rations', 'maintenance' and 'production requirements', were not to be found in his vocabulary. The results of Kellner's classical feeding trials in Germany were only just beginning to filter through to the attention of the scientific agriculturist in Great Britain.

The early years of this century, however, ushered in a long and fruitful period of agricultural inquiry. During this time, when fresh lustre was being added to the splendid traditions of soil and crop research at Rothamsted, T. B. Wood, at the sister institute in Cambridge, was engaged in studying the question of the efficient and economic feeding of farm animals. His great aim was to establish the application of the scientific method to the difficult problems of animal husbandry. That his labours in this field have been crowned with success is freely admitted on every hand. His name will live with those of Lawes and Gilbert, Kühn and Kellner. No greater and no juster praise can be bestowed upon his memory.

I suppose it was Prof. Wood's association with Norfolk farming, an association continued to the day of his death, which led him, in his earlier work, to investigate the composition and feeding value of the root crops. These researches were fruitful of remarkable results, which frequently have been recalled in these later days when controversy has raged round the desirability, or non-desirability, of feeding roots to dairy cows.

The wheat-breeding investigations of his colleague, Sir Rowland Biffen, led Prof. Wood to become interested in the problem of wheat strength. This problem presented, and still presents, difficulties of a baffling nature. Why do certain wheats yield flour which is capable of giving rise to shapely, well-piled loaves, whilst flour from other wheats is of little use for bread-making? Why do strong flours contain a tough, elastic gluten, whilst weak flours are characterised by a gluten of crumbly, putty-like consistency? No fixed answer has yet been given to these questions, despite mass attacks on the problem in recent years. It was Prof. Wood, however, who, by dint of ingenious experiments, first shed light into the dark recesses of this strange and perplexing phenomenon. His two long papers published in the *Journal of Agricultural Science* for 1907 still remain classics, and no treatise on the subject of wheat strength is complete without a full consideration of the conclusions he arrived at.

During the War, Prof. Wood's genius was employed in the service of his country. How well he succeeded in the difficult task of devising and administering schemes for utilising to the best advantage our impoverished supplies of feeding stuffs can only be appreciated fully by his colleagues of those troublous times. His was the mind which rejoiced in propounding big ideas and schemes and, what is equally if not more important, in seeing that they were properly carried into effect. On the cessation of hostilities he returned to Cambridge, and then began the most fruitful period of his career. It was at his suggestion that the present writer began a series of investigations into the nutritive value of pasture. If, as is sometimes suggested, the results of these investigations mark an epoch in the history of grassland husbandry, let it be remembered that it was at the suggestion of Prof. Wood that the researches were begun. Also at his suggestion, his intimate friend and colleague, Dr. Capstick, devised and built the large animal calorimeter which has been such a familiar sight to visitors to the School of Agriculture during recent years. By its help, Wood and Capstick were able to carry out important and fundamental researches into the maintenance requirements of swine at all ages between weaning and slaughter. This valuable work is being continued and expanded by Dr. Deighton, who for some years past has enjoyed the privilege of close co-operation with Prof. Wood in matters relating to the practical nutritional aspects of animal calorimetry.

Ably seconded by the staff of the Animal Nutrition Institute, Prof. Wood also conducted long and laborious investigations, by the method of comparative slaughter, into the production requirements of cattle, sheep, and pigs. As a result of these researches, it is now possible to draw up tables of the precise food requirements of farm animals at all ages and live weights. Compare this happy state of affairs with the general ignorance of thirty years ago in matters of feeding and obtain in that way a measure of the debt which agriculture owes to Prof. Wood's activities. Almost his last piece of work, carried out in conjunction with Mr. Mansfield, was to measure the maintenance and production requirements of ewes and lambs, a difficult investigation which called forth a display of great experimental ingenuity.

It is not merely as an experimentalist, however, that Prof. Wood will be remembered. He has also left his mark permanently on the philosophy of the subject. At this juncture it is only possible to refer to his teachings in respect of the rationing of farm animals. He demonstrated that the method of computing rations for milk-producing animals, by summing the separate requirements for maintenance and production, could be applied with equal success to meat-producing animals. He reduced his proposals to the form of the general equation:

$$R = Am + gc,$$

where R is the net energy of the ration, A the

(Continued on p. 813.)

surface area of the animal, m its maintenance requirement per unit surface area, g its gain in live-weight, and c the energy stored in unit live-weight increase. Where A , m , and c are known, and g is given a desired value, R , the net energy of the ration to be fed for the purpose of producing the desired rate of gain of live-weight, can be calculated. He demonstrated, further, that under certain conditions of experiment, the equation can be used for computing the net energy or starch equivalent of a feeding stuff.

Space forbids more than this fragmentary sketch of Prof. Wood's scientific work. To do this justice must form the theme of some future monograph. Nor can adequate reference be made to his influence as teacher and lecturer, his gifts as author and editor, his powers as organiser and administrator. His energy was amazing. It has well been said of him that for many years there was not an agricultural project of any importance on which he was not consulted before it was finally adopted. From modest beginnings he patiently developed an imposing organisation for teaching and studying agriculture in all its manifold phases. This was his crowning achievement. He was concerned also to house his subject worthily. Hence rose the School of Agriculture at Cambridge, which fair and gracious building is his enduring monument.

So much for the man and his work. On both, posterity will pass its judgment. But to us who mourn his loss, to us who shared his labours, his aspirations, his successes, and sometimes, alas, his disappointments, to us, in these early days following his death, it is the character of the man which stands out pre-eminently. Noble and just of temperament, with an infinite capacity for kindly thought and action, he endeared himself to all who came within his influence. How many of his younger associates, amongst whom the present writer, with gratitude, numbers himself, will cherish his memory through the years to come. Truly it may be said of him: his generation was the better for his having lived.

H. E. W.

WITH very great regret—a regret which is shared by his hosts of friends—I have read the news of the recent death of Prof. Wood. To the value of his stimulating work in many branches of agricultural science, many competent judges will give, or have already given, their testimony with far greater knowledge than my own. I confine myself here to the personal acknowledgment of the invaluable services which he rendered during the last three years of the War to the nation and to more than one great department of State, and especially to the Board of Agriculture. I feel that I should like to add something, if I can, to the memory of a most loyal colleague.

In December 1916, when I became president of the Board of Agriculture, farming in England seemed to be almost at its last gasp. The late Lord Oxford's "Reminiscences" contain a report to the

Cabinet in the preceding autumn, which presents a striking picture of the widespread sickness that had gripped the industry. If any attempt was to be made to revitalise agriculture, a definite policy must be framed and steadily pursued. The note of the German Government that, on Feb. 1, 1917, the unlimited U-boat campaign would begin, emphasised the necessity for immediate action. The problem set the Board was the production, with the greatest possible speed, of the largest possible supply of indispensable food for the needs of a beleaguered city.

In the anxieties of this gloomy period, the visits of Wood were welcome as the sun. He seemed to radiate health, energy, and cheerfulness, and his optimism, when the difficulties were so obvious and apparently so insurmountable, was invigorating. He came to me fresh from the Food Council, of which he was a prominent member, master of its latest opinions, ready, with unflinching good humour, to explain their mysteries in simple language. He proved an excellent counsellor. We had to form an idea, as exact as possible, of the food requirements of the nation, of the constituent parts of a ration which should be physiologically satisfactory, of the quantities of each constituent required, and with these facts in our minds to concert the means for their supply. On all these initial points, which included a host of subsidiary questions, Wood was most useful. But he was especially valuable in reference to the most advantageous utilisation of the live-stock of the country for our purpose. Here his practical knowledge and experience came into full play.

Nor was it only in the inauguration of the movement that Wood's services were employed to advantage. In the summer of 1917 the reserves of frozen meat for the army were running dangerously low. Until the reserves could be restored, it was decided to feed the troops at home with fresh meat. Wood served on the committee set up for the purpose, with Mr. Gavin as its secretary. The work was done so efficiently and quietly that it passed unnoticed by the country. Another work on which he was engaged at the conclusion of the War was the compilation not only of exact details of the number and age of the cattle, but also of their whereabouts, so that no district should be disproportionately depleted. He even found time to direct the work of the committee formed to disseminate among farmers information respecting the use of feeding stuffs and approved methods of alternative feeding.

I have dealt only with my personal relations with Prof. Wood, and have not referred to his work on the Inter-Allied Scientific Food Commission in Paris and afterwards in Rome. At the former conference his influence is shown in the adoption, for all allied countries except France, of the policy pursued in Great Britain on the relation of live-stock to available food supplies. His War-work is a striking record of a most unassuming and lovable man who spent his great abilities and untiring labour in the cause of his country.

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