

The Third
Lord Hastings
Memorial Lecture

1961



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DELIVERED BY

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A Revolution in Arable Farming

This is the opening paragraph in the first Minute Book of the Norfolk Agricultural Station:

“In the year 1885 the Norfolk Chamber of Agriculture started a movement for carrying out agricultural experiments of various kinds in different parts of the county and the work was continued for some years under its auspices, being supported by voluntary money subscription and service supplemented after a time by grants first from the Board of Agriculture and then from the Norfolk County Council. The connection with the Chamber continued to within the last year or two and since then the work has been carried on by the Department of Agriculture of the University of Cambridge.”

It was written in 1908 and ended by suggesting that the experimental work of the Norfolk Chamber of Agriculture should be perpetuated on a Norfolk farm which “should be a demonstration farm rather than an experiment station. It should put to the test of actual farming practice the latest discoveries of the experiment stations and give the farmers the chance of seeing them carried out on a commercial scale”.

A circular, sent out on the 22nd February, 1908, defined the aims and objectives of the proposed experimental farm and asked for the subscription of £1,000 as working capital, and if possible the loan of a farm rent free for a period of five years. The response to the circular was most satisfactory—the money was quickly over-subscribed and Lord Hastings made Jex Farm, Little Snoring available for the work rent free for eight years. He was elected Chairman of the Executive Committee in 1912 and held the office, with great distinction, until his death on the 18th January, 1956; in all for forty-four years.

The occupation of Jex Farm was relinquished in 1920, and the capital which had increased to over £2,000 was put into the bank pending the re-start in 1921 of the work on a farm nearer to Norwich—Middle Farm, St. Faith's—the first scientific Director, Mr. C. Heigham, M.A., being appointed in 1923. The move to the present farm at Sprowston was made in 1924.

Norfolk farming was in considerable difficulty when the Station was re-born in 1921. The sudden repeal of the Corn Production Act of 1917, growing competition from the British Empire and other parts of the world in which we had financial interests and increasing farm wages, low as they were at the time, cast doubts on the soundness of the Norfolk four-course rotation which had been so meticulously practised in the county, with little or no change for well over 100 years, and was sincerely believed to be the only way Norfolk could be farmed. Any alternative or modification, no matter how simple, was regarded as downright wicked.

Since this lecture is intended to try and show how the four-course rotation in its traditional form gradually disappeared and to describe the part the Station played in the revolution which developed, it is appropriate to deal shortly with the historical background of the farming practices of the time, for they explain, and indeed justify, many of the farming opinions so firmly held when the Station re-started at St. Faith's in 1921. It is impossible here to deal fully with the fascinating story of the evolution of the Norfolk four-course rotation, but Townshend and Coke were largely responsible for it. Neither, in fact, introduced either the turnip or the swede, but both by their example and enthusiasm developed the use of new crops, improved breeds of sheep and cattle, methods of irrigation, under drainage, better techniques of cultivation and of maintaining the land in good heart.

Townshend took over his estates in 1730, Coke inherited his in 1776, by which time the turnip was well known in Norfolk. In due course the succession of crops—wheat, roots, barley, hay,—sheep in close folds and the fattening of cattle in yards during the winter became as regular and immovable in Norfolk farming as the seasons. There was of course continued progress in the use of horse-drawn implements and improved farming techniques, but in spite of the increasing use of natural fertilisers like shoddy, guano and nitrate of soda, and the beginnings of the fertiliser industry encouraged by the work of Lawes

and Gilbert, there was no profound change in the basic principles of four-course farming between 1800 and 1921. The system was rigid, the four crops following one another with almost military precision. It was not a very intensive system but it kept the land clean and in fair condition, for which it relied mainly on the muck from the bullocks and the "taih" from the ewe flocks or fattening hoggetts. Fertilisers occupied a minor rôle and were often regarded as "stimulants" and land robbers. Half the arable land was cropped with cereals and the remainder grew hay and roots for sheep and bullocks, and fed the horses, the chief source of power on the farm. Sales were confined to cereals, meat and wool, all of which were difficult to produce profitably at prevailing prices, and it was obvious that the edifice built up so meticulously over a long period of years was shaking at its foundations in the county of its origin.

It was clear that profound modification, perhaps even a revolution, was necessary; it was equally clear that the Norfolk Agricultural Station ought to be able to assist in overcoming the dilemma in which Norfolk farming was finding itself. The circular of 1908 had said that the farm should be a demonstration rather than an experimental farm and should test the latest discoveries. Demonstration alone, valuable as some of its aspects proved to be, could not provide the answers, for the alternatives had to be measured and not guessed at before their impact could be accurately assessed. So, early in 1924, the Station entered the field of controlled experimental work, adopting methods based upon statistical planning and analysis led by Udney Yule and Engledow at Cambridge. Fortunately the sugar beet crop was re-introduced into Norfolk at this time, and seemed to meet the need for a cash yielding, stock feeding root crop to replace swedes and mangels. But this crop was unfamiliar to Norfolk farmers and brought with it a host of doubts. Could it be grown successfully in the county? Could cattle and sheep be fattened on it and, if so, would the produce be as good and the effects on soil condition be equal to those from bullocks and sheep fed on mangels and swedes? Could sugar beet, in fact, be fitted into a mixed system of arable farming? Every detail, therefore, had to be examined and Sprowston was the place to do it. The facilities, however, were not overwhelming, for the Sprowston farm was only 183½ acres in 1924, but a start was made on the immediate problems, namely the need for cheaper methods of livestock production, the possibilities of cultivating

sugar beet in Norfolk and above all, to encourage Norfolk farmers to adopt a more scientific approach to their farming. It must be remembered that forty years ago there was no organised agricultural education or advisory service in Norfolk, and the experimental station had not yet obtained the confidence of its farmers; nevertheless it started to examine critically all that was dear to Norfolk farmers' hearts and sacrosanct to their forbears.

Against this background the Station began a long series of experiments in 1924, experiments which were demonstrated to a growing number of visitors on each inspection day. It also began to modify its farming policy and to demonstrate the application of agricultural science to farming practice.

WINTER BEEF PRODUCTION

It has already been inferred that the production of winter beef and muck was a sheet anchor in the Norfolk four-course rotation; "prime Norfolks" held a prominent position in the beef trade. The feeding methods were simple in the extreme, consisting of one cwt of mangels for a 10 cwt store animal, unlimited straw and a liberal allowance of a mixture of linseed and cotton cakes. Frequently for a heavy bullock at the end of the fattening period half a linseed cake and half a cotton cake were fed daily. For many years these cakes had been cheap but, cheap as they were, economies were obviously possible by adopting a more scientific approach to the feeding. Here was an opportunity, foreseen in the circular of 1908, "to put to the test of actual farming practice the latest discoveries . . ." The late Professor T. B. Wood produced his livestock feeding standards just after the 1914-18 war and their application to winter feeding in Norfolk was certain to reduce feeding costs.

Traditional methods often resulted in feeding from $\frac{3}{4}$ -1 $\frac{1}{2}$ lb digestible protein in excess of the standards advised by Wood. This was the same as saying that 3-6 lb of linseed cake were being wasted daily on every animal, or that the wastage itself contained sufficient protein for another fattening bullock. But these facts carried little weight with those whose methods had for so long produced "prime Norfolks". Nothing but demonstration backed up by information based upon feeding trials would suffice. In the years 1924-6, 72 bullocks were

fattened in the experiments at Sprowston; one lot on linseed and cotton cakes and the other on a ration made up as Wood advised and which never contained more than $1\frac{1}{2}$ lb of a high protein cake. The results had a profound influence on winter feeding in Norfolk and elsewhere for the cheaper mixture was just as effective as the dearer one. Each produced a little more than the 2 lb per day live weight gain for which they were theoretically fed, but the saving from the cheaper ration even at the low prices of feeding stuffs then ruling was £1 10s. *od.* for each animal in the three winters of the trial (1).

There was nothing original in this work; it was just a simple demonstration of established scientific fact and the result was self evident from the first day of the trials, but nevertheless not everyone was satisfied. What, they asked, is the quality of the beef and the value of the muck? Surely it cannot be as "rich" as that from the cakes? We can dispose of the first question now and return to the second one later. There was no difference in the quality of the carcasses although the cake-fed animals had more "bloom", but £1 10s. *od.* per animal was a high price to pay for something which only satisfied the eye and the ego of the feeder and was not reflected in the sale price of the bullocks.

BEEF PRODUCTION ON SUGAR BEET BY-PRODUCTS

In 1921 sugar beet was the only crop on offer at a fixed contract price. All the others were subject to the vagaries of markets over which farmers had no control and in which the Government had little or no interest, for the era of price fixing had yet to come. Thus there was no lack of appreciation of the cash value of beet, but if the new crop was to fit into the root shift it had to do all that swedes and mangels could do and, particularly, it had to fatten bullocks—so between 1927 and 1931 the yards at Sprowston were occupied by a total of 109 bullocks fattening either on beet tops, beet pulp or swedes. There were some variations in the results of these trials, especially from beet tops, which vary in composition according to weather and other factors over which farmers have less control than in feeding swedes. The general conclusions were that the three foods could each be used to fatten cattle, but the tops were not quite equal to swedes ton for ton. The actual value calculated from the live-weight gains was 1 ton of tops equalled 0.93 ton of swedes (2). Theoretically, the deficiency could be met by