

In Memoriam

SIR JOHN BENNET LAWES, BART.

1814-1900.

BY

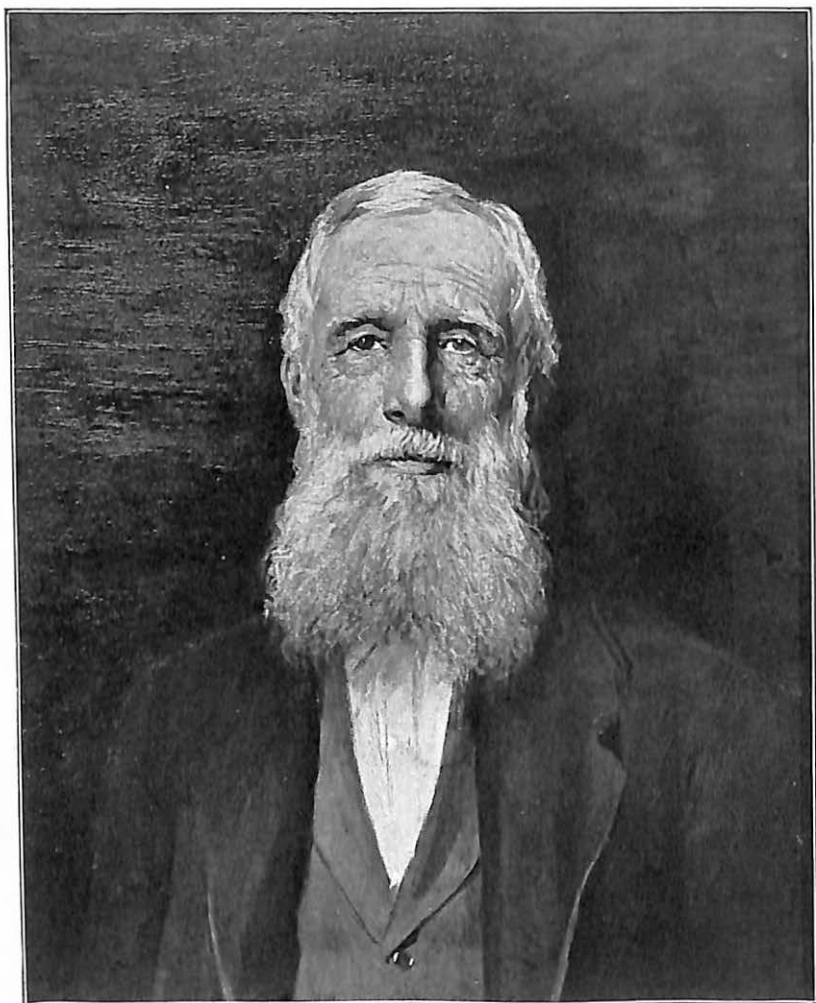
W. FREAM, B.Sc., LL.D.

WITH A PORTRAIT.

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1900.



Hubert Herkomer, R.A., pinxit.

J. B. Lawes

SIR JOHN BENNET LAWES, BART., F.R.S.

Born December 28, 1814. Died August 31, 1900.

In Memoriam

SIR JOHN BENNET LAWES, BART.

On the last day of August 1900, Sir John Bennet Lawes passed peacefully away at his ancestral home. He was so hale and active until quite recently that it seemed likely he would live into the next century. This, however, was not to be, and the nineteenth century, with which his name and his work will be inseparably associated, claims him. Through his death the Royal Agricultural Society has to mourn the loss of one of its best friends and the oldest member of its Council, whilst Agriculture loses one of the greatest benefactors it has ever had.

Born on December 28, 1814, in the old Manor-house at Rothamsted, Herts, where nearly 86 years later he died, the deceased baronet was the son of the late Mr. John Bennet Lawes, whom he succeeded in the paternal estates in 1822, at the early age of eight. After leaving Eton he proceeded to Oxford, and passed some time at Brasenose College. His inclinations, however, were not much in the direction of classical study, and he shortly found himself in more congenial surroundings in the chemical laboratory of Dr. Antony Todd Thomson, at University College, London. On entering into possession of his hereditary property at Rothamsted in 1834, he at once began experiments upon plants growing in pots, the investigations being subsequently extended to the field. One of the most striking results observed in these early days was the excellent effect produced upon the turnip crop by dressing it with mineral phosphates that had been treated with sulphuric acid. At once grasping the importance of this discovery, Mr. Lawes, as he was then, obtained in 1842 a patent for the manufacture of superphosphate, and thus laid the foundation of a great industry.

In the following year was taken the decisive step of establishing at Rothamsted a properly equipped agricultural experiment station. Simultaneously, Mr. Lawes secured the

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co-operation of a young chemist, Dr. (now Sir) J. Henry Gilbert, and the association which was thus commenced fifty-seven years ago has been attended by the happiest results, as the numerous scientific memoirs that have issued year after year from Rothamsted amply testify.

Two main lines of inquiry have been followed, the one relating to plants, the other to animals. In the former case the method of procedure has been to grow some of the most important crops of rotation, each separately, year after year, for many years in succession on the same land, without manure, with farmyard manure, and with a great variety of chemical manures; the same description of manure being, as a rule, applied year after year on the same plot. Experiments on an actual course of rotation, without manure, and with different manures, have also been made. Wheat, barley, oats, beans, clover and other leguminous plants, turnips, sugar beet, mangels, potatoes, and grass crops have thus been experimented upon. Incidentally there have been extensive sampling and analysing of soils, investigations into rainfall and the composition of drainage waters, inquiries into the amount of water transpired by plants, and experiments on the assimilation of free nitrogen. Lest any misunderstanding should arise as to the attitude taken up concerning the last-named subject, it may be useful to quote the following from the Memoranda of the Rothamsted Experiments, 1900 (p 7):—

Experiments were commenced in 1857, and conducted for several years in succession, to determine whether plants assimilate free or uncombined nitrogen, and also various collateral points. Plants of the gramineous, the leguminous, and of other families, were operated upon. The late Dr. Pugh took a prominent part in this inquiry. The conclusion arrived at was that our agricultural plants do not themselves directly assimilate the free nitrogen of the air by their leaves.

In recent years, however, the question has assumed quite a new aspect. It now is—whether the free nitrogen of the atmosphere is brought into combination under the influence of micro-organisms, or other low forms, either within the soil, or in symbiosis with a higher plant, thus serving indirectly as a source of nitrogen to plants of a higher order. Considering that the results of Hellriegel and Wilfarth on this point were, if confirmed, of great significance and importance, it was decided to make experiments at Rothamsted on somewhat similar lines. Accordingly, a preliminary series was undertaken in 1888; more extended series were conducted in 1889 and in 1890; and the investigation was continued up to the commencement of the year 1895. Further experiments relating to certain aspects of the subject were commenced in 1898, and are still in progress. The results have shown that, when a soil growing leguminous plants is infected with appropriate organisms, there is a development of the so-called leguminous nodules on the roots of the plants, and, coincidentally, increased growth, and gain of nitrogen.

The experiments with farm animals began in 1847, and have been continued at intervals nearly to the present time. Amongst the points that have been investigated are the following:—

1. The amount of food, and of its several constituents, consumed (*a*) in relation to a given live weight of animal within a given time, (*b*) to produce a given amount of increase in live weight.

2. The proportion, and relative development, of the different organs, or parts, of different animals.

3. The proximate and ultimate composition of the animals in different conditions as to age and fatness, and the probable composition of their increase in live weight during the fattening process.

4. The composition of the solid and liquid excreta (the manure) in relation to that of the food consumed.

5. The loss or expenditure of constituents by respiration and the cutaneous exhalations—that is, in the mere sustenance of the living meat-and-manure-making machine.

6. The yield of milk in relation to the food consumed to produce it; and the influence of different descriptions of food on the quantity, and on the composition, of the milk.

Incidentally, the results obtained from the inquiries just enumerated have furnished data essential to the consideration of such problems as (*a*) the sources in the food of the fat produced in the animal body; (*b*) the characteristic demands of the animal body—for nitrogenous or non-nitrogenous constituents of food—in the exercise of muscular power; (*c*) the comparative characters of animal and vegetable food in human dietaries.

Amongst the field experiments there is, perhaps, nothing of more universal interest than the field—known as Broadbalk Field—in which wheat has been grown for fifty-seven years in succession, without manure, with farmyard manure, and with various artificial manures. The results show that, unlike leguminous crops such as beans or clover, wheat may be successfully grown for many years in succession on ordinary arable land, provided suitable manures be applied, and the land be kept clean. Even without manure, the average produce over forty-six years, 1852–1897, was nearly thirteen bushels per acre, or more than the average yield of the whole of the United States of America, including their rich prairie lands—in fact, about the average yield per acre of the wheat lands of the whole world. Mineral manures alone give very little increase, nitrogenous manures alone considerably more than mineral manures alone, but the mixture of the two considerably more

than either separately. In one case, indeed, the average produce by mixed mineral and nitrogenous manure was more than that by the annual application of farmyard manure; and in seven out of the ten cases in which such mixtures were used the average yield per acre was from over two to over eight bushels more than the average yield of the United Kingdom (which is rather less than twenty-eight bushels of 60 lb. per bushel) under ordinary rotation. It is estimated that the reduction in yield of the unmanured plot over the forty years, 1852-91, after the growth of the crops without manure during the eight preceding years, was, provided it had been uniform throughout, equivalent to a decline of one-sixth of a bushel from year to year due to exhaustion—that is, irrespectively of fluctuations due to season. It is related that a visitor from beyond the Atlantic, talking to Sir John Lawes in Broadbalk Field, said, “Americans have learnt more from this field than from any other agricultural experiment in the world.”

Another field experiment of singular interest is that relating to the mixed herbage of permanent meadow, for which seven acres of old grass land were set apart in Rothamsted Park in 1856. Of the twenty plots into which this land is divided, two have been left without manure from the commencement, two have received ordinary farmyard manure continuously, whilst the remainder have each received a different description of artificial or chemical manure, the same being, except in special cases, applied year after year on the same plot. No one can inspect this field during the growing season without being impressed by the striking evidence it affords of the influence of different manurial dressings. So much, indeed, does the character of the herbage vary from plot to plot that the effect may fairly be described as kaleidoscopic. Repeated analyses have shown how greatly both the botanical constitution and the chemical composition of the mixed herbage vary according to the description of manure applied. They have further shown how dominant is the influence of season. To such an extent, it may be added, is this the case that a given quantity of gross produce of the mixed herbage may be one thing in one season, and quite another in another season, both as to the proportion of the different species composing it, and as to their condition of development and maturity.

About 130 separate papers or reports on the Rothamsted Experiments have been published, most of them in the joint names of Sir John Lawes and Sir Henry Gilbert. More than one-third of these have been given to the world through the

medium of this Journal, in which the earliest paper to appear was that on "Agricultural Chemistry" in Vol. VIII. (1st series), 1847, and the latest, that on "The Growth of Sugar-Beet and the Manufacture of Sugar in the United Kingdom," in Vol. IX. (3rd series), 1898. These two dates embrace a period of fifty-two years. Of papers relating to experiments with animals, the first dealt with "Sheep Feeding and Manure," and was published in Vol. X. (1st series) in 1849; the last was on "The Feeding of Animals for the Production of Meat, Milk, and Manure, and for the Exercise of Force" in Vol. VI. (3rd series), 1895. Other subjects dealt with in this Journal include turnip culture (1847); the amount of water given off by plants during their growth (1850); agricultural chemistry, specially in relation to the mineral theory of Baron Liebig (1851 and 1863); the comparative fattening qualities of different breeds of sheep (Hampshire and Sussex Downs, 1851; Cotswolds, 1852; Leicesters and Cross-breeds, 1855); pig-feeding (1853); the Holkham wheat experiments (1855); the growth of wheat by the Lois Weedon system (1856); the growth of barley continuously on the same land (1857, 1873); experiments with different manures on permanent meadow land (1858, 1859, 1863); observations on the recently-introduced manufactured foods for agricultural stock (1858); experiments on the growth of red clover by different manures (1860); the composition of oxen, sheep, and pigs, and of their increase whilst fattening (1860); experiments on the feeding of sheep and on the fattening of oxen (1861, 1862); the Rodmersham wheat experiments (1862); the utilisation of town sewage (1863); experiments on the growth of wheat for many years in succession upon the same land (1864, 1884); the home produce, imports, and consumption of wheat (1868, 1880, 1893); effects of the drought of 1870 on some of the experimental crops at Rothamsted (1871); the valuation of unexhausted manures (1875, 1885, 1891); our climate and our wheat crops (1880); the amount and composition of the rain and drainage waters collected at Rothamsted (1881, 1882, 1883); the history of a field newly laid down to permanent grass (1889); the food of our agricultural crops (1890); the sources of the nitrogen of our leguminous crops (1891); allotments and small holdings (1892); rotation of crops (1894); the depression of corn prices, and the production of wheat in some of the chief exporting countries of the world (1896); the Royal Commission on Agricultural Depression, and the valuation of unexhausted manures (1897); and the valuation of the manures

obtained by the consumption of foods for the production of milk (1898).

Voluminous papers have appeared in the Philosophical Transactions of the Royal Society, notably those upon the "Agricultural, Botanical, and Chemical Results of Experiments on the Mixed Herbage of permanent Grass-land, conducted for many years in succession on the same Land"—the agricultural results in 1880, the botanical results in 1882, and the chemical results (section 1) in 1900. Through the same medium were published, in 1859 and 1883, the reports upon an experimental inquiry into the composition of some of the animals fed and slaughtered as human food. To the Journal of the Chemical Society papers were contributed on the composition of the ash of wheat grain and wheat straw (1884), on the composition of soils (1884, 1885), and on other subjects. Observations on rainfall, percolation, and evaporation at Rothamsted appeared in the Proceedings of the Institution of Civil Engineers in 1891. Two reports were presented to Parliament, one in 1865 on the sewage of towns, in connection with a Royal Commission of which Mr. Lawes was a member; and one in 1866 on experiments undertaken, by order of the Board of Trade, to determine the relative values of unmalted and malted barley as food for stock.

The foregoing summary of papers is far from exhaustive, but it is illustrative of the many-sided activity of the founder of the Rothamsted Experiment Station. Sir John Lawes did not often appear as a lecturer, but mention may be made of his papers read before the London Farmers' Club, on exhaustion of the soil in relation to landlords' covenants and the valuation of unexhausted improvements (1870), and on the more frequent growth of barley on heavy land (1875). In 1870 he addressed the Maidstone Farmers' Club on scientific agriculture with a view to profit, and in 1879 he gave a lecture to the East Berwickshire Agricultural Association on the question—"Is higher farming a remedy for lower prices?" He was an earnest advocate of the system of selling cattle by live weight, and his useful book of "Tables for estimating Dead Weight and Value of Cattle from Live Weight" has long been included amongst the publications of the Royal Agricultural Society. In the autumn of 1862, and every year since, Sir John Lawes sent to "The Times" a letter containing his estimate of the produce of the wheat crop in the United Kingdom for the current year, and this letter was annually anticipated with much interest by agricultural readers and others. A few years ago the Rothamsted papers were collected

and bound up in three quarto and six (now seven) octavo volumes, and presented to various national institutions throughout the world.

The unique feature of Rothamsted—which is now the oldest agricultural experiment station in the world—is the long unbroken continuity of the investigations. It would have been nothing less than a national calamity had these ceased at the death of their founder. Sir John Lawes must have felt this, for he foresaw it, and with laudable munificence and admirable public spirit set aside a sum of 100,000*l.* for their permanent continuance. The fund is administered by the Lawes Agricultural Trust Committee,¹ the work of which began ten years ago and now goes on uninterruptedly despite the lamentable death of the donor.

Sir John Lawes was elected a Member of the Royal Agricultural Society in 1846, and a Governor in 1878. He was elected to a seat on the Council on May 22, 1848, became a Vice-President on December 11, 1878, and a Trustee on June 24, 1891. As the time for celebrating in 1893 the Jubilee of the Rothamsted experiments drew near, he was approached with the view of his occupying, in conjunction with that auspicious event, the office of President of the Royal Agricultural Society, a position he would no doubt have accepted and adorned but for advancing years and increasing deafness, which the veteran experimenter pleaded as an excuse for declining the honour which the Society was anxious to bestow. Sir John Lawes always took a warm and active interest in the experimental investigations carried on by the Society, and it need hardly be said that his advice relating to the inauguration and development of the Woburn Experiment Station was invaluable.

The many honours that were bestowed upon the late baronet were significant of the public appreciation of the great work which he had voluntarily undertaken. In 1854 he was elected a Fellow of the Royal Society, and in 1867 that distinguished body awarded the Royal Medal jointly to himself and Dr. Gilbert. In presenting this signal mark of distinction the President, Sir Edward Sabine, stated that Messrs. Lawes and Gilbert had been engaged for the last twenty-four years in a systematic series of researches upon Agricultural Chemistry, with a view of determining, by exact experiments, the principles, chemical and physiological, which are involved in the general and fundamental processes of successful agriculture. After

¹ For the constitution and functions of this Committee, see *Journal R.A.S.E.* 3rd series, vol. vii. 1896, pp. 324–332.

enumerating the several lines of inquiry that were being pursued, he concluded with the words :—

It may be sufficient to sum up these remarks by stating that the various inquiries to which a brief reference has been made have been conducted with a skill, perseverance, and success which have placed their authors, by general consent, at the head of those who have pursued this important branch of experimental inquiry.

In February 1894, the Albert Gold Medal of the Society of Arts was presented by His Royal Highness the Prince of Wales, on behalf of the Society, both to Sir John Lawes and to Sir Henry Gilbert "for their joint services to scientific agriculture, and notably for the researches which, throughout a period of fifty years, have been carried on by them at the Experimental Farm, Rothamsted." Various foreign governments and agricultural or scientific societies bestowed upon Mr. Lawes tokens of their appreciation of his work. Nor were academical honours wanting, for in 1877 the University of Edinburgh conferred upon him the degree of LL.D., Oxford made him D.C.L. in 1893, and in the following year Cambridge placed his name upon its D.Sc. roll. In the year 1882 Mr. Lawes was created a baronet in recognition of his services to Agriculture.

Two incidents in the career of the late baronet are of exceptional interest to agriculturists. The one occurred in 1854, the other in 1893. In the earlier year a considerable sum of money was raised by subscription in order to present to Mr. Lawes a testimonial in recognition of the services he had rendered to British Agriculture. The proposal of the committee was to purchase a service of plate, but at the suggestion of the intended recipient the amount subscribed was devoted to a purpose of greater utility. At the commencement of the regular experiments in 1843 an old barn had been fitted up as a laboratory, but had long since been found inadequate to meet the requirements. Consequently the fund raised in 1854 was expended in the erection of a new laboratory, which continues in service to-day. The formal presentation took place in July, 1855, and Mr. Lawes, in returning thanks, made *inter alia* the following remarks :—

I will now explain to you to what purpose we intend to devote your building, and show you to what extent science is most likely to be beneficial to agriculture. The great chemists of old had an opinion that science could do but little in aid of agriculture . . . If you consult works on agriculture previous to 1840, you will find no mention of the terms commonly used now. The French and Germans were the first to apply the science, and they made progress in the chemistry of agriculture. Agriculture as practised in Great

Britain in the present day is a very different process, requiring more skill and capital, than agriculture as practised in other countries . . . I must explain that the object of these investigations is not exactly to enable me to put money into my pocket, but to give you the knowledge by which you may be able to put money into yours. Science is not to do away with a rotation of crops, but to enable you to judge of the properties of all your several crops in rotation, and whether it would be better, under certain circumstances, to grow a second, third, or even fourth crop on the same land, or to follow your usual course . . . When investigations such as these have occupied our attention many years, we are led to regard them in some way as our children, and are unwilling to desert them or leave them destitute at the time of our death. This infant of mine, for which you have built this magnificent abode, combines with the helplessness of a babe the appetite of a giant. When, some twelve years ago, I delivered it into the arms of its present nurse, Dr. Gilbert, it was struggling for an existence. Under his tender management it has arrived at its present thriving condition. The interest in its welfare is not confined to this immediate neighbourhood, but extends even to foreign countries . . . So great is the amount of accumulated matter which I have not hitherto published that I consider it would take at least five years to place it all before the public. I have, therefore, although the subject is surrounded by many difficulties, provided that in the event of my death these investigations shall be still carried on, and the reports of what we have already done placed before the public for a term of at least five or seven years. A variety of circumstances prevented me doing more than this; but I cannot conceive that the agriculturists of this country, who have shown so great a sympathy with the experiments I have carried on, will ever allow the building to fall into disuse. I should be most ungrateful were I to omit this opportunity of stating how greatly I am indebted to those gentlemen whose lives are devoted to the conduct and management of my experiments. To Dr. Gilbert more especially I consider a debt of gratitude is due from myself and from every agriculturist in Great Britain. . . . Gentlemen, to you who have left your several important occupations to assemble here to-day, as well as to those who have subscribed to the testimonial but are unable to be present, I return my most sincere thanks. The scientific investigations which I have carried on will henceforth assume an importance in my eyes not hitherto belonging to them. Whether they are eventually to become the guiding star to agriculturists, or to sink into insignificance before others more grand and comprehensive, my gratitude to you will be the same; and a remembrance of your kindness to me to-day will be engraven in my heart until my eyes shall become dim, and my memory shall cease to serve.

The second incident, in 1893, arose out of the public desire to fittingly celebrate the Jubilee of the Rothamsted Experiments. Accordingly, at a meeting convened by the late Duke of Westminster, as President of the Royal Agricultural Society, and held on March 1, 1893, the Prince of Wales in the chair, it was resolved "that some public recognition should be made of the invaluable services rendered to Agriculture by Sir John Lawes and Dr. Gilbert." In the course of the speech made by His Royal Highness, the objects of the movement were tersely stated thus:—

All those who are interested in the progress of agricultural knowledge, and especially in the application of chemistry to the cultivation of crops and the feeding of stock, must be aware of the extreme importance of the valuable series of experiments so long carried on at Rothamsted by Sir John Bennet Lawes. These experiments were commenced in the year 1843, so that the current year will witness the conclusion of no less than half a century's investigations, which have been conducted during the lifetime of their founder. During the whole of this period, moreover, Dr. Gilbert has been associated with Sir John Lawes in the work of experimental research.

The Rothamsted experiments have from the commencement been entirely disconnected from any external organisation, and have been maintained at the sole cost of Sir John Lawes. For the continuance of the investigations after his death, Sir John has recently made the munificent endowment of 100,000*l.*, besides the famous laboratory and certain areas of land, and has nominated some of the most distinguished scientists of the day to administer the trust.

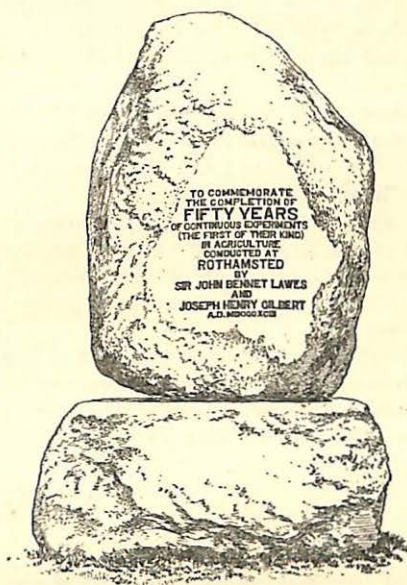
In view of all these facts, and the great national importance of the Rothamsted experiments, it is only fitting that some public recognition should be made of the invaluable services rendered to Agriculture by Sir John Lawes and his distinguished colleague, Dr. Gilbert. Any expensive gift would, of course, under the circumstances, be out of place; the great thing necessary is that the agricultural and scientific world should make, as it were, some outward and visible sign of its appreciation of the value of Sir John Lawes's half-century of investigations. The manner in which this is proposed to be done appears to me to be such as would be both appropriate to the occasion and agreeable to Sir John Lawes's feelings.

The commemoration of the Jubilee of the Rothamsted Experiments took place at the Laboratory, Harpenden, on July 29, 1893. The occasion being one of national interest, the President of the Board of Agriculture (the Right Hon. Herbert Gardner, M.P.) occupied the chair, and there was a distinguished assembly of visitors. The Chairman carried his audience with him when, referring to the published works of Sir John Lawes and Dr. Gilbert, he said :—

Those works, more than all the perishable portraits, more than all the silver plate, even more than the everlasting granite which I see opposite me,—those works are the truest memorial of what these gentlemen have done. It is with the sincerest pleasure and the profoundest respect that I tender to Sir John Lawes and Dr. Gilbert, in the names of the Agriculturists of this country, our felicitations on the Jubilee of their work, and at the same time express our most fervent prayer that they may long live to enjoy the honour and admiration of all classes of their fellow-countrymen.

The granite memorial consists of a huge monolithic boulder of irregular shape. It was obtained in Westmorland, weighs eight tons, and rests upon a granite base from the same source. It stands in front of the Laboratory at Harpenden. The

following is a representation of it, with the inscription which it bears upon a polished face :—



The Duke of Westminster, on behalf of the subscribers, presented to Sir John Lawes his portrait,¹ and also an illuminated address, of which the following is the text :—

TO SIR JOHN BENNET LAWES, BART., D.C.L., LL.D., F.R.S., &c., &c.

On behalf of the Committee of the Rothamsted Jubilee Fund, and of the numerous subscribers to that Fund in all parts of the world, I offer you the most hearty congratulations on the completion of half a century's un-interrupted investigation of agricultural problems of the highest practical value and interest.

¹ The Portrait is a life-sized three-quarter length, by Mr. Hubert Herkomer, R.A., and represents Sir John Lawes standing in a characteristic attitude, facing the spectator. A reproduction of the head of the portrait is given as the frontispiece to this brief Memoir. At the foot of the frame is a brass plate with the following inscription.—

PRESENTED
BY SUBSCRIPTION
TO SIR JOHN B. LAWES, BART.,
D.C.L., LL.D., F.R.S.,
TO COMMEMORATE THE
JUBILEE OF THE ROTHAMSTED EXPERIMENTS,
JULY 29TH, 1893.

These investigations, which originated with you, relate not only to the growth of cereal and other crops under the most varying conditions, but also to the economic effect of different foods on the development of the animals of the farm. They have embraced, moreover, most important researches concerning the chemical constituents of soils, the rainfall, drainage waters, and the sources from which plants derive their supply of nitrogen.

During the whole of this period of fifty years you have had the zealous co-operation of your lifelong friend Dr. Joseph Henry Gilbert, whose name will ever be associated with yours, and whom jointly with you we desire on the present occasion to congratulate.

For the continuance of the experiments and investigations which have already extended over so long a period, you have munificently provided by the establishment of the Lawes Agricultural Trust, so that our successors will profit even more, if possible, than we of the present day have done, by your enlightened labours.

The Memorial which is now erected will, it is hoped, preserve your joint names in honoured remembrance for centuries to come, while the portrait that is presented to you herewith will hand down to future generations the likeness of one of the most disinterested as well as the most scientific of our public benefactors.

ALBERT EDWARD P.

July 29, 1893.

The Duke of Devonshire, as President of the Royal Agricultural Society in 1893, in presenting an address from the Society, remarked that they had had set before them at Rothamsted a model of what all work of experimental inquiry ought to be, and that example, and the notable results achieved by it, had stimulated the carrying out of experiments on a lesser scale on other farms. He need only allude to the foundation of the Woburn Experiments, which took their rise directly from the Rothamsted researches, and to numerous local societies which had been more or less concerned in experimental work, and to which Rothamsted had given so great an impulse. The address was as follows :—

TO SIR JOHN BENNET LAWES, BART., D.C.L., LL.D., F.R.S., &c., &c.

Trustee of the Royal Agricultural Society of England.

The Royal Agricultural Society of England by its Council gladly embraces the occasion of the Jubilee of the Rothamsted Experiments to tender to you its hearty congratulations upon the satisfactory completion of half a century of unceasingly applied scientific knowledge to the solution of problems affecting the cultivation of the soil, and the theory and practice of economic animal nutrition—problems of world-wide importance.

It has been well said that nothing in the records of scientific research is more honourable to our country than the experiments which, with self-denying skill, you have, in conjunction with Dr. Gilbert, carried on and continue at Rothamsted.

These independent and continuous scientific operations, conducted under uniform conditions, are unique in the whole history of science. They have been carried on during fifty years at your sole cost, and their future continuance you have secured by munificent endowment.

As regards ultimate cultivation, without added or artificial enrichment, you have taught those concerned how to estimate the actual mean fertility of the earth's surface; and amongst other innumerable and invaluable lessons, be it especially remembered that in the composition of permanent pasture you have, to the practical advantage of the farmer, successfully employed readily available chemistry to modify at pleasure the entire character of the vegetation.

Good and true work is usually abundantly prolific; and the Rothamsted example has already led, in various directions, to the formation of lesser experimental stations, and, notably, the Royal Agricultural Society owes to your immediate advice, precept, and example, much of such success as may have attended the experimental station established at Woburn.

As a member of the Council during a period of forty-five years, the Society has benefited by your active co-operation. You have frequently been applied to for special advice and assistance, and, in response, you invariably rendered services to the Society which have been simply invaluable; and, further, you have, in conjunction with Dr. Gilbert, contributed to the Journal of the Society a series of scientific papers, which papers alone would render the Journal famous.

In an age of science, a period of active evolution, Time, without doubt, will, in an ever-increasing ratio, cause your fructifying labours, and recorded experience, to be more and more realised and appreciated. The Society hopes that Providence may long spare you to continue your beneficent labours; and for all you have done for Agriculture and for the cognate sciences, and for the cultivators of the soil, the Royal Agricultural Society offers you very hearty acknowledgments and most grateful thanks.

Signed on behalf of the Council,

DEVONSHIRE, *President.*

July 26, 1893.

Addresses were presented also from the Royal Society; the Chemical Society; the Linnean Society; the Royal Agricultural College, Cirencester; the Société Nationale d'Agriculture de France; and the Association of Agricultural Experiment Stations in the German Empire. Presentations were simultaneously made to Dr. Gilbert, who very shortly afterwards received the honour of knighthood.

In his successful efforts to wrest from the soil its secrets, Sir John Lawes established facts which were unknown—undreamt of, even—in the pre-Victorian days, when he first began his experimental inquiries. Many of the truths that he discovered have now become incorporated with the stock of common knowledge, and have benefited the agricultural practice of all progressive countries. He worked, indeed, for mankind, and, happily for the results, he was actuated throughout by an unswerving purpose. The fame of the Rothamsted Station is world-wide, and visitors from beyond the seas were always impressed by the charming old Manor-house, so beautifully set among its sylvan surroundings—a fit type of the “homes of England.” They invariably carried away, moreover,—as did all who visited the station,—agreeable recollections of the goodness of heart and the courtesy of the great yet unassuming man whose remains were laid to rest, amid every sign of sorrow and respect, at the Parish Church, Harpenden, on Tuesday, September 4. Of him it might well have been written—

“Thou shalt come to thy grave in a full age, like as a shock of corn cometh in in his season.”

W. FREAM.

Downton, Wilts.

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