

the Agronomist

The BASF magazine for the progressive farmer

EDITOR'S COMMENT

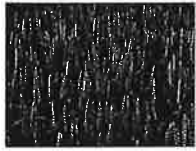
It has been widely assumed that low input, extensive farming is more benign in an environmental context than higher input, more intensive farming systems.

A key article in this issue challenges this assumption. The author gives a quantitative calculation of the balance of inputs and outputs for a total agricultural area, including land which can be released from crop production by a relatively intensive approach. In doing this, account is taken of the total energy balance and gaseous and leachate emissions resulting from the alternative strategies.

I believe you will find the conclusions of the article 'How high should low intensity be on the agenda' present fresh and stimulating views on the current debate surrounding this important topic.

John Walker

IN THIS ISSUE

Helping farmers	2
A view from Sweden	4
 Low input, low output farming may not be better for the environment.	
Potato production in the 1990's	6
Barren brome	8
How to be a safe spray operator	11
Arable Farming – Planning for Profit	12
Flexible management holds key to arable profits	
Working for the benefit of fruit growers	15
UK research is helping home-grown fruit to compete with imports	

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Helping farmers to help themselves



The Manor at Rothamsted. Lawes had the best bedroom set up as a laboratory, much to his mother's disgust.

Rothamsted has gained international prominence as a centre of research excellence. The station, which celebrates its 150th anniversary this year, was founded on 1 June 1843, when John Bennet Lawes and Joseph Henry Gilbert began their 57-year partnership in experimentation.

Rothamsted is a Saxon place name and there has been a manor on the site since at least the 13th century.

Dr. Tom Addiscott traces the development of Rothamsted as a research station and sheds some light on the characters of its founders.

John Bennet Lawes was a rare blend of entrepreneur, scientist and idealist. He inherited the Rothamsted Estate when he was eight years old. During his education he acquired an interest in chemistry, which he applied to the problems of improving crop production on his farm.

By his early 20's he was experimenting with the manufacture of calomel – mercurous chloride – and corrosive sublimate – mercuric chloride. He recorded, in an account of his early years, that: "it was about the year 1837," (when he was 23), "that I commenced a few experiments upon the actions of chemical salts on the growth of plants. Shortly after that I began to manufacture chemical products for the use of agriculture. To these occupations," he

added, "a great proportion of my time has been devoted."

Joseph Henry Gilbert was the perfect foil to Lawes. He was a patient, meticulous and highly trained chemist, who provided the rigour that transmuted Lawes's flair into soundly based, scientific field experiments.

Scientific base

Together they formed a partnership that has not been surpassed in influence throughout the history of agricultural science.

Lawes was also a farmer and throughout his long life the welfare of the farming community remained close to his heart.

He noted in the personal record quoted earlier that (in 1834) "farmers were suffering from the abundance of the crops and wheat, although rigidly protected, was very low in price."

Later on he was to say in a lecture that they were to: "farm more scientifically, to meet lower prices by increased production, or put a stop to music in (their) family circle."

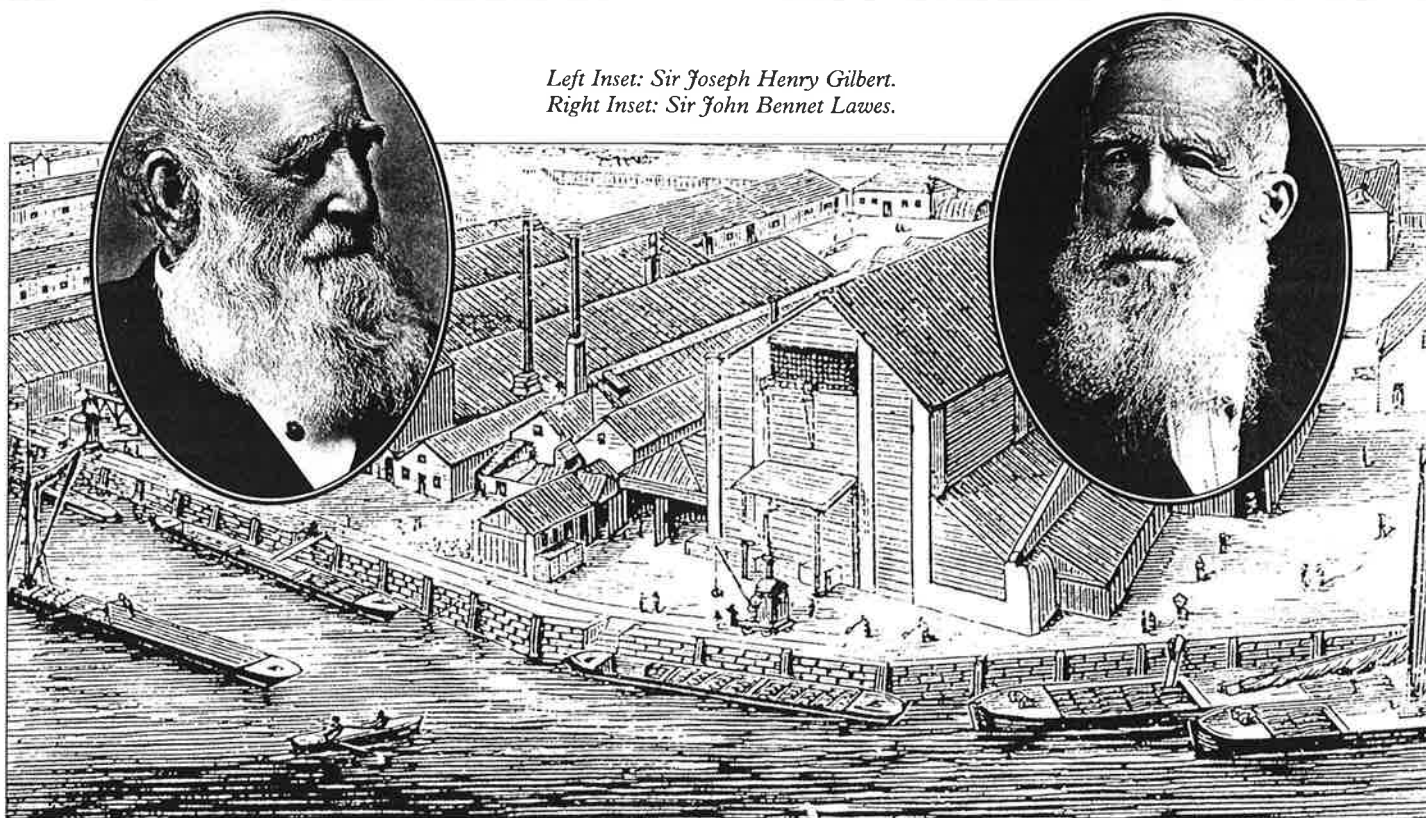
He provided the means for the first two by continuing his manufacture of fertilisers, particularly superphosphate, and through the priceless information on crop nutrition that he and Gilbert provided farmers from their field experiments.

Elder statesman

Lawes soon saw that nitrogen was the nutrient that most influenced the yield of the majority of crops and, being a man of principle, he made this clear to farmers despite the fact that he made most of his money from superphosphate. When he sold his fertiliser business in 1872 for £300,000, Lawes assigned £100,000 to a trust for the continuation of the experiments.

His interest in agricultural problems was, however, unabated and he remained an

Left Inset: Sir Joseph Henry Gilbert.
Right Inset: Sir John Bennet Lawes.



The Deptford fertiliser factory. Lawes spent his honeymoon cruising the Thames looking for suitable sites.

elder statesman to the farming community, providing both practical and scientific guidance.

His remarkable foresight continued too. It was during the 1870's that Lawes and Gilbert began measuring losses of nitrate from arable soils, a good 100 years before the emergence of the 'nitrate problem', on which the measurements they initiated cast considerable light.

Heritage

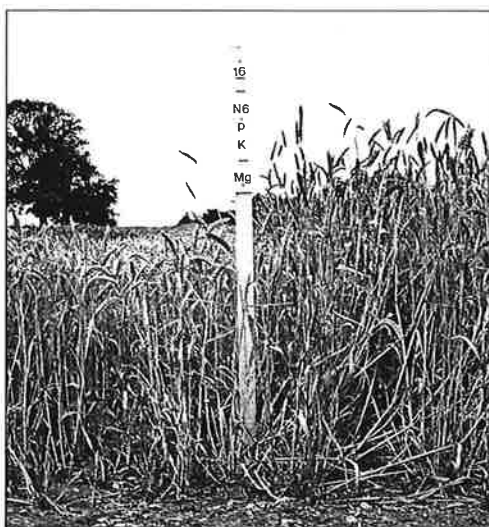
Though proud of its heritage, today's Rothamsted has changed in many ways. It has more land, because a neighbouring farm was acquired in 1968. And despite the cuts of the 1980's, many more scientists work here on a vastly extended range of topics. Many of the experiments were undreamt of when Lawes and Gilbert were at their peak.

Molecular biology, for example, was not invented until the 1950's. The equipment used now would have astonished our predecessors. There were of course few tractors until about 20 years after Lawes and Gilbert died, and certainly no combine harvesters: horses were all-important.

Nutrient analyses had to be done by wet chemistry. Our inductively-coupled plasma spectroscopy capable of the simultaneous analysis of 20-plus elements would surely have been beyond the wildest dreams of Gilbert's analysts.

Both crops and varieties have changed. When Squarehead's Master, the winter wheat variety grown on Broadbalk most years between 1900 and 1916, was re-introduced on part of that field a few years ago, it looked enormously tall by comparison with modern, short strawed varieties and was also much redder in colour.

And what about the problems: are they still the same? Like our illustrious prede-



Then and now. Squarehead's Master (right) and Brimstone on Broadbalk in 1989. The post is about 4 feet tall. Squarehead's Master was previously grown most of the years between 1900 and 1916.

cessors, we are still concerned to help farmers make the best use of the fertiliser applied to their crops. But motives and methods have both changed.

Motives

The environmental implications of farming have changed the motives, while the advent of computer modelling has brought a new dimension to the methods. Although cereal production has become the wrong sort of problem under the CAP, there are still crops such as grain legumes for animal feed where we shall be doing our best to help farmers to increase production.

Some of the other problems on which we work – resistance of weeds to herbicides for

example, or variations in the quality and yield of oilseed rape – would have been distinctly novel to Lawes and Gilbert. Some pest and disease problems would have been more familiar, but the means of control a great advance.

The development of the various synthetic pyrethroids was very much in the Lawesian tradition of practical, effective help to the farmer. The same goes for more recent efforts in pest and disease prediction. As for our work on set-aside.... I would be fascinated to know what Lawes would have made of both the politics and the resulting problems. But I am sure that his main reaction would have been one of concern for the welfare of the countryside and farmers.

Foresight

Although Lawes and Gilbert were much concerned with the practical problems of the working farmer, some of their greatest contributions to both farming and science sprang from their foresight.

They were the first masters of strategic research. Here too we seek to follow in their footsteps in building up fundamental scientific knowledge. Our research covers soil and plant processes, the molecular basis of plant disease, population dynamics of invertebrates, the biology and ecology of pests and many other topics.

Here we do not necessarily seek to answer just the questions of today's farmers. Basic research is a long-term commitment and, unless these topics are addressed now, the next generation of farming problems will prove even more intractable than some of those we face today. □

Dr Tom Addiscott has worked at Rothamsted for the past 26 years. Before that he worked for the fertiliser company founded by Lawes.