

1862 Preface to Agricultural Chemistry

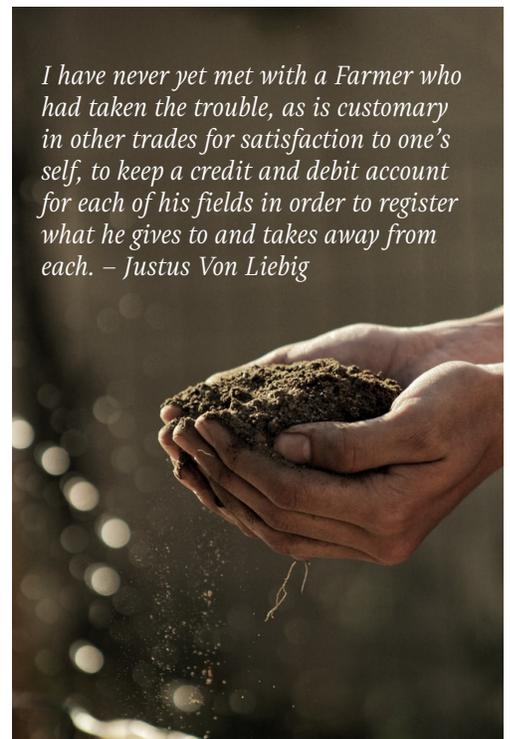
[And the Roots of the Robbery Economy Inherent in Capitalism]

Justus Von Liebig

In 1862, Justus von Liebig published the seventh edition of his Organic Chemistry in its Application to Agriculture and Physiology, more commonly known as Agricultural Chemistry. It was standard for Liebig's work to be immediately translated into English. However, the first volume of the 1862 edition of Agricultural Chemistry, particularly its long and incendiary introduction, included an extensive critique of British high farming. Liebig's English publisher, Walton, declared it "libelous" and destroyed his copy. Hence, the complete work was never published in English.

However, in 1863, the second volume was translated by the Irish scientist John Blyth as *The Natural Laws of Husbandry* and published by Appleton in New York. That book included the preface to the 1862 edition, but in an abridged and subdued form, with Liebig's references to the "robbery economy" and "Rob-Culture" (or "robbery culture") missing or presented in Aesopian terms.

Nevertheless, an English translation of both Liebig's preface and introduction had been completed in January 1863 by Maria Gilbert, the wife of Joseph Henry Gilbert, one of Britain's leading agricultural chemists—a former pupil of Liebig, and director of the agricultural experiment station at Rothamsted. Maria Gilbert's translation, written in her elegant longhand, is held in the archives of the Rothamsted Experiment Station (now Rothamsted Research). What follows is Maria Gilbert's complete translation of the 1862 preface, transcribed by André Toshio Villela Iamamoto. Brackets indicate text introduced by the editors for clarity. We publish it here with the



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permission of Liz Allsop, head librarian at Rothamsted Research, who helped with various inquiries. Fred Magdoff also played a key role in making this possible.

In the mid-nineteenth century, English agriculture was dominated by a system of large landowners receiving prodigious rents from numerous tenant farmers, each of whom usually worked less than fifty acres of land. Many of these tenants, while incorporating forms of crop rotation, were practical farmers, working out of tradition or following earlier practical guides to English husbandry as handed down by Sir Humphry Davy and others, and were reluctant to embrace scientific agricultural chemistry as it had developed by the mid-nineteenth century. Nevertheless, more and more agriculture was coming to be dominated by large landowners, who guided the operations. British agriculture was becoming increasingly intensive, importing large amounts of fertiliser and emphasising the maximum commercial output. This system of high farming was, in Liebig's terms, an advanced "robbery economy." All these concerns are thus reflected in his preface, designed to highlight the reasons for the polemic in his introduction and much of the rest of the work.

Liebig had been writing of the robbery economy since the late 1850s, notably in his *Letters on Modern Agriculture* (1859). Concerns over English-style commercial and industrial agriculture and its extraction of fertiliser resources (bones, guano) from the rest of the world had increasingly

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come to dominate his thinking. As he notes in the preface, he had been "reproached on many sides for describing modern Agriculture as a system of Plunder/Robbery." An example of such criticisms was the New York magazine *The Cultivator*, which in its January 1860 issue sharply criticised Liebig's notion of a

"robbery system," declaring rather that "the soil is given to man to use. The materials from which it is made exist certainly in inexhaustible quantity, and for the most part the soil is inexhaustible." It was in the face of such resistance that Liebig placed renewed emphasis on the growing problem of the robbery of the soil and the constant need for its replenishment through nutrient recycling. This is now understood as one of the great early developments in modern ecology, leading to the development of contemporary theories of soil metabolism.

—John Bellamy Foster

In the sixteen years which have elapsed since the publication of my "Chemistry applied to Agriculture and Physiology" I have had abundant opportunity of estimating the impediments which stand in the way of scientific doctrines passing into the domain of practical Agriculture.

The reason of which is, especially, that no connexion was formed between Practice and Science.

Agriculturists have apparently had a common prejudice that less [intellectual] cultivation may suffice for their industry than for any other, so that reflection may endanger the practical ability of an Agriculturist if he appropriates to himself what Science may have won for his improvement and placed at his disposal; what they were able to comprehend was considered as Theory, which as the exact opposite of Practice, was little esteemed or not noticed. It was a fact that scientific doctrine or Theory frequently brought only injury to the practical man as soon as he turned his attention to it; what he attempted was often enough quite wrong: he knew not that its right application did not depend on itself, and that it had to be learnt in the same way as the dexterous management of a complex instrument.

No one will consider it a matter of indifference whether the ideas which influence a man and determine his actions are true or false.

By this want of all intelligence, Practice saw no means of improvement in all the correct ideas which Science gave into her hand, in the elucidation of the growth of Plants and of the share in it belonging to soil and air, to tillage and manuring; while Agriculturists were unable to find out the connexion between scientific teaching and the Phenomena which their industry presented to them, they from their stand-point, arrived at the conclusion that generally no connexion existed between the two.

The practical farmer allows himself to be guided by certain facts observed, during a long period, in his neighbourhood, or, if he aspires to more general views, by certain authorities whose system of management is considered a pattern. No words could prove this system, no scale exists to measure it.

What Thaer found to be good and useful upon his fields in Möglin, is considered equally good and useful for all German fields, and the facts ascertained by Lawes upon a quite small strip of field in Rothamsted, are regarded as axioms for all English fields.

Under the dominion of Tradition and Faith in Authority the practical man has renounced the power of rightly comprehending the facts which come daily under his notice, and at length he is unable to discriminate them from mere opinions. And so it has come to pass, that when Science has doubted the Truth of her explanations they have affirmed that Science has disputed the existence of facts. If the former says that it may be desirable to supply the deficiency of stable manure by its operative constituents, or that superphosphate of lime may be no specific manure for roots, and Ammonia no specific manure for corn-plants, they have supposed that Science has denied their efficacy.

About misunderstandings of this kind there has been a long warfare; the practical man has not comprehended scientific conclusions and has believed himself obliged to defend his traditional notions; his dispute was not with scientific principles which he did not at all understand, but was with his own mis-conceptions of them.

Before this quarrel is settled, and Agriculturists themselves become the arbitrators in it, little real help can be expected from Science, and I much doubt whether that time is yet come. However, I fix my hopes upon the young generation, who start in Practice with an entirely different preparation from that of their fathers. As far as I am concerned, I have attained that age when the elements of the dying body betray a certain longing to begin a new career, when one thinks of setting his house in order, and when one dare not keep back what one has still to say.

Since every experiment in Agriculture endures a year or more before its full results are given, so there remains scarcely any prospect that I shall live to see the results of my teaching. Under these circumstances the best that I can do seems to be so to arrange them, that for the future it will be impossible for those to misunderstand them, who take the trouble to thoroughly acquaint themselves with them. From this point of view must the polemical parts of my book be judged. For a long time I believed that in Agriculture, as is customary in Science, it was sufficient to teach Truth in order to diffuse it and not to trouble oneself about Error. At length, however, I perceive that this has been a false way, and that the altars of lies must be destroyed before Truth can obtain secure ground. Everyone will concede to me the right of purifying my teaching from the defilements which, for so many years, have, without discernment, been heaped upon it.

I have been reproached on many sides for describing modern Agriculture as a system of Plunder/Robbery (Raubwirtschaft), and after the communications which many Farmers have made to me respecting their management, my charge against such [individual farmers] cannot be maintained. I have been assured that in North Germany, in the Kingdom of Saxony, Hanover, Brunswick, etc., very many Farmers most carefully give very much more to their fields, than they take from them, so that in their case we cannot speak of a "Rob-Culture." But taken as a whole, it is relatively only the few who know how it is with their fields.

I have never yet met with a Farmer who had taken the trouble, as is customary in other trades for satisfaction to one's self, to keep a credit and debit account for each of his fields in order to register what he gives to and takes away from each.

It is an old inherited disease with Farmers for each to judge Agriculture in the whole from his own narrow standpoint, and if one avoids doing wrong, it is a sufficient proof to him that all do right.

The enormous exportation of bones from Germany is a matter-of-fact proof how small, generally, is the number of Agriculturists who trouble themselves about the requisite compensation of phosphates, and if only one small manufactory in Bavaria (Henfeld) exports into Saxony about 1 ½ million pounds of bones from the neighbourhood of Munich, it can only be done by robbing the Bavarian land.

The great plunders the small, the learned the ignorant, and this will always be.

But also the future history of the German beetroot sugar manufacture, may perhaps still prove to many of our contemporaries that in many parts of north Germany a mischievous robbery of the land is perpetrated.

By the application of Superphosphate of Lime and Guano very large crops of roots for sugar have been obtained, and as

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this has continued already for many years without diminishing Harvests, the root-planters believe in their unintelligent minds that these good crops will always be got, in the face of the fact that by this management the potass in their field is always being withdrawn, and must at length be exhausted.¹ Potass, they say, may be a much too costly a manure, and as, for its price, they are able to purchase from three to four times more superphosphate and guano, they

believe that by this addition they do better for their land. Certainly they do not know how high the price of the potass in the stable manure is with which they try to compensate for it [the lost nutrient].

Nothing can be more certain than that they deceive themselves in their supposition and that in the molasses and refinery charcoal they export the most important matter of sugar production and herewith their fields.² They will find by experience, perhaps in ten years, as is incontestably the case already in France and Bohemia, that by this method after a certain time, not gradually but suddenly, the sugar contents of the roots from 11 and 10 percent, will sink down to 4 and

¹ ↪ "Potass" is an archaic spelling of "potash."

² ↪ Liz Allsopp notes: "*Schlempkohle*—a by-product of sugarbeet refinery used for the manufacture of potash. The sentence is obscure (to me!) in the original German and from the crossing out I assume that Maria Gilbert found it a problem too. I think the general meaning is that the nutrients in these by-products are essential for sugar production and that by 'exporting' them farmers risk reducing the fertility of their fields."

3 percent, and that superphosphate and guano will no longer be able to increase the produce of those same fields which formerly yielded such large crops of sugar.

And thus, two generations hence, those countries in which sugar culture is flourishing now according to this system, will be cited as instances of what the foolishness of man could do in an industry which, according to its nature, can continue for ever on the same land without exhausting it.

In England exactly similar practice has been followed. In all turnip fields from which the roots have been taken without compensating (restoring) the potass, an equal deterioration of their quality has resulted, and only in those places where the roots have been fed off by sheep upon the field itself, thus restoring the potass-contents, have the crops remained unaltered in quantity and quality.

In the first volume of this work the section contained in the earlier editions on “the chemistry of fermentation, decomposition and putrefaction” has been excluded, not being immediately connected with Agriculture. By the comprehensive and important works of Pasteur, Berthelot, H. Schroeder and others, our knowledge of the processes of fermentation and putrefaction has, since 1846, been very essentially enlarged, so that I consider it suitable to devote a separate work to the subject, on which I am now engaged.

Munich. Sept. 1862

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- ❖ **About the author: Justus Von Liebig** was born on May 12th, 1803 in Darmstadt, Grand Duchy of Hesse. He made important contributions to organic chemistry, analytical chemistry, agricultural chemistry, nutritional science, and physiology. In addition, Liebig innovated chemistry education by lecturing and advised his students directly in the labs, and his lab at University of Giessen attracted many students from Germany and other countries. Liebig had been writing of the robbery economy since the late 1850s and regarded intensive agriculture systems as an advanced “robbery economy.” On April 18th, 1873, Liebig died in Munich, Germany at age of 69.
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