LIEBIG'S INFLUENCE UPON AGRICULTURE

A few facts in Liebig's life may conduce to a better understanding of his great work for agriculture and agricultural chemistry. He was born in 1803. In his early days so deficient was he in memory that he was deemed stupid. On one occasion the rector of his school berated him for his ignorance, telling him that he was the despair of his teachers and the heaviness of his parents, and winding up by asking, "What will become of you?" Liebig, who was even then fairly read in science and given to experimenting, answered, amid a burst of derisive laughter, "I shall be a chemist." In spite of the fact that at that time students did not look upon chemistry as furnishing a field broad enough for a man to devote his life to it, he never wavered in his selection of his specialty. It surprises one to recall that Germany, now the home of palatial chemical laboratories and the center of chemical research, did not in 1820 have a single laboratory open to students. To prosecute his chemical studies Liebig went to France, but found it very difficult to get into a laboratory there. Finally, by Humboldt's aid, he was installed in the great Gay-Lussac's laboratory. There he made his first important discovery, that of isomerism. His impetuous master, in his delight at the discovery, whirled him in a wild waltz all over the laboratory.

Through Humboldt's nomination he was elected professor of chemistry in the small German university of Giessen. There, after difficulties, he opened a laboratory for students, with the aim of being to young German students of chemistry what Gay-Lussac had been to him. His was the first public laboratory for the teaching of practical chemistry ever opened in Germany. For twenty-eight years at this little university he carried on original research and from dawn to dark taught men who were to carry his methods and his spirit and his success all over the earth. In 1852 he was called to Munich, and died there in 1873. "Liebig," says Shenstone, "was essentially a pioneer in science. In the course of his life he took the lead in no less than four great departures. The first was in organic chemistry; the second and third in the application of chemistry to agriculture and to physiology; the fourth was the outcome of his labors as a teacher."

Space will allow me to touch only upon his founding of the science of agriculture and his contributions to agricultural chemistry.

"The subject was worthy of the worker," but when he began there was no such thing as a science of agriculture, and most of the farmers were ignorant, badly educated and slaves of tradition. Liebig sought to correct this state of affairs. He saw then what everybody sees now, that you must revolutionize the man on the farm before you can revolutionize the farm. How to do this, how to educate the farmer into a man of science so that he shall face the great problems of agriculture with an open mind, and himself co-operate in attempting to solve them, was then, as now, the great question in technical education. Liebig's answer to this question still challenges the thought of the world. His idea was that the farmer must first be trained in pure and exact science, and secondly in practical experimentation. "Perfect agriculture," says he in his first book on the subject, "is the true foundation of all trade and industry; it is the foundation of the riches of states. But a rational system of agriculture cannot be formed without the application of scientific principles, for such a system must be based on an exact acquaintance with the means of nutrition of vegetables, and with the influence of soils and actions of manure upon them."

Then with a foundation laid the farmer must next be an experimenter and thinker on his own account. In the preface of his "Natural Laws of Husbandry" Liebig called attention to the fact that no progress could be made so long as agriculturists continued to be guided merely by the facts observed in their own neighborhood or at most by the system of some recognized authority. He says again: "If farmers would only make up their minds to acquire by experiments on a small scale an accurate knowledge of the productive power of their land for certain kinds or classes of plants, a few more experiments would readily enable them to discover what nutritive substances the land contains in minimum proportion and what manuring agents ought to be applied to ensure a maximum crop." Then he continues: "In matters of this kind the farmer must pursue his own course;" do his own experimenting.

To carry out some experiments in fertilization that he had planned and incidentally to blaze the way for the farmers, he bought at Giessen ten acres of the poorest land in Germany. The field was so poor that the whole ten acres would not raise enough fodder for one sheep. By a system of mineral manures, as he called them, he sought to make this poverty flat fertile. It was divided into plats, and every sort of experiment in fertilization of different crops was tried. In a few years he had brought the land to such a degree of fertility that his old gardener writes to a friend, "If you could see it you would be astonished; it is truly wonderful."

FIRST EXPERIMENT STATION.

This was the first agricultural experiment station ever started on scientific principles and for scientific demonstration. It was the precursor of all the schools and all the experiment stations that are now doing so much to make agriculture a science as well as an art. When the results from this station were published, so clearly did Germany see that this was the way to teach agriculture that in a few years the German empire, says Dr. Shenstone, "possessed above one hundred high schools, middle schools and lower schools, with a full provision of experimental stations attached to them, besides more than a thousand others where the principles of agriculture were taught to all classes." Then our American government saw the great possibilities in these stations, and by the Hatch act established one in every State in our Union. Their influence on agriculture has been tremendous, and if Liebig had done nothing else but this for agriculture, he would deserve immortality.

Not only did Liebig start the experiment stations, but he started the movement to reach the people with the acquired information. Both the farmers' institute, the plan by which the agricultural college seeks to reach the people, and the university extension movement, the plan by which the universities try to elevate the masses, owe their initial impulse to our chemist. He endeavored to bring the learning accumulated in the university to the people at large in two ways—first, by his letters on chemistry; secondly, by bringing to the university selected persons from the provinces to attend his course of lectures, in order that on returning they might carry a little knowledge and some interest back with them to the province, and maybe sow the seed which would produce greater things afterward. He did this by inducing the government to pay the expenses of the visitors.

HUMUS THEORY.

Liebig's first great contribution to the pure science of agriculture was his demolition of the humus theory of plant food. At the date of his investigation it was almost universally believed that humus or the vegetable mold occurring on the surface of virgin soils was the source of the fertility of these soils. By an extension of this idea vegetable physiologists taught that this humus was the source of plant food, and that plants by their roots extracted it from the ground. As long as this theory was believed, there could be no proper feeding of plants.

By a few experiments and many analyses, and by some clear thinking, Liebig demonstrated the untenability of the theory, clinching his argument by pointing out that since it is admitted that humus is produced only by the decay of plants, so primitive humus cannot have existed, for the first plants must have preceded the humus.

But Liebig's mind was not one to be content with the mere overthrow of a theory; he was bound to answer the question, where did the plants get their carbon? After a masterful investigation and some beautiful inductions he announced the conclusion, now generally accepted, that plants have the power of absorbing their carbon from the carbonic acid gas of the air, and that the amount of carbon in the atmosphere is kept constant by the withdrawal of the excess by the plants. This is very elementary knowledge to us now, but it was threading labyrinths in Liebig's day.

His next important work was the study of the mineral food of plants. It is refreshing to ordinary mortals to find that in his earlier studies on this subject Liebig made many mistakes, but in the end he led his farmer followers to the right conclusion, namely, that they must replenish their soil by replacing whatever minerals were withdrawn by their crops; if they did not, soil exhaustion would follow. "It appears evident," says he virtually, "that the chief work of the agriculturist, after keeping his soil in proper condition by tilling it, is to prevent loss of mineral matter, or, when that is inevitable, to restore the fertility of the soil by adding what is required." By his demonstration of what is required to keep up this fertility Liebig taught the world how to feed crops. The great growth of commercial fertilizers now made and used everywhere resulted from his teaching. The present, the rational way of nourishing plants is the direct result of his work in the field.

Time forbids an extended notice of all that this useful man did for agriculture. Most of his latter days were spent in attempts to bring about a practical application of chemical principles to soil cultivation. His studies in surface soils, in sub-soils, in rotation are among the most stimulating in recent years.

The rational agriculture that he taught, the system of agricultural practice that demands that everything which is taken from the land must go back in one form or another, is now the system followed by the thoughtful farmers of the world. Just as no man now thinks of drawing daily on a bank without putting in money to replace what is checked out, so no longer do intelligent men draw at liberty on their land.

The influence of Liebig's work cannot be measured solely by the new facts that he contributed, but ought to be judged by the stimulus that his great brain gave to a diligent study of scientific agriculture. He was the founder not only of a new school of farming, but he made farming a science. It has been said truly of him that we owe the existing machinery of agricutural research and teaching very largely indeed to the widespread interest he awakened in scientific husbandry. Every chemical laboratory for soil and plant analysis, every agricultural school or college, every agricultural experiment station, every scientific farm magazine, is a monument to the memory of the lasting work that Liebig did for the universal art.—I. O. Schaub in American Gardening.

M'GOVERN A CLEVER JOCKEY

Terry McGovern, the little fistic wonder, has made the name of the McGovern forever great by his marvelous successes in the ring. It seems that his younger brother, "Sport McGovern," will eclipse even his brother's fame by successes on the turf.

EDUCATIONAL.

L. D. S. COLLEGE.

Salt Lake City—On Monday evening next, at the assembly rooms, Elder B. H. Roberts will deliver a lecture before the Y. L. M. I. A. on the "Translation of the Plates." The lecture begins at 8 o'clock.

We undertsand that certain members of the Zeta Gamma society of the University took offence because, last week in announcing a debate between that and our college society, the name appeared in small letters. These good people will, of course, be satisfied when they know that the thing was done with no bad intent nor with any desire to pass upon the merits of the respective debaters.

On Wednesday and Thursday the Logan college basket-ball team were the guests of our college. President Paul appointed a committee of twelve of our choice young ladies to care for them. On the former evening a banquet and ball contributed to their entertainment and on the latter evening our boys entertained them, we trust, right royally, with what result we have not heard.

The students who take speed work in typewriting have decorated very beautifully the speed room with flowers and bunting. Hence, and also because these are they who write all the way from 85 to 120 words per minute, this room has been very attractive to our visitors lately. Besides, Mr. Funk entertains no scruples about letting anyone that so wishes dictate to the class

On Thursday appeared one of the most creditable issues of the Gold and Blue, our college paper. "A Prisoner," an incident in the Philippines, is the opening selection—a well-written article by A. H. Derbyshire. "Methods of Psychological Study," is the title of an able paper by an annonymous contributor. Timely editorials, "classes," "locals," and "more or less funny," make up the rest of the paper.

James G. Duffin, president of the Northwestern States mission, was a visitor at the college last Thursday, and spoke to us at devotional exercises. Many others from the colleges at Logan and Provo, have been visitors to the college this week.

BRANCH NORMAL.

April 4.—Considering that the greater number of our students come from farming communities, the attendance is holding out remarkably well. Very few have thus far discontinued.

The entertainment on Saturday evening was quite successful. A good sum was realized by the athletic association. This organization plans giving a series of entertainments in the near future.

The field day exercises on Friday afternoon proved very interesting. Considerable interest in the events was exhibited by the students, the larger portion of them being present to witness the contests. As the events were purely competative, no records were kept. One thing, however, was clearly shown; should any contest be carried on with other schools there will be some who will be able to give a very fair account of themselves.

Not a little surprise was felt by the members of the athletic association here on receiving Saturday a formal proposition from Secretary Sheley of the University Athletic association, for a meet between the University track team and Branch Normal track team. The proposition, it does not seem to have been sent as a challenge and is not so regarded here, provides for a trip to Cedar City by the University athletes this year, and a visit to the University by the Branch Normal team next year. The boys here have formed themselves into a ways and means committee, and if they find that the money necessary to cover expenses can be raised, the offer will doubtless be accepted. The prospect is already a subject for much discussion among students and citizens. While the athletes here are "few and far between," they say they will do their best to make the affair pleasant and interesting to the visitors.

BEAVER BRANCH.

Beaver Branch, April 3.—Last Friday evening the Polysophical Society was entertained by the Geology class,

The different classes will contest with one another on Field's Day," the 4th of May. If all is well it will no doubt be a gala day. Next Friday evening the school will give an entertainment in the Concert hall consisting of a tastily arranged program and a lunch, which we suppose will also be tasty. The occasion is going to be "A Funny Time."

There is quite a lot of sickness here now, but we hope that this discouraging cloud which now hangs over our institution, will soon be raised and all will go on in bright sunshine again.

The students and teachers have planned to go in the hills for an "Eastering" next Saturday and a happy time is looked forward to.

GREATNESS.

"Some are born to Greatness."

"Some Achieve Greatness.

"Some have Greatness Thrust upon them."

HANDY ALL AROUND.

1. Mail Carrier (collecting mail)—Oh! yes, Jones, the bicycle makes my work very easy.

2. Nicest thing in the world to collect the mail with.

3. Jones (as the collision occurs)—Yes, indeed—

4, and it seems to be kind of a handy thing to distribute mail with, too!