LEIBIG'S AGRICULTURAL CHEMISTRY

From the (Halifax N. S.) Colonial Farmer.

No person hitherto appears to have discovered in what manner Gypsum operates as manure It is well known that upon some soils a spoonful in a hill of corn will increase the crop at least one third, while near the sea it has no visible effect Leibig, whose works on Agricultural Chemistry and Physiology are at present egaging considerable attention, thinks that it attracts and decomposes the Carbonate of Ammonia which falls in rain water, thus forming soluble Sulphate of Ammonia and Carbonate of Lime Mr Partridge, a Chemist at New York, has denied the possibility of such a combination at a common temperature; and Dr. Bond, of Yarmouth, has also stated that no decomposition would follow if Gypsum were added to Carbonate of Ammonia, but that if Sulphate of Ammonia and Limestone were brought in contact, Gypsum and Carbonate of Ammonia would be formed; and the Doctor is supported in his reasonings by all the Tables of Chemical affinity which we have seen. We are not, however, prepared to say that Leibig is certainly in error as we know from experiance that the relative attractions of certain substances differ cosiderably at different temperatures, but in his works we find many paradoxical assertions, so intermixed with demonstrated facts, that the person who has no knowledge of Chemistry would, we think, be liable to go astray if he took Leibig for a guide, notwithstanding the great quantity of real Chemical knowledge he possesses. A Chemical work, to be useful to the farmer, should teach what has been discovered, rather than what has been conjectured We think the following extracts from a sensible Agricultural Chemist much to the purpose:—"The farmer is too anxious that the Chemist should at once shew him what can be done to *improve the present state* of agriculture, and cannot well understand why Chemists are not *at least* as far advanced as he is on the road to improvement. It is evident very little reflection is necessary to point out the incorrectness of such a conclusion. It is calculated that two hundred millions of individuals spend their daily toil in the practice of agriculture, and that this state of things has continued for thousands of years; whereas, as regards the science of agriculture, it has never yet occupied *exclusively* the attention of even twenty individuals in the whole civilized world, and even there during scarcely more than the present century. How then is it possible that a science so recent and so sparingly cultivated, should be capable at once to keep pace with a practice the most ancient, and the most extensively pursued, of all the varied arts with which man is acquainted?

"I have noticed with regret, that almost all the popular works hitherto written upon agricultural science, have fallen into one common error of endeavouring to make a Chemist of the practical farmer: the authors all seem to think it necessary that in order to the improvement of agriculture, every farmer must study Chemistry. In this respect, however, I hold a totally different opinion It appears to me that it would be a precisely analogous case, if writers on climate had said, that in order to preserve health, it were absolutely necessary that every individual should study Medicine It is not an extended *knowledge* of Chemistry that is required—it is only a *confidence* in the results obtained by Chemists that is absolutely necessary. If the farmer becomes acquainted with the facts as they apply to his practice, and if he has such confidence in these facts, that he is willing to act in accordance to them, there is not the least necessity that he should occupy his time and burden his mind with all the abtruse processes of reasoning and experimental proof by which the Chemist has been enabled to trace out their connection with the complex phenomena which they serve to illustrate.

"I admit that it is requisite, in the first instance to enter just so far into chemical detail as to convince the farmer of its accuracy, but still I believe that this can in general be much better accomplished, by merely pointing out the connection which subsists between various phenomena, and their mutual dependence on each other, than by attempting to follow out, step by step, the chemical reasonings which form the ground work of these opinions." * * * If a person satisfies himself with *book knowledge* for his practice, and contents himself with sitting in his closet, and drawing up codes of agriculture according to his preconceived opinion of what is right, he will never be able to render any real service to the practical farmer. He may indeed, by his scientific investigations, throw such light upon some abtruse question as to be essential in guiding others, who understand both theory and practice, into the right path of enquiry; but still I feel confident that the farmer cannot be too cautious in receiving the advice of the *purely scientific*, of those who consider it essential to make *Chemists* of every farmer who comes to them for advice: by those he may frequently be misled, but seldom will he be essentially benefited The man of science who would devote himself to the improvement of agriculture must himself become acquainted with all the minutiæ of practice"—Dr. Henry H. Madden, "On the state the the soil should be in, when the seed is deposited in it;" Published in the 58th Number of the Quarterly Journal of Agriculture *

"The opinion that the substance called *humus* is extracted from the soil by the roots of plants, and that the Carbon entering into its composition serves, in some form or other, to nourish their tissues, is considered by many so firmly established that any new argument in its favour has been deemed unnecessary; the obvious difference in the growth of plants according to the known abundance or scarcity of *humus* in the soil, seemed to afford incontestible proof of its correctness. Yet this position, when submitted to a strict examination, is found to be untenable, and it becomes evident from most conclusive proofs, that *humus*, in the form in which it exists in the soil, does not yield the smallest nourishment to plants.

"The facts which we have stated in the preceding pages prove that the Carbon of plants must be derived exclusively from the atmosphere."—*Leibig's Agricultural Chemistry.*

Notwithstanding all these "facts" adduced, we still believe that the plants which we cultivate derive most of their nutriment from the mould of *humus*. We know that houseleek, and some kinds of Cactus, (Prickly Pear,) and also many Lichens draw most of their food from air and water, and we are convinced that every plant which we cultivate derives a part (but we think the smallest part) of its nutriment from the same sources. We have often seen new land which had a proportion of mould, cultivated without manure, the mould and the fertility of the soil constantly decreasing, till at the end of ten years no mould could be seen, and the land was no longer worth cultivating Of this *humus* or mould it should be observed there are endless variations, from the peat and coarse turf produced by the decay of the productions of the most barren soils, to the fine soapy moulds formed from the plants which grow on the richest. When the farmer finds a very thick layer of this last on his new land, he expects that it will produce large crops for a long time, nor is he ever disappointed in his expectations.

Among the "facts" adduced, we find some very problematical assertions. "Let us now enquire whence the grass in the meadow, or the wood in the forest, receives its Carbon, since there is no manure—no Carbon has been given it for nourishment? and how it happens, that the soil thus exhausted, instead of becoming poorer becomes every year richer in this element? A certain quantity of Carbon is taken every year from the forest or meadow in the form of wood or hay, and in spite of this, the quantity of Carbon in the soil augments; it becomes richer in humus."—*Leibig*

The Chemist is here in error,—his "facts" are not as he has stated; a natural meadow which has never been mowed or grazed, but on which all the grass falls and decays, holds its own, and in some cases improves, but when it is mowed and the hay removed from it, it has in every instance that we have seen, grown poorer, except it was annually flowed by water, which brought a considerable portion of alluvial soil upon it Mowing soon destroys the blue joint grass, which is replaced by a much inferior sedge, and on many meadows constant mowing reduces the sedge, so much that it is found best to allow the grass to rot on the ground every alternate year. The soil also in the old forest, which has never been disturbed by the axe, is found to be more fertile than on tracts where part of the wood has been carried away for a considerable number of years. "It is not denied that manure exercises an influence upon the developement of plants; but it may be affirmed with positive certainty, that it neither serves for the production of Carbon, nor has any influence upon it, because we find that the quantity of Carbon produced by manured lands is not greater than that yielded by lands that are not manured."—*Leibig.* Every farmer knows that manure will greatly increase a crop of hay, and consequently the quantity of Carbon. "2755 lbs of hay contain 1111lb. of Carbon."

"It is universally admitted that humus arises from the decay of plants. No primitive humus, therefore, can have existed—for plants must have preceded the humus.—*Leibig.*

Where is the proof? Is it more difficult to create humus than plants?

"Large forests are often found growing in the soils absolutely destitute of carbonaceous matter."

We have spent years in "forests," but have always found the poor soils covered with turf, and the rich with fine mould. In seeming contradiction to these assertions, Leibig states that when plants first begin to grow, they are nourished by carbonic acid gas formed from the union of a portion of the mould with the oxygen of the air. After the leaves are grown, he thinks that plants take all their food from the atmosphere. Agricultural Chemistry is a new science, and the most that has been published upon it, has been written by men who had very little knowledge of practical farming. It is not strange, that in this stage of the science, opinions should be advanced that will be hereafter abandoned as more knowledge is acquired. We would wish that Dr. Bond, or some other person would ascertain by experiment, whether Carbonate of Ammonia can be decomposed by Gypsum at a common temperature. Leibig says that it is slowly effected, but he repeats it with such confidence, that he ought to have more than conjecture for it. Any cheap material to mix with heaps of manure that would prevent the escape of Ammonia would be useful.

*Some virgin soils, such as those of America, contain vegetable matter in large proportion; and as these have been found eminently adapted for the cultivation of most plants, the organic matter contained in them has naturally been recognized as the cause of their fertility. To this matter the term "vegetable mould" or *humus*, has been applied. Indeed this peculiar substance appears to play such an important part in the phenomena of vegetation, that vegetable physiologists have been induced to ascribe the fertility of every soil to its presence It is believed by many, to be the principal nutriment of plants, and it is supposed to be extracted by them from the soil in which they grew.

To Preserve Beef and Hams.—Take 12 lbs. of common salt, 4 oz saltpetre, 1½ gallons molasses or 12 lbs. coarse sugar, and six gallons of water—mix intimately, and apply cold to one barrel of Beef or Hams.

How to be Rich.—The secret is not in earning but in saving. Almost any man can earn money, but few can keep it.—A small sum is disregarded, yet a large one is only several small ones united; unless little sums are laid together, how can there ever be a great one?

Suppose a person saves a cent a day—at the end of the year he has $3,65—at the end of 20 years he has about $100 including interest. How easy it is for a man to save a cent a day; how many can save 10 cents a day—or $36,50 a year—or about a thousand dollars in 20 years, including interest.

He who spends 7 cents a day upon some idle fancy—for instance in drink, cigars, fruit, &c.,—should at the same time reflect that he throws away the interest of a dollar for a year. Are there not often occasions in the course of a day, when a person spends 1 cent, 2 cents, or 3 cents, which he might avoid without feeling the worse for it? Then goes his ten cents a day—his one thousand dollars in 20 years—the very interest of which would afford him and his heirs a clear profit of $70 a year. Many grow rich by saving, but with little faculty for earning; some old men who have always lived well, are very rich from mere saving, who do not earn so much daily as their poor neighbors.—*N. Y. Farmer.*