

The Farm a Chemical Factory

Chemistry

By EDWIN E. SLOSSON

Every farm is a chemical factory and always has been. But it has never yet been brought under the control of the chemist, consequently it lacks flexibility in the adaptation of its products and it loses heavily from waste.

I venture as my first forecast that the farmer of the future will stop, to a large extent, raising field crops as such. He will raise raw materials. He will aim to produce carbohydrates, fatty acids, amino-acids and heterocyclic compounds, rather than raise sugar beets, cotton seed, beef and tobacco. He will employ whatever plants will give, in his locality, the largest yield at the lowest cost of the particular class of chemical compounds that are most in demand at the time.

The farmer of the future will not confine himself so largely as in the past to the production of foods. For there is a limit to this market. We ought not to eat any more than we do and we ought not to waste as much as we do. Even if the highways are lined with illuminated billboards beseeching or commanding us to "Eat more wheat", "Eat more raisins", "Eat more apples", "Eat more potatoes", and "Eat more peanuts", we cannot follow all this gratuitous advice. My grandfather used to say to me when I overloaded my plate with some food I liked: "My boy, your eye is bigger than your stomach." But that is only true of eating. Our stomach for automobiles, radios, silk stockings and newspapers seems insatiable. Therefore, the farmer longs to get out of food production and into a field where the opportunity for high-powered salesmanship is unlimited.

Further, I venture to say that the farmer of the future will find it worth while to make the lower forms of life work for him. He has hitherto regarded molds and maggots, bacteria and fungi in the light of enemies to be eradicated. He may turn them into his slaves, as in the early days of husbandry the wolf was converted into the shepherd dog. Such minute creatures grow faster, live cheaper, require less room and reproduce more rapidly than the higher plants and animals. Microbes that double in size and number every twenty minutes beat Belgian hares in the art of multiplication. Starting

with sawdust or waste molasses and ammonia made from the air, it is possible to make all manner of fats and proteins and flavors by the aid of micro-organisms. Already this field is being entered. I have taken at my table a broth from yeast that could not be told from the best beef tea. Can the cattle business compete with the yeast plant? I visited recently a mold factory run by the U. S. Department of Agriculture where glucose was being converted quantitatively and in quantity into gluconic acid. Hitherto gluconic acid has been sold at about \$100 a pound, or rather priced at that, for the demand was limited. By this new process it may be made for 35 cents a pound. All that is needed to make the process profitable is to find a market for gluconic acid by the ton, when it could not be sold by the gram.

I have never been one of those chemists, like Berthelot, who foresee

a time when all our food will be synthetic. I do not anticipate the day when we shall do away with our three meals and simply swallow a pill containing the essential elements and energy. Such a condensed diet would, it seems to me, be a hard pill to swallow, for it would have to have a density surpassing platinum, even approaching the specific gravity of the faint companion of Sirius.

I believe that the bulk of our food will continue to be raised by the aid of vegetation and that while it may be possible to make any kind of food from coal, air and water with certain salts, I doubt if it will be generally profitable to do so. So I anticipate that the future rivalry between the chemist and the farmer will turn out a drawn game, and result finally in some system of mutual cooperation, a sort of symbiosis to the profit of both parties.

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In This Issue—

An argument against the next war, p. 333—Freeing the world from bondage, p. 335—Color snapshots, p. 337—Millions of Indians, p. 337—Secrets of Rubber, p. 339—Knockless fuel, p. 341—Electrons and protons, p. 341—Inflammable air, p. 343—New books, p. 346.



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