

FOOD FOR PLANTS

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Food for plants by Edward B. Voorhees

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EDWARD B. VOORHEES

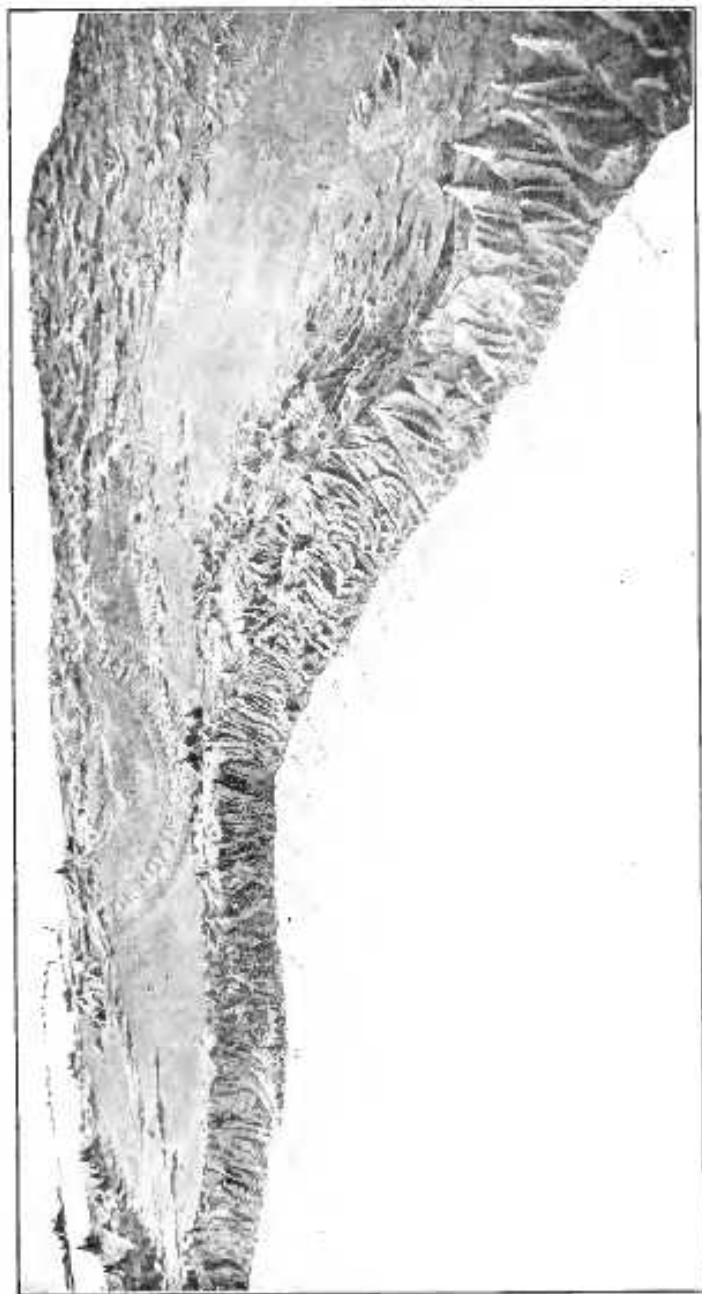
**FOOD
FOR PLANTS**

FOOD FOR PLANTS

Fifteenth Edition



CHILEAN NITRATE OF SODA EDUCATIONAL BUREAU
67 WILLIAM STREET, NEW YORK



Section of Relief Map of South America.—Chile in right foreground.

PREFACE

This is the fifteenth edition of "Food for Plants." The work has come to have a standard place in American Farm literature. It includes results of experiments on Highlands Experimental Farms, under the personal direction of the late Professor E. B. Voorhees, of the New Jersey Experimental Station.

Crop utilization and relative agricultural efficiency of nitrogen in various commercial materials were outstanding points of his New Jersey work. The record of the first twenty years' work on the availability of nitrogen in Nitrate of Soda is reproduced in this volume. It includes the work of Professor Voorhees up to the time of his death. It is regarded as one of the most important contributions to Soil Science which has been made in this country.

Results of experiments also set forth field work intended as demonstrations in farm practice of what may be accomplished by the rational use of Nitrate of Soda under average farm conditions in a typical hay and dairy section of New York State.

The results were also published in "Grass Growing for Profit" and "Growing Timothy Hay for Market." These practical contributions were based on actual scientific data. Results of studies of methods of crop growing, from the preparation of the land to handling and marketing, also appeared in these bulletins.

The Corn for Ensilage Experiments recorded are regarded as of first value. The United States Government made studies of the ensilage grown with Nitrate which was regarded as of high feeding quality.

Apple growing, which is at present our most important money crop in the northern states, is treated in an up-to-date manner in a chapter by itself.

The use of Nitrate on Sugar Cane is set forth briefly.

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Blasting a Test Hole.



Caliche Ready for Transport to Oficina.

FOOD FOR PLANTS

The Food of Plants consists of a number of elements, including Nitrate, phosphate, lime and potash. Nearly always two of these are lacking in adequate quantities to produce crops, especially is Nitrate wanting in the vast majority of instances. In this case the normal growth and yield of the crop will be limited only by the quantity of *Nitrate* it can properly assimilate. There might be an abundant supply of all the other elements, but plants can never use other kinds of food without Nitrate.

Nitrate Nitrogen is the food that is nearly always deficient. The question that presents itself to the farmer, gardener and fruit grower is, How can I supply my plants with Nitrogen, phosphoric acid and potash, in the best forms and at the least expense? We will try to throw some light upon this question in the following pages. We will take first, phosphoric acid.

There are several sources of phosphoric acid, the principal being bones and rock phosphate. Of these, the rock phosphate is the cheapest source. A prevailing impression exists that super-phosphate made from rock phosphate is not as good as that made from bones. It has been shown by many experiments that this idea is entirely without foundation. What the plants want is available phosphoric acid, and it makes little or no difference from what source it is derived.

The largest deposits of rock phosphates exist in South Carolina, Florida and Tennessee. These beds of phosphate are supposed to be composed of the petrified bones and excrements of extinct animals. When this substance is ground and mixed with a sufficient quantity of sulphuric acid, the larger part of the phosphoric acid which it contains becomes available as plant food. This fact was one of the greatest agricultural discoveries of the age.

When the rock phosphate is thus treated with sulphuric acid, it becomes what is commercially known as superphosphate, or acid phosphate. The same is true if ground bone is treated in the same way. Good superphosphate, or acid phosphate, contains about 14 per cent. of soluble phosphoric acid.

The best sources of potash are sulphate of potash and unleached wood ashes, which latter contain from 3 to 5 per cent. of potash in the form of carbonate. They also contain from 1 to 2½ per cent. of phosphoric acid. They are valuable as plant food for the potash as well as for the valuable lime they contain.

Nitrate is the most important and effective element of plant food, and at the same time, as stated, is the one that is generally deficient in the soil.

Crops must have meals, that is, food cooked for them in advance. The sun will help do this cooking, as its heat and light promote nitration which is really a process of cooking and also pre-digestion. When the nitrogenous plant food is cooked and prepared for use it is Nitrate, hence Nitrate of Soda is in a class by itself, different from all other plant foods.

There are a great many *sources of Nitrogen*, such as dried fish, cotton-seed meal, dried blood, and

tankage. But none of these furnish Nitrogen in the Nitrate form. This can only be furnished to plants in the form of Nitrate of Soda.

Nitrate of Soda contains the Nitrogen that is necessary for the growth of plants, and is the best form in which to furnish it to them. When we say the *best* form we mean as well the best *practical* form. Nitrate of Soda not only furnishes Nitrogen in its most available form, but it furnishes it cheaper than any other source, because 100 per cent. of it or all is available.

No other form containing so much available plant food is also capable of unlocking the latent potash in the soil.

Nitrate of Soda or Chile Saltpetre.

Nitrate of Soda or Chile Saltpetre occurs in vast deposits in the rainless districts of the west coast of South America, chiefly in Chile, from whence it is imported to this country for use in chemical manufacture and in agriculture. As imported into the United States, Nitrate of Soda usually contains about 15 per cent. of Nitrogen. Nitrate of Soda resembles common salt, with which and sodium sulphate it is often adulterated. This salt is at once available as a direct fertilizer. Whenever practicable, it should be applied as a top-dressing to growing crops, and if possible the dressings should be given in two or three successive ratings.

Nitrate of Soda is usually applied at the rate of from 100 to 200 pounds per acre on land previously dressed with farm-yard manure. To secure an even