A storehouse filled with dried vegetables awaiting shipment

The conveyor that carries the fresh vegetables up to the preparing room

Dehydration Industry in America

How It Is Carried On, and the Place It Holds in Our War Progress

By E. Clemens Horst

FOSTERED by large Government contracts there is developing in this country a new industry that will be of material permanent benefit to our economic life. This industry is the dehydration, or drying, of vegetables. By subjecting fresh vegetables to the action of circulating currents of warm, dry air the moisture content is exhausted with the result that the weight and bulk of the product is greatly reduced and the vegetable is made non-perishable and can be kept indefinitely. The cell structure and the flavor is not injured by the drying process; soaked in water for a few hours, the dehydrated product is restored to its original color, bulk and food qualities and when cooked it has the flavor and appearance of the fresh article.

A year or two ago the dehydration of vegetables in this country was practically unknown. There were one or two small plants engaged in drying berries and vegetables, but the bulk of their output was used in Alaska or other distant places, where food supplies must be light and durable. At the entrance of this country into the war, and when our soldiers began going abroad in large numbers, the War Department was confronted with the task of supplying enormous quantities of food to maintain the United States Army in France, at a time when the demands upon world shipping were the most pressing in the history of the world. To solve the food problem the various departments of the Government coöperated and exhaustive tests were made of the different kinds of food available for export. The advisability of using dried vegetables was suggested, and a hearing on the subject was had before a sub-committee of the Senate Committee on Agriculture and Forestry, at which the food experts of the Department of Agriculture and the Food Commission appeared and testified as to the merits of the food. Representatives of commercial companies engaged in dehydrating vegetables were also heard, and the writer appeared before the Committee and told of his experiments conducted in California. Samples of dried vegetables were exhibited, and hundreds of pounds of the food were distributed throughout Washington to be tested for flavor and food values. The restaurants in the Capitol served various vegetables cooked from dehydrated stock supplied from the California plants, and scores of Senators and Congressmen ate the food and were astonished at the similarity to the fresh. At the Reed Hospital in Washington, 450 men were fed on the dried vegetables, and it was found that five pounds of dried stock supplied ample food for all. The President was even kind enough to try some dried tomatoes, which were made into soup, and many of the officials of the Government tried the samples in their own homes.

As a result of these tests the War Department entered into contracts with several companies possessing the facilities for drying vegetables, and these contracts are being enlarged as the industry develops and can take care of new demands. On the Pacific Coast, one organization alone now operates ten large commercial driers, employing several thousand people, and large acreages have been contracted in the vicinity of the drying plants for the growing of vegetables. Millions of pounds of dried potatoes, carrots, turnips and other varieties have already been shipped to our armies abroad, and a steady stream of the new form of food speeds across the country and the Atlantic to satisfy the appetites of our boys over there. The American Red Cross has also become a large purchaser of dried vegetables for use in its rescue work in the devastated

regions, and in this country many of the large charitable institutions are becoming interested in the product for use in their work. The big shipping companies have found dried vegetables particularly adapted for use on ocean vessels, because of the small space required for storage, and the keeping qualities and superior taste over canned goods. Scores of the finest hotels from New York to San Francisco now serve vegetables made from the dehydrated stock, and they report that the food is superior to that made from anything but absolutely fresh produce. Many economies can be practiced by these large institutions in using dried vegetables, because all of the labor of preparing the food is eliminated. There is nothing to discard and no cleaning or washing of the vegetables is necessary, as all of this is done at the drying plant. Dietitians of hospitals and food experts and chefs all unite in recommending the food.

When it is considered that from 65 to 85 per cent of the entire bulk and weight of green or fresh vegetables is water, and that it is the moisture that causes decay and deterioration, it is apparent that, when the dried

often true that the weight capacity of a boat is fully utilized without taking up all of the bulk.

The reason why so many hotels, hospitals and cafes are using dried vegetables is because of the convenience of the new food. A few cartons or tins of each variety of vegetable can be stored in a small space, and when desired for use the only work involved is to place a few handfuls in water to restore the moisture content. Where fresh produce is used, a small army of helpers is required to sort the green stock, discarding wilted parts, tops or roots, and to wash the grit and dirt from the food. Even where the fresh vegetables are kept in refrigerated rooms, the loss through deterioration is excessive, and it is estimated that fully 50 per cent of green vegetables grown are lost before reaching the consumer.

Vegetables used for drying are grown in the immediate vicinity of the drying plants, and are allowed to reach full maturity before picking. Within an hour or so after coming from the field they are sorted and washed, after which they are carried, by endless belts, to various machines which peel, slice or otherwise prepare the vegetables for the drying trays. Wherever possible machines are used instead of hand labor, which insures absolute cleanliness and uniformity. The drying trays are taken to the drying rooms and arranged, one on top of another, with open spaces on all sides so that the warm, dry air circulating throughout the room can come in contact with the food, slowly extracting the moisture without injuring the cell structure or chemical constituents of the product. The air is not allowed to get so hot that the food will be scorched or shriveled, and by a system of distribution the air is kept in constant circulation at a uniform temperature throughout the room. When dried, the trays are taken to the packing room, and the food immediately placed in paper cartons, lined with waxed paper, or in large tin cans. Thus protected, the containers can be shipped to all parts of the world and the food will not be injured by excessive heat or cold.

At the drying plants nothing is permitted to go to waste, for all tops, peelings and waste portions from vegetables are fed to stock or hogs, and even the water used for washing the vegetables is saved and the mineral salts found therein are mixed with the greens fed to hogs.

The expansion of the industry offers tremendous opportunities to this country. With a large commercial plant or a community plant in each locality, a new market will be offered to vegetable growers. Thousands of acres of waste lands in the outskirts of cities, towns and villages can be utilized for the growing of vegetables, and the spaces between fruit trees in orchards can be used for the same purpose. Surplus market stocks can be taken to a nearby drying plant and saved, as is done in Europe. Germany has several thousand drying plants scattered throughout the country in which are dried all surplus vegetables grown, and before the war she annually dried twice as many potatoes as were grown for all purposes in this country. Her dehydrated vegetables have doubtless been one of the reasons why she has been able to withstand the food blockade of the Allies. England, Italy and France are also large users of dried vegetables, and in many communities the law requires that all fresh vegetables left over in markets at the end of the day shall be taken to drying plants. The feasibility of the new industry has been fully demonstrated, and the only thing remaining to be done to cause its rapid expansion is to educate the people to use the new form of food.

The fan that forces the warm air into the drying room

product is used, a wonderful saving can be effected in transportation, storage and handling. One pound of dried tomatoes or cabbage is equal to 20 pounds of the fresh or canned; one pound of spinach, when dried, is the equivalent of 18 pounds of the fresh, and so on down to potatoes, which have a ratio of one to six. One carton of dehydrated tomatoes, weighing 2¼ pounds, is equivalent to a case of the canned containing two dozen quart cans, the whole weighing 60 pounds. Therefore, in shipping dried vegetables to our soldiers in France, the Government is able to furnish, in one shipload, as much actual food as could be carried in from fifteen to twenty shiploads of canned goods. If we went a bit further and included the weight and bulk of the tin and wooden containers needed for the canned product, we should find a still greater saving, for in every car of canned vegetables the containers alone weigh about 24,000 pounds. While the dried vegetables furnished the Government are put up in tins, they are large enough to hold about ten pounds each, and two tins make up a crate light enough to be handled by one man. The lightness of the dried product also permits vessels to be loaded to full cargo capacity, whereas in the case of heavy canned goods it is