greatly change fertilization practices.

It seems that potato research, including potato breeding work, has just started to gain some real momentum. New varieties will eventually solve many of the present problems. Plant breeders should make much greater effort to eliminate viruses from their new releases. Recent unequal advances in freight rates, improved ways of combating some of the troubles mentioned above, acreage control and price support programs may tend to cause increased production nearer consuming areas, thus affecting present producers of both seed and table potatoes.

As the result of more fertilization, better insecticides and fungicides, larger yields and improved quality are made possible. If better yields and better quality become easier to maintain, a smaller total acreage will be required to supply the table needs of the nation. Less certified seed acreage will accordingly supply the seed market. There will be need for a readjustment of certified acreages. Some relocation of acreage might take place. Even though the growing of good certified seed has been an almost unsurmountable task, the supply has often exceeded the demand with the result of little or no price premium. States might aid greatly in correcting this situation by tightening requirements both in the field and in the final pack.

R. C. Hastings, Seed Commissioner,
Fargo, North Dakota.

CONVERSION OF POTATOES TO STABLE FORM¹

Roderick K. Eskew²
Eastern Regional Research Laboratory³
Philadelphia 18, Pa.

(Accepted for publication Feb. 9, 1949)

The greatest drawbacks to the industrial utilization of potatoes are their great bulk and perishability. The obvious way to overcome these is to convert the potatoes to stable form by drying. Consequently, the Department of Agriculture's Eastern Regional Research Laboratory has been engaged in engineering research on a pilot-plant scale to develop cheap methods of accomplishing this.

¹Presented at the meeting of the Potato Association of America held in Pittsburgh on November 16, 1948.
²Head, Chemical Engineering and Development Division.
³One of the Laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, United States Department of Agriculture.
What is so difficult about drying a potato? Those of you who have tried it on a commercial scale will have some ideas on that point. To begin with, you must evaporate about 4 pounds of water to get 1 pound of dry solids. So you decide to press out some of the water first and save drying costs. Then you find that you have lost nearly 20 per cent of the solids, and your reduced yield may have more than offset your savings in drying. Or perhaps you got into difficulty with the local authorities for putting the press effluents into the river. If your drying was done in a direct-heat drier without precautions to avoid a spark, you may have had a fire or an explosion from the finely divided starch. If you were fortunate enough to avoid these troubles, you no doubt observed that the ground potatoes rolled up into pellets the size of marbles, the insides of which remained soft and doughy even though you dried the outside to a crisp.

Perhaps, instead of grinding the potatoes you decided to slice them and use a direct-heat drier. Then you undoubtedly had the unpleasant experience of having the slices stick to the drier or stick to each other, forming lumps the size of footballs. But you don’t want to hear about processes that fail; you want to know about the ones that function.

There are three physical forms in which a potato may be feasibly dried: raw ground, raw sliced, and cooked and mashed. Let us consider first grinding them raw.

**Steam Tube Drier Process for Feed**

Figure 1 shows a process for producing feed from raw ground potatoes with a steam tube drier. Here the potatoes unloaded from a box car are flushed by flume to a conveyer, which delivers them to a washer. This may be any one of a number of types. The one commonly used in starch factories is simple and efficient. It consists of a semi-cylindrical tank divided into compartments and partially filled with water. A shaft with agitators runs the full length of the tank, and paddles lift the potatoes from one compartment to the next. The clearance between the paddles and the shell is such that the stones are left in the trough and periodically removed with the dirt. The washed potatoes are ground in a hammer mill having ¼-inch holes in the screen. The ground product is delivered to a mixer conveyer, where a sufficient quantity of the dried product to achieve a moisture content not exceeding 45 per cent is incorporated with it. This is equivalent to recycling about 1.1 pounds of dried product for each pound of potatoes ground. This recycling is roughly analogous to refluxing part of the product obtained in fractional distillation.