scientific feeding and breeding, illustrates what is taking place with respect to many products in many countries.

Another significant development is a tendency to greater specialization in production. Use of machinery and of scientific knowledge encourages specialization. Improvement in transportation facilities and relatively cheap freight rates make it possible to specialize in production in distant areas most suitable for the product, and to market the product where there is the greatest demand.

Changes in markets and in demand for agricultural products are as significant as changes in production. The westernization of the Orient is increasing the oriental demand for the products of other countries. Japan is becoming a manufacturing country and the large coastal cities of China are importing large quantities of agricultural products from other parts of the world. Increase in demand from oriental markets has offset, in part, the reduction in European market demands. During the five years preceding the war only about 3 per cent of the agricultural exports of the United States went to Asia. In the past three years 11 per cent has been shipped to Asia. Peace in China now offers further opportunities for the development of the oriental market.

Changes in World Demand

There are some significant changes in the world's demand for agricultural products. Use of the automobile and the tractor is reducing the number of horses in the world, thereby reducing the demand for feed grains. Production of rayon has increased enormously as a substitute for or competitor with silk and wool. On the other hand, the demands for some commodities are increasing. It is apparent that the demand for wheat and sugar has increased rapidly in recent years. Although demand for wheat flour in the United States is now less than before the war, the demand has increased in many countries. In Europe wheat is taking the place of rye; in the Orient it is taking the place of rice and other grains as the bread grain of the people. The demand for tobacco, particularly of the cigarette type, has increased greatly. The enormous production and low prices of sugar have stimulated consumption in the United States and elsewhere. Another notable shift in demand is an increased use of vegetable oils as a substitute for, or in competition with, animal fats. There has been a tremendous growth in the use of vegetable oils both in the manufacture of soaps and as foodstuffs. These changes in demand must be taken into account in planning agricultural production.

O. C. STINE.

YELLOWS-RESISTANT Cabbages Developed by Plant Breeding

The yellows disease, caused by a soil fungus (*Fusarium conglutinans*), is a decidedly limiting factor in cabbage production throughout the central belt of States from the Atlantic seaboard to the Rocky Mountains. It was first brought under control some 12 years ago when a resistant selection of storage cabbage, Wisconsin Hollander, was first introduced into general use in southern Wisconsin. Since that time breeding and selection work has been under way with the purpose of developing yellows-resistant strains of late, medium, and early varieties, so as to meet the needs of the various seasons throughout the infested area.

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Two late flathead varieties particularly useful for sauerkraut manufacture, Wisconsin All Seasons and Wisconsin Brunswick, were introduced in 1922. Three midseason varieties suitable for shipping and sauerkraut manufacture were next perfected and introduced in 1927 as Marion Market (round head), Globe (round head), and All Head Select (flat head). (Fig. 250.)

During the earlier period of this investigation, lines were improved in resistance by mass selection of individuals surviving in succeeding generations on badly infested soil. This process yielded highly resistant strains within a few years but did not completely fix the resistant character. Later studies upon the inheritance of resistance showed it

FIGURE 250.—Cabbage variety trials on soil severely infested with the yellows organism at Racine, Wis., 1927. The two center rows, almost completely destroyed by yellows, are Commercial Hollander and Commercial Copenhagen Market. The row at the left is the resistant variety, All Head Select, a mid-season flat-head type; the one at the right is the resistant variety, Globe, a mid-season round-head type

to be a simple dominant Mendelian character. This fact having been ascertained, it has become a comparatively simple procedure to secure completely resistant strains by means of pure-line selection, while at the same time greater uniformity in other varietal characters may be attained. In this manner resistant strains have recently been developed from two of the earliest maturing varieties in use, the Early Copenhagen Market or Golden Acre and Jersey Wakefield. The new types are very close to the original varieties from which they were selected and have withstood the disease satisfactorily when planted upon infested soil in a number of States, including Wisconsin, Indiana, Ohio, Virginia, Kentucky, Mississippi, and Iowa. These will be introduced for general use as soon as seed can be multiplied.

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