varieties is available from the usual commercial sources. C.P. 29/116, Co. 290, C.P. 31/511, Cayana, P.O.J. 213, C.P. 807, and P.O.J. 36-M are in commercial production and can be obtained from farmers in practically every sirup-producing center of importance.

SELECTION OF SUGARCANE LAND

As sugarcane is a tropical plant, grown in the United States somewhat beyond its natural climatic zone, it is more sensitive to climatic conditions here than in the Tropics. The crop requires a uniformly high temperature, ample sunshine, and a large and constant supply of moisture to keep the plants growing rapidly during the crop season, which should extend for a period of 8 months or more. These requirements restrict profitable culture of sugarcane to a definitely limited area (fig. 2). Within this area sugarcane is grown on a variety of soils, but because it is a gross feeding crop, making heavy

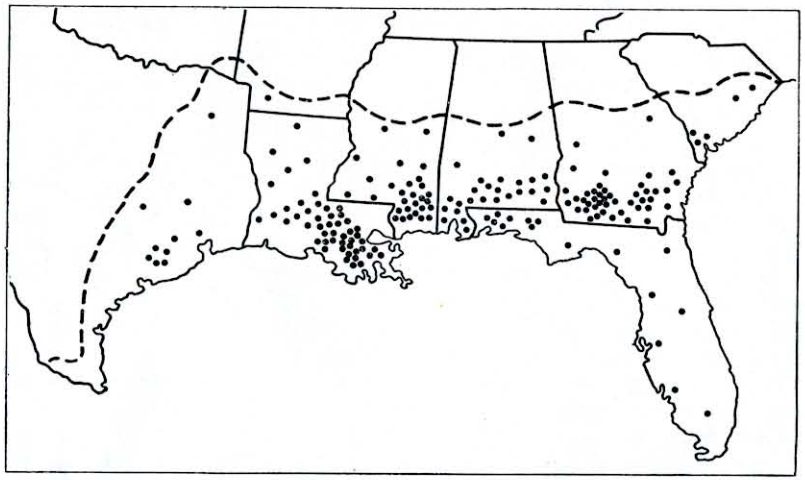

FIGURE 2.—Successful sugarcane culture for sirup production is restricted to the area below the broken line shown in the map. The geographic concentration of the industry within this area is indicated by dots, each of which represents 100,000 gallons of sirup produced in 1932.

demands upon the soil for moisture and plant food, the soils must possess definite characteristics for successful cane culture. Only the best soils in the area indicated can be used to advantage. They must be well supplied with mineral and other required plant food and humus. They must retain moisture well, but it is imperative that they be naturally well drained or drained by means of inexpensive systems of ditches. It is important that the texture of the soil permit rapid prolific root growth and allow thorough cultivation. In the eastern part of the area alluvial soils along streams, depressed areas where the soils are dark, and the more fertile uplands are used successfully for cane. It is generally known that a lighter-colored and better-quality sirup is produced from cane grown on light-textured, well-drained, sandy loam and fine sandy loam. In Louisiana Sharkey clay in its better-drained phases is extensively used for sugarcane growing, but for sirup production silt loam, silty clay loam, and fine sandy loam are preferable.

LIGHT SANDY LANDS AND HEAVY CLAY LANDS

The expense of keeping up the fertility on light sandy lands is prohibitive and, in the absence of frequent and adequate rainfall, the crop suffers quickly and seriously from drought. On the other hand, heavy clay lands do not warm up early enough in the spring, do not drain properly, and cannot be kept in a state of cultivation necessary for best results.

The prospective sugarcane planter in the eastern Gulf States where sand predominates in the soils must seek a soil with a relatively high percentage of silt and clay or, in their stead, a liberal supply of humus to enable it to retain moisture and plant food and to produce good crops. In these sections, where very sandy soils predominate, the rolling clay hills or the so-called "hammocks" are sought, or, where such lands are not available, the drained bayheads and shallow ponds are utilized. It is doubtful, however, whether the humus-sand soils which lack silt and clay completely will continue productive through a long series of years under ordinary farm methods, which tend to deplete the humus supply. With such soils expensive means of replenishing the humus must be employed, and only under exceptional circumstances will the value of the cane crop justify the cost.

The flat piny-woods sand areas with neither clay nor silt and with only very small quantities of humus which occur so extensively near the southern Atlantic and eastern Gulf coasts are unsuitable for the culture of sugarcane. Such land, when plentifully supplied with water, frequently produces fairly good crops for a few years while it is new and contains a good supply of humus, but satisfactory yields are rarely secured throughout any long period of years. Land of this kind can be made to produce further crops of sugarcane by treatment to restore the humus and plant food, but the continuous need for such treatment involves too great expense to make it profitable.

Where clay predominates in the soil, as in the alluvial bottoms along the lower Mississippi River, lands containing a relatively high percentage of silt and sand are found more suitable for sugarcane culture. These are usually found adjacent to the river and to the numerous bayous. Clay soils lying farther back from these streams, and frequently adjoining swamps, are less suitable, as they are generally too stiff to permit being kept in the most favorable state of cultivation and usually do not warm up early enough in the spring for early growth of the cane. Such soils are more suitable when they contain considerable humus or vegetable matter, but in general heavy, impervious clay soils are unsuitable for satisfactory culture of sugarcane.

PEAT SOILS

Peat soils, provided they have a high percentage of mineral matter and are well drained, will produce large yields of cane, and with a long, favorable season, as in southern Florida, the cane will contain satisfactory percentages of sugar. It is questionable whether peat soils that contain a very low percentage of mineral matter, and that are, therefore, deficient in natural plant food, can be used successfully for sugarcane culture even if well drained. One disadvantage of any peat land is that it affords such poor anchorage for the roots

that the cane lodges easily and gives a tangled mass of stalks instead of erect rows. Compared with other soils, heat radiation from the black peat is rapid, and during cold, clear nights in winter this results in lower temperatures and greater injury to the cane. In Georgia it is commonly reported that rich, dark soils along the edges of swamps, while producing high yields of cane, exert a deleterious effect upon the color, clearness, and flavor of sirup made therefrom. Such soils are not generally used, the growers preferring the lighter-colored loamy upland soils.

DRAINAGE

In low, flat areas where natural drainage does not keep the ground-water level 3 feet or more below the surface, it is essential that artificial drainage be provided. Under such conditions, drainage is ordinarily accomplished by means of systems of ditches, the depth of which is sufficient to maintain the ground-water level at least 3 feet below the surface and the width and distribution of which is sufficient to permit prompt run-off of excessive rainfall. In the case of some peat soils the growth of the cane appears to be favored by maintaining the ground-water level at less than 3 feet below the surface, especially during periods of insufficient rainfall, and in some instances drainage ditches are laid out in such manner as to permit raising the water level by flooding them. The low, flat character of lands in Louisiana and southern Florida and the frequently excessive rainfall which occurs in these areas necessitate extensive systems of drainage ditches of ample capacity. The character and the elevation of the lands used throughout the greater part of the areas in which sugarcane is grown for the production of sirup only does not necessitate artificial drainage, though in many instances, such as lands adjacent to the coast and low-lying, poorly drained lands elsewhere, drainage must be provided either by systems of ditches or by tiling.

Irrigation of sugarcane is rarely practiced in the United States, as the amount and distribution of rainfall in the States in which sugarcane is grown is usually sufficient for reasonably satisfactory growth of the crop. However, serious droughts occur from time to time, the effect of which is very harmful upon the growth and yield of the crop. The application of irrigation water would undoubtedly prove profitable in areas of frequent droughts, provided adequate supplies of water were readily available and the cost of applying water would not greatly increase the per-acre cost of producing the crop. Application of irrigation water would be necessary, of course, in connection with any attempts to grow cane in regions with scanty rainfall, such as southern Arizona and California.

MANURIAL REQUIREMENTS

COMMERCIAL FERTILIZERS

The use of commercial fertilizers in sugarcane growing is almost universal in the United States and in other cane-growing countries, but local practices differ widely as to the particular fertilizer elements used and the forms and proportions in which they are applied.

Some form of nitrogenous fertilizer can be applied with profit or is absolutely essential in practically all localities. The quantity of

nitrogen that is applied on the best-managed farms of the South usually ranges from 20 to 50 pounds per acre.

The soils of nearly all sugarcane localities respond to the application of phosphoric acid, but the quantity required varies considerably. From 40 to 80 pounds per acre of soluble phosphoric acid in a complete mixture are usually recommended in Louisiana. To the lighter soils of Georgia and Florida it is not unusual to apply considerably more, even up to 120 pounds per acre.

Applications of potash give little or no response in most of the rich alluvial sugarcane soils of the Mississippi Delta. In the States east of Louisiana, however, potash is applied, usually at the rate of 30 to 50 pounds per acre.

It is a common practice to buy fertilizers ready mixed, though in the interests of economy many farmers do their own mixing. In the trade the mixed fertilizers are commonly described by three figures in regular sequence referring to the percentages of plant food which they contain, and the order, nitrogen-phosphoric acid-potash, is standard practice. However, in the Southern States the order phosphoric acid-nitrogen-potash is commonly used.

The mixtures most popular in southern Georgia and northern Florida for spring and early summer application usually do not vary far from the 4–8–4 formula, i.e., 4 percent of nitrogen, 8 percent of phosphoric acid, and 4 percent of potash. The total quantity of fertilizer applied varies from 500 to 1,500 pounds per acre, depending upon its composition, the fertility of the soil, and the character of the crop preceding the cane. Under some conditions the application of from 500 to 800 pounds proves sufficient, though under most conditions and for most soils more satisfactory growth and yields result from the application of from 1,000 to 1,500 pounds. These quantities are mentioned as an example of common practice in southern Georgia and northern Florida and not as a recommendation for any wide range of localities or soils. Where the soil has been restored to high fertility by turning under a crop of legumes, application to the plant-cane crop of commercial fertilizers, especially nitrogenous ones, may be decreased greatly or even omitted, although in the case of soils deficient in phosphoric acid and potash moderate quantities of these plant foods should be applied. Succeeding ratoon crops should be given sufficient fertilizer to insure rapid and satisfactory growth.

APPLICATION OF FERTILIZERS

In spring planting it is customary to scatter a rather liberal application of mixed fertilizer in the furrows in which the cane is to be dropped. Some implement is run through the furrow to mix this fertilizer with the soil. For cane planted in the fall or early winter, fertilizer is used very sparingly, if at all, at the time of planting, most of it being applied in the spring when the crop starts to grow.

In case of either spring or fall planting, another application is frequently made near the middle of May, designated as a side application, because it is distributed along the sides of the rows and cultivated into the soil. Some growers favor the application of a top dressing of readily available nitrogen at the time of laying-by the crop, July 15 to August 1, but the once common practice of late