Herbert Hoover was president, no one had ever heard of tv dinners or OPEC, and sugar was a gleam in every child's eye. Fifty years ago almost all sugar produced was used in the home, in preparation of baked goods, candy and desserts. All sugar was derived from sugar beets and sugar cane.

Today more than two-thirds of sugar used in the United States is in industry and practically all of this in the fantastic number of products of the food industries. These foods are produced for an extremely diverse population of consumers with specialized demands.

The many needs of the consumer and the great product diversity created by industrial growth has led to the development of corn sweeteners, including dextrose, regular corn syrup and blends such as the recently developed high-fructose corn syrup.

Sugar use in processed foods accounted for forty per cent of total deliveries last year while beverages, primarily soft drinks, totaled twenty-three
percent.

The high sugar prices of 1974-1975 coincided with technological breakthroughs in the isomerization of high-fructose corn syrup. This price increase stimulated the use of non-sucrose caloric sweeteners. Since seventy percent of U.S. consumption is indirect, in the form of processed foods and drinks, there are many instances where non-sucrose sweeteners can be used. The abundance and relative inexpensiveness of corn contributes to this state of affairs.

High-fructose corn syrup is an entirely new concept in sugar composition. In this syrup a portion of glucose has been isomerized to fructose or levulose. Inexpensive commercial production of this corn syrup has become a reality only in the past few years.

The development of this product has already had a significant impact in those product areas where its use is more convenient than sucrose. High-fructose corn sweetener is often used in beverages because of its liquidity. HFCS, as it is often referred to, differs from conventional corn syrup in that it has a greater sweetening capacity per unit of measure, which makes it less expensive to
There is a large variety of foods in which HFCS can be used, but nevertheless sucrose use in beverages and foods increased overall in 1976. Within the food industry the increase was a near two percent in processed foods, but nearly twenty percent in confectionaries.

While it is technically possible to use HFCS in candy, it is often not very practical because of the shorter shelflife of the corn sweetener. HFCS also absorbs water and this limits its applicability in most candy and in many other foods as well. The new corn sweetener is almost never used in baked goods because no practical process for crystallizing the blend has been developed.

The confectionary and bakery industries require sucrose in the form of granulated crystals ranging from Confectioners AA, an extremely large crystal approximately 1/8 in. in its longest dimension, to powdered sugars used to produce the creamy frosting or icing on cakes. This variety and exactness of grain size required in many industries precludes the use of high-fructose corn syrup.

Early in 1976 the corn sugar industry in the United States anticipated sales of 1 million short tons (dry basis) for high-fructose corn syrup. However, as sugar prices declined, it became clear
that these high expectations would not be met. High-fructose corn syrup shipments in 1976 totaled nearly 800,000 tons, a healthy increase over the 300,000 tons shipped in 1975, but well below earlier prognostications.

Even though the corn refining industry has a production capacity of nearly 2.5 million tons of HFCS annually, actual shipments are not likely to exceed 1.3 million tons, barely half that capacity. An HFCS domestic market of 2 to 2.5 million tons by 1980 seems more probable than the 3 million plus tons projected by the corn sweetener industry in 1976. Increases in corn prices are also likely this year due to the strong domestic and foreign demand as well as the dry weather in grain producing areas. Corn sweetener prices are naturally responsive to these changes as much as to the price of sugar.

If sugar prices rise, then HFCS will be more competitive and production will increase.

While high-fructose corn syrup is making inroads in the U.S. market, it does not now constitute a threat to sucrose consumption in most other high-income countries. Sugar consumption abroad involves a smaller percentage of processed foods, even in Europe. The price of corn is also higher because of tariffs and other fiscal realities.
The growth in consumption of processed foods is a trend in every industrialized country, however, and is likely to remain so. This fact will have long-range effects on the world sugar economy. Since 1940 the per capita consumption of sugar in the United States has stayed virtually the same at 100 lbs. per person. This level seems to be the peak in other developed countries as well. Even during the 1974-1975 period of high prices this rate of consumption dipped only slightly.

The effect of the price rise in low-income importing countries was, of course, much more sharply felt and consumption was reduced thirty to fifty percent or more. These countries account for a small segment of world consumption, however, and so even with world prices tripling world-wide consumption was reduced by only two million tons. Consumption actually rose in low-income exporting countries by one million tons during this time so the net drop in consumption was only 1 million tons. This did reverse a 25 year old trend of rising consumption to the tune of 2 to 5 million tons a year.

Since many countries have a per capita consumption of sugar well below the 100 lb. level of the United States and do not have a great variety of processed foods, the worldwide demand for sucrose will continue to increase, at a considerably faster rate than within the U.S.
Ninety percent of the current yearly increase in sugar consumption is in the developing areas. This is due, to a large extent, to the rate of population growth in these countries. This consumption demand cannot be met by non-sucrose sweeteners since processed foods are not widely available and many countries lack the starch hydrolyzing industries necessary to the production of high-fructose corn syrup.

Sugar producers in Europe are also concerned about competition from non-sucrose sweeteners since they are already working with an export surplus. The threat is diluted, however, by European import needs for grain. The European Economic Community currently imports about fifteen million tons of corn a year.

The immediate situation is not good for sugar producers worldwide, based on the simplest law of supply and demand. 1977 world consumption will reach 82.8 million metric tons, up 2 million tons from 1976, but 4.2 million tons will be added to stocks already at an adequate level.

In the United States high-fructose corn sweeteners are not competing only with sucrose sweeteners, but also with conventional corn syrup and dextrose. Dextrose is the most costly corn syrup to produce
and HFCS exceeded dextrose consumption for the first time in 1976. Per capita consumption of dextrose was 5 lbs., while HFCS averaged 2 lbs. short of the 7 lbs. averaged by HFCS. High-fructose corn syrup consumption in 1975 had totaled less than 5 lbs. Conventional corn syrup was consumed at a per capita rate of 18 lbs., virtually no increase from 1975. While dextrose and regular corn syrup consumption is expected to match and slightly exceed last years' figures, HFCS consumption is likely to increase 2 to 4 lbs. per capita.

The long range impact of high-fructose corn syrup is likely to be even greater as manufacturers attempt to take advantage of every possible market. Though HFCS has many limitations on the types of products in which it can be used and is currently being restrained from greater production by low sugar prices, high-fructose corn syrup is here to stay. In the words of the Wall Street Journal, "A major segment of the food business may never be the same again."