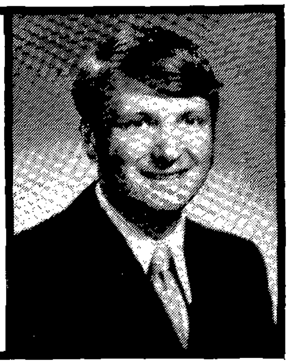
Fats & Oils Outlook[1]

JON L. HEIMANN, Corporate Purchasing Staff, Emery Industries, Inc., Cincinnati, Ohio



Before taking a close look at what will happen in fats and oils during the next decade, it might help to develop perspective in this bicentennial year if we take a look at agriculture 200 years ago and then 200 years in the future.

American agriculture has moved through many stages since 1776. The United States Department of Agriculture estimates that in 1776, 90 out of each 100 workers were farmers while in 1976 the number has shrunk to four out of each 100. At the time of the American Revolution, most farm tools differed little from those of 2,000 years earlier.

One of the earliest dramatic breakthroughs came in 1793 with the invention of the cotton gin. The second major development came as a result of the Civil War—a change from man power to horse power. The war induced labor shortages, high prices and actually, for the first time, plunged the American farmer into commercial production. While self-propelled gasoline tractors were on the market in 1892, it required nearly 50 years and World War II before the American farmer fully utilized the tractor and other mechanized equipment.

Mechanization is only one side of the story. Other developments included use of lime and fertilizer, use of cover crops and conservation practices, irrigation, improved varieties and breeds, hybrid corn, better livestock feeding, pest and weed controls, and other management improvements.

I believe that the agricultural revolution may be only in its infancy.

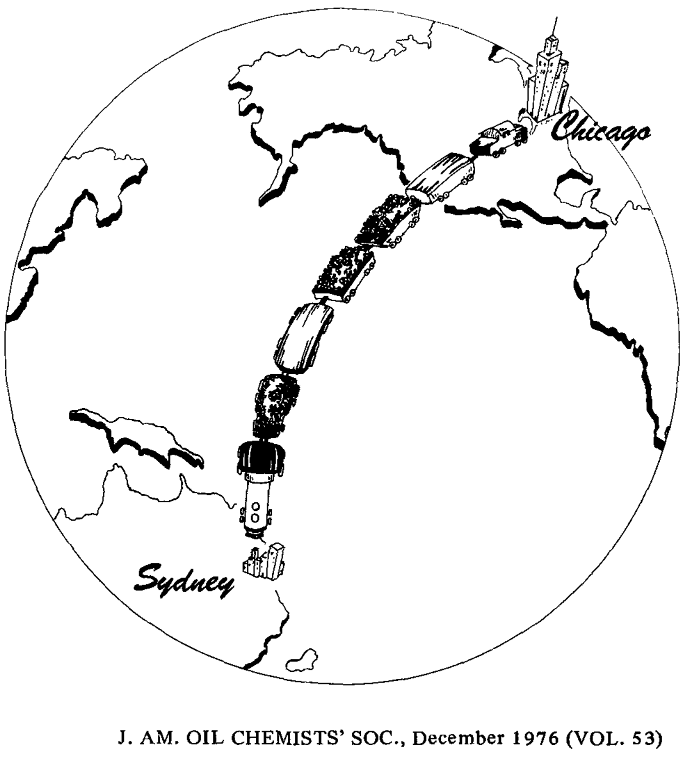
Here are a few of the developments which USDA researchers think might come to pass in the next 200 years:

- Minimum or no-till crop productions, to prevent wind and water erosion.
- Hybridizing of additional crops, including more cross-breeding (as in the case of crossing wheat and rye to produce triticals).
- Learning soil management techniques that would permit agricultural use of the fragile soils of the tropical rain forest.
- Biological rather than chemical control of harmful insects and diseases.
- Control of the tsetse fly, the vector of sleeping sickness in Africa, thereby opening for agricultural use vast areas of that continent that now lie idle.
- Successful long-range weather prediction, and possible weather modification.
- The use of satellites for worldwide crop reporting.
- Extension of the principle of nitrogent fixation to new groups of plants, in addition to legumes, thus cutting down the need for commercial fertilizer.
- The desalting of sea water, permiting human habitation and agricultural productions in lands now unused.
- Conquest of the fuel problem, probably by the use of nuclear energy.
- Greater environmental control for both plants and animals, providing more economic production and higher, more specialized quality.
- Advances in food technology, particularly the modification of plant protein so as to provide meat analogs to the many millions who cannot afford palatable and nutritious meat, milk, and eggs.
- The use of microbial action on various feedstocks (such as organic wastes or fossil fuels) for the direct production of feed and food.
- Improved understanding of relationships, so that computers will give us more sense and less nonsense.
- Most important of all, advances in family planning and in greater public acceptance of the replacement-sized family so that mankind might move out from under the Malthusian shadow.

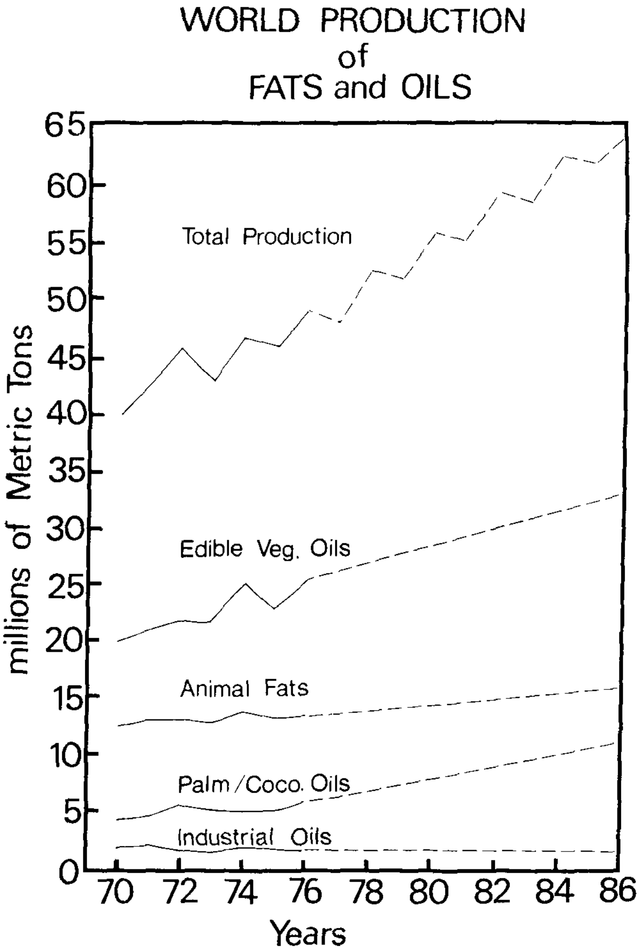
Certainly any company solving or partially solving the indicated problems could expect not only humanitarian rewards but also good corporate profits.

That's what may lie ahead in the next 200 years. Let's return to a look at fats and oils in the 1980s.

During the next ten years we will see dramatic developments in fats and oils. World production of fats and oils will increase from a level of 48.6 million metric tons in 1976 to a level in 1986 of approximately 64 million metric tons. The enormity of that figure—64 million metric tons—challenges the imagination. To try to comprehend it, imagine a train of jumbo tank cars—942,000 of them. If they were coupled together the train would stretch 9,000 miles, or approximately the distance from Chicago to Sydney, Australia.



[1]This paper was presented at the AOCS Fall Meeting in Chicago on September 29, 1976.



World production in 1971 and 1972 showed rapid growth, then fell in 1973. This type of erratic growth pattern—surges of growth followed by a setback—has been the general trend from 1970 to 1976. The pattern can be expected to continue through the 1980s. In countries such as the United States, economic changes can cause drastic shifts in acreage from soybeans to corns and cice versa.

How does that 64 million metric tons break down into the four major groups of fats and oils?

Edible vegetable oil (cotton, peanut, soybean, sunflower, rape, sesame, safflower, olive and corn oils) will grow from this year's 25.6 million metric tons to 32.9 million metric tons in 1986—an approximate 3 percent annual growth rate, based on USDA projections through 1980 and then extended linearly.

Animal fats (butter, lard, and tallow) will increase from 13.5 million metric tons in 1976 to 16.8 million metric tons in 1986, an approximate annual growth rate of 2½ percent.

Palm oils (palm oil, palm kernel oil, coconut and babassu kernel oil) are projected to grow from 6.6 million metric tons to 11.7 million metric tons in 1986. Certainly palm oils show the most dynamic growth at 7-3/4 per cent.

Industrial oils (linseed, castor, oiticica, and tung oils) show little or no growth. Formulations utilizing these oils may find tighter supplies in the 1980s.

It may appear that by 1986 the world would be swimming or drowning in fats and oils. My projections show an annual growth of just over 3 percent while world population is growing at a rate of 2 percent a year. However, sheer population growth is coupled with a desire for a better living standard or a rising per capita consumption of fats and oils. For example, the United Nations (FAO, 1971) has estimated that by 1980 world population will rise to 4½ billion people and per capita consumption of oils and fats will rise from 24 pounds in 1970 to 26 pounds in 1980. Within the United States, the level is expected to move from 55 pounds in 1975 to 60 pounds in 1980. On that basis, the total world demand for oils and fats would reach 53.3 million metric tons in 1980. Production will aproximate 54.5 million metric tons in 1980. The difference, if reached, will allow for a slight build in stocks. It is important to keep in mind the possible surge-setback pattern. The figures do illustrate a good balance of supply and demand—certainly no excesses or gluts during the next ten years.

One of my foremost objectives is to identify the dynamic areas of growth in world fats and oils during the next ten years. A key question at this point might be, do we have another important oil source ready to emerge during the next ten years? Looking back at palm oil in 1966 with a production of only 1.3 million metric tons or only 2.8 percent of the world supply, few would have predicted its rise in just ten years to 3.2 million metric tons and to 7 per cent of the world oil supply. Do we have any surprises similar to palm oil? I do not feel that this is probable. Economics at this point seem to favor other crops—soybean, wheat, rice, and corn.

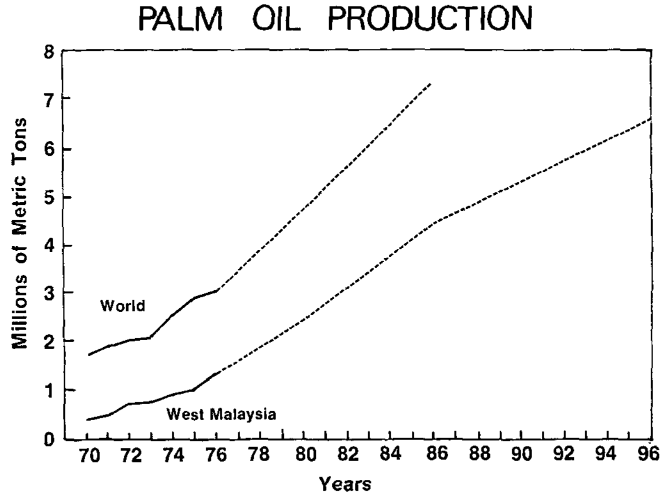
The two most important areas of growth in the next ten years will be soybean oil and palm oil. First, and the most important oil by virtue of both its production and export availability, is soybean oil. From a production standpoint, soybean oil accounted for 20 percent of the world total of fats and oils in 1976. Even more important is its magnitude as an exportable surplus making up 26 percent of world exports.

This huge oil production is generated almost as a by-product. When crushed, a bushel of soybeans yields about 11 pounds of oil; however, 47 pounds of soybean meal are simultaneously produced. A 1973 Wall Street Journal article noted, "The soybean is higher in protein than any other plant known to man" and is one of the major hopes for providing protein for the huge world populations of the future.

As shown by the crushing ratios of oil to meal, meal demand is critical to stimulate the raising of soybeans. Most soybean meal—probably as much as 99 percent—goes into animal feeding mixtures. The addition of soybean protein to feeding formulas helps animals gain weight at a rapid rate. As the world population grows, so will the desire for higher levels of protein in the form of beef, pork, and chicken. Thus an expanding need for soybean protein over the next ten years seems assured. The much-publicized use of soybean protein for direct consumption by humans will be of little significance over the 1976-1986 time period.

The United States is the world's largest soybean producer. Production has not increased smoothly from one year to the next. Each spring, U.S. farmers must decide how much acreage to plant in combination with which crops to maximize their efforts. Land good for soybeans may be planted with corn in the Midwest, cotton in the South, and summer wheat or flax in northern areas. Each crop has its own set costs, yields, and expected selling prices. For example, in the South this past spring cotton was planted in acreage planted the previous year in soybeans. The major reason for this change was that the world economy was showing strong signs of recovery and thus an increase in cotton fiber demand was expected.

In contrast with the U.S. farmer, the Brazilian grower does not need the same expertise in alternating crops. The U.S. farmer would expect yields of 91 bushels an acre for corn against 27 for soybeans; thus a crude selling price ratio of 3 to 1 would be necessary for a break-even point between the two crops (or soybeans at $7.50 and corn at



$2.50 for an oversimplified break-even point). The yield per acre of corn in Brazil is not much better than that of soybeans (maybe 40 bushels an acre); thus, the decision for Brazilian farmers is much less complicated.

Brazil is expanding soybean production rapidly. Between 1970 and 1976, production rose an average of 28 percent a year. U.S. growth during that period was about 5 percent a year, well above average for a crop of this type. The Brazilian soybean crop will continue to expand during the next ten years, but certainly not at rates of more than 20 percent a year. The pressure to balance trade deficits, particularly in petroleum, will help to encourage soybean expansion. The petroleum costs in Brazil have risen from $750 million in 1973 to $3 billion in 1975. Another objective of the Brazilian government is self-sufficiency in wheat which lends itself to double cropping with soybeans.

The real world challenge concerning soybeans is yield. From 1950 to 1973, U.S. soybeans yields have increased only six bushels an acre. By contrast, corn yields have increased 53 bushels an acre. The soybean is much more complex to hybridize than corn because it is self-pollinating. A breakthrough increasing the yield per acre for soybeans has been obtained in test fields, and several seed companies feel that they have developed seed capable of a 20 percent yield increase. A 20 percent increase in soybean yield would have a dramatic effect, particularly on U.S. production.

Palm oil, the other dynamic factor in oil production, offers an interesting contrast to soybean oil.

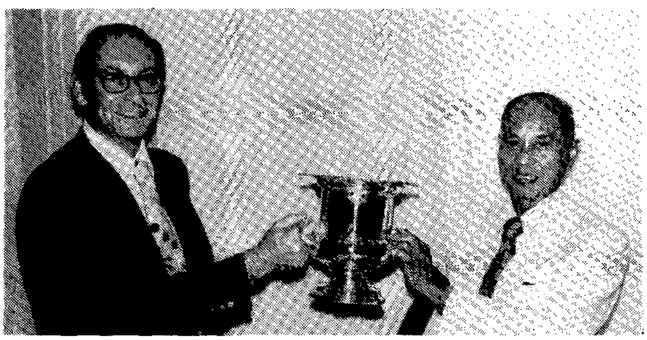
- While each year a planting decision is made concerning soybeans,the oil palm is planted and, after a four-year growing period, produces fruit for the next 30 years. This production is monthly through the entire year while the entire soybean crop is harvested at one time.
- Soybeans have a high protein meal co-product, and palm fruit produces a very poor quality meal.
- Oil palms out-produce soybeans on a per acre basis by a huge margin—3,500 pounds of oil vs. 290 pounds. The cost of production is quite low for palm oil—one estimated break-even point being 5.7 cents a pound without taxes.
- Palm oil contains a very high level of saturated fatty acids in contrast with soybean oil which is rated quite low.

Palm oil and particularly West Malaysian palm oil production will expand on an almost predictable course. At a recent conference, the Malaysians even projected 6.6 million tons production by 1995.

While total production of fats and oils is important, the figure most important to world trade is production over domestic needs. As an example, India is the world's largest groundnut producer with about 40 percent of the world's production, but its huge internal needs allow less than one percent of the crop to be exported.

By 1986, palm oils will account for 40 percent of the exports and soybean oil 35 percent. This would indicate that both oils will be available to the many nations of the world needing edible oils. ●

Northeast Section makes awards



Kak Yuen Tao, right, receives awards from Howard Gordon

Dr. John Monick, research associate at Colgate-Palmolive Co., received the Northeast Section Achievement Award for technical accomplishments and service to the section during the AOCS's section's September meeting.

Monick also presented a talk on how research is conducted in industry.

Also honored at the meeting was section past-president Kak Yuen Tao who received (from Howard Gordon, current vice president) a plaque and cup in recognition of his services as section president. Tao is a research chemist with W.A. Cleary Corp.

The annual awards achievement dinner was held Sept. 14 at the Robin Hood Inn in Clifton, NJ. ●

'78 Posts Filled

Robert Burton, general chairman for the 1978 AOCS annual meeting in St. Louis, MO, has appointed Robert Liss and Harold Nicholas to head the technical program committee.

Liss is manager of research and development for Monsanto Co. in St. Louis. Nicholas is a professor of biochemistry at the St. Louis University School of Medicine. Burton said the appointments were made to be certain that the final program would reflect both the industrial and academic interests of the society's membership.

James Willard Jones, president and general manager of PVO International Inc. in St. Louis, will be chairman of the finance committee for the meeting. Barbara J. Struther, project leader with Ralston-Purina, will head the registration committee.

The meeting will be held May 14-18, 1978, in the Chase-Park Plaza Hotel. It will be the first AOCS meeting in decades to follow the previous national meeting by a full year. ●

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508 South Sixth Street
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