FIG. 1. This old-fashioned oil expressing plant is one of 124 oil refineries in Taiwan.

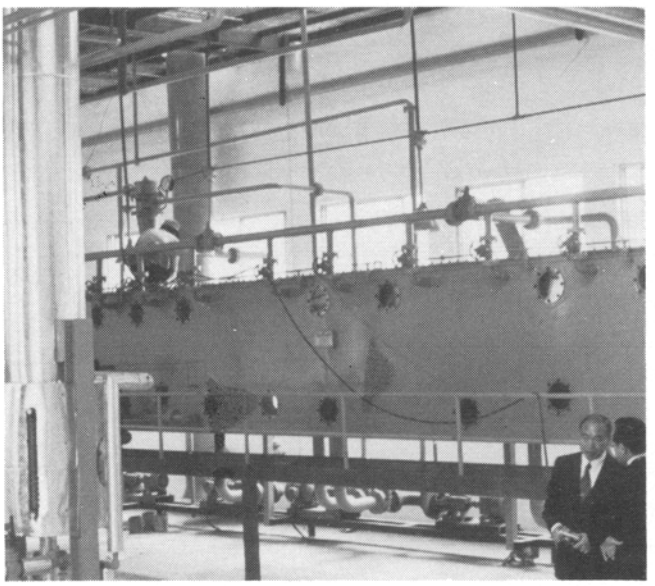

FIG. 2. Thirty-six Taiwanese oil refineries have facilities similar to those in this ultramodern solvent extraction plant.

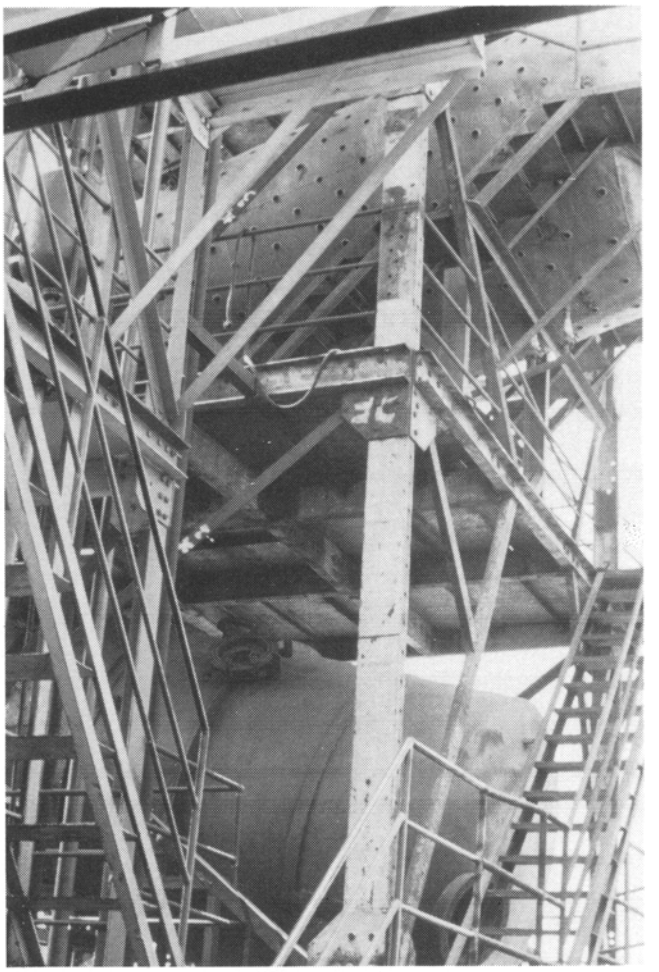

FIG. 4. This semicontinuous deodorizer was designed and built in Taiwan.

FIG. 3. Beautifully landscaped grounds surround this modern oil refinery.

on visit to Taiwan's labs and refineries

Stephen S. Chang, past president of the AOCS and of the AOCS Northeast Section, recently served as an adviser to the National Science Council and a consultant to the Ministry of Economic Affairs of the Republic of China. During March 25th to April 14th, he visited 14 oil refineries and three laboratories and gave four lectures, according to a schedule arranged by the Joint Commission on Rural Reconstruction.

Manufacturing facilities range from old-fashioned to ultramodern

Chang found that the oil refineries in Taiwan ranged from old-fashioned, primitive oil expressing (Fig. 1) to ultramodern, continuous solvent extraction and refining (Figs. 2-4). There are a total of 124 oil refineries in Taiwan, 36 of which have solvent extraction facilities. Approximately 12 of the refineries have a capacity for crushing 85-300 tons of soybeans daily.

Hydrogenation is uncommon in Taiwan; only three companies have hydrogenation plants. Margarine and shortening are only used for western-type bakery products. However there is a modern plant in Taiwan specializing in the manufacture of margarine and shortening (Fig. 5). The quality of Taiwanese shortening and margarine is rather poor, and the bakers are complaining of the poor quality; however they do not know exactly what they want. Neither the manufacturers nor the users know how to set up specifications for margarine and shortening.

Most of the oil refineries in Taiwan are built by European and Japanese companies. There are three large plants under construction, one by Lurgi, one by DeSmet and the other by Crown. Since oil consumption in Taiwan is increasing rapidly and since there is the possibility of exporting to other Southeast Asian countries, more new oil refineries will probably be built in Taiwan. There are at least two companies planning to do so at the moment, and these companies have asked Chang if it would be possible to purchase such plants from American companies, because they don't know whom to contact. Any American company with the necessary technical know-how, interested in building oil refineries in Taiwan, should contact Stephen S. Chang, Professor of Food Chemistry, Department of Food Science, Rutgers State University, P.O. Box 231, New Brunswick, N.J. 08903.

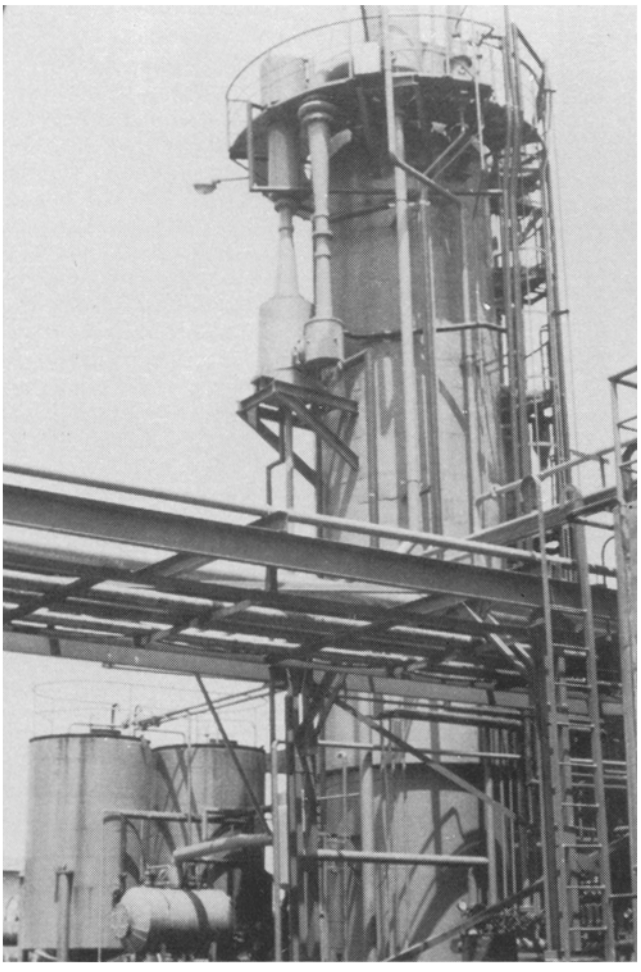

FIG. 5. This modern plant specializes in the manufacture of margarine and shortening, although those products are used only for western-type bakery goods.

Quality control and research labs poorly equipped

Most of the quality control laboratories of the oil refineries in Taiwan are poorly equipped. Only one company has a small research laboratory. Consequently the quality of the oils produced in Taiwan at the moment is only fair. Practically all the soybean oil samples, the most commonly used oil in Taiwan, tasted by Chang were highly reverted.

Consumption of fats and oils increasing

The per capita consumption of fats and oils in Taiwan is increasing very rapidly. In 1966, the per capita consumption was 5.0 kg, out of which 3.0 kg were vegetable oils and 2.0 kg were animal fats. In 1970, the per capita consumption had increased to 7.7 kg, including 5.6 kg of vegetable oils and 2.1 kg of animal fats. The animal fat consumed in Taiwan is essentially lard. The vegetable oils are mainly soybean oil made from soybeans imported from the U.S. Currently ca. 70 million U.S. dollars worth of soybeans are imported by Taiwan each year. Peanut oil is the next commonly used vegetable oil. Others are sunflower, safflower, sesame, ricebran and coconut oils. A small amount of rapeseed oil is also produced. Recently one company started manufacturing corn oil.

Associations and publications work to improve industry

There are two associations in Taiwan concerning fats and oils: the Taiwan Vegetable Oil Association and the American Soybean Institute. Both are doing an excellent job in improving the edible fats and oils industry in Taiwan. They

FIG. 6. The *Journal of the American Oil Chemists' Society* is prominently displayed in a Taiwanese library. Stephen S. Chang (left) is shown with Shiu Lee of the Joint Commission on Rural Reconstruction.

publish jointly a monthly journal entitled *Soybean and Oil Manufacturing*, which is widely distributed in Taiwan.

Chang was delighted to find the *Journal of the American Oil Chemists' Society* in several libraries in Taiwan (Fig. 6). He also found a number of potential AOCS members.

Chang offers 23 recommendations

At a final meeting chaired by Y.S. Sun, Minister of Economic Affairs, in the presence of representatives of all the involved government agencies and institutes, Chang made 23 recommendations to improve the edible fats and oils industry in Taiwan. It was decided that the oil refineries in Taiwan, through the Joint Commission on Rural Reconstruction, will select two technical experts each year to receive training in the U.S., based at the Food Science Department of Rutgers State University. It was also decided that an edible fats and oils division will be set up in the Food Industry Research and Development Institute in Hsinchu, Taiwan. This institute has a large modern office and laboratory building and is excellently equipped. The new edible fats and oils division will be financially supported by placing a small amount of extra tax upon each ton of soybeans imported to Taiwan.

Chang is now searching for an American oil chemist with both academic and industrial experience to head this new edible fats and oils division. The responsibility of this division is to set up a model quality control laboratory and to use basic chemical principles to assist the edible fats and oils industry to solve its practical manufacturing problems and to improve the quality of its products. This American specialist will stay in Taiwan for 1-2 years. At the same time the National Science Council will sponsor a Chinese specialist to receive education and training in the chemistry and technology of fats and oils in the U.S. At the end of 2 years, the Chinese specialist will return to Taiwan to head the division in the Food Research Institute and to allow the American oil chemist to return home.

Those who enjoy travel and would like to help developing countries might find this assignment extremely interesting. It also offers an opportunity to enjoy the traditional hospitality of the Chinese people. Since the Taiwanese Government is prepared to pay the oil chemist's salary and expenses in U.S. dollars and since the living cost in Taiwan is extremely low, this assignment might also offer someone an opportunity to make a significant saving. Any qualified American oil chemists who are interested in this assignment should contact Chang directly.