formulated for specific applications and this, too, tends to limit the possibility of economies from larger scale.

Polymerization polymers realize significant cost savings with increasing scale. These include the large-volume thermoplastics such as polystyrene, polyethylene, polypropylene and polyvinyl chloride. With the exception of polyvinyl chloride and polyvinyl alcohol, the U.S. has historically had an advantage in scale of production and, therefore, in the costs of producing these materials. The use of natural gas raw materials has added to this advantage. However, the conversion of foreign production from a coal base to oil and gas, now underway and largely accomplished, removes this relative advantage. And, the advantage of scale is also shifting as foreign producers expand their capacities. It is projected that, by 1970, the U.S. will no longer enjoy any production cost advantages in the polymerization polymers, and, in fact, may even be subject to disadvantages in both raw material and labor costs.

Research and development costs, application engineering costs, and the costs of technical assistance to customers are considerably higher in the U.S. than in foreign countries. These costs are higher both in absolute amount and as a percentage of sales. They have been necessary for the rapid growth of the industry and perhaps are the major reason for this growth. We now see a significant expansion of these activities in other major producing countries. Since most of these costs are the employment costs of scientists, engineers and technicians, the higher salary costs in the U.S. appear to assure a continuing competitive advantage for foreign countries in this area.

World competitive cost trends hold little promise for the U.S. maintaining any continuing cost advantage. In the condensation polymers, where the U.S. is even now at a disadvantage, we see little likelihood of closing the gap. In the large-volume polymerization polymers, we see the probability of loss of our present advantage through the increasing scale of production abroad as well as the lower raw material and labor costs enjoyed by foreign producers.

3. Comparative world prices

Two difficulties are encountered in making price comparisons among the domestic markets of the major producing countries. First is the problem of obtaining reliable price information since it is not customary to use published price sheets in other countries. Second is the problem of establishing comparability in product grade and quality, and in terms of sale.

In spite of these difficulties, some general conclusions can be drawn:

(*a*) Many prices are lower in other countries than in the U.S. This tends to be the case where the plastic material has been produced for a number of years, has well-developed applications, and has adequate production capacity. Lower foreign prices are more typical for condensation polymers than for polymerization polymers. However, in the case of some of the more mature polymerization polymers such as polyvinyl chloride, polyvinyl alcohol, and acrylics, foreign prices are found to be below those in the U.S.

(*b*) On the other hand, some prices are lower in the U.S. than in other markets. Ordinarily, this tends to be the case with the large-volume polymerization polymers and in a limited number of the specialty materials.

(*c*) Tax-paid delivered cost should be the basis of comparison between the U.S. prices and foreign prices for plastic materials. In this country, the normal price quoted is a delivered price, including freight to customer which is estimated to average about one cent per pound. In other countries, price is typically quoted f.o.b. with freight for buyer's account.

(*d*) In order to sell at competitive prices in world markets, giving consideration to the costs of ocean freight, foreign duties, and taxes, it appears that the justification for export sales in many major producing countries is based on the economics of incremental costs.

4. Technical contribution of major producing countries

All major producing countries have made substantial technical contributions to the industry, and this technology has been disseminated to the point where all such countries today have virtually the same technical capabilities. No country has a dominant technical position, or a patent structure, which gives it a competitive advantage.

5. Tariff rates

Tariff rates for the major plastic materials are summarized in Appendix A, attached to this statement. Pre-Kennedy Round, Kennedy Round, and Kennedy