On the basis of expected increases in crude running, reforming should increase as shown on the lower dotted line of Fig. 2. However, at the same time octane requirements are also increasing so that the upper dotted line probably represents more closely the future trend for catalytic reforming.

On the basis of averages published by the licensors of all of the reforming processes, we have then arrived at the quantity of platinum being used at any one time, and this is shown graphically in Fig. 3. Thus, we would expect that there would be in use for reforming catalyst purposes about 2,200,000 troy ounces of platinum by the end of 1964, and that new installations at that time would require about 60,000 ounces per year on a more or less continuing basis.

In addition to the larger bulk of platinum on catalyst either in use, or being made for use, there is a small but regular consumption of platinum in the manufacture of fresh catalyst, in the loss of catalyst during use and in handling at the petroleum refineries, and in the processing of spent catalyst for platinum recovery. As shown in Fig. 4 this amounted to about 30,000 ounces in 1956, and we would expect it to reach approximately 70,000 ounces by 1965, which would then represent a continual consumption about equal to the platinum requirements for catalyst for new units.

With the rapid spread of catalytic reforming to the rest of the world, and the greater proportion of straight-run naphtha in the motor fuel for these markets, it would appear probable that the total world requirement for platinum in the petroleum industry could be estimated by taking a ratio of total crude throughput to U.S. throughput, with perhaps a two to three year lag in the platinum uptake.

Special Platinum Alloy Thermo-Junctions

RAPID MEASUREMENT OF THERMAL CONDUCTIVITY

A platinum alloy thermocouple junction which closely resembles a single wire, uniform in size, in electrical resistivity and in thermal properties from end to end has recently been developed and produced by the Research Laboratories of Johnson Matthey & Co. Limited in collaboration with Mr. R. A. W. Hill, of the Research Department of the Nobel Division of Imperial Chemical Industries Limited, for use in a new method of measuring the thermal conductivities of poor conductors.

As described by Mr. Hill in *Proc. Roy. Soc. A*, 1957, **239**, 476-486, the principle of the method is to observe the rate of heating of a fine wire when a constant radio-frequency current is passed through it, the wire being maintained first surrounded by air and then surrounded by the liquid or other medium of which the thermal conductivity is to be measured. By comparing the heating curves of the wire in the two environments, the thermal conductivity of the medium can be determined. The measurement can be made in less than one-tenth of a second.

In order to measure its temperature, the wire is made in the form of a thermo-junction of two 40 SWG wires chosen to have the same resistivity, and the thermo-e.m.f. is observed by an oscillograph.

The alloys used for the two elements of the thermo-junction were finally chosen, after experimenting with a number of combinations, as (a) platinum with 8 per cent gold and (b) platinum with 2 per cent ruthenium. The electrical resistivities of these alloys are closely matched and the couple develops about 15 microvolts per degree C. The couple wires were welded together and the junctions drawn down in a die to the diameter of the wire so as to be quite invisible to the eye. By this means, it has been found possible to apply this method to small, rapidly changing systems at high temperatures. The accuracy has been checked by measurements on medicinal paraffin, glycerol, and water.