glass, coloured glass, lead crystal and borosilicate glass, the advantages including flawless industrial and household glass and an exceptional constancy of weight. The author concludes that increased production and efficiency can definitely be furthered by the use of platinum components at a number of the most crucial locations.

A New International Thermocouple Standard

The International Electrotechnical Commission (IEC) based in Geneva is instrumental in forming new standards of measurements. Since all the industrialised nations of the world are represented on the IEC technical committees considering topics in which they have a special interest the decisions or agreements reached express as nearly as possible an international consensus of opinion on the subjects dealt with, and so promote international unification.

Of particular significance in the field of temperature measurement was the approval in 1978 of IEC Publication 584–1 "Thermocouples. Part 1: Reference Tables" containing the tables for use in converting thermocouple voltages into their equivalent measured temperatures and vice versa, which was reported here earlier (P. I. Roberts, *Platinum Metals Rev.*, 1978, **22**, (3), 89). These tables confirmed the e.m.f.-temperature relationships detailed in the British Standards Institution Publication B.S. 4937: Parts 1–7: 1973/74 and the U.S. National Bureau of Standards Monograph 125. Since that time a number of national standards—including those of Japan (JIS 1602) and Germany (DIN 43710)—have been re-issued to bring them into line with IEC 584–1.

However, even in 1978 it was realised that an international standard was required to define the manufacturing tolerances of thermocouples satisfying Part 1 of the standard. The relevant British Standard, B.S. 1041: Part 4: 1966 "Thermocouples" included a section on thermocouple tolerances, but was not considered to form an acceptable basis for an international standard, particularly as the tolerances applied to the noble metal thermocouples varied in a step-wise manner rather than increasing linearly with temperature. Now a new standard, IEC 584–2 has been issued.

Platinum Metal Thermocouples

The new standard contains the manufacturing tolerances for both noble and base metal thermocouples and representatives of Johnson Matthey Metals Limited and Engelhard Industries Limited assisted the relevant subcommittees of the British Standards Institution during the preparation of their comments on the IEC proposals relating to the three recognised noble metal thermocouple combinations, namely:

Type S: 10 per cent Rhodium-Platinum: Platinum
Type R: 13 per cent Rhodium-Platinum: Platinum
Type B: 30 per cent Rhodium-Platinum: 6 per cent Rhodium-Platinum

The National Committees of twenty-one major industrialised countries voted explicitly in favour of publishing the new standard.

IEC Publication 584–2 "Thermocouples Part 2: Tolerances" gives tolerance values for thermocouples manufactured in accordance with IEC 584–1 as delivered to the user but does not allow for calibration drift during service. The tolerance values for the noble metal thermocouples are tabulated below, t being the temperature in degrees Celsius; the greater value applies.

The new tolerance standard is to be adopted by the British Standards Institution and an equivalent British Standard will be issued in due course. P.I.R.

Thermocouple Type	Temperature Range °C	Tolerance Class		
		1	2	3
R or S	0–1600	± 1 °C or ± [1 + 0.003(t − 1100)]°C	± 1.5°C or ± 0.0025t	Not applicable
B	600–1700	Not applicable	± 1.5°C or ± 0.0025t	± 4°C or ± 0.005t