investigations are currently in progress.

Several clinicians indicated means by which the nephrotoxicity could be significantly limited. E. Cvitkovic and his colleague also of the Sloan Kettering Memorial Institute, New York, have hydrated patients prior to treatment and administered mannitol (a diuretic) to promote urine flow, along with the *cis*-Pt(II). This technique allows much higher doses to be given and greatly improved therapeutic results are being obtained. There are indications that the higher dose therapy will cause a wider range of tumours to respond. C. Merrin of Roswell Park, Buffalo, reported that they had found a dose schedule comprising multiple small doses to be equally effective in this respect.

Reports on *cis*-Pt(II) given in combination with other chemotherapy agents were particularly encouraging and this represents another way of overcoming the toxicity. Results for testicular cancer involving *cis*-Pt (II) with Bleomycin and Vinblastine reported by L. H. Einhorn of Indiana University Medical Centre, were outstanding although true judgement must await a larger sample of patients. E. Wiltshaw of the Royal Marsden Hospital, London, stated that *cis*-Pt (II) was as good as any other single agent in the therapy of ovarian tumours and initial results indicated that in combination a considerable improvement was obtained.

Clinical Trials with Newer Platinum Compounds

The only report of clinical trials on other Pt compounds came from the Wadley Institutes of Molecular Medicine where trials on [Pt A(malonate)] (A=1,2 diaminocyclohexane) are in progress. Some responses have been observed but the results are of too preliminary a nature to draw conclusions as yet. Clinical testing of platinum uracil blue and *cis*-[PtA_2Cl_2] (A=cyclopentylamine) has been discontinued. Clinical trials on [PtA(sulphate)] (A=1,2 aminocyclohexane) will start shortly.

Exhaust Gas Sensors Aid Emission Control

ZIRCONIA DEVICES UTILISE PLATINUM ELECTRODES

The purification of automobile exhaust gases by platinum group catalysts can be most consistently achieved when the engine is operated with an exactly stoichiometric air/fuel ratio. One way of achieving this state is by monitoring the oxygen content of the exhaust gas and using the information to control the input of air to the engine. This requires an instrument which can reliably detect the variations in oxygen concentration.

Exhaust sensors consisting of a ceramic tube of stabilised zirconia closed at one end and having porous platinum electrodes on both the inner and the outer surfaces have been developed for this purpose. The sensor is inserted in the exhaust system so that the exhaust gases flow over the outer platinum anode while the platinum cathode on the inner surface is open to atmosphere. As the sensor is heated by the engine exhaust the ceramic becomes conducting to oxygen ions and, as the partial pressure of the oxygen on the two sides of the device is different, an electrical potential is generated between the two electrodes. A change in voltage occurs whenever the composition of the exhaust changes, for example from 'rich' to 'lean' or vice versa. This signal is a measure of the air/fuel ratio and can be used, via a closed loop circuit, to control any departure from stoichiometry.

While the sensor voltage can be calculated from the appropriate thermodynamic relationship, actual sensor behaviour can differ from this ideal, and such departures are detrimental to the performance of the systems they control. In a recent article W. J. Fleming of General Motors Corporation, Research Laboratories (*J. Electrochem. Soc.*, 1977, **124**, (1), 21–28) describes work to derive a physical model of a non-ideal sensor. The physical processes involved in the function of zirconia exhaust gas sensors are examined and a theory to account for the departure from ideal behaviour is presented.