century, although it is expected that both the catalysts and the processes will have been improved by continuous development. Hopefully, further deterioration in the environment will be prevented, and both existing and foreseen platinum metal technology has much to contribute to this.

By the year 2000 diminished reserves of gaseous and liquid fossil fuels will be conserved by the more efficient use of fuels, as in the catalytic engine, while fewer losses will occur when electrical energy is generated directly from the fuel. Chemicals and fuels will be manufactured from more widely available feedstock, principally synthesis gas produced from coal using platinum group metal catalysts.

Although widely used at present, platinum group metal catalysis will undoubtedly have an even greater role to perform at the start of the next century.

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Platinum Anti-Cancer Drugs

More than 30,000 cancer patients in the United States of America are now being treated each year with a combination of drugs which includes Cisplatin. This combination is particularly effective against testicular cancer but Cisplatin is also approved by the Food and Drug Administration (F.D.A.) for first line therapy of ovarian and bladder tumours. These three tumours affect over 60,000 of the 800,000 new cancer cases reported in the U.S.A. each year. Marketed by Bristol-Myers of New York—who in their 1983 Annual Report to stockholders included a special report on the search for new anti-cancer drugs—Cisplatin is now the leading anti-cancer drug in the U.S.A. and is also registered widely in Europe and most recently (1984) in Japan. The compound resulted from a research programme started at Michigan State University in 1965 and sponsored by Rustenburg Platinum Mines and Johnson Matthey. It was developed into a viable product by way of a major project by Johnson Matthey in association with universities, institutes and hospitals in the United Kingdom and in the U.S.A. To produce the drug, Johnson Matthey Inc. set up a special unit at West Whiteland, Pennsylvania in 1978, built to standards approved by the F.D.A. The bulk drug is supplied to Bristol-Myers for conversion to the final dosage form, suitable for patients treated intravenously, although alternative treatment routes are being investigated.

Work on less toxic analogues of Cisplatin, namely Carboplatin and Iproplatin, was reported at the Second International Platinum Group Metal Chemistry Conference at Edinburgh, in July 1984. As with Cisplatin, research on the chemistry and pharmacology of these two compounds was progressed by Johnson Matthey through collaborative projects with U.K. institutions notably the Royal Marsden Hospital/Institute of Cancer Research (London) for Carboplatin, and the Christie Hospital/University of Manchester Institute of Science and Technology for Iproplatin. Bristol-Myers have licensed these compounds from Research Corporation and Johnson Matthey, respectively. A major comparative clinical study for these compounds and Cisplatin is now in progress in parallel with the registration procedure for Carboplatin in Europe. Preliminary results show promising activity against a number of other tumours suggesting that a greater proportion of cancer patients will benefit from platinum chemotherapy in the late 1980s.

P.C.H.