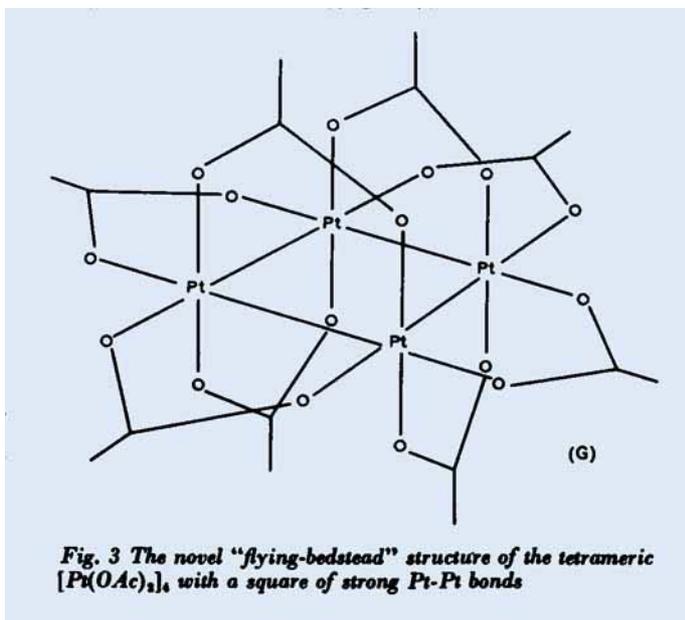


involving 5-coordinate osmium. A similar structure [D] has been found for the monomeric complex  $(C_2H_4O_2)_2OsO_4$ , showing that osmium can bridge two C-C linkages in both monomer and dimer. It was suggested that  $OsO_4$  could also attack -SH and -NH<sub>2</sub> groups in proteins; a complex of hexamethylene tetramine with  $OsO_4$  has the structure [E]. The Os-N bond length is very large (2.42Å) explaining why the  $OsO_4$  can be readily vaporised from the complex.

Using the large cation  $[Ph_4As]^+$  to minimise packing effects on the anion, it has been found that in the tetraphenyl arsine complexes, the anions  $[OsNCl_4]^-$ ,  $[OsNI_4]^-$  and  $[RuNCl_4]^-$  are isostructural having  $C_{4v}$  symmetry and a short  $M\equiv N$  and large M-halogen bond lengths.

In contrast to this, in the complex



$Ru(NPEt_2Ph)Cl_3(PEt_2Ph)_2$  (structure [F]) the Ru-N bond is longer than expected for a single bond while the P-N bond is somewhat shorter than in a P=N double bond.

Finally Dr Skapski referred to the novel "flying-bedstead" structure of the tetrameric  $[Pt(OAc)_2]_4$  involving a square of strong Pt-Pt bonds (Fig. 3, [G]).

G. W.

## Advances in Platinum Metallurgy in Russia

**Physical Metallurgy of the Platinum Metals** BY E. M. SAVITSKII, V. P. POLYAKOVA, N. B. GORINA AND N. R. ROSHAN, Metallurgiya, Moscow, 1975, 242 pages

Over the past ten years or so a great deal of original work on the platinum metals has been carried out in the Metallurgical Institute of the U.S.S.R. Academy of Sciences in Moscow and this volume, contributed by four of the leading workers in the Institute's laboratories, brings up to date the whole subject of their physical metallurgy and metal physics.

The background knowledge on the structure and properties of the platinum metals and their many alloys is, of course, adequately covered, but much newer material has to do with their work on single crystals of the pure metals and with the interaction of the platinum metals with almost every other element and the nature and structure of the resulting intermetallic compounds.

There are sections on metallography—including field ion emission—and a full range of equilibrium diagrams of the alloy systems.

The book is described as being written for workers in the Russian noble metals industry to familiarise them with developments in the physical metallurgy of the platinum metals since the publications of V. A. Nemilov and A. A. Rudnickii which appeared some thirty and twenty years ago respectively, and a great deal of valuable information has indeed been compressed into a relatively small volume.

There are in all 499 references, the great majority of them to Russian work, although some of the leading British, German, American and Japanese workers in this field receive honourable if brief mention.

L. B. H.