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**SOME TRANSITION METAL COMPLEXES OF A
NOVEL DIPHOSPHINE LIGAND**

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Presented by

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The design and synthesis are described of a novel sterically-constrained diphosphine ligand, 2,11-bis(diphenylphosphinomethyl)-benzo[c]phenanthrene (PCPH_2), and the physical and spectroscopic properties of the complexes formed between this ligand and a number of transition metal ions are discussed in terms of the stereochemistry of the complexes.

Nickel(II)halide and pseudohalide complexes $(\text{PCPH}_2)\text{NiX}_2$ are shown to have square planar structures in which the diphosphine spans trans-positions whilst cobalt(I) complexes $[(\text{PCPH}_2)\text{Co}(\text{CO})_3]^+$ and $(\text{PCPH}_2)\text{Co}(\text{CO})_2\text{X}$ ($\text{X} = \text{halide}$) are probably 5-coordinate. A bimetallic cobalt(III) complex involving diphosphine bridging is described and a tetrahedral environment about the cobalt atom is established for the complex $(\text{PCPH}_2)\text{CoCl}_2$. Depending upon the particular metal and upon the nature of X, the complexes $(\text{PCPH}_2)\text{MX}$ ($\text{M} = \text{Cu}, \text{Ag}, \text{Au}$) may be either 2-coordinate ionic species or 3-coordinate covalent species and, in some cases, there is evidence for these two structures existing in equilibrium in solution. The 3-coordinate complexes $(\text{PCPH}_2)\text{MCl}$ ($\text{M} = \text{Cu}, \text{Ag}$) are shown to have distorted trigonal planar structures in the solid state.

It is concluded that the steric properties of the ligand PCPH_2 show significant deviations from those predicted.