of the old *z* axis and also confine rearrangement of ligands to the *xy* plane. We conclude that rearrangement will and can only occur to the trigonal bipyramid with X apical (B) and that attack by the entering water molecule will be limited by the electron distribution to the equatorial plane, with the same cis-attack symmetry rule as for bipyramid A. This intermediate can lead, therefore, only to *cis*-aquo-X product in the theory. The last possibility, loss of the axial L from the $^4B_2$ state, seems highly improbable as there is no labilization on this axis. If, however, it did occur, it would be expected to give a tetragonal pyramid of high reactivity, with a doubtful urge to rearrange to any trigonal bipyramid. It would therefore react with retention of configuration and would be expected to yield trans product exclusively. We consider it so improbable, however, that we do not entertain it as a real possibility.

We conclude that the VC theory predicts (1) that axial and equatorial ligand loss from the ^4E state lead to the same trigonal bipyramid and therefore give rise to the same product stereochemistry[6] and (2) that equatorial ligand loss from the $^4B_2$ state of $[CrL_5X]^{2+}$ leads eventually only to cis aquo product.

These predictions cannot account for the high proportion of trans product found as a result of equatorial ammonia loss in $[Cr(NH_3)_5F]^{2+}$, and we conclude that the VC theory of the stereochemistry cannot be correct. The author has argued before[7] that the unique features of the stereochemistry of Cr(III) photoreactions likely relate to the vacant t_{2g} orbital in the excited state, which enables bonding of an entering ligand, and that reaction by a concerted mechanism involving a seven-coordinate transition state is the most likely explanation of the stereomobility of the process. A theory along these lines would be most useful.

Registry No. *trans*-$[Cr(en)_2NH_3F]^{2+}$, 58410-71-2; $[Cr(NH_3)_5F]^{2+}$, 65982-64-1; *cis*-$[Cr(en)_2(NH_3)_2]^{3+}$, 66008-06-8.

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(6) It should be noted that, for loss of the equatorial ligand from ^4E, the trigonal-bipyramidal intermediate is produced in an excited state for which the symmetry restrictions now require trans attack of the entering ligand. If one accepts the possibility of reaction by the five-coordinate excited-state intermediate, then this explains the trans product from this reaction mode and suggests that the equatorial mode arises from the ^4E state, *inconsistent* with findings of wavelength and temperature dependence in other complexes. The author acknowledges helpful discussions on the theoretical aspects with A. Ceulemans (Koln, 1978).
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Relationship of the *styx* Rules to Wade's Rules

Sir:

For simplicity, consider a neutral boron hydride B_pH_{p+q} in which there is one external terminal hydrogen on each boron. The *styx* rules[1,2] were formulated from the electrons of the inner polyhedral surface,[2] neglecting bonds to the outer surface of the external hydrogens, as

$$s + x = q$$

$$s + t = p$$

$$t + y + (q/2) = p$$

and hence are related to the total electron count of the inner surface. Addition of the first equation to the last yields

$$s + t + y + x = p + (q/2)$$

Either side of this equation is recognizable as the number of bonding pairs. Wade's rules[3] then follow upon identification of *q* values of 2, 4, 6, and 8 with the closo, nido, arachno, and hypho types of boron hydrides, corresponding to the earlier formulation initiated by Stock of B_pH_{p+2}, B_pH_{p+4}, B_pH_{p+6}, and B_pH_{p+8} series and to examples were addition of electrons open the polyhedra.[2]

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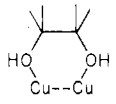
The Reaction Product of Uridine with Dimeric Copper Acetate: Not a Monomer

Sir:

Biological processes which distinguish between ribo- and deoxyribonucleosides frequently involve metal ions.[1] Berger et al.[1] have presented evidence that dimeric copper(II) acetate ($Cu_2(OAc)_4$) in dimethyl sulfoxide (Me_2SO) reacts with ribonucleosides to form a unique type of dimeric complex in which the 2′ and 3′ furanose hydroxyl oxygens interact with each of the Cu atoms as in I. The distance between the O atoms is 2.7 Å and that between the Cu atoms in $Cu_2(OAc)_4 \cdot 2H_2O$ is 2.64 Å. Deoxynucleosides which lack analogous hydroxyl groups cannot form such a complex. The validity of this intriguing dimer model has been questioned.[2-4] The principal objection offered in the literature is that the available spectroscopic data can be accommodated by monomeric Cu(II) species.[2,3]



I

Some important observations reported earlier[1] for Me_2SO solutions of $Cu_2(OAc)_4$ include: a 50% hypochromic effect at ~715 nm upon addition of various ribonucleosides, no spectral change upon addition of pyrimidine deoxynucleosides, and a stoichiometry of one ribonucleoside to one $Cu_2(OAc)_4$ dimer.

Frozen Me_2SO solutions of $Cu_2(OAc)_4$ and ribonucleosides were investigated later by Brun et al.[2] using ESR. These frozen solutions had signals which were attributed to monomeric Cu(II) complexes. Without any experimental justification, it was concluded that monomers must also be formed at ~300 K. The visible spectral changes accompanying the