dispersed in solution (400 ml.) was negligible. The theoretical curve, Fig. 2, was made to coincide with the initial part of the experimental curve by assuming that one atom of antimony deposited on a pure nickel surface alters the hydrogen-evolution characteristics of 2·6γ surface nickel atoms, where $\gamma \geqslant 1$ is the surface roughness factor. Experimental details and theory will be given elsewhere.

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[2] Joliot, F., *J. Chim. Phys.*, **27**, 119 (1930).

Mr. Peers presents a solution to the technical problem of mounting a metal film in contact with a solution in such a way that cements, etc., do not cause contamination of the solution. Mr. Peers's solution of this problem is not compatible with the gradual approach of solution to the metal surface which is a characteristic feature of the method described by us. This method of gradual approach is necessary when the solution background exceeds a small fraction of the radiation from the adsorbed amount (Fig. 1 in our communication). However, Mr. Peers points out that the background from his solution was negligible compared with the activity of the adsorbed amount. Simple computation indicates that the maximum concentration of adsorbable species in the solution has to be smaller than about 10^{-6} mole $l.^{-1}$ in Mr. Peers's method. Our technique enables determinations of adsorbed amounts (with a precision of 0·1 of a monolayer) up to concentrations of adsorbate in the solution of about 10^{-3} mole $l.^{-1}$.

It may be mentioned that the problem of bringing the metal film in contact with the solution without causing contamination to the solution has also been solved by us, though in a different way from that now described by Mr. Peers. One method used by us consists in mounting the metal foil flush on a holder in such a way that the foil covers the edges and sides of the holder. Another technique consists of evaporating a metal film on a mica foil fused to the edges of a glass cylinder which surrounds the counter, using a low-melting glass. These details were excluded from our brief communication. A full account of the results will be published elsewhere.

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Structure of the Trinuclear Basic Acetates

The trivalent metal ions, for example, Cr^{3+}, Fe^{3+} and Al^{3+} form a variety of basic acetates which are usually supposed to contain complex ions of the type $[M_3(Ac)_6(OH)_2]^+$ (refs. 1 and 2). In addition, a very few compounds containing only one hydroxyl group have been described[2]. The whole group of compounds is of considerable interest in view of their unusual magnetic properties[3,4].

The following are among the most significant findings of the many studies which have been reported. (1) The great majority of compounds contain six or more acetate groups for each group of three metal ions. (2) Trinuclear complexes are formed only if the complex ion can be formulated to contain either hydroxyl groups or water molecules, that is, one cannot replace 'hydroxyl' groups by halide ions. (3) Strong magnetic interactions occur between the metal ions[3,4].

Here I wish to propose a structure for the group of compounds based on the experimental evidence. First, we suppose that each metal ion is octahedrally co-ordinated by negative ions or polar molecules, for this is the only type of co-ordination known for the Cr^{3+} ion. This excludes structures related to that of the cupric acetate dimer involving direct metal–metal bonds. Next, we remember that magnetic interactions between metal atoms joined by one or two hydroxyl groups, for example, between Cr^{3+} ions, are usually weak while interactions via oxide ions are often strong[5]. Finally, we note that acetate groups often link pairs of metal atoms, as in basic beryllium and zinc acetates[6].

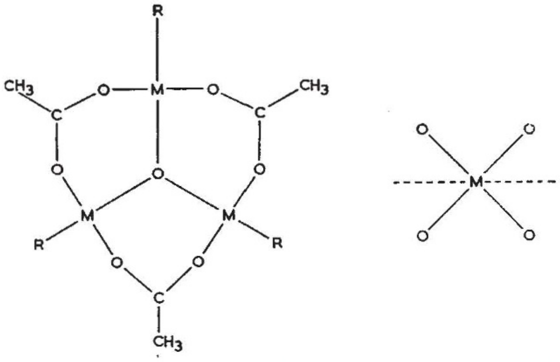

Fig. 1. Proposed structure for the $[M_3(Ac)_6O]^+$ ion: *a*, projected on to the M_3O plane; *b*, seen along an *M*—O direction, the dotted line indicating the M_3O plane

These considerations suggest that the structure basic to the whole group of compounds may be represented as in Fig. 1. The three metal atoms are arranged in an equilateral triangle about a central O^{--} ion. The positions *trans* to the O^{--} ion may be occupied by any of the ligands normally associating with trivalent transition-metal ions, for example, water, amines, further acetate groups and halide ions. By varying these groups a variety of different complexes can be obtained. The six acetate groups complete the octahedral co-ordination about the metal ions, each one lying completely to one side of the plane of the metal ions and linking a pair of them. A simple geometrical construction shows that this structure builds very nicely if the usual bond-lengths are assumed.

The proposed structure is closely related to that of basic beryllium acetate. It differs in that the central O^{--} ion is trigonally rather than tetrahedrally co-ordinated. (Trigonally co-ordinated O^{--} ions occur in the rutile type oxides TiO_2 (ref. 6), etc.) The apparent requirement for at least one hydroxyl group in the complex is explained if it is assumed that it is really an O^{--} ion which is involved; if OH^- were really present as such it is difficult to see why it should not be replaced, for example, by halide ions.

While other structures are possible, for example, the metal ions might lie at the vertices of an equilateral triangle with two hydroxyl groups, one above and