colloidalisation of bismuth—Bredig's method and mechanical colloidalisation. In Bredig's method I obtained an abnormally low value, due to the powder containing a mixture of oxide and the metal, as was pointed out by me. In the case of bismuth, S. S. Bhatnagar[3] contends that he obtains a large amount of oxide by mechanically colloidalising bismuth, and part of the decrease of diamagnetism that I obtained by that method is also due to oxidation.

We have recently investigated carefully prepared gold sols avoiding all possibilities of oxidation. The sol was prepared by the method of Zsigmondy for the preparation of gold sols, by reducing dilute solutions of gold chloride ($HAuCl_4$) by formaldehyde. The particle sizes are 10-40 $\mu\mu$ as mentioned by him. The sol was always kept in an atmosphere of hydrogen and never allowed to come in contact with the atmosphere. It was coagulated, washed, and dried in a high vacuum desiccator. From a large quantity of the sol about 20 mgm. were obtained as precipitate.

Its susceptibility was then determined in a high sensitivity Curie balance, the substance being sealed in a thin capsule and a correction being applied for the susceptibility of the latter. The specific susceptibility, χ, obtained was $0{\cdot}0804 \times 10^{-6}$, the value for gold in the massive state being $0{\cdot}15 \times 10^{-6}$ (I.C.T.).

As Gerlach has explained[4] the phenomena observed by Honda[5] on the decrease of diamagnetic susceptibility of copper and silver on cold working as due to the small percentages of the amorphous substance dispersed in the main body of the elements, it is possible that in a sol a very small percentage is in an amorphous state. An alternative suggestion is that a small percentage is in a crystalline structure different from cubical (copper, silver, and gold are cubical in structure), as the sols of gold and silver are known to exhibit magnetic double refraction. The well-known X-ray spectrograms of colloidal gold and that of crystals by Debye and Scherrer, however, show that both give similar line spectra, but in the former case the lines are more diffuse. While more work is necessary to decide completely between these explanations, it is certain that diamagnetism in gold and possibly also in many other substances depends on crystalline and block structure.

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Structure of the Trifluorides of Aluminium, Iron, Cobalt, Rhodium, and Palladium.

UNTIL recently very little was known about the structure of these trifluorides.[1,2] An examination by the powder method was made of aluminium and iron trifluorides, forming a part of an investigation on the structure of the trihalogen salts of aluminium, iron, and chromium. The diagrams so obtained proved that the trifluorides mentioned in the title are all isomorphous, as was already known of the four latter compounds.

The hexagonal elementary cell contains three molecules:

AlF_3:	$a = 4{\cdot}93$ A.,	$c = 6{\cdot}25$ A.,	$c/a = 1{\cdot}265$
FeF_3:	$a = 5{\cdot}20$ A.,	$c = 6{\cdot}66$ A.,	$c/a = 1{\cdot}28$ [2]
CoF_3:	$a = 5{\cdot}06$ A.,	$c = 6{\cdot}63$ A.,	$c/a = 1{\cdot}31$ [2]
RhF_3:	$a = 4{\cdot}88$ A.,	$c = 6{\cdot}81$ A.,	$c/a = 1{\cdot}39$ [2]
PdF_3:	$a = 5{\cdot}05$ A.,	$c = 7{\cdot}08$ A.,	$c/a = 1{\cdot}40$ [2]

Contrary to Ebert,[2] I found that these structures are not purely rhombohedral, for with chromium $K\alpha$ rays it was possible to discern undoubtedly 200 near 003 (111 rhombohedral). The space group proved to be D_3^1 with metal on

one onefold position: 000, and on
one twofold position: $\frac{1}{3}\,\frac{2}{3}\,u_1$; $\frac{2}{3}\,\frac{1}{3}\,\bar{u}_1$; with $u_1 = \frac{2}{3}$.

The fluorine ions on:

(1) one threefold position:

$$u_2\,u_2\,\tfrac{1}{2}\ ;\ 0\,\bar{u}_2\,\tfrac{1}{2}\ ;\ \bar{u}_2\,0\,\tfrac{1}{2}\ ;\ \text{with } u_2 = \tfrac{2}{3},$$

(2) one sixfold position:

$$xyz\ ;\ y-x,\ \bar{x},\ z\ ;\ \bar{y},\ x-y,\ z\ ;$$
$$yx\bar{z}\ ;\ \bar{x},\ y-x,\ \bar{z}\ ;\ x-y,\ \bar{y},\ \bar{z},$$

with $x = \frac{1}{6}$, $y = \frac{5}{6}$, $z = \frac{1}{6}$.

These five parameters will differ very little from the above rational values. The intensities calculated with these parameters are in good agreement with those observed.

In the case of aluminium trifluoride, u_1 is perhaps 0·70 rather than $\frac{2}{3}$.

The structure consists of alternating planes of metal and fluorine ions, the latter being close-packed around the first.

The distance between two fluorine ions is somewhat smaller than that calculated with a radius of 1·33 A., namely: $AlF_3 = 2{\cdot}46$ A., $FeF_3 = 2{\cdot}60$ A., $CoF_3 = 2{\cdot}53$ A., $RhF_3 = 2{\cdot}44$ A., $PdF_3 = 2{\cdot}52$ A. This is in remarkable agreement with the observation in some trifluorides of the rare earths by Oftedahl,[3] who found 2·47 A. in lanthanum trifluoride.

The metal ions are arranged on a nearly cubic rhombohedron, the fluorine ions (2) are on the middle of the six polar edges; only the fluorine ions (1) are not on the middle of the other edges.

A full report will be given in the *Z. für Kristallographie*. A communication on the various structure types for compounds of the type MF_3 will also follow. I am indebted to Dr. H. J. Verweel for a part of the experimental work.

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Effects of Inadequate Feeding on Insect Metamorphosis.

SOME years ago H. S. Pruthi pointed out [1,2] that moulting in insects is not the result of growth, but is "primarily concerned with metabolism". He found that intermittent starvation of the larvæ of *Tenebrio molitor* extended the duration of the larval period and increased the number of moults, the size and weight before pupation of the older larvæ being the same as in the younger ones. Partially starved larvæ of *Pieris brassicæ* also showed an increased number of moults, the size and weight before pupation being the same as in normally fed caterpillars used for control experiments. Pruthi therefore concluded that if "moulting is simply to allow growth, there is absolutely no necessity for extra moults", and expressed the opinion, based on observations detailed in his paper,[1] that if larvæ are starved before the commencement of the metamorphic processes pupation is delayed, while if they are starved after maturity pupation is accelerated. On the other hand, as he himself shows, several workers contradict the theory that inadequate feeding, quantitatively or qualitatively, delays metamorphosis,