referred to as the standard deviation of an observation of unit weight, $[\Sigma w\Delta^2/m-n]^{\frac{1}{2}}$ (*m* is the number of observations, *n* is the number of variables), was 1·25. The parameters obtained are presented in Table 1. The Se–Zr interatomic distances implied by these parameters are presented in Table 2. The data of Table 1 demonstrate that Zr_2Se is isostructural with Ta_2P (Nylund, 1966) and with Ti_2S. The setting used by Nylund differs from that used here by an interchange of the *a* and *b* axes. The fact that Ta_2P, Ti_2S and Zr_2Se are isostructural is not an unexpected result considering their similar radius ratios and valence electron configurations. It has further been shown by the data of Table 2 that selenium, as well as sulphur, exhibits coordination as high as seven and eight fold with augmented trigonal prismatic arrangement of the metal atoms. A list of F_{obs} and F_{calc} is given in Table 3.

A view of the bonding of chalcogens in trigonal prismatic (Franzen, 1966), and augmented trigonal prismatic (Owens, Conard & Franzen, 1967; Franzen, Beineke & Conard, 1968) environments has been presented which attributes the occurrence of these coordination configurations to the involvement of the chalcogen *d* orbitals in the chemical bonding. It would seem that this view of the bonding is unavoidable in the case of Zr_2Se, since the 4*d* levels of both Zr and Se are of nearly the same energy, and thus they surely will mix in the formation of a valence band in Zr_2Se. The metal coordination in compounds of this structure type has recently been discussed (Franzen, Smeggil & Conard, 1967).

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The cell constants and space group of the complex $(C_6H_5)_3Sn.Mn(CO)_5$

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The cell constants for the complex $(C_6H_5)_3Sn.Mn(CO)_5$ are $a=15{\cdot}91\pm0{\cdot}01$, $b=16{\cdot}32\pm0{\cdot}01$, $c=32{\cdot}12\pm0{\cdot}02$ Å; $\beta=95{\cdot}0\pm0{\cdot}1°$. There are two molecules in each asymmetric unit. The crystal belongs to the space group *C*2/*c*.

The complex $(C_6H_5)_3Sn.Mn(CO)_5$ would be expected to have a direct metal to metal bonding as the crystals are diamagnetic. As a part of a study of metal to metal bonds between such dissimilar metal atoms, the crystal structure determination of this complex by X-ray diffraction methods was undertaken.

The crystals are monoclinic. The cell constants determined from zero-layer Weissenberg photographs about *a* and *b* axes with Cu *Kα* radiation are:

$$a=15{\cdot}91\pm0{\cdot}01,\ b=16{\cdot}32\pm0{\cdot}01,\ c=32{\cdot}12\pm0{\cdot}02\ \text{Å};\quad \beta=95{\cdot}0\pm0{\cdot}1°.$$

The density observed by the method of flotation was 1·74 g.cm^{-3}, and the calculated density for 16 molecules in the unit cell was 1·74 g.cm^{-3}.

The systematic absences observed from Weissenberg photographs for the 0 to 4th layers about the *a* axis, the 0 to 9th layers about the *b* axis, and the 0 and 1st layers about the *c* axis may be summarized as below:

Reflexions *hkl* are present for $h+k=2n$.
Reflexions *h*0*l* are present for $l=2n$, and $h=2n$.
Reflexions 0*k*0 are present for $k=2n$.

Thus, from all these conditions of systematic absences, the space group is either no. 9, *Cc* or no. 15, *C*2/*c* (*International Tables for X-ray Crystallography*, 1952).

A three-dimensional Patterson synthesis revealed linear concentrations at $0,y,\frac{1}{2}$ and planar concentrations at $x,0,z$. This shows that the space group is *C*2/*c* (Buerger, 1959). This creates the problem of placing two molecules in each asymmetric unit.

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