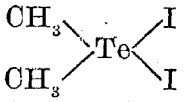
The Constitution of Tellurium Dimethyl Dihalides from the Magnetic Standpoint.

LOWRY AND GILBERT (*Nature*, **123**, 85, 1929) studied the magnetic properties of tellurium dimethyl dihalides and found them to be diamagnetic. From this they concluded that there could be no single electron bonds in these compounds. This argument overlooks two facts. Firstly, that Sugden postulates that the single electron bond always occurs in pairs in these molecules and the compound shows diamagnetism due to the neutralisation of the magnetic field of the electrons. Sugden's postulate constitutes a *prima facie* answer, although it is an unsatisfactory answer, as it needs to be substantiated by some independent physical evidence, such as association of the molecule twice or an even number of times. The second fact which has been overlooked is that the total diamagnetic contribution of the constituent molecules may mask the paramagnetic effect of the singlet linkage and hence the value of χ at one temperature would hardly yield any conclusive evidence on the point under discussion.

Further, it also seems certain that in a compound like



the single electronic bonds should be at an angle and thus have a resultant magnetic moment.

We have, therefore, investigated the thermal variation of χ for $(CH_3)_2.TeBr_2$, $(CH_3)_2.TeCl_2$ and $(CH_3)_2.TeI_2$ and $(CH_3)_2.Te(NO_3)_2$. We find that the change of χ with temperature is negligible and so it eliminates the possibility of a masked paramagnetic configuration in these compounds. We have also employed the method of arriving at the structure of compounds by comparing the calculated and experimental values of χ after the manner of Angus and Farquharson (*Proc. Roy. Soc.*, **A. 136**, 1932). The theoretical values were computed from Pascal's data introducing constitutive correcting factors for dihalides and using all chemical bonds as simple two electron bonds. The following table gives the comparison:—

	χ (Specific) Calculated	χ (Specific) Experimental
$(CH_3)_2.TeBr_2$	0·40	0·37
$(CH_3)_2.TeCl_2$	0·47	0·42
$(CH_3)_2.TeI_2$	0·37	0·36

There appears to be a fair agreement between the calculated and experimental values. There are practically no differences which can be attributed to single electron linkage and it appears that all the valencies are fully satisfied. From this and the experiments on the thermal variation of χ it appears probable that single electron bonds do not exist in these compounds.

A detailed account of the work will be published elsewhere.

S. S. BHATNAGAR.
T. K. LAHIRI.

University Chemical Laboratories,
University of the Punjab,
Lahore,
May 1933.