# MOLECULAR STRUCTURE OF SOME TELLURIUM COMPOUNDS DETERMINED BY MAGNETIC METHOD

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THE structures of some of the selenium compounds obtained by the use of the Langevin equation and Slater's and Angus's methods for the calculation of $\Sigma \bar{r}^2$ are given in the previous paper.[1] In this investigation an attempt has been made to discuss the constitution of some tellurium compounds. Tellurium belongs to the same group of elements as S and Se and the constitution of their compounds may throw light on the constitution of the compounds of tellurium. The Guoy balance and the method of working described in the previous paper were used in this investigation. The magnetic susceptibilities of the compounds investigated are given in Table I.

## Table I

| Substance | Molecular formula | $\chi_a \times 10^6$ | $\chi_m \times 10^6$ |
|---|---|---|---|
| Tellurious acid | $H_2TeO_3$ | $-0 \cdot 1965$ | $- 34 \cdot 89$ |
| Tellurium dichloride | $Te\ Cl_2$ | $-0 \cdot 4760$ | $- 94 \cdot 45$ |
| Tellurium dibromide | $Te\ Br_2$ | $-0 \cdot 3701$ | $-106 \cdot 20$ |
| Telluric acid | $H_2TeO_4, 2\ H_2O$ | $-0 \cdot 2503$ | $- 57 \cdot 55$ |
| Dimethyl tellurium diiodide | $(CH_3)_2\ TeI_2$ | $-0 \cdot 3535$ | $-145 \cdot 40$ |
| Dimethyl tellurium dichloride | $(CH_3)_2\ TeCl_2$ | $-0 \cdot 4047$ | $- 92 \cdot 43$ |

All substances except dimethyl tellurium diiodide and dimethyl tellurium dichloride were obtained either from Kahlbaum or from Theoder Schuchardt and were of extra pure quality. The author is thankful to Miss K. D. Gavankar, m.sc., Analyst, Royal Institute of Science, for preparing the two substances in this laboratory.

*Dimethyl tellurium diiodide* $(CH_3)_2TeI_2$.—Amorphous tellurium (25 g.) and methyl iodide (55 g.) were kept in a hard glass bulb on a water-bath

[1] *Proc. Ind. Acad. Sci.*, (A), 1940, **12**, 185.

at 80° for about 48 hours. It was then cooled and the substance was extracted with chloroform from which it was obtained as red crystals,[2] m.p. = 125°–26°; standard value 127°. The density of the crystals was found to be 2·651. gm./c.c.

*Dimethyl tellurium dichloride* $(CH_3)_2TeCl_2$.—To dimethyl tellurium di-iodide (about 5 g.) concentrated aqueous ammonia was added drop by drop till the red salt was transformed entirely into a pasty greyish white mass. The precipitate was dissolved in water with one or two drops of ammonia and an aqueous solution [50 c.c. of the solution containing 12·14 g. of $AgNO_3$ and just sufficient quantity of $NH_4OH$ to redissolve the precipitate of Ag(OH)] was added to it. The mixture was boiled and filtered and the filtrate was evaporated till no smell of ammonia was detected. Then it was diluted and any silver iodide present was removed. The excess of silver nitrate was removed by the repeated addition of HBr. The remaining solution was evaporated to about 100 c.c. and was treated with HCl until no further precipitation took place. The dichloride thus obtained was purified by crystallisation from alcohol (m.p. = 93°–94°; literature = 92°).

## Discussion of Results

The values of $\Sigma \bar{r}^2$ and the ionic susceptibilities for Te in various valency states, calculated according to Slater's and Angus's methods as well as with the slight changes mentioned in the previous paper, are given in Table II.

### TABLE II

*Diamagnetic susceptibilities of* Te *in various valency states calculated from various methods*

| Valency states | $\Sigma \bar{r}^2$ calculated by Slater's method | $\chi \times 10^6$ calculated by Slater's method | $\Sigma \bar{r}^2$ calculated by modification in Slater's method | $\chi \times 10^6$ calculated by modification in Slater's method using constant of 0·807 instead of 0·790 | $\Sigma \bar{r}^2$ calculated by Angus's method | $\chi \times 10^6$ calculated by Angus's method | $\Sigma \bar{r}^2$ calculated by modification in Angus's method | $\chi \times 10^6$ calculated by modification in Angus's method and using constant 0·790 instead of 0·807 |
|---|---|---|---|---|---|---|---|---|
| Te divalent .. | 66·19 | −53·43 | 45·66 | −36·08 | 66·36 | −53·30 | 56·08 | −44·30 |
| Te tetravalent | 39·01 | −31·49 | 30·28 | −23·92 | 38·85 | −31·35 | 30·10 | −23·78 |
| Te hexavalent | 22·08 | −17·81 | 19·71 | −15·57 | 21·92 | −17·69 | 19·53 | −15·43 |

These values were employed to calculate the magnetic susceptibilities and have been designated with the same symbols as given in the previous paper (*loc. cit.*).

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[2] *Jour. Chem. Soc.*, 1920, 86, 117.

*Tellurious Acid* ($H_2TeO_3$).—Like sulphurous and selenious acids there are two possibilities for its constitution: $O = Te\diagup^{OH}_{\diagdown OH}$ (I) and $^{O}_{O}\!\!>\!\!Te\diagup^{OH}_{\diagdown H}$ (II). The experimental and calculated values for tellurious acid, on the basis of Pascal's value for O ($-3\cdot36 \times 10^{-6}$), are given under A of the Table III.

## TABLE III

| Constitution | A | | B | |
|---|---|---|---|---|
| | Symmetrical $O = Te\diagup^{OH}_{\diagdown OH}$ $-\chi \times 10^6$ (I) | Unsymmetrical $^{O}_{O}\!\!>\!\!Te\diagup^{OH}_{\diagdown H}$ $-\chi \times 10^6$ (II) | Symmetrical $O = Te\diagup^{OH}_{\diagdown OH}$ $-\chi \times 10^6$ (I) | Unsymmetrical $^{O}_{O}\!\!>\!\!Te\diagup^{OH}_{\diagdown H}$ $-\chi \times 10^6$ (II) |
| $(\chi_a)_1$ | 0·2813 | 0·1978 | 0·3364 | 0·3089 |
| $(\chi_m)_1$ | 49·93 | 35·12 | 59·72 | 54·70 |
| $(\chi_a)_2$ | 0·2386 | 0·1852 | 0·2938 | 0·2955 |
| $(\chi_m)_2$ | 42·36 | 32·88 | 52·15 | 52·46 |
| $(\chi_a)_3$ | 0·2805 | 0·1972 | 0·3357 | 0·3075 |
| $(\chi_m)_3$ | 49·79 | 35·00 | 59·58 | 54·58 |
| $(\chi_a)_4$ | 0·2373 | 0·1844 | 0·2930 | 0·2947 |
| $(\chi_m)_4$ | 42·12 | 32·74 | 52·01 | 52·32 |
| $(\chi_a)_E$ | .. | 0·1966 | .. | .. |
| $(\chi_m)_E$ | .. | 34·89 | .. | .. |
| $(\chi_a)_{O_1}$ | .. | 0·1900 | .. | .. |
| $(\chi_m)_{O_1}$ | .. | 33·72 | .. | .. |
| $(\chi_a)_{O_2}$ | .. | 0·2027 | .. | .. |
| $(\chi_m)_{O_2}$ | .. | 35·97 | .. | .. |
| $(\chi_a)_{O_3}$ | .. | 0·1897 | .. | .. |
| $(\chi_m)_{O_3}$ | .. | 33·68 | .. | .. |

$O_1$ Refers to the values obtained by S. Meyer (Mellor's *Inorganic Chemistry*, **11**, 73).

$O_2$ Refers to the values calculated from Bragg's data by Bhatnagar and Luther (*J. Ind. Chem. Soc.*, 1929, 3, 30).

$O_3$ Refers to values calculated as an electronic isomer by Bhatnagar and Dhawan, also by Bhatnagar and Mathur (*Phil. Mag.*, 1928, **5**, 536 ; 1928, **6**, 217).

The calculated values for the constitution II agree well with the experimental values thus confirming that the constitution $^{O}_{O}\!\!>\!\!Te\diagup^{OH}_{\diagdown H}$ for the tellurious acid is similar to that of the selenious acid. This is to be expected from the similarity in the behaviour of selenium and tellurium and their

compounds. It should, however, be noted that in the calculation of the molecular susceptibilities of selenious acid Slater's value for O $(-13\cdot15\times10^{-6})$ was used. Calculations made with this value in the case of tellurious acid are shown under B of the above table. No value thus calculated agrees with the experimental value showing thereby that Pascal's value alone can be employed in this case. The reason for this peculiarity may be found in the fact that the binding between oxygen and tellurium may be stronger than that between oxygen and selenium, for, lower diamagnetic value of oxygen is admissible in the calculation of the susceptibility of tellurious acid.

*International Critical Tables* give for tellurious acid $X_a = -0\cdot24\times10^{-6}$ or $X_m = -42\cdot60\times10^{-6}$. These values agree neither with the calculated ones nor with those experimentally found by the author and other workers and need correction.

*Tellurium dichloride* *(TeCl₂).*—Tellurium does not form monochloride of the type $Te_2Cl_2$. This behaviour is unlike selenium and sulphur which yield compounds of the type $Se_2Cl_2$ and $S_2Cl_2$. Therefore dichloride was chosen for investigation. This compound is very unstable and the decomposition begins even when the tube is being filled up. Hence great precautions were taken to fill the tube and the observations were taken as quickly as possible. The results obtained experimentally and those calculated for the constitution $Te\!\!<^{Cl}_{Cl}$ are given below:

TABLE IV

| Constitution | $Te\!\!<^{Cl}_{Cl}$ $-\chi\times10^6$ |
|---|---|
| $(X_a)_1$ | 0·4928 |
| $(X_m)_1$ | 97·83 |
| $(X_a)_2$ | 0·4057 |
| $(X_m)_2$ | 80·48 |
| $(X_a)_3$ | 0·4925 |
| $(X_m)_3$ | 97·70 |
| $(X_a)_4$ | 0·4471 |
| $(X_m)_4$ | 88·70 |
| $(X_a)_E$ | 0·4760 |
| $(X_m)_E$ | 94·45 |

The calculated values are slightly different from the experimental one
but in view of the experimental difficulties mentioned above, the results o
tained may be taken to be in good agreement with the theory.

*Tellurium dibromide (TeBr₂).*—This compound also, like $TeCl_2$, is ;
unstable one. With all the necessary care taken in the measurement it ca
not be said that the experimental value is the susceptibility of the pu
compound.

TABLE V

| Constitution | $Te\begin{smallmatrix}Br\\Br\end{smallmatrix}$ $-\chi \times 10^6$ |
|---|---|
| $(\chi_a)_1$ | 0·4121 |
| $(\chi_m)_1$ | 118·43 |
| $(\chi_a)_2$ | 0·3515 |
| $(\chi_m)_2$ | 101·08 |
| $(\chi_a)_3$ | 0·4117 |
| $(\chi_m)_3$ | 118·30 |
| $(\chi_a)_4$ | 0·3804 |
| $(\chi_m)_4$ | 109·30 |
| $(\chi_a)_E$ | 0·3701 |
| $(\chi_m)_E$ | 106·20 |

The observed discrepancy between the calculated and the experimen
values may be due to the unstable nature of the compound. In both t
dichlorides and dibromides, the divalent tellurium tends to undergo se
oxidation and reduction, forming a solid solution of the element in the tet
chloride and tetrabromide.[3] Further both of them are hygroscopic and t
water absorbed by them from the atmosphere, causes decomposition ir
the tetrahalide and free tellurium.[4]

*Telluric acid* $(H_2TeO_4, 2H_2O)$.—There is no possibility of any otl
constitution for this acid (with molecules of water distinct from the anhydro
acid) except the graphic formula,

$$O{\Large\diagdown}{}_{O{\diagup}}Te{\diagup}^{OH}_{\diagdown OH}\ ,\ 2H_2O$$

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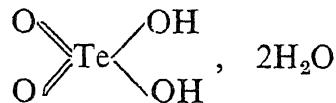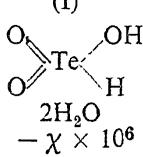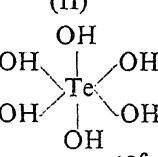
[3] Damiens, *Ann. Chim.*, 1923, **19**, 44.
[4] Brauner, *Monatsh*, 1889, **10**, 411.

Since it is a hydrated salt, it will be interesting to see how far the law of additivity applies to this case. The calculated and observed values are given under A of Table VI.

TABLE VI

| Constitution | A | B |
|---|---|---|
| | (I)  $2H_2O$ $-\chi \times 10^6$ | (II)  $-\chi \times 10^6$ |
| $(X_a)_1$ | 0·2855 | 0·2747 |
| $(X_m)_1$ | 65·53 | 63·05 |
| $(X_a)_2$ | 0·2757 | 0·2650 |
| $(X_m)_2$ | 63·29 | 60·81 |
| $(X_a)_3$ | 0·2850 | 0·2743 |
| $(X_m)_3$ | 65·41 | 62·93 |
| $(X_a)_4$ | 0·2751 | 0·2643 |
| $(X_m)_4$ | 63·15 | 60·67 |
| $(X_a)_E$ | 0·2508 | 0·2508 |
| $(X_m)_E$ | 57·55 | 57·55 |

It is seen from the above that the calculated values are higher than the experimental ones. Gutbier[5] considers that both molecules of water in the hydrate $H_2TeO_4$, $2 H_2O$ are constitutional so that the formula for telluric acid would be $H_6TeO_6$ or $Te (OH)_6$ and the constitutional formula can be written as



(II)

The magnetic susceptibilities of telluric acid for the above constitution were calculated and are given under B of the above table.

Even with the molecular constitution (II), the calculated values are higher than the observed ones, although they are a little lower than those

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[5] Mellor's *Inorganic Chemistry*, **11**, 85.

calculated for (I). The experimentally determined value appears to be in line with the view of Ray Choudhary[6] who determined the magnetic suscept- ibility of a number of salts in the hydrated and anhydrous state and found that for a large number of substances investigated, the observed value for the hydrate is less than the calculated value. He also showed that the deviation from the additivity law is more prominent in cases where the heat of hydration is large. As a quantitative estimation he found that in the case of salts whose heats of hydration lie in the vicinity of 20 calories, the observed values of magnetic susceptibility are about 20 per cent. lower than the values calculated from the anhydrous salts. Though much importance cannot be attached to the quantitative nature of the change, the results on telluric acid support Ray Choudhary's general conclusions.

Varadachari[7] measured the diamagnetic susceptibilities of a number of crystalline inorganic salts. In the case of sodium sulphate[8] he found that the magnetic susceptibility of the hydrated salt undergoes no change when the salt is rendered anhydrous and he, therefore, suggested that the binding of the water molecules with the sulphate is very loose. It appears probable that the lowering in the observed value of telluric acid is due to the strong binding of the water molecules with oxygen ions. This conclusion is in agreement with the representation of the molecular constitution of the acid as $Te(OH)_6$.

*International Critical Tables* give the diamagnetic susceptibility $X_a$ for anhydrous telluric acid as $-0.43 \times 10^{-6}$ and $X_m = -98.69 \times 10^{-6}$. These values are very different from the calculated and the experimental ones and need correction.

*Dimethyl tellurium diiodide* $(CH_3)_2TeI_2$.—Pascal's additivity law is based mostly on his extensive results obtained from organic compounds, which have covalent bindings and as such his susceptibility constants fit in well in inorganic compounds involving covalent linkages, though complete agreement is not found as can be seen from the foregoing discussions. The study of some organo-inorganic compounds of tellurium was, therefore, undertaken. $(CH_3)_2TeI_2$ was selected because the nature of its covalency has been dis- cussed at length by Lowry[9] and its graphic formula is fixed as

$$\begin{array}{ccc} CH_3 & & I \\ & \diagdown Te \diagup & \\ CH_3 & \diagup \diagdown & I \end{array}$$
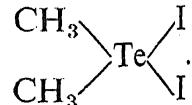
[6] *Zeit. Phys.*, 1932, **77**, 271.

[7] *Annamalai University Journal*, 1935, **4**, 73.

[8] *Proc. Ind. Acad. Sci.*, 1935, **2**, 161.

[9] *Soc. Chim. Belg.*, 1931, 91.

For the calculation of its susceptibility the value for iodine is taken as $-45.6 \times 10^{-6}$.[10] The values for $CH_3$ calculated from different compounds are different, as shown below:

Value for $CH_3$ from $CH_3Cl$    $9.86 \times 10^{-6}$

  ,,   ,,   ,,   ,,    $CH_3Br$    $12.78 \times 10^{-6}$

  ,,   ,,   ,,   ,,    $CH_3I$    $11.58 \times 10^{-6}$

  ,,   ,,   ,,   ,,    $CH_3OH$    $16.14 \times 10^{-6}$.

Consequently all the values for $CH_3$ were used, together with different values for tetravalent tellurium, to calculate the susceptibility of $(CH_3)_2TeI_2$.

TABLE VII

| | $\chi$ calculated using $CH_3$ values from $CH_3OH$ $-\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3Br$ $\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3Cl$ $\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3I$ $\chi \times 10^6$ |
|---|---|---|---|---|
| $(\chi_a)_1$ | 0.3768 | 0.3606 | 0.3461 | 0.3547 |
| $(\chi_m)_1$ | 154.97 | 148.25 | 142.40 | 145.85 |
| $(\chi_a)_2$ | 0.3581 | 0.3420 | 0.3277 | 0.3362 |
| $(\chi_m)_2$ | 147.40 | 140.68 | 134.84 | 138.28 |
| $(\chi_a)_3$ | 0.3762 | 0.3600 | 0.3459 | 0.3542 |
| $(\chi_m)_3$ | 154.83 | 148.11 | 142.27 | 145.71 |
| $(\chi_a)_4$ | 0.3580 | 0.3415 | 0.3275 | 0.3358 |
| $(\chi_m)_4$ | 147.26 | 140.54 | 134.70 | 138.14 |
| $(\chi_a)_E$ | .. | .. | .. | 0.3535 |
| $(\chi_m)_E$ | .. | .. | .. | 145.40 |
| $(\chi_a)_{E_1}$ | .. | .. | .. | 0.3600 |
| $(\chi_m)_{E_1}$ | .. | .. | .. | 148.10 |
| $(\chi_a)_{O_1}$ | 0.3700 | .. | .. | |
| $(\chi_m)_{O_1}$ | 152.20 | .. | .. | |

$O_1$ Refers to values calculated by Bhatnagar and Lahiri (*Curr. Sci.*, 1932, **1**, 380).
$E_1$ Refers to the experimental values of Bhatnagar and Lahiri (*loc. cit.*).

The above table clearly shows that the susceptibilities calculated by taking the value for $CH_3$ from $CH_3I$ and the values of tetravalent tellurium according to Angus and Slater, are in very good agreement with the experimental values. The experimental value obtained by Bhatnagar and Lahiri[11] agrees very closely with that of the author. But their calculated value is rather high and may be due to the choice of the value of $CH_3$ which is large if

[10] Stoner, *Magnetism and Matter*, p. 468.
[11] *Ibid.*

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calculated from $CH_3OH$. The author's calculated values in column 1 of the table is very nearly the same as that calculated by Bhatnagar and Lahiri.

*Dimethyl tellurium dichloride* $(CH_3)_2TeCl_2$.—This is the second organo-inorganic compound of tellurium selected for investigation. The following table gives the various values of the susceptibilities calculated in the same manner as in the case of $(CH_3)_2TeCl_2$.

### TABLE VIII

| | $\chi$ calculated using $CH_3$ values from $CH_3OH$ $-\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3Br$ $-\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3I$ $-\chi \times 10^6$ | $\chi$ calculated using $CH_3$ values from $CH_3Cl$ $-\chi \times 10^6$ |
|---|---|---|---|---|
| $(\chi_a)_1$ | 0·4737 | 0·4443 | 0·4336 | 0·4186 |
| $(\chi_m)_1$ | 108·17 | 101·45 | 99·95 | 95·61 |
| $(\chi_a)_2$ | 0·4403 | 0·4111 | 0·4005 | 0·3855 |
| $(\chi_m)_2$ | 100·60 | 93·93 | 91·48 | 88·04 |
| $(\chi_a)_3$ | 0·4729 | 0·4434 | 0·4330 | 0·4179 |
| $(\chi_m)_3$ | 108·03 | 101·32 | 98·91 | 95·47 |
| $(\chi_a)_4$ | 0·4403 | 0·4104 | 0·3999 | 0·3849 |
| $(\chi_m)_4$ | 100·46 | 93·74 | 91·34 | 87·90 |
| $(\chi_a)_E$ | .. | .. | .. | 0·4047 |
| $(\chi_m)_E$ | .. | .. | .. | 92·43 |
| $(\chi_a)_{E_1}$ | .. | .. | .. | 0·42 |
| $(\chi_m)_{E_1}$ | .. | .. | .. | 95·92 |
| $(\chi_a)_{O_1}$ | 0·47 | .. | .. | |
| $(\chi_m)_{O_1}$ | 107·40 | .. | .. | |

$O_1$ Refers to the values calculated by Bhatnagar and Lahiri (*loc. cit.*).
$E_1$ Refers to their experimental values.

It is seen here also that if Slater's and Angus's values for $Te^{++++}$ are employed, the only calculated values which approach the experimental ones are those in which the value for $CH_3$ obtained from $CH_3Cl$ is used. The calculated value is widely different if the value for $CH_3$ obtained from $CH_3I$ is employed. The experimental value of Bhatnagar and Lahiri is almost the same as that obtained by the author and their calculated value agrees with that given in column 1 of the above table. This is higher than the experimental value. This shows that for good agreement between the calculated and observed values the choice of the other radicals must be made from substances of similar nature.

### Conclusion

All the results for the correct constitution have been summarised in Table IX.

TABLE IX

| Compound | Constitution | $-\chi \times 10^6$ observed by the author | $-\chi \times 10^6$ observed by other authors | $-\chi \times 10^6$ calculated by Slater's method | $-\chi \times 10^6$ calculated by the modification of Slater's method | $-\chi \times 10^6$ calculated by Angus's method | $-\chi \times 10^6$ calculated by the modification of Angus's method |
|---|---|---|---|---|---|---|---|
| $H_2TeO_3$ | $O{=}Te{<}^{OH}_{H}$ (with $O$) | $(X_a)$ 0.1966 $(X_m)$ 34.89 | $(X_a)$ 0.24 $(X_m)$ 42.60 (Int. Crit. Tab.); $(X_a)$ 0.19 $(X_m)$ 33.72; $(X_a)$ 0.2027 $(X_m)$ 35.97; $(X_a)$ 0.1897 $(X_m)$ 33.68 | $(X_a)$ 0.1978 $(X_m)$ 35.12 | $(X_a)$ 0.1852 $(X_m)$ 32.88 | $(X_a)$ 0.1972 $(X_m)$ 35.00 | $(X_a)$ 0.1844 $(X_m)$ 32.74 |
| $TeCl_2$ | $Te{<}^{Cl}_{Cl}$ | $(X_a)$ 0.4760 $(X_m)$ 94.45 | | $(X_a)$ 0.4928 $(X_m)$ 97.83 | $(X_a)$ 0.4057 $(X_m)$ 80.48 | $(X_a)$ 0.4925 $(X_m)$ 97.70 | $(X_a)$ 0.4471 $(X_m)$ 88.70 |
| $TeBr_2$ | $Te{<}^{Br}_{Br}$ | $(X_a)$ 0.3701 $(X_m)$ 106.2 | | $(X_a)$ 0.4121 $(X_m)$ 118.43 | $(X_a)$ 0.3515 $(X_m)$ 101.08 | $(X_a)$ 0.4117 $(X_m)$ 118.30 | $(X_a)$ 0.3804 $(X_m)$ 109.30 |
| $H_2TeO_4$, $2H_2O$ | $O{=}Te{<}^{OH}_{OH}$, $2H_2O$ Or | $(X_a)$ 0.2508 $(X_m)$ 57.55 | $(X_a)$ 0.43 $(X_m)$ 98.69 (Int. Crit. Tab.) | $(X_a)$ 0.2855 $(X_m)$ 65.53 | $(X_a)$ 0.2757 $(X_m)$ 63.29 | $(X_a)$ 0.2850 $(X_m)$ 65.41 | $(X_a)$ 0.2751 $(X_m)$ 63.15 |
| | $Te(OH)_6$ (OH, OH, OH, OH, OH, OH) | | | $(X_a)$ 0.2747 $(X_m)$ 63.05 | $(X_a)$ 0.2560 $(X_m)$ 60.81 | $(X_a)$ 0.2743 $(X_m)$ 62.93 | $(X_a)$ 0.2643 $(X_m)$ 60.67 |
| $(CH_3)_2TeI_2$ | $Te{<}^{I}_{I}$ with $CH_3$, $CH_3$ | $(X_a)$ 0.3535 $(X_m)$ 145.40 | | $(X_a)$ 0.3547 $(X_m)$ 145.85 | $(X_a)$ 0.3362 $(X_m)$ 138.28 | $(X_a)$ 0.3542 $(X_m)$ 145.71 | $(X_a)$ 0.3358 $(X_m)$ 138.14 |
| $(CH_3)_2TeCl_2$ | $Te{<}^{Cl}_{Cl}$ with $CH_3$, $CH_3$ | $(X_a)$ 0.4047 $(X_m)$ 92.43 | | $(X_a)$ 0.4186 $(X_m)$ 95.61 | $(X_a)$ 0.3855 $(X_m)$ 88.04 | $(X_a)$ 0.4179 $(X_m)$ 95.47 | $(X_a)$ 0.3849 $(X_m)$ 87.90 |

Notes (for $H_2TeO_3$ other-authors values): (S. Meyer); Calculated by Bhatnagar and Luther.; Calculated by Bhatnagar and Dhawan.

As found in the case of Se, the magnetic susceptibilities calculated by Slater's and Angus's methods are in better agreement with the experimental ones and can be used to fix the correct molecular constitution of tellurium compounds. It may be remarked here that in the case of organometallic compounds there is a better agreement between the calculated and experimental values than in the case of inorganic compounds. This finding is in agreement with the view put forward by Pascal and other workers.