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On the preparation and composition of the salts of antimony

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The remarkable fact of a *recurrence* of cusps observed by Mr. Airy in 1842, and his explanation of it, should be attentively considered. See Ast. Soc. Notices, v. 296.

8. If possible, accurate *measures* should be taken of the *apparent diameter* of the dark disc of the moon upon the sun, which may be expected to be greatly less than the truth, owing to the irradiation of the sun's light.

9. It should be noticed whether any external *luminous arch* is formed over the part between the cusps, a little before the first junction and after the final separation, and the *colour* of the light.

It was observed, and appeared *brown* to De Lisle (Phil. Trans., 1748, 490), *reddish* in other cases (Ast. Soc. Mem., i. 144, x. 37), and *purple* in others (ib. x. 16).

ON THE PREPARATION AND COMPOSITION OF THE SALTS OF ANTIMONY. BY M. E. PELIGOT.

Sulphates of Antimony.—When oxychloride of antimony ($ClSb^2O^2$) is treated with hot concentrated sulphuric acid, a salt is formed which is deposited in acicular crystals, hydrochloric acid being at the same time evolved. This salt, as well as another sulphate to be described, can only be obtained in a dry state by long remaining *in vacuo*, or in perfectly dry air upon porous plates of pipe clay. These plates were heated to redness before the crystalline magma was placed upon them, and they were left to cool in air deprived of moisture. This method of drying yields products which usually contain a slight excess of sulphuric acid. If however the points of contact between the salt to be dried and the absorbent earth be renewed from time to time, and the absorption goes on for several months, compounds of sufficient purity to remove all doubts of their true composition may be obtained.

One hundred parts of the sulphate of antimony, obtained by common sulphuric acid and oxychloride of antimony, gave—

Sulphuric acid	51·9
Oxide of antimony (by carbonate of ammonia)	50·2

The composition of this salt is therefore—

$4SO^3$	2000	51·2
Sb^2O^3	1912	48·8
	3912	100·0

Another specimen gave 53·1 of sulphuric acid, and 44·3 of oxide of antimony.

Another sulphate of antimony was obtained in the form of small brilliant crystals, by treating sesquioxide of antimony with Nordhausen sulphuric acid. After remaining ten months on the dried clay, it gave—

Sesquioxide of antimony	63·0	64·3
Sulphuric acid	37·1	35·0

The formula $2SO^3$, Sb^2O^3 gives 65·6 oxide of antimony and 34·4 sulphuric acid.

Mixtures of these salts in different proportions were also obtained;

but no analysis indicated the existence of the compound $3SO^3$, $5Sb^2O^3$, which, according to Berzelius, would be the neutral sulphate of antimony.

On treating the above-described salts with hot water, a subsalt is obtained, the composition of which is represented by the formula—

		Calculation.	Experiments.
$2Sb^2O^3$	3824	88·4	88·6
SO^3	500	11·6	11·4
	4324	100·0	100·0

The analysis of two other specimens is correctly represented by the formula $2Sb^2O^3$, SO^3, 2HO.

Nitrate of Antimony.—This salt was obtained in the form of pearly crystals by dissolving the oxide in cold fuming nitric acid, and adding water to the solution. Its composition is $2Sb^2O^3$, NO^5.

Oxychlorides of Antimony.—Powder of Algaroth was prepared by treating chloride of antimony with cold water. After some days the mass became crystalline; when well-washed its composition agreed with the analyses which have served to fix the formula of this compound. This formula is more simply replaced by $Cl\,Sb^2O^2$.

When the sesquichloride of antimony, or rather the sesquioxide dissolved in a great excess of hydrochloric acid, is treated with hot water, another oxychloride is obtained, which, on the cooling of the liquor, precipitates in dense brilliant crystals. Its composition is represented by the following formula:—

		Calculation.	Experiments.	
Cl	443	10·6	11·1	11·4
4Sb.....	3224	77·3	76·5	76·8
O^5	500	12·1		
	4167	100·0		

This compound consequently must bere presented by the formula, $Cl\,Sb^2O^2 + Sb^2O^3$.

Tartrates of Antimony.—By allowing a syrupy solution of tartrate of antimony, obtained by dissolving the oxide of the metal in tartaric acid, to remain for a long time, large transparent crystals of tartrate of antimony were obtained. The mother-water, after the separation of the crystals, furnished more afterwards by spontaneous evaporation.

This salt is very soluble in water. It is deliquescent in a moist atmosphere. Its composition is represented by the following formula:—

		Calculation.	Experiments.	
C^{16}	1200	19·6	18·9	19·0
H^{16}	200	3·2	3·5	3·5
O^{28}	2800	46·0		
Sb^2O^3....	1912	31·2	31·5	
	6112	100·0		

At 320° F. this salt lost 23·1 per cent. of water.

On decomposing the formula as follows, the loss of twelve equivalents of water represents 22 per cent. of the weight of the salt—

$$2C^8\,H^2\,O^8,\,Sb^2\,O^3,\,12HO.$$

On pouring alcohol into a concentrated solution of the acidulous tartrate of antimony, a precipitate is obtained which, when dried at 320° F., yielded 16·4 of carbon and 1·3 of hydrogen. The composition of this salt is represented by the formula $C^8\,H^2\,O^8$, $Sb^2\,O^3$, HO, which requires 17·2 of carbon and 1 of hydrogen. The salt which M. Peligot analysed contained a little more water than the quantity required by this formula, but not enough to allow of the addition of another equivalent.

Acidulous Tartrate of Antimony and Potash.—This salt was described by M. Knapp, who obtained it by mixing solutions of tartaric acid and tartarized antimony. The salt which was analysed by M. Peligot was in very regular crystals. It yielded—

Carbon	19·5	18·7
Hydrogen	2·7	2·7
Sesquioxide of antimony	31·0	

The formula $C^{16}\,H^4\,O^{16}$, $Sb^2\,O^3$, KO, 8HO represents its composition. It gives—

Carbon	19·1
Hydrogen	2·3
Sesquioxide of antimony ..	30·5

According to M. Knapp it contains one equivalent less of water.

Oxalate of Antimony.—M. Peligot prepared this salt by four processes:—1st, by boiling in a solution of oxalic acid oxide of antimony prepared from the chloride by carbonate of ammonia; 2nd, by treating the powder of Algaroth with oxalic acid; 3rd, by pouring hydrochloric acid into a hot solution of the double oxalate of potash and antimony; the oxalate of antimony precipitates in the state of a crystalline powder; 4th, by adding oxalic acid to a solution of the same double salt.

The oxalates of antimony obtained by these processes are similar in composition. The author attempted, but in vain, by varying the proportions, to obtain other compounds of oxalic acid and oxide of antimony. This salt is crystalline and insoluble in water. It is decomposed by boiling water into oxalic acid, which dissolves, and sesquioxide of antimony.

Its composition is represented by the following formula:—

		Calculated.	Experiments.		
C^4	300·0	10·2	10·1	10·6	10·6
O^6	600·0	20·6			
$Sb^2\,O^3$	1912·9	65·4	66·7	65·6	
HO	112·5	3·8	3·8	4·5	4·0
	2925·4	100·0			

Double Oxalate of Potash and Antimony.—The preparation and analysis of this salt are very difficult. The salt obtained by M. Pe-

ligot was crystallized in transparent prisms; it is readily soluble, and is decomposed by a large quantity of water.

The quantity of water in this salt appeared to vary from unknown causes, but apparently dependent on the temperature at which the salt crystallizes. The formula appeared to be $7C^2 O^3$, $Sb^2 O^3$, 3KO, 6HO. This gives as the composition of 100 parts of the salt—

Carbon	13·9
Water	9·0
Oxide of antimony	25·7
Potash	23·5

M. Peligot obtained—

Carbon	13·7	14·3	14·4	14·0
Water	9·7	9·2	10·1	8·9
Oxide of antimony	25·7	26·2	24·8	

Ann. de Ch. et de Phys., Juillet 1847.

ACTION OF HYDROCHLORIC ACID IN THE FORMATION OF OXALIC ACID.

M. Kopp states that the presence of hydrochloric acid in nitric acid is peculiarly favourable to the formation of oxalic acid. The resins of benzoin and Tolu, treated with pure nitric acid, yield no oxalic acid; but with an impure acid it is obtained. Pure nitric acid occasions the formation of terebic acid only, in acting upon oil of turpentine, and to oxypicric acid, in oxidizing the gum-resins. By using nitric acid containing much hydrochloric acid, oxalic acid only is obtained under the same circumstances.—*Ibid*, Juillet 1847.

PROJECTION OF ALDEBARAN ON THE MOON.

At the British Association in Oxford a question arose respecting the apparent projection of Aldebaran on the disc of the moon in occultations. Prof. Airy and Dr. Forster stated having seen this phænomenon, which Prof. Struve seemed disposed to attribute to to some mal-adjustment of the telescopes. On looking back, however, to the Philosophical Magazine, it will be found that this appearance has been three or four times recorded; as well as some other circumstances calculated to show that the light of different stars is very differently refracted. See Phil. Mag. for April and May 1824.

THE PUFF PARLIAMENTARY:—DISINFECTION.

The art of puffing has not yet exhausted its resources; and a Parliamentary Report well got up, printed at the expense of the public, and from which extracts may go the round of the newspapers, seems to be the last and boldest device for the purpose, which however has been fearfully exposed in the Dublin Quarterly Journal of Medical Science.

The Times newspaper in a leading article of the 20th of August, felicitates itself on having "the pleasant task of giving what publicity it may to a discovery made by a French gentleman, M. Ledoyen,