



LVIII. Analysis of the sulphuretted oxide of manganese of naygag

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to be of an inferior quality, its specific gravity was greater, because upon this supposition, and in order to make the loss of weight in the silver amount to 88.105 grains, the specific gravity of this alcohol, compared with that of water, must have been 0.920. But Mr. Biddle could not but be mistaken with such a liquor, which was nothing more than the most common spirits, and which, if I am not mistaken, could not support the temperature of the experiment without freezing.

It appears, therefore, ascertained, that there is an error in the weights; and consequently we may conceive that, the density of the solid mercury having been deduced from the comparison of the results of these weights, the density has been found so much the greater as the loss of the weight in silver had been expressed by too large a number.

I have no intention to pre-judge the question relative to the density of solid mercury: I am far from wishing to raise doubts upon the talents of Mr. Biddle, or upon the penetration of the members of the Philosophical Society of Birmingham, in whose presence and to whose satisfaction the experiments of the former were made; but I think myself entitled to say, that the experiments, of which he has published the results, ought at least to be made over again. Mr. Biddle's idea is a happy one, and I do not deny that these experiments may lead to the solution of the problem.

I have the honour to be, &c.

TARDY DE LA BROSSY.

LVIII. *Analysis of the sulphuretted Oxide of Manganese of Naysag.* By M. VAUQUELIN*.

M. KLAPROTH, having made an analysis of the sulphuret of manganese under the name of *siebenburghischen*, discovered that it is composed of 82 parts of oxide of manganese at the minimum, or soluble in nitric acid; of five parts of carbonic acid, and of eleven parts of sulphur, without

* From *Annales du Muséum d'Histoire Naturelle*, vol. vi.

having

having discovered either gold or silver in it, as asserted by M. Muller, of Reichenstein.

The celebrated Berlin chemist having thus enriched mineralogy with a new species of the manganese genus, which down to the present time had existed only in one form, that of oxidated manganese, he has also thereby enriched chemistry with a new fact concerning the action of the nitric acid upon sulphurets, for the decomposition of which it is usually employed, with the view of dissolving the metallic oxide combined with sulphur, without touching the latter.

As soon as M. Haüy recognized this mineral in his collection, he sent us a specimen in order that we might submit it to analysis.

M. Proust also analysed this mineral almost at the same moment with M. Klaproth. The former observed the same phenomena, but for want of a large enough quantity he was not able to determine the state in which manganese is when combined with sulphur, nor the respective quantities of these bodies.

The sulphuret of manganese of naygag is accompanied with manganeseous carbonated lime: it has for a matrix a white hyaline quartz: its specific gravity is 4: its texture is lamellous, with a metallic lustre, when the surface has not been long exposed to the air. Reduced into powder, it is of an olive green colour: it loses nothing by heat.

Five grammes of this mineral, perfectly freed from its matrix, were reduced to a very fine powder and treated with weak nitric acid; which immediately exercised a lively action upon it, accompanied with a disengagement of sulphuretted hydrogen gas. We gathered a certain quantity of this gas, in order to examine its nature. The mixture was slightly heated, and a new portion of the nitric acid was introduced until effervescence ceased: the liquor was then filtered, which was a little reddish, but became colourless upon the addition of water. The residue weighed a decigramme. It was composed of blackish brown flakes, which, upon being exposed to flame with the blowpipe, took fire like sulphur, spread a slight arsenical smell, and left a substance which did not colour borax like manganese, but like iron.

The gas obtained in this experiment, when passed through lime water, did not injure its transparency, but gave it the property of blackening solutions of lead.

The nitric solution was mixed with carbonate of potash : it formed an abundant white precipitate with a brisk disengagement of carbonic acid gas. We heated it lightly in order to drive off the excess of this acid ; and we separated the precipitate, which, upon being well washed and dried, weighed $7\frac{1}{2}$ grammes. The difference between our results and those of M. Klaproth seems to arise from the manganese used by us having been very pure, while that employed by M. Klaproth probably contained carbonate of lime.

M. Klaproth endeavoured to form a combination between sulphur and the oxide of manganese at the minimum, in order to make comparative experiments, and he discovered that the artificial sulphuret of manganese, when no atom of sulphuretted hydrogen could enter into it, had the same characters as the natural sulphuret. In order to follow his experiments, I calcined in a retort, the aperture of which communicated with a balloon filled with lime water, 7.4 grammes of carbonate of manganese obtained by precipitation by means of carbonate of potash.

The carbonic acid gas began to disengage itself before the retort was red, and at the end of a quarter of an hour's calcination the disengagement ceased. The oxide contained in the retort was slightly coloured, at least at its surface. We introduced into the retort, while yet warm, two grammes of flowers of sulphur, and we agitated it in order to produce a mixture ; the mass melted, and a considerable quantity of sulphur was sublimed. As soon as the sublimation of the sulphur ceased, the mass, when taken out of the retort while warm, took fire on exposure to the air in the manner of pyrophorus. It was green, like the natural sulphuret in powder ; and it weighed 5.9 grammes. This artificial sulphuret dissolved in weak nitric acid with effervescence and a disengagement of sulphuretted hydrogen gas ; but it leaves more sulphur as a residue than natural sulphuret.

The following is the manner in which M. Klaproth explains the disengagement of the hydrogen gas which takes place

place during the solution of manganese in the nitric acid. In spite of the disengagement, says he, of a considerable enough quantity of sulphuretted hydrogen gas during the solution of this mineral, it appears to me that it would be an error to believe that this gas exists ready formed in the mineral or in any of those which yield it by the humid way, and to regard it as one of their constituent parts. There is no doubt that it is formed by the decomposition of water, since by calcination we obtain nothing else but carbonic acid gas. By synthesis, the probability that no hydrogen enters into the combination of sulphur with the oxide of manganese acquires still more force; and yet this combination yields sulphuretted hydrogen gas with the acids.

In order to know if the nitric acid is not decomposed during the solution of sulphuret of manganese, as happens with almost all the metals which have a great affinity for oxygen, or, if water alone, by yielding its oxygen to one of the elements of this mineral, does not give birth to this hydrogen gas, we dissolved a certain quantity of sulphuretted manganese in weak nitric acid; we concentrated the solution, and distilled it in a retort with caustic potash: but the produce not having given any sign of the presence of ammonia, we concluded from this that the nitric acid is not decomposed in this operation. In order to have the just quantity of oxide of manganese at the minimum, we calcined in a retort 7·4 grammes of carbonate of this metal prepared from a solution of five grammes, and we obtained an oxide almost white, which, weighed while warm, yielded 4·25 grammes, which was at the rate of 85 in the hundred.

Let us actually admit a loss of two parts: we shall then have 13 parts of sulphur; and as the loss can scarcely be any thing else than sulphur, the quantities will stand thus:

| | | |
|--------------------------|------------------------|-------|
| Manganese at the minimum | - | 85 |
| Sulphur | - - - - | 15 |
| | | 100 * |

* There is also in this mineral a small quantity of iron and arsenic, which has been discovered among the sulphur which remains after its solution in weak nitric acid; but these substances appear to be accidental.

Reflections.

M. Klaproth justly regards the manganese in the mineral of which we are speaking as oxidated at the minimum, and he has recourse at the same time to the decomposition of water in order to explain the disengagement of sulphuretted hydrogen gas which takes place during the solution of the mineral in the acids; but this philosopher neither tells us how or wherefore water is decomposed in this operation. The manganese cannot be the cause of it, since it is already united to oxygen, and because it is discovered in the acids which have dissolved it in the same state in which it existed in the fossil, that is to say, at the minimum. The water, then, could not have been decomposed but by the sulphur. But how can we comprehend this effect while the nitric acid is present? If, however, it is the sulphur which decomposes the water, and which gives birth to the sulphuretted hydrogen, I should have found sulphuric acid in the nitric solution of the mineral. In order to ascertain it, I dissolved in the cold a certain quantity of the same sulphuret of manganese in weak nitric acid, in order that it might not burn the sulphur. The phænomena were the same as before; and the filtered solution gave, in fact, by means of the muriate of barytes, a precipitate which was a true sulphate of that base.

This experiment, then, seemed to demonstrate, that sulphur united to oxide of manganese has the power of decomposing water by combining with its oxygen, and thus sets its hydrogen at liberty, which unites with another portion of sulphur. This fact is the more worthy of the attention of chemists, that, to my knowledge, this is the first time that it has been observed, and that in every case where metallic sulphurets or sulphuretted oxides have been decomposed by the strong or weak nitric acid, it has been always the latter which has been decomposed, and nitrous gas, or modifications of it, constantly obtained, and never sulphuretted hydrogen gas: this is quite conformable to the laws of chemical affinity. It is true, that there are metals which decompose water at the same time with nitric acid; but hydrogen never makes its appearance: it unites with the azote of the nitric acid and forms ammonia.

The

The sulphuretted oxide of manganese thus forms an exception to the rule hitherto observed, if we do not admit hydrogen into this substance as one of its constituent parts.

LIX. *Memoir on the Eremophilus and Astroblepus, two new Genera of the Order of Apodes. By M. DE HUMBOLDT* *.

WHEN we ascend the chain of the Andes to the height of 2600 toises (16661 $\frac{3}{4}$ English feet) and upwards, great level plains and lakes of a considerable extent are seen. It is singular to observe, that, while the soil is still covered with a beautiful vegetation, the woods filled with quadrupeds, and the air with a great variety of birds, the water alone, the lakes and the rivers, are so little inhabited. The cause of this phænomenon relates, without doubt, to geological facts; it pertains to the grand mystery of the origin and migration of species.

The considerable lakes which surround the city of Mexico, at the height of 1160 toises †, nourish but two species of fish, of which one, the *axalotl*, belongs rather to the genera *sirenus* and *proteus*. M. Cuvier, to whom we brought this extraordinarily organized animal, unknown in Europe, is engaged with its anatomy, which he will shortly publish. In the kingdom of New Granada, in the beautiful valley of Bogota, about 1347 toises high, there also exist but two species, which the inhabitants of that country call *capitan* and *guapucha*. The one is an *atherine*, and the other a new genus of *apodes*, that I am about to describe in this memoir. The form of its tail and its anal fin distinguish it sufficiently from the genus *trichiurus*, which is also found in the fresh waters of South America. I have designed this non-descript fish at the place; and Messrs. Lacepede and Cuvier, who have willingly examined my descriptions, like me, consider it a new genus well characterized. I have named it *eremophilus* on account of the solitude in which it lives at so great

* From *Recueil d'Observations de Zoologie et d'Anatomic comparé*, 1re livraison. Communicated by a correspondent.

† The French toise is about six feet four inches nine-tenths English.