

ART. XXI.—*Miscellaneous Contributions to Chemical Science.*

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No person engaged in the actual operations of chemical research, can avoid, if he be possessed of any tact of observation, reflecting on the numerous phenomena that he shall meet with, which, although too easy of formation, and produced under circumstances that occur too often to allow him to consider them as not having been seen before, are yet not described by authors, and he is consequently left for any information that he may wish to gain concerning them, to the exercise of his own analytical skill to determine their composition, and of his own ingenuity to account for their appearance.

If all who have observed such phenomena had described them even in a general manner, great advantage would have been gained. We should be in possession of an immense number of facts which now, although probably known, a few to each individual engaged in chemical research, yet not being generally known, cannot be brought to bear upon any of those great problems, the solution of which forms an era in the history of science, probably in the history of mankind, and confers immortality upon the solver.

In a science like chemistry, a science of observation, it is of paramount importance that all facts should be recorded: one should not be excused on saying, I do not see the application of this fact. When the early analysts published their results, they had no idea of the constancy of relative proportion solving the problem of the constitution of matter. When Bergman constructed his coarse tables of affinity, he did not even dream of establishing the order of negative or positive energy. Let those

therefore who observe facts communicate them, and probably their application may be made by our successors in the field.

Acting upon this principle, I have collected some observations on different chemical subjects, which not being, separately, sufficiently voluminous, or probably even important, to be the subject of a formal memoir, are yet, in my opinion, of sufficient value to be laid before my co-labourers in this splendid field, whose talents and assiduity may enable them to develop those investigations to an extent suited to their value.

COMPOSITION OF THE BLOOD IN JAUNDICE.

My friend Dr. Corrigan having transmitted to me a specimen of blood taken from a woman labouring under jaundice, I undertook the analysis in order to verify the researches of Lecanu, and some analyses made by myself at a former period.

The blood had separated perfectly, the clot, not buffed, lay soft and loose at the under surface. The superficial arterialization was very imperfect (the vessel had been close air-tight by bladder).

The serum was of a deep yellow colour, browned turmeric paper, was salty to the taste, and when mixed with muriatic acid became vivid grass green in colour. Sp. gr. 1029.25.

The quantity of blood sent to me weighed 3168 grains, consisting of—

Serum	-	-	-	-	1420
Clot	-	-	-	-	1748
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A quantity of serum having been carefully dried, was found to consist of—

Water	-	-	-	-	893.1
Solid matter	-	-	-	-	106.9
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					1000.0
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A quantity of clot having been dried, was found to be composed of—

Water	-	-	-	-	656
Solid matter	-	-	-	-	344
					<hr/>
					1000
					<hr/>

The salts were found by appropriate re-agents to be present in their natural proportion. Their quantitative estimation was not, in the future steps of the analysis, attempted.

The dried serum having been reduced to very fine powder, was boiled in dilute alcohol, and afterwards in very strong alcohol. The alcoholic solutions were mixed together, and very much concentrated. They deposited successive crops of common salt, and were alkaline. They were finally evaporated to dryness.

The dried serum, when it ceased to yield any soluble matter to boiling alcohol, was weighed and estimated as *albumen*.

The dry residue of the alcoholic solutions was digested in cold ether, which dissolved most of it, and assumed a gold colour. The undissolved matter was boiled in a small quantity of alcohol, which dissolved it, and on cooling deposited flocculi of *phosphuretted fat*. The ethereal solution, when evaporated, gave a residue of the *yellow biliary colouring matter*, and an *oily liquid* which floated quite separate from it (*oil of Babington*).

The clot was washed with water carefully until the *fibrine* remained white; it was then carefully dried and weighed.

The liquor in which the clot had been washed was heated to 200°; the mixture of *albumen* and *hematosine* coagulated, and the quantity of the former having been gotten by calculation from the quantity of water that existed in the clot, as serum, and added to the albumen before obtained, we have the entire quantity of *albumen* in the blood, and the residue gives of course the *colouring matter*.

In former analyses of the blood in disease, I usually incinerated the hematosine in order to determine the quantity of oxide

of iron that I could obtain. But as the iron exists in the hematosine, not as oxide, but probably as an ultimate constituent, and is consequently proportional in quantity to that of the hematosine, I do not now think it necessary to determine its amount separately.

The quantitative results of the analysis are as follows :—

Water	-	-	-	-	-	-	762.28
Albumen	-	-	-	-	-	-	71.4
Fibrine	-	-	-	-	-	-	2.8
Hematosine	-	-	-	-	-	-	126.7
Phosphuretted Fat	-	-	-	-	-	}	2.0
Oily matter and yellow colouring matter	-	-	-	-	-		
Salts, loss, &c.	-	-	-	-	-	-	34.82
							<hr/> 1000.00 <hr/>

This analysis fully confirms the result of Lecanu as to the existence, in the blood of jaundiced patients, of the yellow colouring matter of the bile, and also as to the absence of cholesterine. In consequence of this latter principle being often a constituent, in minute proportion, of healthy blood, I sought for it carefully, but could not detect any trace of it. My results, however, differ in an important relation from those of Lecanu; he found that the quantity of colouring matter was less than in health; in the foregoing analysis it is very nearly the exact healthy average. I am not inclined to attribute great importance to the difference between our results in this respect, as the quantity of that principle varies in health between limits extending beyond both.

THEORY OF THE ETHERS.

Dumas and Boullay had determined that in the ethers the carburetted hydrogen might be regarded as a base similar to ammonia; they even contrasted in a table its properties to those of ammonia, and shewed that in all the important characteristics

it was equally marked, and that but for the accidental circumstance of its insolubility in water, its alkaline nature would have been long since recognized. Having devoted some attention to the ammonium theory of Berzelius, in which he regards an atom of hydrogen as converting the ammonia into a substance possessing many properties in common with the metals, I was induced to try whether the same simplicity of arrangement and classification which was given to the ammonia compounds by that hypothesis, could not be afforded to the different combinations of the ethers by the assumption of similar principles. Let us consider the base of the ethers as being, not olefiant gas, but, as Thompson proposed, the isomeric liquid, whose formula is $(4\text{ C} + 4\text{ H})$; denote by the name of *etherium* the hypothetic body formed by its union with an atom of hydrogen, (as Berzelius terms the compound of ammonia + an atom of hydrogen, *ammonium*;) and see the expressions for the composition of some of the most interesting of these bodies.

Sulphuric ether (oxide of etherium) = $(4\text{ C} + 4\text{ H}) + \text{H} + \text{O}$.

Alcohol (hydrated oxide of etherium) = $((4\text{ C} + 4\text{ H}) + \text{H}) + \text{O} + \text{H}$.

Muriatic ether (chloride of etherium) = $(4\text{ C} + 4\text{ H}) + \text{H} + \text{Ch}$.

Hydriodic ether (iodide of etherium) = $(4\text{ C} + 4\text{ H}) + \text{H} + \text{I}$.

*Sulpho-vinic acid (bi-sulphated oxide of etherium) = $2\text{ S} + (4\text{ C} + 4\text{ H}) + \text{H} + \text{O}$.

*Hennell's oil of wine (sulphated oxide of etherium) = $\text{S} + (4\text{ C} + 4\text{ H}) + \text{H} + \text{O}$.

The sulpho-vinates, as sulpho-vinate of potash, (double sulphates

* Hennell has not given water as a constituent of these substances; by the later researches of Wöhler, Liebig, and others, it has been proved to exist constantly in the atomic relation, corresponding to the view we have taken up.

of potash and oxide of etherum) $(\overset{\cdot\cdot}{\text{S}} + \overset{\cdot\cdot}{\text{K}}) + (\overset{\cdot\cdot}{\text{S}} + (4 \text{ C} + 4 \text{ H}) + \text{H}) + \text{O}$.

Nitrous ether (hypo-nitrite of oxide of etherum) $= \overset{\cdot\cdot}{\text{N}} + (4 \text{ C} + 4 \text{ H}) + \text{H}) + \text{O}$.

Oxalic ether (oxalate of oxide of etherum) $= 2 \overset{\cdot\cdot}{\text{C}} + (4 \text{ C} + 4 \text{ H}) + \text{H}) + \text{O}$.

Any one conversant with the subject will at once see how simply the above view accounts for the varied decompositions which occur in the production of these different bodies. I regret that the necessary brevity of this note prevents me from illustrating any instance in detail, for it would facilitate very much the comprehension of the subject. It is at once apparent that the different oxy-combinations of etherum have been well studied, and that it is very probable that corresponding chlorine, iodine, &c. compounds exist, a few of which, as muriatic, hydriodic, and hydrosulphocyanic ethers, are already known. I had intended to enter into the developement of this subject myself, but want of time prevented me; the only experiments I made on it are a few, which I shall subsequently relate. I now bring the subject forward in order to direct the attention of those persons who are interested in the progress of chemical philosophy to it, that its truth or falsity may be, if possible, proved.

ACTION OF IODIDES ON HYDRIODIC ETHER.

Having seen, in the foregoing note, that the oxy-combinations of etherum are known, I wished to try whether I could not form different iodine salts of etherum, taking the iodide of etherum as the iodine base, and various negative iodides as the acids. I had not time to follow up the subject, but I shall relate those experiments that I made, in order to shew the probability of the existence of these compounds.

1. A quantity of hydriodic ether (iodide of etherum) was poured on the black iodide of platinum (first described

by me, Vol. I. of this Journal) and left for some days. The iodide of platinum was nearly all dissolved, and the ether had acquired the intense claret colour common to all the iodo-platinates.

When the combination thus obtained was allowed to evaporate spontaneously, it left a dark semifluid mass, deep claret-coloured, which, when heated, gave out first hydriodic ether, then iodine, and left metallic platinum.

When this combination is mixed with water, it separates totally from it, and remains under it as hydriodic ether alone would. The water having remained for some days in contact with it, became slightly coloured.

It dissolved totally in ether.

When this red combination was agitated with an aqueous solution of ioduret of potassium, the latter became deep claret-coloured; iodo-platinate of potassium was formed, and the ioduret of ethereum separated pure to the bottom of the solution.

When this iodo-platinate of ethereum was digested in a solution of ioduret of hydrogen (hydriodic acid), it was in the same manner decomposed; iodo-platinate of hydrogen being formed, and ioduret of ethereum (hydriodic ether) separated.

From these experiments, it appears probable that the ioduret of ethereum, being positive, unites with the negative iodide of platinum, and forms an iodo-platinate of ethereum. It is evident that this hypothetical base *ethereum* is less positive than hydrogen and potassium.

2. Colourless hydriodic ether having been poured on bin iodide of mercury, after some time became of a pure gold colour.

When this liquor is evaporated spontaneously, it yields beautiful and even moderately large crystals, of a splendid red colour; they were tables of four sides, varying to six or eight by the truncation of the opposite angles. They were permanent in the air, but decomposed when exposed to heat; when heated, they gave out iodide of mercury, some gaseous products, and a trace of carbonaceous matter remained.

When this yellow liquor is mixed with an excess of solution of ioduret of potassium, pure hydriodic ether separated, and the iodo-hydrargyrate of potassium existed in solution.

When this yellow liquor is decomposed by only a small quantity of ioduret of potassium, no hydriodic ether separates, but a yellow powder, of an amylaceous feel, is precipitated, and the liquor contains much mercury.

This yellow powder is insoluble in water or in alcohol ; it is tasteless and totally inodorous ; when heated it first gives out vapour of hydriodic ether, then a heavy yellow vapour, which crystallizes on the inside of the tube (iodide of mercury), some metallic mercury, and leaves a carbonaceous residue.

From these experiments, the natural inferences are, that biniodide of mercury, and ioduret of ethereum, combine in two distinct proportions, and form two iodine salts ; the one, containing most of the negative element, can be obtained in fine red crystals, and the other, containing less, is found to be insoluble, and of a yellow colour.

The success of these few trials shows how very probable it is that an industrious investigation of the ethereal combinations would lead to consequences important alike in a practical and in a theoretical point of view ; and they render extremely probable the hypothesis which I have suggested, that, for example, we must regard hydriodic ether, which consists of one atom of hydriodic acid + two atoms of olefiant gas, as being an ioduret of a substance formed by the addition of the hydrogen of the hydriodic acid to the liquid corresponding to the two atoms of olefiant gas, just as we regard sal ammoniac as being composed, not of hydrochloric acid and of ammonia, but as being a chloride of a substance composed of the hydrogen of the hydrochloric acid united to the ammonia.

ACTION OF SULPHURIC ETHER UPON IODIDES.

In the memoir on the iodide of platinum, published July, 1832, I mentioned that ether had not any sensible action on it;

this I have since found to be incorrect, and I deem it necessary to describe the peculiar action of ether upon some iodides, including that of platinum.

1. When ether is digested upon iodide of antimony, it dissolves it, and by spontaneous evaporation we can get the iodide confusedly crystallized in needles. If we take the ethereal solution and evaporate it on the surface of water, the water contains much hydriodic acid, and oxide of antimony separates.

When sulphuric ether is digested on iodide of platinum, it dissolves a small quantity of it, and assumes a red colour ; when this solution is evaporated on the surface of water, the water contains much hydriodic acid, and a black powder, aggregated in spongy masses, collects on the surface of the water ; bubbles of gas separate from it, and after some time it falls down ; it is then found to be metallic platinum. Probably, as in the case of iodide of antimony, where water was decomposed, and hydriodic acid and oxide of antimony formed ; oxide of platinum is formed here in the first instance, but immediately decomposed, oxygen separating, as we have seen, in the gaseous form, and metallic platinum finally subsiding.

Ether does not appear to have any action on bin-iodide of mercury.

COMBINATION OF IODIDE AND OXIDE OF ANTIMONY.

It is well known that when iodide of antimony is put in contact with water, hydriodic acid and oxide of antimony are formed ; it was even formerly used as a mode of obtaining hydriodic acid. This effect requires a moderately large quantity of water, and I have found that when a smaller quantity of water is employed, the decomposition is not perfect, but that a combination of oxide with unaltered iodide, corresponding to the powder of algaroth, is produced. The quantity of iodide remaining undecomposed varies according to the quantity of water ; the precipitate is at first of a fine yellow colour, but after remaining

for some time in contact with water, it is further decomposed, and, finally, nothing but oxide of antimony and hydriodic acid remains.

I have made several analyses of this yellow precipitate, and as its composition, when the same proportion of water was employed, appeared to be nearly constant, it may be useful to state the mean result of the analysis, which corresponds to—

$$4 \text{ Atoms oxide of antimony } (12 + 64.6) \times 4 = 306.4.$$

$$1 \text{ Atom iodide of antimony } (189.7 + 64.6) = 254.3.$$

As the quantity of iodide decomposed increases with the quantity of water used, and with the time that the precipitate remains in contact with the water, it is evident that the composition of this precipitate must be liable to considerable variation.

NEW MODE OF PREPARING PROTO-IODIDE OF TIN.

In the course of some researches on the combinations of chlorine with iodine, in which I am at present engaged, I was led to the investigation of the general law of the action of iodine upon the chlorides, and met with some curious and unexpected results, which I shall communicate in a future collection of these miscellaneous observations. At present I shall only describe a simple mode of obtaining the proto-iodide of tin beautifully crystallized. If we take a warm solution of proto-chloride of tin, and add to it a quantity of iodine in fine powder, the iodine is rapidly dissolved; and if the solution had been strong, a large quantity of the orange-red iodide of tin is deposited immediately in small micaceous plates, which, when in the fluid, appear like red litharge. If the solution be less concentrated, little is deposited on the instant, but as the solution cools (and great heat is evolved during the process) the iodide separates in long splendid red prisms of four and six sides. These are very delicate, and require great caution to be preserved.

While in the solution from which they were deposited, these crystals preserve very well ; but if after having been taken out they come in contact with water, they are decomposed, hydriodic acid and oxide of tin being formed.

In the process, a quantity of perchloride of tin is formed ; the decomposition is thus very easily explained : taking two atoms of proto-chloride of tin and one of iodine, you have—

2 Chlorine + 2 tin.

1 Iodine.

And after decomposition—

2 Chlorine + 1 tin.

1 Iodine + 1 tin.

I shall develop the general law of the action of iodine upon chlorides in a future communication.

PRIORITY OF DISCOVERY OF THE IODIDE OF PLATINUM.

In the October number of the *Journal de Chimie Medicale*, there is an abstract of a letter sent by Lassaigne to the Academy of Sciences, announcing his discovery of the iodides of platinum, and of the various saline combinations into which one of them enters. He, in it, merely states generally the result of his labours, deferring the more particular exposition of the history of these bodies until the appearance of a matured memoir.

According to Lassaigne, there are two iodides of platinum, formed by decomposing the two chlorides of platinum by ioduret of potassium ; they are both black powders, insoluble in water, and they correspond in composition to the chlorides, containing, the one, 2 atoms of iodine + 1 platinum, and the other, 1 atom of iodine + 1 platinum. The periodide, says he, unites to the iodides of potassium, of sodium, &c., and forms double iodides. He also obtained a combination of hydriodic acid and iodide of platinum.

I would direct the attention of my readers to a paper, published in this *Journal* in July, 1832, on the iodide of platinum

and its saline combinations, in which I described that substance at length, developed the history of the compounds it forms with the iodides of the basic metals, and enumerated all the important facts in its history. It is a source of the highest gratification to me, that so eminent a chemist as Lassaigue has followed the same train of research, and fully established the accuracy of my investigations by their close coincidence with his results. There is but one point on which we differ, and on that he appears to have fallen into an error, for which, from the simplicity of the subject, I cannot well account. He considers the periodide of platinum as being composed of 2 atoms of iodine + 1 platinum, while, according to my analysis, it is composed of $1\frac{1}{2}$ iodine + 1 platinum.

Where a difference arose between a chemist, so justly celebrated as Lassaigue, and myself, I would be very much inclined to suspect that I was wrong, but in the present instance there is no doubt that Lassaigue has fallen into error. When perchloride of platinum and ioduret of potassium are mixed together, the perchloride being in excess, iodide of platinum is thrown down, and *chlorine liberated*. This fact at once proves that the iodide thrown down contains *less than two atoms* of iodine, and by decomposing it by heat, the analysis constantly gave as its composition, $1\frac{1}{2}$ atoms iodine + 1 platinum.

I had the honour of reading my paper to the Royal Irish Academy in June, 1832, and it was published in this Journal the July following. The letter from Lassaigue was read to the Academy of Sciences of Paris the 17th September, 1832, and published in the Journal de Chimie Medicale (the only journal in which I have as yet (Nov. 23rd) seen it) October, 1832. It is thus evident that he has been anticipated by me in these researches; but it is certain that he was not aware of having been so, for he makes no reference whatsoever in his letter to the labours of any other chemist, and I am aware that Lassaigue is too honourable to act otherwise than in the most candid manner.

In my paper I announced the existence of the proto-iodide

of platinum, but did not enter into its description in detail ; I consider that it is the same with the proto-iodide described by Lassaigne. Another point to which it is necessary to refer, is, that Lassaigne examined the compounds of iodide of platinum with iodide of potassium, &c. as double iodides, whilst I investigated them as iodine salts, in which the iodide of platinum is the electro-negative (acid) element, and the other iodide, the positive (basic). He does not appear to have any general idea of the nature of the compounds of the negative iodides with hydriodic acid, but I succeeded in developing their nature, and the nature of the hydracids generally, in a paper published in the July number (1832) of this Journal ; and acting on my theoretic ideas of their nature, succeeded in forming the compound of iodide of platinum as the acid, and ioduret of hydrogen as the base, which has since occupied the attention of Lassaigne.

ART. XXII.—*Notes on Malignant Cholera, as it appeared in Dublin.* By SIMON M'Coy, late one of the Resident Medical Officers of the Grange Gorman-lane Cholera Hospital.

THE medical reader has already perused so many books and minor undertakings on and about cholera, that he now hardly does more than glance over the beginning of paragraphs in each new issue from the press on the subject, from a pre-conviction that nothing new is to be expected in the elucidation of its phenomena, and almost as little of *important* novelty in its treatment. Knowing this, I should have hesitated in obtruding any thing under the head of cholera on public notice but for the following considerations. In April last I was appointed, by the General Board of Health for the city of Dublin, one of the resident medical attendants of its chief cholera hos-