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As to the facts observed by Mr. Noad, you will easily perceive that some of them have been already mentioned in my letter to Mr. Faraday, published in Number 59 of your Magazine. The conclusion drawn by Mr. Noad from some of his experiments, that iron being in its peculiar state is incapable of conducting current electricity, is, I am afraid, not admissible; for as I have shown elsewhere, an inactive iron wire can perfectly well perform the function of the positive electrode, even of a very small pile, without undergoing any change with regard to its peculiar condition; and besides this fact, there are many others, which do not allow the adoption of Mr. Noad's conclusion. It is, however, true, that iron in its peculiar state obstructs very much the passage of currents of low intensity, and acts in this respect very like platina.

I am, Gentlemen, yours, &c.

Bâle, May 8, 1837.

C. F. SCHÖENBEIN.

P.S. You will oblige me very much by letting Mr. Faraday have a sight of the preceding letter previously to its insertion in your valuable Journal. S.

LXXXII. On the Protochloride and Terchloride of Iodine.

By ROBERT KANE, M.D., M.R.I.A.*

IN the *Journal de Pharmacie* for February 1837, received here (at Dublin) April 4th, there is a paper by Soubeiran in which he describes a chloride of iodine, consisting of three atoms of chlorine and one of iodine, as new, and as having been first discovered by him. In the number of the Dublin Journal of Medical and Chemical Science for July 1833, I described this very body, as well as a lower chloride which appears to have escaped Soubeiran's notice; and as that memoir has evidently not attracted the attention of chemists, I take the liberty of subjoining the results contained in it in as brief a form as admits of their being intelligibly described. The difference of dates (four years nearly) renders it unnecessary to enter into any argument about priority.

"In order to obtain a compound containing the greatest possible quantity of iodine, I passed a current of chlorine through water in which iodine was diffused, leaving a considerable excess of iodine. The liquor became of a deep brownish-red colour; gave off fumes of chloride of iodine highly irritant to the eyes and nose; had a peculiar smell intermediate between those of its constituents; first reddened and

* Communicated by the Author.

then bleached litmus paper: when cooled considerably it deposited a considerable quantity of a reddish yellow matter, which was again redissolved by heat."

For analysis an excess of pure potash was added, the whole dried and ignited, redissolved and precipitated by nitrate of silver, the mixed chloride and iodide of silver separated by ammonia. In two analyses were obtained,

| | 1. | 2. | |
|-----------------------------|--------------|--------------|-----------------------|
| Chlorine ... | 22·36 | 23·76 | Mean { 23·06 76·94 |
| Iodine | 77·64 | 76·24 | |
| | <hr/> 100·00 | <hr/> 100·00 | <hr/> 100·00 |
| The body Cl + I should give | | | |
| Chlorine..... | 35·42 | 21·9 | |
| Iodine..... | 126·30 | 78·1 | |
| | <hr/> 161·72 | <hr/> 100·0 | |

"The solution of this chloride in water is deep reddish yellow. On the skin it produces a deep yellow mark, and smarting is not soon washed off. When heated it is partially decomposed, and by frequent distillations can be completely decomposed into iodine and the terchloride.

"When put in contact with the red oxide of mercury, the red or brown oxide of lead, or the oxides of copper, there is oxygen copiously disengaged, while chloride and iodide of the respective metals are produced, and some iodine deposited. With oxide of zinc this reaction is particularly remarkable. The action of this chloride of iodine on metallic chlorides gives rise to some interesting phenomena, which are exhibited in a tabular form in the original paper, to which I shall refer for the details. With protochloride of tin, the protochloride of iodine gives perchloride of tin and protiodide of tin in splendid orange prisms; iodine being separated by the first action but subsequently dissolved. Thus,



and with other protochlorides the metal is carried to the highest degree of combination with the chlorine."

"Of the Terchloride of Iodine.—When a solution of the protochloride of iodine has been repeatedly distilled, the quantity of iodine which separates each time diminishes, until at last a liquor is obtained which is vaporized unaltered. It then contains terchloride, although it is exceedingly difficult to obtain it pure. It can likewise be obtained by adding to protochloride of iodine a strong solution of corrosive sublimate, which throws down much iodine; and on pouring off

the clear liquor and distilling, the terchloride can be gotten nearly pure. A great number of analyses were made of it, which, though the specimens prepared in different ways and at different times gave results slightly varying, all agreed within narrow limits with the formula $3 \text{ Cl} + \text{I}$, which gives

| | | |
|-------------|---------------------------|--------|
| Chlorine... | $35.42 \times 3 = 106.26$ | 45.66 |
| Iodine..... | $126.30 = 126.30$ | 54.34 |
| | <hr/> | <hr/> |
| | 232.56 | 100.00 |

“The properties of this compound, admitting its existence, are, generally speaking, similar to those of the protochloride, with one exception, which serves to distinguish it from it, and to determine when it is rendered impure by admixture with any of it. When the terchloride of iodine is mixed with protochloride of tin, iodine is thrown down; but when more chloride of tin is added, in place of forming the orange-red crystals of protiodide of tin with the excess of protochloride of tin, the iodine dissolves and forms a perfectly colourless solution; therefore, in distilling the chloride of iodine, as long as the distilled liquor forms any orange-red crystals with an excess of protochloride of tin, it has not been as yet freed sufficiently from protochloride of iodine.”

Soubeiran doubts altogether the existence of the perchloride ($\text{Cl}_5 + \text{I}$), in consequence of his not having been able to obtain it pure. I have not myself made any experiments on that subject, but from the positive results of Davy and Gay-Lussac, I am still disposed to admit of its existence and to consider that there are three chlorides of iodine, Cl I , $\text{Cl}_3 \text{ I}$, and $\text{Cl}_5 \text{ I}$.

I cannot conclude this note without expressing the great pleasure I received from seeing my early results confirmed by the accurate experiments of Soubeiran, and in stating that although obliged by justice to myself to call the attention of chemists to my former paper, yet that the recent memoir in the *Journal de Pharmacie* has filled up an important vacancy in science, by showing that the terchloride was of a more permanent nature and could be obtained by simpler processes than I had been inclined to suppose; and I am sure had Soubeiran attempted to analyse the compound with maximum of iodine, he would have much illustrated the history of that body, which I was able at the time but partially to explore.

Dublin, April 12, 1837.