

There are, of course, many other phenomena exhibited by these cells, which I do not attempt to explain. For instance, there are stream movements seen in the cell, and even in the pseudopodia themselves. These are probably purely molecular, and may be the result of heat; for many curious movements and currents are to be observed in heating liquids, and especially a mixture of dissimilar ones.

If oil suspended in water, or acetic acid on a glass slide, be heated, as certain temperatures are reached flowing movements of a very curious nature are to be observed not unlike the streaming of protoplasm. This explanation has received a wider extension by Professor Rindfleisch ("Centralblatt," Oct. 23, 1880), who would account for much more upon this one factor.

That the above views are merely speculative, and views which may have eventually to be withdrawn, I need hardly say. It is natural and right to ask, when a new anatomical structure is discovered, What are its functions?

The paper of Professor Rindfleisch was not in my possession when I introduced this subject to the Society. I have taken, however, the liberty of mentioning its main contents.

Monday, 3d January 1880.

Professor DOUGLAS MACLAGAN, M.D., Vice-President,
in the Chair.

The following Communications were read:—

1. On the Effect of Permanent Elongation on the Specific Resistance of Wires. By Mr T. Gray. Communicated by Sir William Thomson.
2. Meconic Acid. By Mr D. B. Dott. Communicated by Professor Crum Brown.

Although meconic acid is constantly taken, even in the most recent handbooks of chemistry, as an instance of a tribasic acid, it is

by no means certain that it possesses that nature. Some years ago, Dittmar and Dewar* investigated the matter, and came to the conclusion that meconic acid is dibasic though triatomic; but their experiments are not supposed to completely elucidate the subject. All published statements regarding this acid are consistent with it being only dibasic, if we except one or two analyses of its metallic salts. Only two ethyl ethers are known, while hydromeconic acid, which is formed from meconic acid by the action of sodium-amalgam, forms dibasic salts alone. With morphia and with aniline tribasic compounds are not known, though the dibasic salts are easily prepared.

There can be no doubt that the chief reasons for assuming the tribasic nature of meconic acid, are the statements which have been made concerning the composition and properties of the silver and lead salts, notably of the former. The object of the present paper is to prove that the alleged facts regarding these compounds do not rest upon solid ground.

The meconic acid used in the experiments hereafter described was carefully purified, being obtained in the form of well-defined prisms perfectly free from colour. No impurities for which it was tested were found to be present, and the acid neutralized the required proportion of standard alkali.

I. *Meconates of Lead.*

(1.) Prepared by adding solution of lead acetate in excess to aqueous solution of meconic acid. Even after long-continued washing the precipitate still yielded to the filtrate lead and meconic acid, showing that the salt is not insoluble, as is sometimes stated. After drying at 120° C. the meconate was ignited, and the residue ignited with ammonic nitrate to oxidize the metal.

8.295 grs. gave 4.22 grs. PbO = 50.87 per cent.
 8.260 „ 4.20 „ = 50.84 „

(2.) This salt was prepared in the same way as the above, at least there was no difference noticed in the method of procedure.

47.50 grs. gave 26.70 grs. PbO = 56.21 per cent.

* Proc. Roy. Soc. Edin. 1867.

(3.) Another salt similarly prepared.

20·11 grs. gave 12·06 grs. = 59·96 per cent.

(4.) In this case the precipitate was produced by mixing solutions of lead acetate and neutral ammonium meconate

22·60 grs. gave 14·64 grs. PbO = 64·77 per cent.

(5.) This salt was prepared by adding solution of lead acetate to solution of neutral morphia meconate.

6·69 grs. gave 4·07 grs. PbO = 60·76 per cent.

$\text{PbC}_7\text{H}_2\text{O}_7 = 55·06$ per cent. PbO.

$(\text{PbC}_7\text{H}_2\text{O}_7)_2\text{PbO} = 64·76$ per cent. PbO.

$\text{Pb}_3(\text{C}_7\text{HO}_7)_2 = 65·91$ „ „

$\text{PbC}_7\text{H}_2\text{O}_7\text{PbO} = 71·01$ „ „

From these results it is manifest that the precipitates obtained as above described are of variable composition, and are probably mixtures of different salts. Stenhouse* prepared several basic salts, one of them containing as much as 64·7 per cent. of lead oxide. I believe it is this tendency of meconic acid to form basic salts, which has led to the belief in its tribasicity:

II. *Meconates of Silver*

(1.) Prepared by adding nitrate of silver in excess to solution of neutral ammonium meconate. Precipitate dried at 100° C.

9·82 grs. gave 3·44 grs. Ag = 35·03 per cent.

12·77 „ 4·47 „ = 35·00 „

(2.) This precipitate was produced by adding excess of silver nitrate to alkaline solution of ammonium meconate, the product being dried at 120° C.

10·050 grs. gave 4·86 grs. Ag = 48·35 per cent.

9·745 „ 4·72 „ = 48·38 „

(4.) Prepared by mixing solutions of ammonium meconate and silver nitrate, the former being in excess. Precipitate dried at 100° C.

10·215 grs. gave 5·195 grs. Ag = 50·85 per cent.

9·310 „ 4·705 „ = 50·53 „

* Gmelin's Handbook, xii. 128.

(5.) Prepared by mixing solutions of meconic acid and nitrate of silver, the resulting precipitate being dried at 120° C.

6.46 grs. gave 3.42 grs. Ag = 52.94 per cent.

(6.) Prepared by adding argentic nitrate to solution of neutral meconate of ammonia. Dried at 120° C.

8.035 grs. gave 3.385 grs. Ag = 42.12 per cent.

(7.) Prepared in the same way as the preceding.

12.410 grs. gave 5.705 grs. Ag = 45.97 per cent.

(8.) Prepared by mixing solutions of silver nitrate and neutral morphia meconate. Precipitate dried at 120° C.

6.11 grs. gave 3.41 grs. Ag = 55.81 per cent.

(9.) A quantity of argentic meconate prepared by precipitation was boiled for a few hours with water, the residue then dried and ignited.

6.075 grs. gave 3.785 grs. Ag = 56.45 per cent.

(10.) Another portion of the same salt was boiled in water for twenty-four hours.

2.840 grs. gave 1.725 grs. Ag = 60.73 per cent.

(11.) Another portion boiled for forty hours, and the residue similarly ignited.

6.065 grs. gave 5.390 grs. Ag = 88.87 per cent.

(12.) A quantity of argentic meconate, formed by mixing solutions of nitrate of silver and meconate of ammonia, was boiled with water for forty hours and the resultant substance ignited.

3.67 grs. gave 2.84 grs. Ag = 77.38 per cent.

$\text{AgC}_7\text{H}_3\text{O}_7 = 35.17$ Ag per cent.

$\text{Ag}_2\text{C}_7\text{H}_2\text{O}_7 = 52.17$ „

$\text{Ag}_3\text{C}_7\text{HO}_7 = 62.18$ „

When the experimental results above described are compared with the numbers just given, it will be noticed that in no case do

the figures correspond, while in Nos. 11 and 12 the percentage of silver is far above that required for the triargentic salt. Wackenroder* appears to have been the first to afford the information that a tribasic meconate of silver is produced by precipitation, when the ammonium meconate is used, and that the same salt is formed by boiling the diargentic meconate with water. These statements, though generally accepted as correct, are not borne out by anything I have observed. Doubtless, if in boiling the meconate of silver with water the operation be stopped at a certain point, the product will have apparently the composition of the triargentic salt; but then, if the boiling be continued, the percentage of silver increases, until probably there is nothing but oxide of silver left. There is therefore no evidence that a tribasic meconate has been prepared, and we are not, so far as I can see, in possession of any information which should lead us to suppose that meconic acid is tribasic.

3. On the Crystallization of Silica from Fused Metals. By R. Sydney Marsden, D.Sc., F.R.S.E., F. Inst. Chem., &c.

The crystallization of silica from fused metals, although at first sight appearing to be of little importance, nevertheless presents some features of peculiar interest. It also constitutes a field almost entirely new to the investigator, though the subject is one which, from a technical point of view, may prove to be of very considerable importance.

I have therefore undertaken the examination of some of the facts relating to this subject—at first more particularly inquiring into the nature of the change which occurs when silica itself is kept at a high temperature for a number of hours and subsequently submitted to a process of very slow cooling.

The substance which formed the basis of these operations, and in which the changes hereafter mentioned were noticed, consisted of several Berlin porcelain crucibles, in which, in the course of some other experiments, I had reason to keep metallic silver and amorphous carbon at a temperature considerably above the melting point of the former, for a number of hours, and subsequently

* Gmelin's Handbook, xii. 430.