purpose in keeping down temperatures. The importance of the number of organisms was a matter of opinion. Once organisms were created there was always an element of doubt. It seemed a very disappointing thing to have a sort of incubator on the works. Whether the organisms were harmful or not was a very big question, and he was neither disposed nor in a position to discuss the point. With regard to the strainer referred to, he imagined the result depended upon the thickness of the filtering material—that was presuming nothing ran over the top layer. His point was that it would not be sufficiently efficient, and that, when the thickness was increased by so much that it did become efficient, strainers of the type he had mentioned might just as well be employed; in addition there would be the difficulty of cleaning and that this cleaning could not be effected without discontinuing the process. The virtue of the strainer used at Nelson was that all the deposited sludge went on to a comparatively small area and the strainer could be cleaned in a few hours by a few men and the process continued with only slight delay. The design of the filters came in really in the question of the vertical flow. He had no doubt that a great improvement might be effected in that respect, but being a chemist and not an engineer, he was not qualified to speak upon the matter. A very important point had been mooted about the results from strainers not being very encouraging. He was afraid he was somewhat to blame for that because, in selecting the results to put in the tables produced, he deliberately chose effluents which contained a very small proportion of suspended solids. He did not suggest that at Nelson their average effluent from sedimentation tanks contained one part per 100,000 of suspended solids. The point was that if it was possible to take out one part it was possible to take out more, and the purification would go up with increasing impurity of the tank effluent. At Nelson they had had a great deal of trouble with their effluents in trying to work to a standard of 0.10 parts per 100,000 albuminoid ammonia. It was quite easy to do it by the use of the strainers. As to the temperature rising in the tanks owing to a fermentation process, that possibility had occurred to him, but looking at the table and noting the composition of the effluents used, it scarcely seemed likely to be the case. In speaking of the offensiveness of the sludge he had referred to the time when the water had just been run off. It then had a sweet and very objectionable odour which was quite characteristic. In his opinion the fat in the fly scum came from the flies themselves and not from anything floating on the sewage. For analysis he had very carefully chosen layers of the scum which were brown and, as far as he could see, free from matter directly derived from sewage. The fly scum at times was almost black, owing to admixture with sewage fat, etc., although undoubtedly the bulk of it was composed of sewage fly. It would be extremely interesting to procure a measurement of the sunlight for the purpose of investigating the power of the rays. The question had occurred to him during the experiments and, had he known an instrument of the kind could be employed, he would most certainly have used it, since, as had doubtless been observed by others, the rise in temperature showed no sort of parallelism with the conditions. It was possible to have a day with a great deal of sunshine when the temperature of the exposed water did not rise as much as on a day when the conditions were quite different.

SOME BASIC COPPER SULPHATES.

BY G. FOWLES, D.S.C.

A paper by W. F. A. Ermen, entitled "Some Basic Copper Sulphates," has recently appeared (this J., April 15, 1912, 312—314). The author is, perhaps, not aware that some of the work described by him has been previously published. The conversion of basic copper sulphate to copper hydroxide by continually washing with caustic soda is well known, and the method employed is the one used to obtain crystalline copper hydroxide, which can be digested in boiling water without decomposition. It was obtained in this way by Böttger as early as 1857, and Habermann (Z. anorg. Chem., 1906, 318) has confirmed

his work. Others have also investigated it, e.g., Bullheimer (1900) and Van Bemmelen, Ber., 33, 817.

The method of formation of a basic copper sulphate by boiling copper oxide with copper sulphate, was employed by Sabatier in his investigation of basic salts (Comptes rend., 1897, 125, 104). By prolonged digestion of a solution of copper sulphate with the brown hydrate, $4\text{CuO} \cdot \text{H}_2\text{O}$, Sabatier obtained a compound to which on analysis he assigned the formula, $4\text{CuO} \cdot \text{SO}_3 \cdot 4\text{H}_2\text{O}$.

The other methods described by Mr. Ermen for the production of basic copper sulphates, namely, treatment of solutions of copper sulphate with less than their equivalent of ammonia solution or sodium carbonate, have been mentioned many times in the literature of the subject. Reindel (J. prakt. Chem., 1867, 102, 204) showed that when sodium carbonate was added to boiling copper sulphate solution a precipitate was formed to which on analysis he assigned the formula, $6\text{CuO} \cdot 2\text{SO}_3 \cdot 5\text{H}_2\text{O}$. Habermann (Monatsh., 1883, 4, 789) repeated the work and confirmed the results of Reindel. A precipitate of similar constitution was likewise obtained by Reindel by the action of ammonia, but Habermann (Monatsh., 1884, 5, 435), who estimated the CuO and SO_3 in three different preparations gave it the formula $7\text{CuO} \cdot 2\text{SO}_3 \cdot 6\text{H}_2\text{O}$.

He describes it as a bluish green powder, which appears under a microscope of high power to consist of ill-defined crystals. It is quite insoluble in water, is unchanged when heated to 127°C ., and does not blacken until a temperature approaching 300° is reached.

The precipitation of solutions of copper chloride by caustic potash, which Mr. Ermen proposes to investigate, has been studied by Lash Miller and Kendrick (Proc. Roy. Soc. Canada, 1901, 2nd Series, Vol. 7, Sect. 3, p. 35), where they state that when $\text{N}/5$ potassium hydroxide solution is allowed to act on $\text{N}/5$ cupric chloride solution at 85°C ., the solid phase consists exclusively of $\text{CuCl}_2 \cdot 3\text{CuO} \cdot 2\text{H}_2\text{O}$ until all the copper is removed from the solution; on further addition of caustic potash the precipitate blackens, the basic salt being converted into the oxide.

Scottish Section.

Meeting held at Glasgow on Tuesday, 22nd October, 1912.

DR. THOMAS EWAN IN THE CHAIR.

A HEMPEL DOUBLE PIPETTE, MODIFIED TO FACILITATE FILLING.

BY ALEXANDER CHARLES CUMMING.

The filling of a Hempel double pipette, as ordinarily constructed, offers some little difficulty. By the addition of a side-tube, shown in the diagram at A, the pipette

is as easily filled as a simple pipette. The pipette is first filled with an indifferent gas by passing it through while the tube, A, is closed with a cork. The reagent is introduced by pouring in through the tube, A, and water is poured in through B to form a water-seal. The tube, A, is then closed with a well-fitting rubber cork.