

# Editorial

## ACTIVATED SLUDGE.

It is questionable whether the optimist could have predicted the great developments which have been and are taking place in connection with the activated sludge process. Prof. Gilbert J. Fowler announced in 1913 the results of experiments made at the Manchester sewage works by adding iron salts, inoculation of sewage with an organism and blowing in air, which produced a "limpid, sparkling and non-putrefactive effluent." This research was undertaken because of a suggestion made to him by Dr. Maclean Wilson that it might be possible to "discover some kind of clotting enzyme which should do the work which now apparently takes place on the surfaces of the medium of the filter bed." Dr. Fowler, when reading a paper before the Liverpool Engineering Society on March 4th, 1914, stated that he looked "forward with confidence to the time when it will be possible completely to purify sewage in a tank with the production on the one hand of inoffensive sludge which can be readily handled and disposed of as manure, and on the other of a well-aerated effluent."

In May, 1914, the world learned of the results obtained by Messrs. Ardern and Lockett, who were collaborating with Dr. Fowler and from that time to the present sanitarians have in many lands given the activated sludge process a great amount of consideration. Those who have kept in touch with the progress of sewage treatment during the past generation can recall the multitude of methods which were tried; but the standards of purification and the efficacy of the processes did not work out in practice according to the predictions of those who heralded their inception. Consequently, we have been waiting and observing, delving into Nature's mysteries and slowly bringing to light many valuable discoveries which in the aggregate have brought the science and art of sewage treatment within a measurable distance of the desired goal.

We have before us the report issued by the Milwaukee Sewerage Commission, the bulk of which deals with extensive experimentation in connection with the activated sludge process. The forward step taken by Mr. Chalkley Hatton, the chief engineer, and his chief chemist, Mr. William R. Copeland, in advising the Commission to construct a two-million-gallon-per-day plant, commands admiration, for no doubt many problems and difficulties are brought out, when operations are conducted on a large scale, which are often unobserved in the laboratory. For Milwaukee experiments have revealed some of these. For example, the diffusion of air has, in practice, apparently not proved so easy of attainment as was originally anticipated. Mr. George W. Fuller has drawn attention to several points which deserve consideration, and no doubt with patient research they will be satisfactorily solved.

The process, nevertheless, is advanced sufficiently to indicate that it is applicable under a great variety of conditions. It will treat sewage containing large proportions of trade wastes which have hitherto caused great trouble, and also sewage which is entirely domestic; but in each case the treatment, although identical in principle, must be varied according to the strength and characteristics of the sewage. The effluents obtained by the process exceed in superiority those got by ordinary methods, even with

ample area of filters and efficient sterilization. Furthermore, it was possible at Milwaukee to purify about 10 million U.S. gallons per acre, whereas only 2.5 millions are possible by the older methods.

The ordinary haphazard attention, however, will spell failure because, on the one hand, there must not be an accumulation of unoxidized sludge, nor, on the other, much exhausted sludge due to over-aeration. There is a great measure of flexibility in the process, for by aerating the sludge during the period of minimum flow and weak sewage it is possible to charge the incoming sewage during the other periods with vigorous activated sludge.

Whilst the effluent from these tanks is clarified and purified to a greater degree than is possible by ordinary sewage treatment, the sludge which has always been the great bugbear of sewage works is made valuable as a fertilizer, owing to the proportion of nitrogen, phosphorus and potash contained therein. Activated sludge drains easily and can be pressed into cakes. The use of lime, however, may probably be avoided by using fine ashes, coal or lignite dust, or dry peat, and it would be instructive if experiments were made on these lines. Screened cinders are found effective with ordinary sludge at Oldham, and Degeur used lignite in Germany. As activated sludge contains about 98 per cent. of water it will be seen that if the moisture content was reduced to 20 per cent. the weight would be reduced from 100 to 2.5, which is a most important factor in its manipulation.

Although Canadian municipal authorities will learn much by the work done by British and American experiments, there is more to be gained by carrying on similar work because there is a great deal of knowledge to be acquired by observing the particular features of the process under different conditions. No scientist can express in language all the knowledge he has gained, even if he should write volumes. It is the personal contact with a new process which reveals its full value.

The comprehensive experiments made at Milwaukee have so fully confirmed the statements made by Messrs. Ardern and Lockett that there remains but little doubt in the minds of sanitarians generally, that we are to witness a great revolution in the method of sewage treatment and the standards of purification which will in future be attainable in ordinary everyday practice.

## AN INTERESTING ANNOUNCEMENT.

As indicating the confidence of the French people it is interesting to note that plans are now being formulated for the holding of a Reconstruction Exposition in Paris during May, June and July of this year. In a statement to manufacturers it is pointed out that the war has laid bare the habitations of 35,000,000 people and destroyed county roads, city streets, public service systems, factories and farms. This, indeed, is a most interesting announcement and indicates the spirit of the people. It spells hopefulness at least. The prospectus adds that the end of the war will mark the beginning of the work of reconstruction and for this a vast amount of machinery and supplies will be necessary.