

user into harmonious and indeed enthusiastic coöperation here it ought to be possible there.

As men of your sagacity are ever anxious to profit by the experience of others, I commend most earnestly to your attention this opportunity which your American visit offers to profit by the special experience of the American Society for Testing Materials, which stands to you in a relation of filial affection and pride. The natural development of the American Society has happened to be in the direction of specification making. In our opinion, based on our now very considerable experience, this work has proved far more valuable, and of far greater profit to the public, than our simultaneous work of perfecting methods of measurement. Your visit here gives you an opportunity of judging the truth of this opinion, and, in case it shall seem to you true, the further opportunity of profiting by our experience in the methods to be followed and those to be avoided in this special work. Not less strongly do I commend to our American members this opportunity to learn from their foreign colleagues the work which they have found most useful, and the means which they have found most effective.

In closing this address I ask the members of the committee who have labored so zealously and so wisely to organize and carry out this congress and its excursions to rise and receive the thanks which, on behalf of the association, I give them from the bottom of my heart, and I ask their chairmen, Messrs. Clark, Holmes, Humphrey, Hunt, Marburg, Moldenke and Schmitt, and the officers of the subcommittees, Messrs. Chapman, Dunning, Hamburger, Kinkead, Kunz, Miller, Moissciff, Stoughton and Wight, to express our gratitude to the absent members of their committees. Our warmest thanks are due also to our indefatigable secretaries, General Secretary Reitler and Secretary Porter, for their most zealous and efficient labors.

Ladies and gentlemen, I have sought to impress on you that we are among the guardians of mankind; that our services to humanity are of so high a nature as to stimulate us to seek earnestly how we may make them more effective and wider; that one means is to supplement and in time replace our present methods, which rightly viewed are but temporary expedients, with better ones; but that this replacement, much as it is needed, should be made with extreme caution. Classing the two kinds of testing into the vicarious tests to destruction on the one hand and on the other hand the indestructive tests applied directly to the objects which are to enter into service, I have pointed out that in the future these two classes of tests may well be used to supplement each other; that the vicarious tests should be made to reproduce as closely as possible the most trying conditions of service, and that the indestructive tests, with which we have hardly made even a beginning, hold out very wide possibilities of usefulness. I have urged on you our competence and our consequent duty to add specification making to our original plan, and thereby to increase very greatly our services to our brothers, and through our brothers to our Father. Here are tasks which may well fire our imagination, and stimulate us to an ardent consecration of our energies to the work of the International Association for Testing Materials.

STORM AND SURFACE WATER DRAINAGE IN RELATION TO SEWAGE DISPOSAL.

The following is an extract of a paper read by Mr. Ray R. Knight, C.E., at the second annual Congress of the Canadian Public Health Association in Toronto:—

Storm Water, which is the subject matter of the paper, is defined as that portion of the rainfall which finds its way into the sewers. It is described as an offensive and polluting liquid, carrying as it does roof and street washings,

and matters flushed out of the sewers. Storm water is to all intents and purposes diluted sewage.

Under the heading Rainfall, it is pointed out that extraordinary storms (those above one inch per hour) need only be considered in making calculations. Averages are not to be considered. A probable maximum rainfall should be decided upon.

The next consideration is that of the characteristics of the drainage areas. Some interesting figures are given, showing the proportions of impervious areas for different classes of property in Toronto. These proportions range from 0.19 to 0.75, and were arrived at in connection with the author's work on the design of the storm overflow sewers of Toronto.

The quantity of storm water from drainage areas receives attention, and an example giving an idea of the immense amount of storm water a heavy rainstorm will produce is given.

In dealing with the characteristics of storm or surface water, the report of the Royal Commission is quoted. The first flush of storm water is conceded to be of such a foul nature that it ought to be purified. As to what is to be considered the first flush, the author suggests that the first three minutes of a storm be so taken. The difficulty of selecting the first flush, due to the time occupied in the passage of the storm water from the surface and along the sewers to the outfall is pointed out. The engineer has, therefore, to provide for the treatment of what he considers would be classified as polluting liquid.

The choice of separate or combined system, with special reference to purification, is next treated with. From the point of view of purification of the storm water the separate system is favored. In this system the storm water, while being a polluting liquid, is not so much in the nature of a diluted sewage. The difficulties of our larger cities are mentioned, the combined systems in vogue hampering the sewage disposal question considerably.

In comparing the two systems in regard to disposal, the combined system is shown to require sedimentation tanks and filters for at least three times the dry weather flow, whereas in the separate system only one and a half times the dry weather flow need be settled and filtered in the sewage works as distinct from the storm water works.

The closing chapter on purification includes an extract from the report of the Royal Commission in support of the argument for the provision of stand-by tanks for storm water. The period of settling for storm water is suggested as from one to two hours, and provision should be made to accommodate all the storm water which would be brought down to the works by the sewers due to a heavy storm during the first three minutes of the storm, allowance being made for the time occupied in the conveyance of the storm water from outlying districts to the works.

Several stand-by tanks, located in suitable positions with respect to the natural drainage of the area, are recommended. All storm water should pass through the tanks; direct currents should be avoided, however, and to meet this the author suggests the provision of long overflow or discharge weirs at the inlet and outlet. Square tanks are also recommended.

After the period of settling is over, the storm water left in the tanks should be passed on to filter beds at a slow rate through sprinklers or other such method.

In conclusion, it is pointed out that the report of the Royal Commission cannot be applied strictly to Canadian needs. In the majority of cases we have to empty our sewage and storm water into rivers or lakes, which have to form our source for supply of drinking water. Not so in England. The aims of the Commission were directed towards the prevention of sludge deposits and nuisance in the rivers and lakes. With the question of pollution as it