

though the filter strainers clog rather more than is desired and may have to be changed in type before long.

The diagrams illustrating this paper, other than figure 1, a plan showing course of the water from river to consumers, are made up from typical daily notations of turbidity, alkalinity and grains per gallon of sulphate of alumina used in the treatment.

From 1,100 observations recorded during 1915 to 1917 inclusive, 150 have been selected, regardless of season, so as

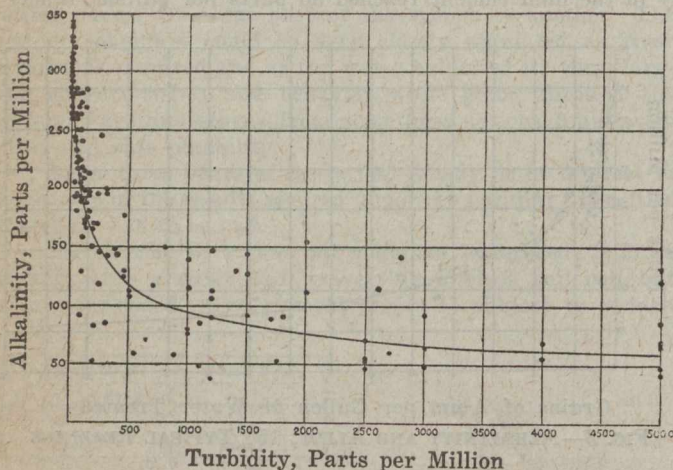


FIG. 4—ALKALINITY AND TURBIDITY; 150 DAILY READINGS

to cover so far as possible several readings at each rate throughout the whole range of variation.

The diagram showing "turbidities" compared with "grains of alum," figure 2, does not indicate clearly any particular law, though a suggestive curve, is shown, more based on general knowledge of the plant than determined from a close study of the turbidities. This is not surprising, for most of the turbidity is caused by heavy suspended matter carried by the high velocity in flood stage and quite ready to settle when brought to reasonable rest.

Occasionally a bad colloidal condition obtains, when the hydrate of alumina finds hard work to perform, but there has been little opportunity to study it carefully as a separate problem.

The diagram comparing "alkalinity" with "grains of alum," figure 3 indicates very nicely a relationship that permits the selection of a fair, smooth curve to represent normal working, except when some special river condition upsets all theories and gives several hours of perplexing activity and experiment.

The remaining diagram, comparing "alkalinity" and "turbidity," figure 4, indicates a chance for a fairly good curve, but one not specially conclusive in nature, and possibly to be changed materially as further observations are made.

The higher alkalinities prevail generally in the winter season, during the lowest river stages, when turbidities would naturally not run high, even with fair-size floods, for frozen lands do not yield so readily to erosion.

In all of the 150 records taken for plotting, the effluents were reported as having zero turbidity.

It is rather an interesting commentary on human nature, however, that while the water company has furnished safe filtered water for twenty years and brilliantly clear, sterilized, filtered water for three years, there are still many residents who hold to the rain tanks with roof washings, and shallow back-yard wells. Rates have been held at the low figures established 30 years ago, based on the low schedules of the city of St. Louis. A change, however, must shortly be made, so as to give more adequate return upon the investment in use.

It is often in the smaller plants that some of the most perplexing problems arise for the water works engineer to solve. This plant has been very interesting to the author, for it has illustrated many of the difficulties of operating a

water treatment system and well repaid his occasional trips to examine its workings, suggest improvements, and generally consult face to face with the operating officials, during 20 odd years of advisory service.

#### ELECTRIFICATION OF C.N.R. TUNNEL, MONTREAL

At the last meeting of the Toronto Section of the American Institute of Electrical Engineers, W. G. Gordon, Transportation Engineer of the Canadian General Electric Co., Ltd., Toronto, described the electrification of the C.N.R. tunnel at Montreal.

The Montreal Light, Heat and Power Co. supplies power at 63 cycles, 3 phase, 11,000 volts. Direct current is provided by two motor generator sets each 750 kw., 1,200 volts. Six locomotives are now in operation.

Special local conditions and temperatures made necessary an extraordinary design of the catenary system. The pantograph is of the sliding type and the conductor wire is of special bronze composition with a strength of 65,000 lbs. per square inch. Mr. Gordon stated that this wire was installed in preference to hard drawn copper because of longer life when subjected to the wear caused by the sliding pantograph, and also because, on account of its greater strength, it can be strung tighter than copper.

#### RECOMMEND RETURN OF DEPOSITS

MONTREAL aldermen have made a recommendation to the city commissioners that the latter should pay the sums now being withheld from the two contracting firms who were connected with the La Salle bridge work. The commissioners are holding \$21,000 deposit of J. Sullivan, the first contractor for the bridge, and also \$15,000 due him for work done. They are also holding \$76,939 due Pion and and Grothe, the second contractors for the bridge, consisting of deposit of \$25,939, and a balance on account of work done of \$51,000.

When the first contractor failed to carry on the work, the city seized his material and machinery and awarded the contract to the second firm for \$259,000, which at the time was considered a low figure. The work was again stopped before long, the contractors claiming that the prices of materials were too high. The city commissioners seized their deposit and all materials on the site and decided to undertake the work themselves, appointing Fraser, Brace and Co. to supervise the construction for a fixed remuneration.

It is hoped that the bridge will be completed next year, but a vote of another \$96,450 is required. The commissioners refuse to return any of the contractors' money until the bridge is completed, as they say that they expect to keep an amount equal to whatever the cost may be in excess of the contract figure of \$259,000.

#### INFRINGEMENT OF PATENTS ADMITTED

INFRINGEMENT of the cement-gun patents have been admitted by Concrete Constructions, Ltd., of Ottawa. This firm had the contract for fireproofing the structural steel work in the Parliament Buildings, Ottawa.

John A. Pearson, the architect for the Parliament Buildings, had specified that the cement-gun be used for the fireproofing work, and the contract was awarded to the above-mentioned company, who were alleged to have devised a "home-made" apparatus which the Cement-Gun Co., Inc., of Allentown, Pa., claimed to be a direct infringement on their patents for applying sand and cement mortar by means of a compressed air jet.

Suit was entered by the Cement-Gun Co., Inc., but the case has been settled out of court by the acknowledgment on the part of the Ottawa contractors that they had infringed, that they recognize the full validity of the cement-gun patents, and that they agree in future not to infringe in any way upon same. It is not known just what monetary settlement was made regarding the admitted infringement.