Cases each week	1911	1912
0	3 weeks	12 weeks
1	6 weeks	13 weeks
2	7 weeks	7 weeks
3	3 weeks	11 weeks
Above 3	33 weeks	9 weeks

The sterilization plant was installed in Nov., 1911, at a cost of $4,500 and has been in continuous operation since that time. It is not intended, however, to always treat the water in this manner, as plans have been completed and the contract awarded for the erection of a mechanical filtration plant, with a capacity of 30,000,000 gallons of water daily at a cost of $330,000.

When first installed the hypochlorite plant was under the supervision of the New Jersey State Board of Health but in March, 1912, the city took charge of the operation of the plant.

The hypochlorite purchased averages about 35 per cent. available chlorine, and treatment was begun with a strength of 0.4 part to the million of available chlorine. This was found to be insufficient and was later raised to 0.8 part and during the year 1912 has varied from 0.7 to 1 part per million with a daily pumpage of about 20,000,000 gallons. In commercial terms this means that 17 to 24 pounds of calcium hypochlorite has been added to every million gallons of water pumped.

Tests of the treated water show a material decrease in the number of bacteria. Ninety-eight per cent. of the tests for colon bacillus, in one cc. of the raw water gave positive results. In the treated water the positive tests for colon bacillus in one cc. have averaged 20 per cent. The average 20° bacteria reduction per cc. of water has been 94.1 per cent.

The hypochlorite plant consists of a small two-story frame building. The lower floor is divided into two rooms, a chemical storage room and a machinery room; the second floor comprises the operating room and office. The machinery and apparatus consists of two chemical dissolving tanks, two chemical solution tanks, one orifice tank and one receiving tank, the last-named tank being connected by a supply pipe to a grid located in the sluice gate manhole in the intake, at a point just before the intake enters the pump well at the main pumping station. From this point the water is pumped to a 110,000,000 gallon distributing reservoir, it requiring about 90 minutes to reach the reservoir from the pumping station. The chemical is dissolved to a 2 per cent. solution and the orifice controls the rate (in gallons per minute) at which the solution is added to the raw water. The plant is under the supervision of Chief Engineer Lenox of the pumping station and, as it is necessary to have some one in constant attendance, it requires the services of three men working on eight-hour shifts.

That the hypochlorite treatment is being used extensively in drinking-water supplies of American cities is attested by the report of the Ohio State Board of Health.[1] It states that information has been received in regard to the drinking-water supply of 99 cities of over 25,000 population in the United States, and that 40 per cent. of these cities are using hypochlorite to purify the water.

[1] Ohio State Board of Health, Mouthly Bulletin, Oct., 1912.

THE DETERMINATION OF MINERAL AGGREGATE IN BITUMEN PAVEMENTS

By C. C. O'Loughlin

Received November 21, 1912

The experiments described below were carried out as a comparison of the filtration and centrifugal methods for the determination of mineral aggregate in bituminous substances.

The following samples were used for both methods:

Refined Trinidad asphalt	51.60% bitumen
Refined Bermudez asphalt	96.22% bitumen
California "D" grade asphalt	99.94% bitumen
California "G" grade asphalt	98.86% bitumen

The Filtration Method.—Ten grams of the asphaltic mixture were weighed and placed in a $2^1/_2''$ funnel, which contained a 9 cm. Schleicher & Schull No. 597 filter paper; a 250 cc. Erlenmeyer flask was used to catch the filtrate.

Carbon bisulfide was run onto the sample until absorbed, but no more, and allowed to stand until it softened and settled into the filter; it was washed again until the solvent nearly filled the filter. This operation was repeated until the filtrate came through clear and then finished with two washings of petrolic ether. The latter operation was found necessary to clean the aggregate of some of the lighter oils, which seemed to remain even after repeated washings with carbon bisulfide.

The aggregate was allowed to drain and when dry brushed onto a watch-glass. The filter paper was placed in a porcelain crucible, burned at a low heat, and then added to the main residue on the watch-glass. The combined samples were dried, cooled in a desiccator and weighed, the weight of residue being the aggregate and the difference being the bitumen.

The above method was found to take from 4 to 10 hours, and in some cases as long as 20 hours. This method used about 250 cc. of solvent.

The Centrifugal Method.—In this method the Dulin Rotarex, designed by R. S. Dulin, Chemical Engineer of the City of Portland, Oregon, was used. This apparatus consists of an aluminum bowl receptacle for the sample, which is $3^1/_2''$ in diameter and equipped with a suitable cover; the cover is fastened on by means of a funnel-shaped screw, through which the solvent is added; this also allows the escape of gases. The above is enclosed in a copper shell, provided with a spout at the bottom side, through which the waste liquors drain; the shell is provided with a two-piece cover, the smaller one being removed to add additional solvent. The machine is run by electric motor directly underneath. The filter of proper diameter is placed between the bowl and cover, and when the machine is in operation the solvent is thrown to the sides, passing through the filter, carrying with it the soluble matter.

Fifty grams of sample were placed in the bowl, the filter put in place, the cover fastened on and 50 cc. of solvent added; the machine was rotated until

the solution ceased to run out of the spout. This operation was repeated and a final extraction with 25 cc. made; the cover was removed and the aggregate allowed to stand in the bowl for about 2 minutes; it was then brushed onto a watch-glass and finished as in the filtration method, burning the filter if necessary, which was not very often the case.

It was found that the centrifugal method on an average of several samples took from 10 to 15 minutes for the complete determination, and that the results check very closely, due to using a large amount of sample for each determination and thereby reducing the error. It was not necessary to finish with petrolic ether, as the results did not differ to an appreciable amount when using ether after the regular extraction. The average amount of solvent used for a determination was 125 cc.

205 COLMAN BUILDING
SEATTLE, WASH.

ADDRESSES

THE PROBLEM OF INTERNATIONAL CONGRESSES OF APPLIED CHEMISTRY

By BERNHARD C. HESSE[1]

The object of the following is to present in concise and impersonal form some of the lessons that seem to me to be read out of the experience obtained in preparing for and in participating in the conduct of the Eighth International Congress of Applied Chemistry. I am persuaded that these notes may be useful, because of the opinions expressed by most of my friends with whom I have discussed the subject, and to whom I have presented my views.

In reading these pages the fact must not be lost sight of that they in no wise deal with the social, the factory-inspection, nor the private entertainment side of such a Congress, nor with anything that in any way deals with any "host and guest" aspect of these Congresses, all of which I regard as with perfect propriety not a matter of any concern whatever to these Congresses as an institution; they are the pleasure and the reward of the host country alone. This article is limited strictly to the outline, preparation and conduct of the scientific side—the actual hard work of the Congress about which all other functions are supposed to cluster. This work is held out as being the real justification for the existence of these Congresses and constitutes their real merit in aiding the progress of mankind.

My own conclusions, based upon what is contained in the succeeding pages, may, in part, be summed up as follows:

I. The International Congresses of Applied Chemistry of the past have been loaded down with such an overwhelming proportion of extraneous matter that their true business has been entirely submerged. The only remedy lies in curtailing such matter and limiting the activities of the meetings to matter of international and debatable character all pre-arranged, with leading discussions in print and the whole matter prepared for *viva voce* discussion.

II. Sectional meetings should be on alternate days and the intervening days be used by sectional secretaries and participants in discussion in definitely making up the record of the meetings of the preceding days; all matter not in the hands of the sectional secretaries within a reasonable time, say, three working days after the close of the Congress, should be denied admission to the printed record.

III. All manuscript *must* be typewritten and all other requirements of the printer fulfilled by all authors, otherwise the papers should be returned by the Committee to their authors.

IV. The only way that the persistent and thoroughly correct demand of members for rapid delivery of the printed proceedings can be complied with is to require all participants to be prompt in supplying their manuscript; rapidity of execution requires efficiency in organization and contributing members are part of such an organization; they must all discharge their respective duties at the same efficiency rate that they expect the officers in charge to achieve; no committee can print from nothing, nor can it proceed any faster than the slowest contributor.

V. The demands made upon the Congress for the treatment of scientific matter have grown out of all proportion to the financial ability of the Congress; prudence and caution as well as a decent regard for financial propriety all demand that that part of the undertaking of the Congress be cut down to a dimension commensurate with its income.

The reasons for these and other conclusions will be made clear as this article proceeds.

Inspection of the Reports of all preceding Congresses, inclusive of the Eighth, discloses an evergrowing tendency to increasing bulkiness, with little or no increase in the efficiency or ripeness of the actual, crystallized work of these Congresses; namely, the discussions and the resolutions offered to and considered by the Congress meeting as a whole in its last session and the Reports of Commissions or Committees created at a preceding Congress and directed to report at a subsequent Congress.

Everyone must be struck by the enormous amount of material brought together at the Eighth Congress. On suitable examination all will, no doubt, agree that more than 90 per cent. of all such material (however valuable *per se* it may be) is not fitted for nor adapted to discussion in a meeting where international interests are supposed to be primarily or almost solely involved; also that these 90 per cent. would have been written and published without the stimulus of such a Congress, in the publications now so plentifully provided all over the world. The final result is that, in an endeavor to do seeming justice to the great bulk of material offered, the real and important work of the Congress (the formulation of an expression of opinion on the part of the Congress on certain topics of international import, scope and interest) is drowned while resolutions and reports are put through hurriedly and without due consideration by the various sections, trusting to the International Commission or to the Congress itself to take care of any imperfect work.

Clearly, it is not the object of these Congresses to provide merely another vehicle of publication for papers that would be written and published without the stimulus of the Congress, nor do men go to the expenditure of time, money and effort to attend such gatherings merely to hear papers read that would reach their library desks automatically. The object of these Congresses must be to bring forth a class of communications and results which cannot be created nor accomplished by the societies, associations and publications, now so plentifully at hand. The results that these Congresses must be intended for, are those for whose accomplishment direct personal contact and direct attrition of minds of men of different and differing opinion on debatable questions are prime requisites and essentials so that out of these various opinions some order, some system, some agreement, some progress may arise. There is very little to be gained by discussing a paper which merely tells you the physical or chemical constants of a limited number of substances, cer-

[1] Secretary of the Eighth International Congress of Applied Chemistry held in New York City, September, 1912.