PAGES

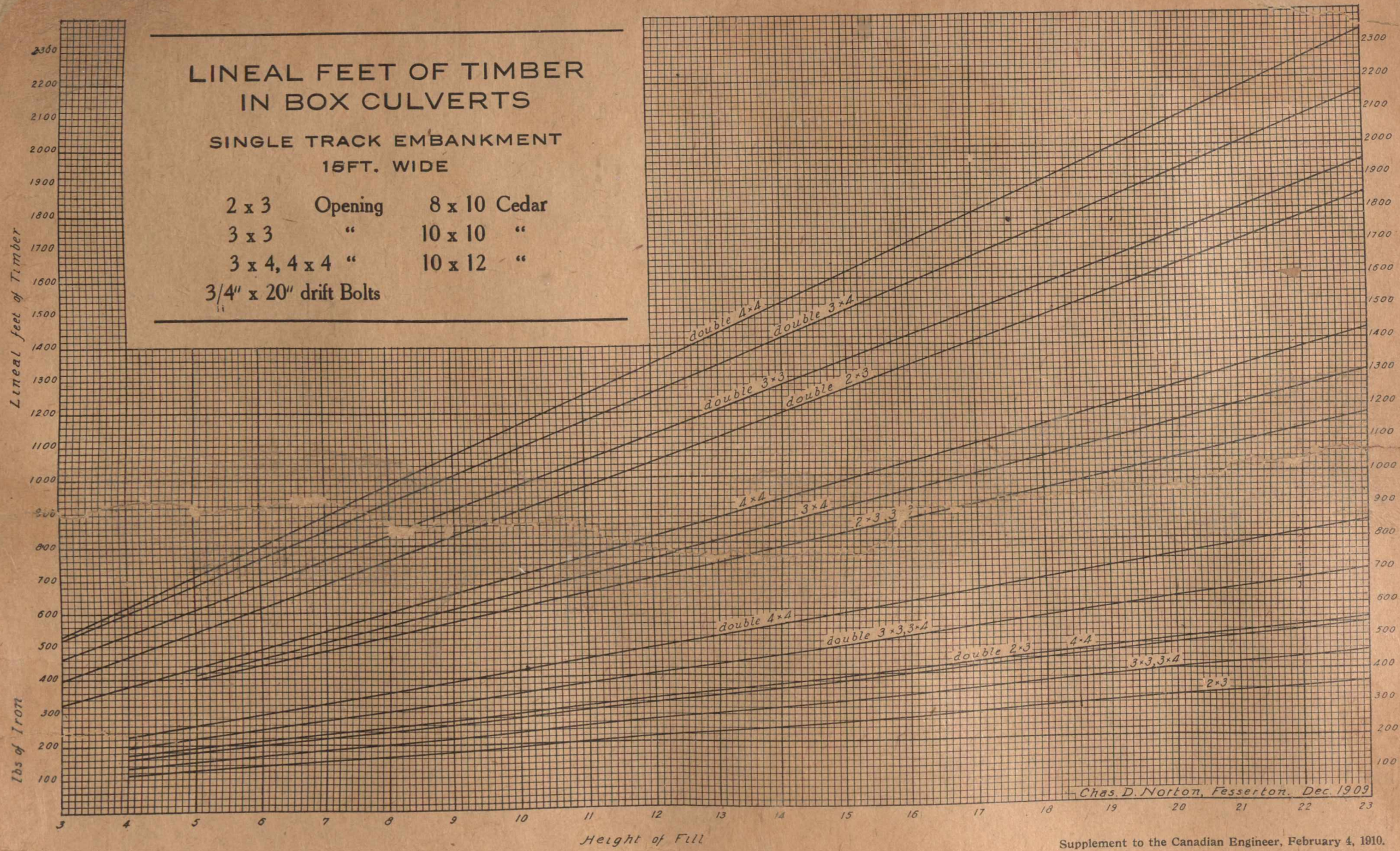
MISSING

LINEAL FEET OF TIMBER IN BOX CULVERTS

SINGLE TRACK EMBANKMENT 15FT. WIDE

2 x 3	Opening	8 x 10 Cedar
3 x 3	"	10 x 10 "
3 x 4, 4 x 4	"	10 x 12 "

3/4" x 20" drift Bolts



were not due to poor explosives, but to carelessness and ignorance on the part of those handling the explosives.

MAKING CONCRETE WATERPROOF.*

By Ira O. Baker,† M. Am. Soc. C.E.

Concrete is very largely employed in many building constructions, and in some situations it is very important that it should be at least practically waterproof. There are several methods of rendering concrete more or less impermeable to water, some of which are simple and free to anyone, and some of which consist in using secret or patented compounds. Of the former, the simplest method consists in mixing hydrated lime or finely divided clay with the concrete, thus at least partially filling the voids or interstices in the concrete and decreasing the percolation of water. Another simple method consists in mixing powdered alum with the cement and dissolving ordinary soap in the water to be used in mixing the concrete. Although the latter materials have been used for more than sixty years as a wash for rendering masonry impervious to water, and although in recent years they have frequently been employed as ingredients of concrete to make the entire mass impermeable, the proportions to be employed, and the reason for the effect seems to have had little or no scientific consideration, at least the proportions used in practice vary very widely. For the purpose of securing data for use in the revised edition of the writer's "Treatise on Masonry Construction," now in preparation, certain investigations and experiments have been made; and it is the object of this article to present these results more fully than can be done in the book mentioned.

Alum and Soap Waterproofing Compound.

To use the alum and soap method of decreasing the permeability of mortar or concrete, the alum in powdered form may be mixed with the dry cement or the sand, and the soap may be dissolved in the water employed in mixing the concrete, or both the alum and the soap may be dissolved in the water. The former is probably the safer method in practice, since with the latter method the water must be thoroughly stirred while the two are being mixed or the precipitate may form in large masses, which it is practically impossible to break up; and further, the water must be kept stirred to prevent the compound from accumulating on the surface. These are conditions that it is not always easy to be certain of securing. However, the alum is more easily dissolved than the soap; and hence the alum may be dissolved in, say, one-fifth of the water and the soap in the remaining four-fifths, and then the two portions may be mixed together, being careful to stir them as the mixing progresses. The alum and the soap combine and form a finely-divided, flocculent, insoluble, water-repelling compound, which fills the pores of the concrete and decreases its permeability.

The best proportions are: alum 1 part and hard soap 2 parts, both by weight. Soap varies in its chemical composition, and hence a single proportion cannot be stated which will be chemically exact for all cases. The above proportion is in round numbers the relative combining weights of alum and average hard soap; and hence it is the best proportion to use, although widely different proportions have been used in practice with success. Any reasonably pure soap will do; but if soft soap is employed, a greater amount should be used in proportion to the amount of water in it.

It is difficult to dissolve more than about 3 per cent. of hard soap in cold water; and hence this practically limits the amount of alum to 1.5 per cent. and of the soap to 3 per cent. These amounts will give a precipitate equal to about 3 per cent. of the weight of the total water. The amount of precipitate formed in the pores of the mortar or concrete will depend upon the amount of water used in the mixing. Of course, if it were desired to use a greater quantity of soap and alum, the soap could be first dissolved in a smaller quantity of hot water, which is afterwards mixed with the water used in making the mortar; but this is hardly practicable, nor necessary, as will appear presently.

An excess of alum does no harm, since alum alone is a fair waterproofing material. An excess of soap does no harm; and an excess is better than a deficiency, since the excess will unite with the free lime of the cement and form calcium soap—a finely-divided, water-repelling compound, which is apparently the essential element of several of the proprietary waterproofing compounds. The above is the explanation why such diverse proportions of alum and soap give reasonably successful results in actual practice.

Effect of Water-Repelling Compound.

A film of oil on the wires of a moderately fine sieve makes it nearly, if not quite, water-tight. The question then naturally occurs: Can a water-repelling compound in the concrete act in the same way as oil on a sieve? Or, in other words, can a volume of water-repelling compound less than the volume of the voids in the concrete decrease the permeability of the concrete in a greater ratio than the per cent. of the voids filled? If so, then a water-repelling compound is more efficient in decreasing the permeability of a concrete than a mere void-filling material.

To test the effect of a water-repelling ingredient upon the permeability of concrete, a series of experiments were made under the writer's direction by Mr. B. L. Bowling in the cement laboratory of the University of Illinois. The experiments consisted in moulding a series of Portland cement mortar disks in short lengths of 6-in. pipe, subjecting these disks to water under pressure, and measuring the amount of percolation. For convenience in making the experiments, mortar was used instead of concrete. The mortar for the treated and the untreated disks was alike except for the alum and soap compound. However, the mortars containing the alum and the soap were invariably drier than those made without these ingredients; but this probably has no significance in this connection. An annulus, 1-in. wide at the circumference of both the top and the bottom faces of the disk was coated with hot asphalt, and also covered with a rubber gasket against which a flat casting was pressed by bolts through an external flange; and consequently the flow was through a disk 4 ins. in diameter and 2 ins. thick. The percolating water was caught in a tin funnel, the top of which fitted closely against the lower casting and the neck of which passed through a perforated rubber stopper into a bottle. The water pressure varied from 40 to 45 pounds per square inch. The date and the results of the experiments are given in the accompanying table. Tests 1 and 2 were made together, as also tests 3 to 6, and 7 to 9. The intention was to have four tests in each series, but through one reason or another some of the tests were of doubtful value or were useless, and hence are not reported.

The mortar used in making the disks was 1:6, which is unusually lean and porous, but it was purposely made porous the better to test the effect of the alum and soap

*From "The Technograph" (the annual of the Engineering Societies of the University of Illinois), No. 23, 1908-09.

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compound. Known weights of cement, sand, and water were used, and the volume of the mortar produced was measured; and then knowing the specific gravity of the several ingredients, the density of the resulting mortar was computed by a process not necessary to explain here. The voids in each disk are stated in the table, and ranged between 23.4 and 24.0 per cent. If the sand had not been well graded, the per cent. of voids would have been considerably greater, and also the individual voids would have been larger. A 1:2:4 concrete made of well-graded sand and stone would have only about 13 to 15 per cent. of voids.

The amount of water used in making each of the several disks is stated in the table. Knowing the percentage of alum and soap in the water and the amount of water used in mixing, it is easy to compute the amount of the precipitate in the mortar. The amount of precipitate in each disk is given in the table.

The percolation for each of several successive 24-hour periods is given in the table. The results show that the alum and soap precipitate is quite effective in decreasing the percolation. In the first series of experiments, Nos. 1 and 2, the alum and soap compound equal to 1.2 per cent. of the cement stopped a little over 76 per cent. of the percolation during the first twenty-four hours; and the corresponding results for the other series are 54 and 69 per cent., respectively. The variation in the several series is surprisingly large, but it is certain that the experiments were carefully made; and the range in the results probably indicates the effect of undetected inequalities in the materials, the proportions, and the mixing.

Somewhat similar results were obtained for each of the successive 24-hour periods. The decrease in percolation through the treated and also through the untreated disks is due to two causes, viz.: (1) The percolating water doubtless has in it some solid matter, which clogs the pores of the upper surface of the disk. However, the water employed was that in the city water mains, and was reasonably free from solids; (2) the percolating water takes up the soluble portions of the mortar from the upper part of the disk and carries them to the lower part. It is universal experience that all masonry becomes more nearly watertight after use. It is interesting to note that in this series of experiments the average percolation during the twelfth 24-hour period was only 2.6 per cent. of that during the first period.

The most interesting feature of these experiments is that the alum and soap compound equal to an average of 1.2 per cent. of the cement in a mortar containing an average of 23.7 per cent. voids, stopped 65 per cent. of the percolation; or, in other words, adding water-repelling void-filling material equal to approximately 5 per cent. of the voids reduced the percolation to one-third of that of untreated mortar. One can hardly conceive that an equal amount of a non-repelling, void-filling material would be equally effective. Apparently, then, the alum and soap compound in the concrete acts like oil on the wires of a sieve. The experiments are being continued to determine the effect of the alum and soap compound with less porous mortars.

The mixing of alum and soap in the concrete reduces its strength somewhat; but there are many situations in which strength is unimportant, or at least is less important than watertightness. The effect of the alum and soap upon the strength of the mortar varies a little with the method of storing the test samples. For example, the mean of six neat Portland cement briquettes mixed with 21 per cent. of water which contained ½ per cent. of alum and 1½ per cent. of new "Ivory" soap, when left in the moulds one day and stored in a moist chamber of six days, had a strength of 87 per cent. of that of similar briquettes made with water alone; and when left in the moulds one day and then stored six days in water had 84 per cent.; and when twice as much alum and soap were used, the strength was 83 and 71 per cent., respectively.

A Better Water-repelling Compound.

Instead of using alum and soap as above, it is better to substitute aluminum sulphate (sometimes, but improperly, called alum) for the alum. The aluminum sulphate is cheaper than alum, and only about two-thirds as much of it is required; and the compound formed is equally water-repelling. The best proportion, in round numbers, is: One part of aluminum sulphate to 3 parts of hard soap, both by weight. Aluminum sulphate equal to 1 per cent. of the water and hard soap equal to 3 per cent. of water will give a dry precipitate equal to 2.5 per cent. of the water.

As with the alum and the soap, an excess of either of these ingredients does no harm; but an excess of soap is better than an excess of aluminum sulphate, since the soap unites with any free lime in the cement and forms calcium soap, which is a better waterproofing material than the aluminum sulphate alone.

Apparently no attention, except possibly by the manufacturers of proprietary waterproof compounds, has been given to the relative effect of capillary repellent and capillary attractive compounds.

One of the best means of making mortar or concrete waterproof is to make a dense mixture, i.e., to use plenty of cement and well-graded sand and broken stone; but nevertheless there are circumstances in which it is desirable to use a waterproof wash or to make a moderately lean mixture impermeable by adding a waterproofing ingredient to the mortar or the concrete. Either pair of the above ingredients is excellent when used as a wash to make a wall waterproof, as, for example, a cistern. To use them for this purpose, make solutions of the alum or the aluminum sulphate and of the soap of the proportions stated above; and then apply one of the solutions to the wall, and when it has dried apply the other. Apply as many pairs of coatings as may be necessary, which will usually be only two or three. It is better to apply the solutions hot; and it is important that they should be well rubbed on, but it is vital that they shall not be rubbed to form a froth.

Table Showing Effect of Alum and Soap on Permeability of Cement Mortar.

Test No.	Water in per cent. of dry Mat.	Precipitate. Per cent. of cement.	Per cent. of voids.	Percolation, in Grams per 24 Hours. 1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	10	0	23.4	945	155	94	61	51	34	30	26	18	14	14	12	....	....
2	10	1.2	23.6	224	37	21	12	10	6	5	4	2	2	2	2	12	6
.	..	...	....	.....	.....	.....	.....	.....	.....	....	....	....	....	....	....	2	2
3	12	0	23.9	1,113.0	342.3	195.0	166.6	132.7	120.4	98.0	73.5	61.4	55.5	52.8	44.9	....	....
4	12	0	23.9	1,061.2	330.6	178.4	145.0	123.2	107.7	66.3	49.8	41.1	37.6	36.3	30.6	....	....
		mean		1,087.1	336.4	186.7	155.8	127.9	114.0	82.1	61.6	51.2	46.5	44.5	37.7	....	....
5	12	1.4	24.0	497.8	206.8	122.3	76.7	64.2	58.2	36.0	25.0	21.0	19.5	17.0	15.0	....	....
6	12	1.4	24.0	517.0	222.2	132.2	87.7	72.1	65.1	39.4	26.1	21.7	19.5	16.9	16.2	....	....
		mean		507.4	214.5	127.2	82.2	68.1	61.6	37.7	25.5	21.3	19.5	16.9	15.6	....	....
	12	0	23.9	1,101.1	324.0	150.9	108.4	84.8	79.2	56.6	59.1	48.9	35.5	31.0	20.2	47.3	21.5
	12	2.8	24.0	339.5	221.2	114.8	75.2	54.4	50.4	33.3	33.7	28.0	20.2	17.3	16.0	25.5	11.0
	12	2.8	24.0	332.8	213.4	113.6	74.9	52.2	47.6	31.5	32.0	25.4	18.0	16.3	14.3	22.3	10.2
		mean		336.6	217.3	114.2	75.0	53.3	49.0	32.4	32.8	26.7	19.1	16.8	15.1	23.9	10.6

THE

Sanitary Review

SEWERAGE, SEWAGE DISPOSAL, WATER SUPPLY AND WATER PURIFICATION

SEPTIC TANK COMPANY'S PATENT CLAIMS.

It will be remembered that the conference of municipalities held in the autumn of last year in Toronto with reference to the above claims for royalties resulted in a deputation visiting Sir James Whitney and an arrangement being made to submit the whole question in dispute to Dr. Amyot (bacteriologist) and Mr. F. Fetherstonhaugh (patent solicitor).

We are informed by Dr. Hodgetts, the secretary to the Provincial Board of Health, that a halt was immediately called on realizing that the task of obtaining the necessary evidence and data on which to base an opinion was a gigantic one, involving evidence from Europe, etc.

The Legislature determined not to proceed with the enquiry into the validity or otherwise of the patents, and offered to the municipalities the services of Solicitor Baird in order to attempt some arrangement or compromise with the Septic Tank Company.

The question of whether it is possible to patent a natural process in British law is apparently going to remain unsettled for the present at any rate, and just how far-reaching the claims of the company may prove in Canada will depend largely upon the pugnacity of the company's directors.

If we, in this country, accept the United States High Court's judgment in the question, then it would appear that every municipality or private person who has built, or may build, a sewage settling tank in which the settled sludge is allowed to collect and undergo putrefaction is liable to pay patent fees to the Septic Tank Company.

It is not a question of the plans or constructive features being exactly on a par with those recommended or adopted by the company. The Saratoga Springs, N.Y., decision ruled out as invalid the apparatus claims (eight in number) and upheld five claims, known as the process claims. Each of the five claims upheld are prefixed by the words: "The process of liquefying the solid matter, etc."

There is no doubt but that in Canada engineers have for the past few years universally recommended the adoption of the septic tank process, a perusal of reports submitted to the Provincial Board of Health of Ontario suggesting schemes for various localities prove this without any qualification. The term "septic tank" is used, and it is pointed out that much benefit is obtained by the liquefaction of sludge and partial purification of the sewage. Such schemes have been adopted in many places and full use made of the process (patented) known as septic action.

Under the direction of Dr. Bryce the Ontario Provincial Board of Health handed out sketch plans as samples of suggested septic tanks.

Of late there has been a tendency (a childish one, indeed), to install tanks under the name of "tankage" or "settling tank," "precipitating tanks," or any other name rather than "septic," in order to attempt to avoid the liability to payment of patent fees. The element of patent, however, does not rest with the **name**, but with the **process.** Any sort of tank used for collecting sewage, if used with intent and purpose for the elimination of sludge by putrefactive processes, is liable to royalties in accordance with the Saratoga decision.

The task of proving whether British law would or would not uphold these process claims having appeared too great a task for the Government, it must remain for each user of the process, either to make separate settlement with the company, or a joint settlement, or else fight the question either individually or collectively by a test case.

The humor of the whole business appears, however, to exist in the fact that the claims connected with the septic process have lately been proven to be not exactly what they pretended to be.

That the claims were at one time fully believed in by engineers and others no doubt can remain. That Cameron, the patentee of the process, caused one of the greatest sensations in sewage disposal is acknowledged. Everywhere, almost, it was believed that the vexed question of the disposal of sludge was simply and finally solved. All that was required was to let it remain and rot under conditions of rapidity and supposed efficiency.

That patents for this process were granted in Great Britain, the United States and in Canada is well known. The company paid money down for these patent rights. Engineers, Boards of Health and others made use of the supposed benefits set forth in the descriptions of patent; and at the present time there exist many communities in Canada who still cling to the process of putrefaction of sludge as something necessary towards the final purification of sewage, or necessary to the economic maintenance of the work, by leaving the sludge in the tanks instead of incurring the expense of constant removal before septic action commences.

If we are not prepared to fight this question, we must be prepared to pay. We are not going to steal by subterfuge or chicanery the fruit of another man's brains, which have been accepted as good and bona fide, and on which a legal and protective price has been fixed.

As we said before, there is a humorous side to the whole question.

Listen to what the experts now say with reference to septic action:—

Fifth Report of the Royal Commission on Sewage Disposal. "Summary of Conclusions," page 229:—

"All the organic solids present in sewage are not digested by septic tanks, the actual amount of digestion varying with the character of the sewage, the size of the tanks relative to the volume treated, and the frequency of cleansing. With a domestic sewage, and tanks worked at a 24-hours rate, the digestion is about 25 per cent.

"The liquor issuing from septic tanks is bacteriologically almost as impure as the sewage entering the tanks.

"Domestic sewage which has been passed through a setic tank is not more easily oxidized in its passage through filters than domestic sewage which has been subjected to chemical precipitation or simple sedimentation."

The Hamburg Institute of Hygiene. "Principles of Sewage Treatment," Professor Dunbar, page 87:—

"At Hamburg contact beds could be filled six times a day with fresh sewage without yielding an unsatisfactory effluent, whereas they would only take septic sewage twice a day."

Mr. James P. Norrington. "Notes on the Separation of Solids from Sewage and Waste Liquors":—

"The principle involved in modern sedimentation tanks is that, after the water has done its work of transporting the polluting solids from the house to the spot where they can be dealt with, the sooner it is separated from the sewage solids the better."

Dr. David Sommerville, of King's College, London, addressing the Society of Engineers at Caxton Hall last year, stated:—

"In anaërobic tanks certain foul-smelling gases were set free. In the presence of oxygen entirely different types of cleavage products were formd whose sulphur was ultimately oxidized in the most unobjectionable manner. There was no necessity to use noxious methods of protein cleavage when inocuous methods were at hand, and he considered that the aërobic method of treating sewage had the best of it all the way round. It was possible to construct a septic tank installation on a small scale where all might go well for a number of years, but large installations without exception failed."

"The Disinfection of Sewage and Sewage-filled Effluents." Massachusetts Research Laboratory, by Earle Bernard Phelps:—

"The disinfection of aërobic filter effluents requires three parts per million of available chlorine, costing $1 to $1.50 per million gallons of sewage.

"The disinfection of crude sewage requires five to ten parts per million of available chlorine, costing $1.50 to $3.50 per million gallons of sewage.

"The disinfection of septic sewage requires from ten to fifteen parts per million of available chlorine, costing $3.50 to $5 per million gallons of sewage"

But does this newer knowledge reach, fade into, and affect the past? We hardly think so. Engineers advised the installation of septic tanks, municipalities accepted the same. All said with one accord: "It is impossible; no man or company can patent one of nature's processes. It is absurd to imagine such a thing." Now, when it comes to the question of attempting to prove whether or not it is possible to patent one of nature's processes, even the Ontario Government flinch from the task.

What then? If we cannot afford to argue, let us pay up and look happy.

PIGEON LAKE GRAVITY WATER SUPPLY*

H. L. Seymour**

To be served by a pumping system the City of Edmonton is not favourably situated, being located at the top of a ravine at the bottom of which flows the Saskatchewan River, the source of the supply. It is necessary to overcome a head of 185 feet to pump the water to the level of the city, and a further head of 185 feet to obtain a fire pressure of 80 lbs. per sq. in. and in the event of accidents to engines and pumps the city is left without fire protection, the tank of only 60,000 gallons used for domestic supply not having either sufficient head or capacity for fire purposes.

The Saskatchewan River as a water supply also possesses the disadvantage (considered by some engineers to be incapable of being fully remedied even at great cost) of for three months in the year carrying down large quantities of river silt, also this water is much too hard to be satisfactory for domestic and manufacturing purposes.

Could then a gravity system be found which would supply pure soft water with head sufficient for fire protection it would clearly be a boon to Edmonton and the advantages of a gravity pure water supply having been recognized by the promoter, it became necessary from an engineering standpoint to obtain if possible all the following conditions, a large pure water source of supply at great elevation above and near to Edmonton. Pigeon Lake more nearly satisfies all these conditions than any other body of water.

Geology of Pigeon Lake

Edmonton is located in the cretaceous formation, the boundary between the cretaceous and tertiary formations running north westerly and south easterly about 25 miles south of Edmonton. The lakes in this cretaceous formation partake of the nature of large sloughs with ragged, undefined shore lines and are generally shallow, the water on analysis proving unsatisfactory. Cooking Lake, although one of the best lakes in this formation was found unsatisfactory for a water supply, on account of the quality of water as well as the fact that it is not a sufficient elevation above Edmonton to give a good gravity supply. Pigeon Lake is located in the tertiary formation 40 miles southwest of Edmonton, the characteristic of lakes in this formation which is sandy being bold short outlines, good depth of clear water filled with fish, the water on analysis proving pure and soft.

The provincial analyst, Dr. Revell, in his report of March 31st, 1909, on Pigeon Lake and Wizard Lake (a small lake in the same tertiary formation to be used as an auxiliary to Pigeon Lake) stated after his analysis that "these figures show that the waters of these lakes are in every respect of excellent quality for the purpose of a public water supply. They are moderately soft and do not contain iron or other objectionable mineral constituent."

The figures in regard to total hardness are:—

	Wiz. Lake.	Pigeon Lake.	Sask. River.
Parts per million	121	114	210

Topography of Pigeon Lake

Pigeon Lake has an area of 37¼ sq. miles and is fed by a total catchment area of 106 sq. miles, the depth probably averages 25 to 30 feet, though deeper soundings have

*Paper read before the Edmonton Engineering Society, 23rd December, 1909.

**Saunders & Seymour, Civil Engineers, who are in charge of the engineering for the Pigeon Lake Gravity Water Supply Scheme.

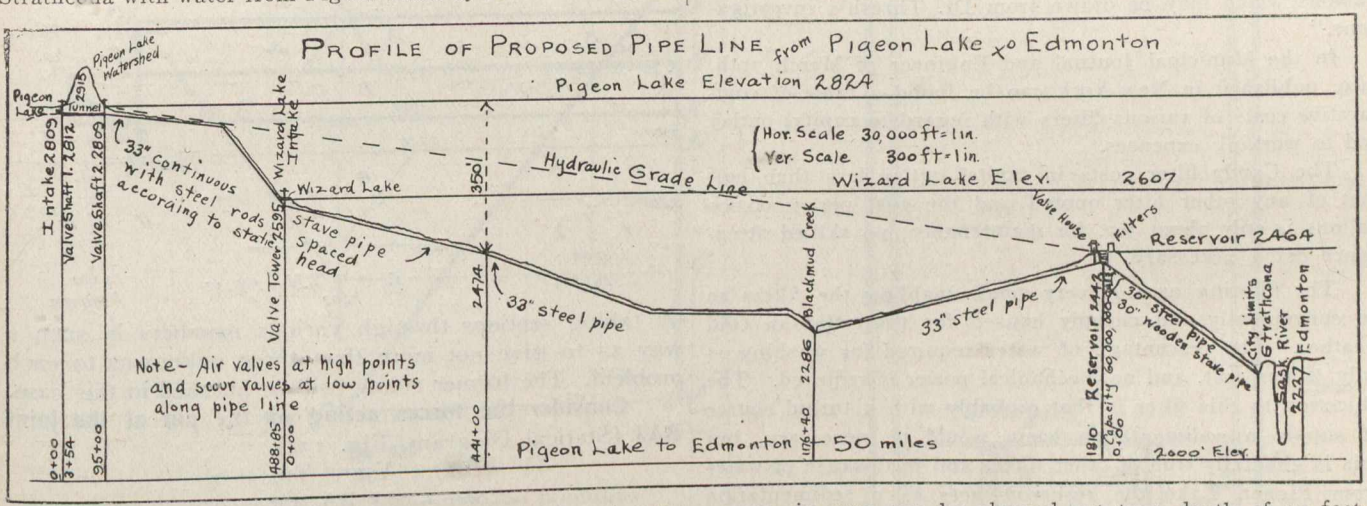
been reported. Mr. John Galt, who was retained by the City of Edmonton to report on the Pigeon Lake supply, based his calculations on the basis of a total annual average precipitation of 18 inches and after allowing for losses due to absorption and evaporation, thought it likely that a continuous flow of 29 million gallons per day could be got. He established a weir at the southeasterly end of Pigeon Lake at Pigeon Lake Creek and the run off was measured for a number of months and he concluded that an average flow of 18 million gallons per day can be taken as a safe basis to go upon or enough water for a district population of 200,000 people.

Wizard Lake, over two sq. miles in area, according to measurements of its outlet in the late fall of 1908 could alone more than twice supply the needs of Edmonton at the present time, a flow of five million gallons being recorded, while Edmonton is probably only using two million gallons per day.

In regard to elevations, Pigeon Lake is 597 feet above Edmonton giving a static pressure of 258 lbs. per sq. inch, while Wizard Lake is 380 feet above giving corresponding pressure of 165 lbs. per sq. inch.

Proposed Engineering Details

It is proposed to supply the cities of Edmonton and Strathcona with water from Pigeon Lake by means of a 33-in. main as far as a reservoir and then by two 30-inch mains to the cities.



This system is capable of supplying about 12 million gallons per day, the total length of pipe being 50 miles.

An intake crib is provided in Pigeon Lake 1,100 feet from the shore at a depth of 15 feet, the water here entering a 33-inch steel pipe. The first difficulty to overcome is the watershed of Pigeon Lake and to keep below the hydraulic grade line, a 5-foot tunnel of 12-inch concrete is necessary, of over 1½ miles in length at each end of which will be placed a valve shaft so that the tunnel can be emptied or the water supply from Pigeon Lake cut off. From the north end of the tunnel a 33-inch continuous wooden stave pipe banded by steel rods spaced according to depth below the level of Pigeon Lake conveys the water 9¼ miles to Wizard Lake valve tower where a further supply can be obtained, a similar provision for intake being made as at Pigeon Lake. From the Wizard Lake valve tower the pipe takes a northeasterly direction to a service reservoir located in the N. E. ¼ Sec. 16, Tp. 52, R. 33, W4th, a 33-inch wooden stave pipe being used until over 350 ft. below Pigeon Lake level when a 33-in., steel pipe is required.

Mannesman steel tubes will probably be used instead of either riveted steel pipes or cast iron pipe for while sharing in the advantages that riveted steel pipe enjoys over cast iron for conduits of large diameter and under high pressure, i.e., smaller cost per foot and great reduction in cost of transportation due to less weight, the Mannesman tube is much stronger according to test than welded or riveted pipe and comes in long lengths up to 40 feet considerably reducing the cost of joining.

Mannesman steel tubes are rolled out by special machinery from a solid block of mild steel and their great tensile strength is probably due to the fact that in addition to being much more worked than most metal, the fibres of the metal run spirally as has been proved by microscopic examination. Kent's Mechanical Handbook states that while cast iron tubes will hardly stand more than 200 lbs. per sq. in. and welded tubes are not safe over 1,000 lbs. per sq. in. the Mannesman tube easily withstands 2,000 lbs. per sq. inch. The smoothness of the interior is another point in favor of this steel tube, which it is claimed can be made proof against corrosion by receiving a hot covering of a special mixture both inside and out and the outside can then be covered with a special jute cloth rendering the tube impervious to rust in either saliferous or acid soils.

The service reservoir is situated 7½ miles and at an elevation of 237 feet above Edmonton giving a domestic pressure of 100 lbs. per sq. in. This small natural lake of 10 acres in area can be cleaned out to a depth of 22 feet, giving a capacity of 60 million gallons. At the reservoir is located a valve house and recording room, a Venturi metre being placed on the main to register the amount of water flowing from Pigeon or Wizard lakes. The domestic supply is drawn from the reservoir through filters and as this is a very important part of the scheme, even though the water supply is comparatively pure, time was spent in investigating the different makes of filters before the analysis of Pigeon Lake water was made. Of so-called mechanical filters the Candy Waterworks filter manufactured in London, England is probably most satisfactory on account of the bacteriological purity of the resultant filtered water a fact attested by recommendations of engineers and by bacteriological analysis.

In a paper read before the Institute of Mechanical Engineers (England) Mr. John Don reviewed the subject of water purification and in regard to the Candy Filter says as follows:—

"Against the use of coagulants there have been urged from time to time various objections, some rather fanciful, others more real. There is the question of expenditure representing an outlay of 5 shillings to 10 shillings per million gallons filtered. It is recognized that it may be beyond

the ordinary attendant of a filtering plant to determine the exact amount of coagulant that should be added under varying conditions of the raw water.

"Oxidium, which is the effective medium of the Candy filter, is a porous composition of iron oxide, silica, etc., which exhibits properties similar to those of spongy platinum, consisting largely of iron and silicates, oxidium absorbs oxygen from the air and yields it again to organic matters suspended or dissolved in the water under filtration. Living germs are intercepted as efficiently as in any of the filters yet described. It appears that wet combustion proceeds rapidly as the water percolates. The oxygen is supplied from the pores of the oxidium wherein it is excluded. The stored oxygen is gradually used up as filtering goes on, but it is easily renewed by empting the cylinder and admitting air. By a simple means a large volume of air is compressed into the dome of the cylinder, so that the descending water is well aerated.

"Dr. Thresh has made many analyses of the effluents of the Candy filters and the purification in general has been shown to be admirable. Practically speaking, there is no escape for pathogenic bacteria. Albumenoid ammonia is reduced to an insignificant amount. Nitrification makes great progress in passing through the layers of oxidium. Iron salts in solution are wholly got rid of. These are the conclusions which may be drawn from Dr. Thresh's investigations."

In the Municipal Journal and Engineer of March 10th, 1909, published in New York can be found a table of comparative costs of various filters with regard to capital outlay and to working expenses.

The Candy filter costs in capital outlay less than half that of any other filter quoted and the cost per 1,000,000 gallons is only about 50c. for maintenance, no skilled attendance being necessary.

The filtering area is very small enabling the filters to be conveniently and cheaply housed for protection in cold weather. The percentage of water required for washing is only ½ per cent. and no mechanical power is required. The objection to this filter is that probably with a turbid source of supply a sedimentation basin would be necessary, but this is generally true of other filters and in the case of water from Pigeon Lake the reservoir acts as a sedimentation basin were such deemed necessary. It is quite probable that on account of the satisfactory analysis of Pigeon and Wizard Lakes, no filters would be insisted on by the Provincial Board of Health.

Two pipes, a 30-inch wooden stave and 30-inch steel pipe would convey the water from the reservoir to the power house at Strathcona and thence by steel tubes under the Saskatchewan River to the Power House at Edmonton where the water would be distributed to the city mains. The valve house at the service reservoir would be connected by telephone to the city fire halls and in case of necessity direct connection could be made with Wizard Lake bringing the water through the 30-inch steel pipe, giving as before stated a static pressure of 165 lbs. per sq. in. which would be over twice the present fire pressure and as much probably as the city mains would stand.

PROBLEMS IN APPLIED STATICS.

T. R. Loudon, B.A.Sc.

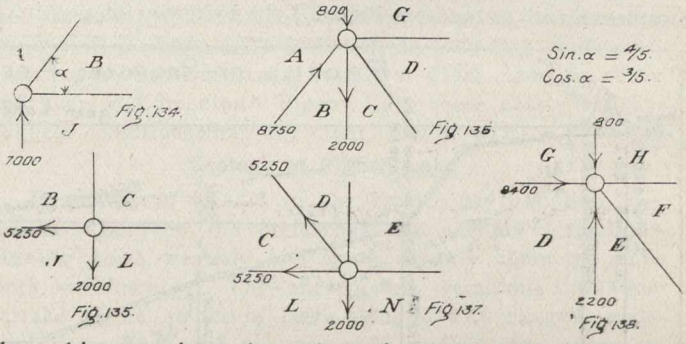
This series of problems began in the issue for the week, October 22nd, 1909. It is assumed that the reader either has an elementary knowledge of the subject of Statics, or is in a position to read some text on such theory.

The Pratt Truss.

Fig. 133 represents a form of bridge truss known as a Pratt Truss. The Effective Dead Load shown in the diagram has been chosen purely arbitrarily without regard to the practical rules which govern the first assumptions as to dead loads on bridges—convenient quantities having been chosen which will serve to illustrate the method of procedure.

Since the truss (Fig. 133) is symmetrically constructed and loaded, it will merely be necessary to consider one-half of the structure, for corresponding members in both halves will have the same stresses.

The required stresses may be determined by either considering the forces acting on the pin at each joint of the truss, or the Method of Sections may be applied



by taking sections through various members in such a way as to give not more than three unknowns to each problem. The former course will be pursued in this case.

Consider the forces acting on the pin at the joint BAJ (Statical Diagram, Fig. 134).

$$\Sigma Y = Y_{AJ} + Y_{JB} + Y_{BA} = 0.$$
$$7{,}000 + 0 + BA.\ 4/5 = 0.$$
$$BA = -5/4.\ 7{,}000 = -8{,}750.$$

The Y of BA is evidently negative. The force BA, therefore, acts against the point; i.e., the member BA is in Compression 8,750 pounds.

$$\Sigma X = X_{AJ} + X_{JB} + X_{BA} = 0.$$
$$0 + JB - 8{,}750.\ 3/5 = 0.$$
$$JB = 5{,}250.$$

The positive result shows that X_{JB} is positive; i.e., JB acts to the right away from the point. The member JB is, therefore, in Tension 5,250 pounds.

Fig. 135 is the Statical Diagram for the forces acting at the point LJBC.

$$\Sigma X = X_{LJ} + X_{JB} + X_{BC} + X_{CL} = 0.$$
$$0 - 5{,}250 + 0 + CL = 0.$$
$$CL = 5{,}250.$$

The member CL is evidently in Tension 5,250 pounds.

$$\Sigma Y = Y_{LJ} + Y_{JB} + Y_{BC} + Y_{CL} = 0.$$
$$-2{,}000 + 0 + BC + 0 = 0.$$
$$BC = 2{,}000.$$

The member BC is in Tension 2,000 pounds.

For the point CBAGD (Statical Diagram, Fig. 136).

$$\Sigma Y = Y_{CB} + Y_{BA} + Y_{AG} + Y_{GD} + Y_{DC} = 0.$$
$$-2{,}000 + 8{,}750.\ 4/5 - 800 + 0 + DC.\ 4/5 = 0.$$
$$DC = -5{,}250.$$

The member DC is in Tension 5,250 pounds.

$\Sigma X = X_{CB} + X_{BA} + X_{AG} + X_{GD} + X_{DC} = 0.$

$0 + 8{,}750.\ 3/5 + 0 + GD + 5{,}250.\ 3/5 = 0.$

$GD = -8{,}400.$

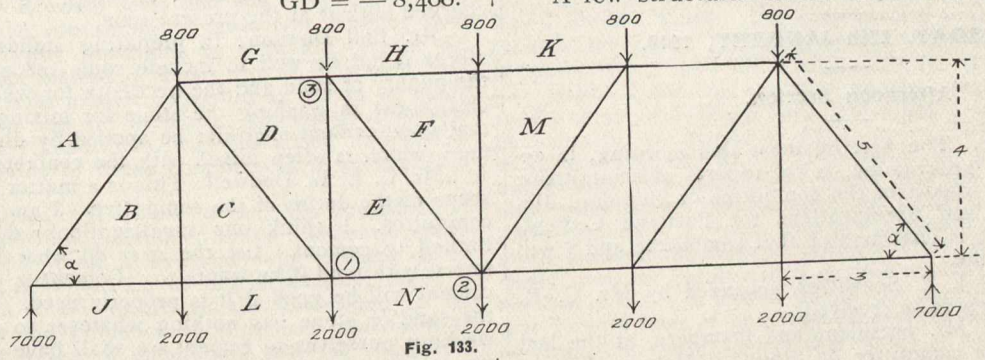


Fig. 133.

The member GD is in Compression 8,400 pounds.

Considering the forces acting at the point NLCDE (Statical Diagram, Fig. 137):—

$\Sigma X = X_{NL} + X_{LC} + X_{CD} + X_{DE} + X_{EN} = 0.$

$0 - 5{,}250 - 5{,}250.\ 3/5 + 0 + EN = 0.$

$EN = 8{,}400.$

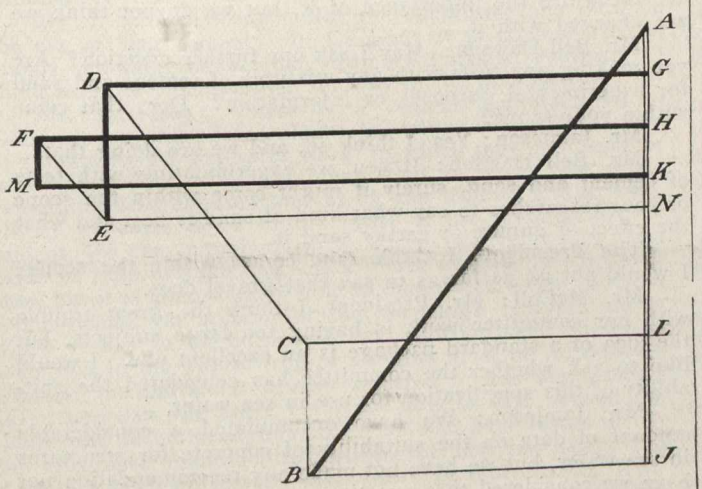


Fig. 139.

The member EN is in Tension 8,400 pounds.

$\Sigma Y = Y_{NL} + Y_{LC} + Y_{CD} + Y_{DE} + Y_{EN} = 0.$

$-2{,}000 + 0 + 5{,}250.\ 4/5 + DE + 0 = 0.$

$DE = -2{,}200.$

The member DE is in Compression 2,200 pounds.

Statical Diagram (Fig. 138) represents the condition at the point EDGHF.

$\Sigma Y = Y_{ED} + Y_{DG} + Y_{GH} + Y_{HF} + Y_{FE} = 0.$

$2{,}200 + 0 - 800 + 0 + FE.\ 4/5 = 0.$

$FE = -1{,}750.$

The member FE is in Tension 1,750 pounds.

$\Sigma X = X_{ED} + X_{DG} + X_{GH} + X_{HF} + X_{FE} = 0.$

$0 + 8{,}400 + 0 + HF + 1{,}750.\ 3/5 = 0.$

$HF = -9{,}450.$

The member HF is in Compression 9,450 pounds.

From inspection of the point FHKM, it is easily seen that the member FM must be in Compression 800 pounds.

Stress Diagram.

The Stress Diagram for the Pratt Truss, loaded as indicated in Fig. 133, is shown at Fig. 139. If the sets of forces acting at the various joints of the truss be considered in the same order as taken up in the preceding analytical solution (see Statical Diagrams, Figs. 134 . . . 138), the Vector Polygons for the respective cases may easily be followed out on the diagram.

Live Load Stresses.

A few structural details will have to be pointed out following discussion of Live Load stresses:—

Fig. 133 represents the truss on one side of a bridge. On the other side is a truss of the same construction. Connecting these trusses at the top is a system of bracing, and at the lower joints provision is made to in order that the reader may clearly understand the

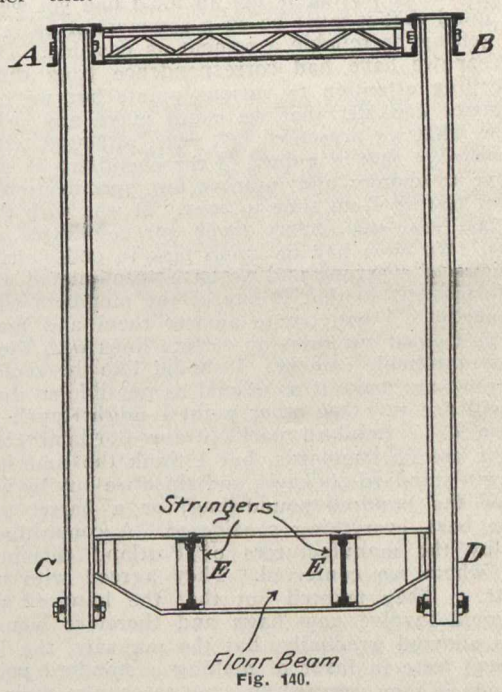


Fig. 140.

support the floor system. Fig. 140 represents diagrammatically by an end elevation, the method of supporting the flooring, etc. This figure represents an end elevation of the joints (1.) and (3.) (Fig. 133) and the corresponding joints on the opposite truss of the bridge.

AC and BD represent the vertical members braced at the top between A and B. Riveted to the lower extremities of these vertical members is a beam, fastened to which are as many other longitudinal stringers (EE) as may be thought desirable to support the floor upon which the Live Load will pass. In this manner, the Live Load is transferred by the stringers EE to the floor beam placed between verticals at C and D, and from thence to the joints of the truss.

If now, a Live Load be in some position between the lower joints (1.) and (2.) (Fig. 133), it is seen from the preceding discussion that part of the load will be transferred to the joint (1.) and part to the joint (2.), the portion of the load transferred to either joint depending upon the distance of the load from (1.) or (2.)

CANADIAN SOCIETY OF CIVIL ENGINEERS.

Verbatim Report of the 24th Annual Meeting, Held at Ottawa, January 25th to 27th, 1910.

THURSDAY, 27th JANUARY, 1910.

Afternoon Session.

The President: The first business this morning, in accordance with our programme, is the reports of committees. There remains the report of the committee on Standard Methods of Testing and Specifications for Portland Cement. Mr. J. A. Jamieson is chairman of that committee and I will ask him to assist me.

Moved by Mr. J. E. Schwitzer, seconded by Mr. C. R. Coutlee, that the report be received.

Mr. Jamieson: Mr. president and members, at the last annual meeting the committee on Standard Metods of Testing and Specifications for Portland Cement, presented to the society a specification and rules for testing. No doubt during the year many members will have had opporunities of testing under this system. The committee thought it well for the society to have what might be called the society's specification so that members in specifying for their work could simply refer to the society's specification. While perhaps this system of testing is not an ideal one yet we have to bear in mind that it must be on a commercial basis, with a view of getting as reliable a cement as possible. During the past year we have had correspondence from different members calling attention to various points but we do not as a committee consider that we could make any material change from what we presented last year, although with the greater knowledge that is gained of the chemistry of cement we will have to change and improve our specifications and the rules for testing from time to time. It was with that in view that last year the society made our committee a permanent one. We have had no small task in endeavoring to meet the views of everyone and we have accumulated a good deal of information, so that if any of the members wish to ask any questions I will try to answer them and make it clear why we framed our rules on certain lines with the view of detecting unreliable cement. I should like the society to adopt this now and make it as official as possible so that the members will use it. One other point I might touch on is the question of a standard package for Portland cement. To-day there are no standards, but I think the time is ripe for adopting a standard package, and since we buy by weight we consider the hundred pound bag, or a barrel of 400 pounds, the best, everything considered. A committee was appointed by the manufacturers of Portland cement last year, with whom we conferred. They agreed with us on most points. They pointed out that the hundred pound package would involve new bags and therefore would require to be adopted gradually, but the majority, the larger manufacturers were in favor of making a standard package of 100 pounds if they were given time to change their bags and use up the ones they had. The merger of the cement companies makes the present time opportune for following up this question. If the meeting will make a recommendation with that end in view I think the committee will be glad to take up the matter with the cement companies and try to obtain their co-operation and arrive at the result I have indicated.

Mr. Leofred objects that the report of the cement committee has not been in the hands of the members long enough to enable them to intelligently discuss it. The president states that this is last year's report, so that the members have had one year to consider the subject. The objection is withdrawn.

Mr. Bell Dawson: Mr. President, may I ask whether the committee has given attention to the quality of sand necessary in the mixing of cement for mortar. Good cement is often more or less spoiled by carelessness in use of the sand, especially in municipal works and other works that one sees going on, for the sake of a very small saving possibly in the cost of the sand they will practically ruin what was originally good cement in the use of it. Has this side of the question been considered by the committee?

Mr. Jamieson: We have not gone into the question of sand in detail or prepared any report on that subject. We recognize that the question of sand is next in importance perhaps to the cement itself. The very best cement can be deteriorated in making concrete by inferior sand. That is a subject we have in view, although we are not specially charged with it at the present time.

Mr. Bell Dawson: In preparing standard specifications might it not be well to include some recommendation as to the quality of sand and the necessity for what one might call cleanliness in washing the stone for mixing the concrete so that good cement shall not be spoiled by dirt, such as street mud, which is often mixed with the concrete.

Mr. C. E. W. Dodwell: This is a matter quite outside the scope of the duties of the committee. I am a member of the committee. I think our investigations should be strictly limited to cement. Let the user do what he likes with it, mix it with mud if he wants to. Cement is cement and good cement will be good if it is properly used. The handling of the sand or stone has nothing whatever to do with this. If we limit ourselves to cement we shall have plenty to do. If we go into the question of mortar, sand, and so on, we will lose ourselves in a mass of work that we were not intended to undertake at all.

The President: I think the objection is well taken that the committee should not extend its labors too widely; yet it might be well to recommend the quality of sand to be used with this cement.

Mr. Jamieson: The question of sand or concrete is really another large subject that should be dealt with as a whole. We recognize the importance of it, but we do not think we are charged with it.

Mr. Bell Dawson: May I ask one further question? Are you making any tests with any mixtures of cement and sand for experimental purposes or information? Does that come within your scope?

Mr. Jamieson: Yes, I think so, and we are doing that.

Mr. Bell Dawson: If you are experimenting with tests of cement and sand, surely it might come within the scope of your researches to say what kind of sand is best and what the effect of impure or earthy sand is.

The President: I think sand comes within the scope; I would not go as far as to say that gravel does.

Mr. McColl: Mr. President, I think the great trouble with our committee work is having too large subjects, but the idea of a standard package is an excellent one. I would like to ask whether the committee has considered the suitability of this specification for use in sea water.

Mr. Jamieson: We have accumulated a considerable amount of data on the suitability of concrete for structures in sea water, but we have not made any recommendation nor have we considered that question very fully.

Mr. Coutlee: Could you embody the data you have already got? There are some experiments in Boston harbour; could those be formulated by the committee and given to the society?

Mr. Jamieson: It might be easy to give a reference to the authorities and different tests of data, but it would be a pretty large undertaking to print them; that is to bring them all into pamphlet form. I might say in reply to Mr. McColl that there is a large amount of evidence now on record going to show that if concrete is well made there is no material difficulty about using it in sea water. It is due to the porosity of the usual concrete that disintegration in many cases has taken place. That is the sea-water percolates through the porous concrete and the magnesia contained in sea-water causes more or less reaction on some of the constituents of the cement; also there is freezing and thawing between high and low tide and that is where the most trouble has been caused. I think the greater amount of disintegration is due to the porosity and the freezing.

Mr. McColl: Then as far as your investigation has gone it is to the effect that a cement that would be good in other water would be equally as good in sea-water. From what experience I have had I have come to about the same conclusion. In the Bay of Fundy we have a difference of forty feet between high and low water, but as far as my experience has gone the difficulties have been largely due to not being properly put in. You can understand that with forty feet of tide rising every six hours it is difficult to get the concrete set before the tide comes up. It has been suggested that we needed a different class of cement. As far as I understand, from what has come before you, it has led you to believe that the same cement is sufficient.

Mr. Jamieson: It is difficult to be definite in the present state of investigation, because there are chemical reactions there that the experts are scarcely capable of giving an opinion on as yet. It would seem that you need cement very low in magnesia and containing as little free lime as possible but it is certainly preferable to have the cement set in the way of blocks instead of depositing it in a semi-fluid state and allowing it to harden. Possibly it should be made more dense in form and set in place. If deposited in sea-water under ordinary conditions, with the rising and falling of the tide it is liable to cause trouble and disturbance in the mass.

Mr. John Kennedy: It seems to me, Mr. President, if the committee is not in a position to make a separate specification—or does not think it necessary—for cement to be used in sea-water, it would be of much practical value if some memorandum of the results of the knowledge so far were published for the guidance of engineers who have to use cement in salt water. I understand that the committee has conferred with the manufacturers and that this report is practically the result of the conference between the manufacturers and the committee. Is that correct?

Mr. Jamieson: That is correct, Mr. Kennedy. That is the manufacturers concurred in our specification at a joint meeting. In some respects they thought we were a little hard on them but they eventually concurred that cement could be commercially manufactured under these specifications.

Mr. J. S. Armstrong: Has the committee any data on the use of slag cement? In Germany it is claimed that it stands sea-water better than ordinary Portland cement. I think iron ore is substituted for clay in the manufacture.

Mr. Jamieson: There is a cement manufactured in Germany for which large claims have been made in the way of superiority for sea-water work, in which they use oxide of iron and reduce the aluminium, that is using the silica containing less alumina and using the iron as a flux. Really if we come down to the basis of the manufacture of cement, we can manufacture the finest cement out of pure oxide of lime or lime and silica, those are the two ingredients, but it is almost impossible to manufacture that, at least commercially, on account of the very high temperature at which it has to be burned to get a fusion, and therefore some flux in the way of iron or alumina must be introduced. Whether the particular cement referred to has any greater advantage over the other I am not able to say, beyond the claims and recommendations of those who have tested it. It has only been manufactured within the last few years and it has not been universally used yet. In reply to Mr. Kennedy's suggestion that the information the committee has should be put out in a form useful to the members as a whole, if it is the feeling of the meeting that they would like that done, I think the committee would be pleased to undertake it, although it involves considerable work. As we have not means for making any very extensive tests we might in that supplementary report give a reference to the articles and data on the subject so that the members could look it up.

Mr. Coutlee: Being a permanent committee, could you issue bulletins?

Mr. Jamieson: Yes! In the same way as we issue our report through the council. We would be glad to do that but we do not want to undertake too much detail work.

The President: It could be issued in bulletin form. If you will look at page 65 of this report you will see that in cement testing they allow a standard sand. I think the suggestion of Mr. Dawson is a good one and that it is not asking too much, if this committee will take up the question of sand. We cannot have another committee on sand. We have several committees working now and two or three more to be added. The cement committee is a standing committee and may very well deal with the question of sand.

Lieut.-Colonel Ruttan: On page 62 there is a specification for standard sand for testing purposes. The sand suggested is the sand used by the American Society of Civil Engineers. A very good sand.

Mr. Bell Dawson: The point I wished to bring forward for discussion was whether inferior earthy sand had not a very detrimental effect upon cement. As a warning against allowing the use of muddy or earthy sand.

Mr. Kelley: While I believe that an examination in detail of various sands would be valuable, I also believe that if this committee takes up that question they will drop cement and study sand. It is a subject that they cannot cover in a year. Some years ago it evolved upon me to take up that very study. The longer I continued at it the less I found I knew. The experiments were conducted over months, not days. I took the standard crushed quartz, which is the accepted sand for testing cement. A uniform cement was used. I had the crushed quartz, common commercial sands, sands of varying sizes, and I had a sand composed of pure quartz, the grains of which under the microscope were as round as an egg and as polished as the glass agates with which boys play marbles. I found that the sand of varying sizes gave better results than the crushed quartz with the same cement. I found that the common sand that would grade through the sieve in different sizes, if graded one way would give one result and if graded another way would give another result. I looked up all the specifications for sand that I could hear of and they all recited that the sand must be clean and sharp. After that series of experiments I took the word sharp out of my specifications, because the very best result I got was with this round, polished sand. Yet if I were to find a sand to-day that was round and polished, I would make a long series of experiments before I would use it. The result of this year of work forced upon me the conclusion that the sand did not require to be sharp but that it did require to be in grains of varying size. A sand of a uniform size gave poor results. A sand running from small to good large grains gave excellent results. Another astonishing result was that one sand pit with mud in it gave better results than sand that was washed and clean. (Hear, hear.)

It was not one experiment but a series of experiments that produced that result, and that is the reason why I say that when I got through that year's work I felt that I knew less about sand than I had ever known before and I think so yet. I believe if this committee will confine their attention to cement and the accepted method of testing with an artificially produced crushed quartz, which is called the standard sand, that they will have their work cut out for them this year and all they can attend to. (Applause.)

Mr. Leonard: Mr. Chairman, some few years ago I carried out some experiments in connection with a work at St. Catharines, somewhat on the lines spoken of by Mr. Kelley. I did not have the polished smoot quartz sand, but I tried the standard sand and varying sands from the district, carrying on the experiments for some months. The results were so conflicting that it was impossible to analyze them, excepting that a particular pit sand containing a small proportion of clay gave the best results of all It was better than the standard sharp sand.

Mr. Bishop: May I ask Mr. Kelley if he used a sand made from crushed granite and if the results differed from the other?

Mr. Kelley: One sand was crushed granite; artificially crushed, not natural. As I recollect at this time it gave results commensurate with the standard sand. It was artificial sand, made for testing and not the clean white standard sand that we get to-day known as the Ottawa Standard Sand.

Mr. W. J. Francis: Mr. President, I have made a number of tests in this connection and I think the only conclusion to come to is that that standard sand used in cement tests can only be regarded as of service in the way of comparison. I agree with what Mr. Kelley and Mr. Leonard have said, that it is almost impossible to tell how a pit sand is going to act in mortar, and there is no doubt that the grading of the sand has a far greater effect than any other property of it. I think it is absolutely necessary to consider very carefully any sand offered for use, and if possible, make tests before any important concrete work is done with it.

Mr. John Kennedy: If I may be allowed another word I think we are discussing two subjects. The cement matter is quite separate. I agree with Mr. Dowdell that the question of cement is separate from that of sand and that a good specification for cement, tested with a standard sand deals with that point. The sand matter, as we all know, is just about as important as the cement. I have had no such extended experience as Mr. Kelley but I had something to do with sand a while ago and got different sands, one from the Saguenay, one from the Ottawa, one from near Montreal, and another from New York. The Saguenay sand was nearly useless, exceedingly bad. With the New York sand we could make

a mortar that had quite twice the strength of that made from the Ottawa sand. The Chateauguay sand came in somewhere between. If the committee can take up the question of sand as another question, it would be of tremendous value, but whether that could be done without an appropriation of funds I do not know. Perhaps some arrangement could be made with McGill or somewhere else to do some investigating. It is quite as important as the cement but another subject. (Applause.)

Mr. Jamieson: I am not sure to what extent we could investigate. So far we have made tests and experiments ourselves and we have also called upon the different testing laboratories to aid us in certain specified tests. They did this gratis, but we cannot call upon them to do too much. Of course all this involves expense to the committee, and therefore we cannot go very far without some special provision. I was particularly well pleased to hear Mr. Kelley's experience with sand, and with which I thoroughly concur. In my experience no special importance should be attached to the sharpness of sand, other conditions being right. The theory on which we may go, as well as practice, proves that the movement that has caused the polishing and rounding of those sand grains has removed all the inferior particles of the sand. That holds good also as to round gravel which we find equally good and sometimes better than crushed stone. The reason is that in crushed stone we often have loose particles adhering to the stone, behind which the cement will not penetrate and adhere to the solid part of the stone. It is more important to have a sand that will grade from fine—not too fine—up to fairly coarse, than it is to have it all of one size, because then there is too much space or vacancy to be filled by the cement. We realize the importance of the sand question, but as Mr. Kelley has shown, it is a large question to go into.

Mr. Bishop: May I ask if anything has been done to show how many pounds of cement equal a cubic foot and whether the committee have any specification as to the volume of cement to the barrel.

Mr. Jamieson: One hundred pounds of cement we consider one cubic foot. Loose cement will only weigh eighty pounds to the cubic foot and a thoroughly packed cubic foot will weigh something over one hundred and twenty pounds; so that a fairly packed cement will run approximately one hundred pounds and that may be considered when you are proportioning by cubic contents.

Mr. Leonard: Mr. President, I understood Mr. Jamieson to speak rather disparagingly of the use of very fine sand in making mortar. That reminds me that a few years ago there was a cement manufacturer in Montreal who turned out a silica cement, which I understand was a mixture of silica sand with cement, and the whole of it then ground very finely. I never made any exhaustive tests of that cement but perhaps the committee have and that would give some definite information regarding the use of that very finely powdered silica sand. Those tests that I made at St. Catharines, that I spoke of previously, included some tests with a sand from the shore of Lake Ontario, near Port Dalhousie, which is practically a dust. I used that alone with cement and also mixed with pit sand. I am sorry I have not got those records but the results were so confusing that it was almost impossible to analyze them and get their meaning, but my impression from memory is that the use of that very fine sand with pit sand gave a good result when intimately mixed, so that there would not be any quantity of it together.

The Secretary: Mr. President, in regard to this matter of testing the value of sands for use with cement, I feel quite sure that arrangements can be made to conduct such work as the committee may care to supervise, in McGill University, without charge, without cost. (Applause.)

Mr. Jamieson: A word in reply to Mr. Leonard, so that we may not be misunderstood. The so-called silica cement consisted of Portland cement 1 part, and silica sand 1 part, ground together. In many respects it was an excellent cement, due to the thorough grinding of the two materials together, and the extra grinding given to the cement over its original grinding, in the process of grinding the two together. It gave very good results, and it has to-day many things in favor of it, particularly in view of the fact that all our cements to-day are burned through the rotary kiln. Rotary kiln cement is naturally very quick setting; almost as quick in its natural state as plaster of paris. The result is that all manufacturers must add to their cement another material to retard the setting, which you will notice we hold down to a certain limit. If we had a mixture of inert material that would reduce the time of setting it would be perhaps of considerable value. That is a matter we have given some consideration to, but I do not change my opinion one iota in regard to fine sand generally such as Mr. Leonard has spoken of. I have had considerable experience with what is called blow sand. Concrete made from that sand has not on the average half the strength of concrete made from good coarse grained sand. It is practically quick sand, which is only a very fine silica or fine sand. It is important to avoid such sand as that in construction, although a small amount of it mixed in with good sand would be all right; that is, we have voids between our sand to fill the same way as we have between our stones and we want to get it as dense as possible, and if you can graduate your material in that way, whether it be sand or stone, you get better results.

Lieut.-Colonel Anderson: I move the adoption of the report, and I should like to add a rider that the committee be instructed to negotiate with McGill as suggested by Professor McLeod, with the object of continuing the tests in the direction of making a special report on the effects of different sands on the constitution of concrete. I remember some years ago when I was in England, in Somersetshire, I saw a man adopting a rather unusual procedure in mixing mortar for a building. He was gathering up the mud off the street and putting it into his trough with the lime. I asked him, "What are you making that mortar with?" and he said, "Us mixes it aw wi' mook," translated he meant that he mixed it with muck. I learned that it is a constant practice in the South of England to make their lime mortar with ordinary mud off the field or street. That would seem to argue in favor of what Mr. Kelley said that a little admixture of mud with the sand is no detriment to the strength of the mixture. I may say that in my own practice I have found that if the granulation of the sand was diverse, ranging from fine to very coarse that it was safe to ignore the presence in the sand of a small amount of vegetable matter or mud of one kind or another.

Mr. Jamieson: I think we should be careful on that point. While a good many tests have shown pretty conclusively that a small percentage of clay will increase the strength of concrete made from it, we must be very careful to not let that exceed a small amount. I think it is safer to keep everything clean. Our results are good enough with clean material. The only time that should be considered is at some point in the country where it is difficult to get absolutely clean sand, but sand with a small amount of clay in it may be obtained easily. Then it is a matter for fair consideration in the saving of cost. I would not like the impression to go out that you may throw anything into cement and obtain good concrete. (Hear, hear.) Vegetable matter particularly is objectionable. A small amount of clean clay would not be an injury, but we should be guarded on that point.

Lieut.-Colonel Anderson: In case I did not make myself clear; all I meant was traces.

Mr. McColl: In seconding the motion I would like to suggest that the committee bring out the effect of sea-water in its next report.

(The motion was then put and carried.)

Mr. John Kennedy: Does the adoption of the report mean that this becomes the standard specification of the society?

The President: I think so. It is adopted at an annual meeting of the society and becomes the specification of the Canadian Society of Civil Engineers for standard cement.

Mr. Jamieson: I would like to hear from Mr. Kelley as to packages. Now I think is a good time to advance that. It cannot be done at once, but we should not lose time.

Mr. Kelley: I think that an essential part of the specification. It is included in the specification of the joint committee composed of members of the American Sociey of Civil Engineers, the Maintenance of Way Association, the American Society for Testing Materials, and the Cement Manufacturers Association. In that a standard package is accepted and included in the specifications. Practically one hundred pounds to the package. There is a tare allowed on account of the sack. As the chairman of the committee remarked a little while ago it is difficult to say what a cubic foot of cement actually will weigh. The variation in specific

gravity makes a difference, so that an allowance is made, but the package mus tnot weigh less than a certain amount. I think that should be incorporated.

The President: The next business is the consideration of Mr. Dodwell's address, given the other evening at the Smoker, as to the standing of Government engineers. Perhaps Mr. Dodwell has a formal resolution.

Mr. Dodwell: I went into the matter pretty thoroughly, and I think I had better leave well alone. I shall be very glad to have the approval of the meeting or a discussion by the members.

Mr. Leofred: Mr. Chairman, I am sorry that a larger number of the members have not had time to study this very important question, probably one of the most important that have been brought before the society. I feel that this society is a great body, composed of many arms through all the Dominion, and anything that benefits one part of that body must be a benefit to the other parts. If this society can influence the Government to increase justly the salaries of Government engineers, every engineer in Canada would benefit by it. Possibly in private practice we may be able to obtain twice as much for the same labor as we are doing now. Employees of the railroads who are now receiving a salary of $1,800 or $2,000 may be able to get double that amount. I think it would be well to have a strong committee of independent men interview Sir Wilfrid Laurier or Mr. Pugsley and endeavor to get something done. I hope that many of the members present will join in this discussion. (Applause.)

Mr. Dodwell: I move that the president name a committee to draft a memorial or petition, something of that nature, as will appear best to the committee, to lay before the Premier and discuss it with him as fully as he will permit. Then if we receive any encouragement—as I believe we will—the next thing will be to draft a series of regulations or a chapter to be added to the Civil Service Act or an entirely new Act. We can get the Blue Books covering the Constitution, recruiting and regulations of the engineering services of India and Australia, and it is upon those lines that I think we ought to go. I think also that Mr. Warburton's speech in the House in connection with this matter on the 17th of January, with the reply of the Hon. Mr. Pugsley, Minister of Public Works, should be distributed among the members of this society. My motion is that the president be asked to name a committee and that the council be authorized to have Mr. Warburton's speech and the Hon. Mr. Pugsley's reply printed and circulated.

Mr. John Kennedy: Cannot we get enough copies of Hansard to send around without having it specially printed? They are sent in tons throughout the country.

Mr. Jamieson: Before you put that motion, Mr. Chairman, I regret that I was not present to hear Mr. Dodwell the other evening. While I know generally the scope of his address I have not particular information. This is not purely a matter of the Government engineers. As it stands the resolution is merely to memorialize the Premier with regard to the Government engineers. If we are to raise the status of the engineer, it should be as a profession and not the Government service alone. (Applause.) The corporations employ the larger number of engineers.

Mr. Dodwell: I do not understand how we can ask the Government to raise the standard of the profession all over the country. If the Government establishes a proper engineering service similar to those of the two great dependencies I have mentioned that would raise the standard of the whole profession. I am in favor in the strongest possible way of the elevation of the standard of the profession, and I think this is a very practical way to go about it. It is for the society itself to raise the standard of the whole profession throughout Canada; the Government cannot do it, but the Government can establish its own engineering service on a high standard, and that will cause the different colleges and engineering societies and schools to make their standard of teaching and qualification commensurate with the requirements of the Government service. The Canadian Society of Civil Engineers now sets the standard of engineers in this country. It is for the Government to take advantage of that standard and organize a reformed and improved engineering service. The only way it can do it I think is on the lines I have suggested.

Dr. J. Galbraith: It will be important, Mr. President, for the committee to study the status of the Government engineer in India and Australia, as has been suggested, and also in the United States and other countries where the Government engineer is already at a high standard. This committee cannot go to the Government with mere generalities; it must have facts, statistics showing what is done in other countries. There may be an exception taken by people to engineers trying to raise their pay. Such a proposal from any one is always open to unpleasant suggestions from others. We must avoid that. The committee should get all the statistics possible, work the case fully and present a good argument altogether aside from what might be called purely selfish.

Mr. John Kennedy: I do not know whether this resolution has been seconded yet. I think it should include more than what has been mentioned. We must consider what we are going to give for increased salaries. This is a large question and has several sides. We now number some twenty-seven hundred members in the society of all sorts; roughly speaking half of those are students and associates. There must be some twelve or thirteen hundred practising engineers.

The Secretary: Thirteen hundred and fifty.

Mr. John Kennedy: Thirteen hundred and fifty is it? At a moderate estimate the expenditure will run into a hundred and fifty million per annum to keep us all busy and give us a moderate remuneration. Taking the Government work by itself we must consider the character of the services to be given, and also we ought to consider how the whole engineering business of the country is to be carried on. Manufacturing and railway companies, private concerns, can take care of themselves, but as to the Government we should make some recommendation on the whole question. I am not speaking of the personnel at all but of the system. The Government system is very good. The departments have their independent engineering staffs and many millions are being expended. I think there should be something like a general staff instead of so many separate departments. It is difficult to work, but there should be some way so that when any great matter is brought before the Government on which millions have to be spent, it shall not all be done upon the advice of any one person; it should be possible to form a consulting council. The American system, for example, is very good. The Government work is done under the general supervision of the Engineer Corps, who are civil as well as military engineers. When any important project is brought forward—as most of you are aware a Board is at once called; the engineer of the district is ordinarily the chairman of that board and other members of the staff are called from different parts of the country, some who are experts already and some who promise to become experts, and this board goes over the project. If it is right it receives the endorsation of the board and the Government can go on confidently. The engineer in charge is relieved from a great deal of petty criticsm because he can refer to the authority of the board at any time. If there are mistakes in the design they are corrected quietly. I place very great importance upon that matter of consultation. Wherever large sums of the public money are to be spent in public works it should not be upon the advice of any one man however good he may be. If it is thoroughly right it will be all the better for endorsation. If he has overlooked any point, this review by his professional brethren will catch that and it will be greatly for his benefit and the benefit of the country that any mistakes should be eliminated. In taking up this matter of remuneration we should advise the Government as to how they shall get the very best services we can render. (Applause.) Let us give good value and then we may ask for good remuneration. We cannot compel anything from the Government nor from the railway companies. There are a tremendous number of engineers being manufactured at present and good ones. I do not know just where the capital expenditure is to come from to keep us all going, but the field is spreading and engineers are being used so much more for all sorts of work in which they were not formerly called upon, and it is such a fascinating employment for so many young men that we must be careful to see that we are able as a profession to give good service. I think ,therefore, the committee should consider how the public engineering service should be constituted as well as the matter of pay. (Applause.)

Mr. Dodwell: Mr. Chairman, it is a great pleasure to hear one of our oldest and most hard working members express himself so clearly in regard to this matter. There are so many ramifications of engineering industry in this country that no national expenditure can be embarked on without

a Board of engineers of some sort. The practice in the great Republic to the south has been, in the case of large harbor works, that the surveys are first made and then the Chief of Engineers at Washington receives the result and the proposed plans. If the work is of sufficient magnitude he calls a Board composed of men from all over the country who are acquainted with that particular kind of work. They meet at the place and go thoroughly into the plans. A modified plan, after they have conferred on it, is signed by each member, including the man who originally made the design. Then they can go ahead with that work and the man who made the design has not got that horrible responsibility hanging over him, "I wonder if something better could have been done." This is most important and I should certainly like to see the committee work towards the organization of an Engineer Corps. Being a graduate of the Military College, I know something of the way Engineer Corps are run, both in Great Britain and the United States. The amount of thought I have given to the matter leads me to the conclusion that it is almost impossible to establish a corps without some method of compensation. The very best men on that Corps will eventually become old and unable to give the same service that they originally did. They may know it themselves but if they resign they have nothing to look forward to but poverty. If we could arrange for a thoroughly good pension system we would have a sound financial basis to work on in the organization of the Corps.

Mr. Jamieson: Mr. Chairman, I consider the point brought up by Mr. Kennedy one of the most important that we have had before this society. In the work of the transportation committee we have remarked that there is no engineering authority in the country to advise the Government as to the best line of expenditure with a view to getting the best results on transportation. We hear discussions of the Georgian Bay Canal, the enlargement of the Welland, the International Trans-Continental Railway, etc., and yet it is only vaguely understood by the general public and not much less vaguely by the engineers, because they are unable to get the necessary data upon which to form a proper judgment. The data may be in the possession of transportation companies and not available, so that Parliament often deals with vast subjects on which it has little or no authentic information. There should be some system by which men having expert knowledge could be called upon to contribute so that a proper conclusion could be reached. If a committee is appointed I would suggest that its members be selected with as much care as possible, in order that the report of the committee may be a credit to the society and increase our prestige. The subject should be dealt with most minutely and carefully. (Applause).

Mr. Dodwell: Mr. Kennedy appears to be under the impression that the chief object of my motion and of this movement is an increase in pay. I wish to assure him that such is not the case. We shall not object at all to an increase, if it comes our way, but the main object of the movement is to get an improved Government engineering service. Mr. Warburton quoted the scales of pay in the Australian and Indian services. The Australian salaries of government engineers are not better than ours, but they are better adjusted, better graded. The pay of engineers in India is certainly higher than ours but the country is a very disagreeable one to live in and a man cannot live there as long as he can in Canada. After a few years service his health is undermined and he is forced to retire. I would rather have four thousand in Canada than eight thousand in India. I think most men would. Increase of salary is not the principal object of this movement. It is to develop a thoroughly first-rate engineering service, properly graded. My idea is that young men should enter that service on passing a competitive examination or on presenting their testimonials, credenials, or degrees from some scientific or engineering college, and that they shall rise step by step from the lowest grade, junior, assistant engineer, third grade, up through the various grades, promotion to be by examination and by merit, until they rise to the highest grade. We have seen many engineers appointed from the outside to posts high up in the government service. There is no system of promotion and no standard of excellence. I thought I had made all this clear in my remarks on Tuesday night, but I appear to have failed in doing so. Mr. Kennedy and Mr. Jamieson have both referred to the desirability of having the Government Engineering Association so constituted that an Advisory Board of the highest skill can at any time be called upon to advise the government in regard to expenditure on important works. Surely under a reformed and reorganized service that Advisory Board becomes a very simple matter. At present there is no system of pension or superannuation in the Civil Service. Neither is there in Australia, but there they have compulsory insurance for every Civil Servant. Each servant contributes so much from his salary as a premium on a policy commonsurate with his salary and responsibilities. In India of course there are pensions because after a dozen years of work there a man goes back to England with his health, in many cases, gone. The service there could not exist without a liberal pension system. I have gone thus fully into these subjects because many of the gentlemen here this morning were not present on Tuesday. I will be glad to answer any questions.

Lt.-Col. Ruttan: I would like to have the resolution read, if I may.

The President: I will have it read by the reporter. If I may express a view, I cannot go so far as to agree with Mr. Dodwell in reference to an examination on entering the service and an examination as you go up each step. I think the standard of the Canadian Society of Civil Engineers should be a sufficient warrant to admit any one to the service. (Applause).

Mr. Dodwell: At the suggestion of Mr. Kennedy I would add to my resolution that copies of Hansard should be used.

Moved by Mr. Dodwell, seconded by Mr. Leofred, that the President be asked to name a committee to memorialize the government on the subject of an improved Engineering Service, and that the Council be authorized to have Mr. Warburton's speech and the Honorable Mr. Pugsley's reply printed and circulated provided that a sufficient number of copies of Hansard cannot be secured.

Mr. Walsh: Mr. Chairman, I listened to Mr. Dodwell's very comprehensive remarks the other evening and I think he has covered the ground fully. There is an impression that engineers are not business men, and in regard to the great works undertaken by this country, they are not considered, except in questions of a technical nature. That puts them in a position of hewers of wood and drawers of water. Why should not the Society endeavor to remove that impression that engineers are not business men. Doctors and lawyers are considered business men. The work engineers are called upon to do brings them in contact with contractors and other business men, so that by force of circumstances, if in no other way, the engineer becomes a business man.

The President: That will be treated as a suggestion to the committee.

Mr. Leofred: Mr. President, if you will allow me a word on your last remark. I believe we will never impress on the Government the advisability of increasing the salaries of its engineering employees if we do not make efforts to raise the standard of admission to this Society. What weight will we have with the Government if they ask us what is the qualification of your Society? We must say that it is being recommended by five friends.

Mr. John Kennedy: Oh, no.

Mr. Leofred: I think if any one is recommended by five members, he is admitted, although sometimes only one of the five knows the candidate. Four may admit that they know very little beyond the fact that they have been asked to sign the letter of recommendation. He is admitted all the same. If we read pages 110 to 122 of the report of 1909 and the letters to council concerning the qualification for admission to the Society, we will find very clearly that the majority of the members do not consider the mode of admission as sufficient or the standard that we should require at this period when we are becoming a very strong Society. At first we had to admit whoever was practising so as to form a nucleus but now that the Society has become strong and when the highest engineers admit that we are becoming too numerous and should look more to the quality than the quantity, I think it is time to raise the standard of the profession required for admission to this Society. (Applause.)

Lt.-Col. Anderson: I would call on the Chairman to contradict at once Mr. Leofred's statement with regard to the qualification for entering the Society.

The President: As you gentlemen know, during the past year, under the new by-laws the elections have been in

that way and the council certainly feel that they have done their duty to this Society in watching and taking care of the qualifications of the men elected to it.

Are your ready for the question on Mr. Dodwell's motion?

Carried.

The committee will be composed of the following gentlemen to confer with the council in the matter:

Mr. H. Holgate, chairman; Mr. M. J. Butler; Mr. J. A. Jamieson; Mr. Wanklyn; Lt.-Col. Ruttan, ex-officio; Mr. Cambie; Mr. Des Barats; Mr. St. Laurent; Mr. Vallee; Mr. H. J. Lambe, with power to add to their numbers.

The meeting is now open for general business and I think Mr. Walsh has a resolution.

Moved by Mr. Walsh, seconded by Mr. Dodwell, that a special committee be appointed for the purpose of investigating and reporting on the question of "Sewage disposal with reference to the pollution of lakes and streams in Canada," said committee to consist of the following persons, viz.: Messrs. R. S. Lea, John Kennedy, W. Chipman, R. Leonard, J. S. Dennis, C. H. Keefer, H. J. Cambie, C. R. Coutlee together with the mover and seconder with power to add to their numbers.

We are all aware, Mr. Chairman, of the outbreaks of typhoid, unfortunately too frequently in the various centres of population and in the smaller towns and villages throughout the country. As we read from the reports of the medical men and Boards of Health this is largely due to pollution of the waters of the country. If I may read an extract from a very able address on public health delivered by Dr. Bryce at Ottawa on the 19th inst. as follows:

"The mortality due to typhoid as being the index of public ignorance and indifference and municipal inefficiency was taken up, and many statistics from different countries, including those of Britain, went to show that the matter of prevention of the pollution of the streams and purification had been the measure of the lessening of deaths from this fatal disease.

"Regarding pollution of streams it was both a municipal, provincial and federal question, and must be dealt with by river conservation boards dealing with the waters of a whole water shed as in England."

Here in Ottawa we have been warned that the danger signal has been up for some time. The people have been advised to boil the water. I read from the Free Press of the 25th inst.:—"Colon bacilli, the sure indication of sewage impurity are again found in the water supply of Ottawa. Dr. R. Law, City Medical Health Officer, has received from Dr. Amyot, the Provincial Analyist, the results of the tests of six samples of water sent up to Toronto on January 11th. Out of the half dozen samples two show colon bacilli. The tests in the last two months had shown the samples sent to Dr. Amyot comparatively free from colon bacilli. Dr. Law, on the instruction of the Board of Control, is continuing the tests in order to get a good idea of the condition of the water throughout the year. "Did the recent thaw result in the colon bacilli being found in the water?" Dr. Law was asked. "No," he replied. "Thaws, such as we have, had usually resulted in impurities being found in the water but the water for this test was taken before the thaw commenced."

In the town of Alymer, up the Ottawa a few miles, I understand they recently commenced to pour the sewage into the Ottawa River and I suppose it is due to that that the water has been proved impure at Ottawa. True, at Ottawa we do the same thing. At Montreal they have had a typhoid outbreak of considerable proportions and unfortunately, as is usually the case, a large number of deaths. The same thing takes place throughout the country; they take the simplest means of getting rid of the sewage, regardless of what may happen to their neighbors immediately below them. As the towns and cities grow this condition becomes worse; we are making cess pools of our lakes and streams. Afterwards attempts are made to purify the water. I think the time has arrived when this society should inquire and ascertain to what extent sewage is disposed of pouring it into lakes and rivers. This is a large undertaking. Perhaps the secretary will be able, with his clerical staff to send out inquiries and get information on the subject. At any rate I think the society should take the matter up and I do not think I need say more about it.

Mr. Leofred: I would ask the speaker if he knows that the Dominion Government is introducing a clause into the Criminal Code making it an offense to allow sewage in a crude state to flow into any navigable river or tributary thereof?

Mr. Walsh: I do not know that that has passed yet. At any rate the action of the society would not interfere at all with that of the Government.

Mr. Leofred: It may be if the Legislation has been introduced, our action would have less reason. As owner and operator of a great many sewer and waterworks plans in the country, I think we should be very delicate in the way we act. I have been notified sometimes by the Board of Health to purify the sewers in some of my sewer plans and I found on investigation that in some cases it would cost much more than the sewer plan itself. The same thing for waterworks. I have been notified that the water was not exactly pure, that it contained a few bacilli per million gallons, and that it would be a good thing to install filters. On investigation I found that the building and operation of a filter would cost more than the waterworks plant itself. The advisability of purifying water systems and sewers has been often brought up for the City of Montreal but they have not found it practicable, on account of their means no doubt. If all the small towns and municipalities are compelled suddenly to purify their sewers and water supply, probably they would not be able to build either sewers or waterworks and they will be in a worse condition than at present. Of two evils they must choose the least and people would rather have a waterworks plant and a sewer system even if not perfect, than nothing at all. If there can be no sewer outlet into a navigable river and if no one can supply a town with water filtering, there will be very little waterworks and sewer plants built and there will be so much less work for our profession. (Applause).

Mr. Walsh: As the last speaker has asked me a question, I may reply. I refer particularly to waters that people take drinking water from, whether navigable or otherwise. The larger the water the less the danger will exist. As to salt water I do not think that affects the question at all. It is for the meeting to say whether they will adopt my motion or not. I consider it right that steps should be taken at once to put a stop to the pollution of streams; I consider it a crime to continue to pollute them.

Mr. John Kennedy: Just a word, Mr. Chairman. I notice that my name is put first on that committee. I am quite willing to serve upon the committee but it will be a difficult one to work as the members are scattered. I suppose the first-named is the convener. I would rather not undertake that. If you will reverse the order and let me get somewhere else than at the first I will be obliged.

The President: We have added the names of Mr. Lea and Mr. Coutlee to those at first proposed. If Mr. Walsh is agreeable we will put Mr. Lea's name first.

Mr. Walsh: Certainly, I am agreeable to anything that Mr. Kennedy desires.

(The motion was carried).

The President: Last evening some of you heard the Hon. Mr. Sifton make a suggestion that I think the meeting will be glad to act on. If there is a resolution ready it may come before the meeting now.

Mr. Coutlee: Mr. Chairman, in reference to the movement now being instituted for the conservation of natural resources in Canada the Hon. Mr. Sifton last night suggested to the society the advisability of some of the members being placed on a committee, or of the members as a whole acting to help and to reinforce the investigations of the commission and to afford aid to the commission. It would probably be better that the members appointed from the society should be chosen by provinces or districts, and to that end I have framed this resolution. I think that to make a hurried selection of the members at this meeting would not be in the best interests of the society; it had better be left to the incoming council to actually name the members who will act. I think we should make it a standing committee of the society. I have pleasure in moving, seconded by Lt.-Col. Ruttan that a standing committee of members of the Canadian Society of Engineers be appointed as follows:—

From Prince Edward Island, 2; Nova Scotia, 2; New Brunswick, 2; Northern Quebec, 2; Southern Quebec, 2; Northern Ontario, 2; Southern Ontario, 2; Manitoba, 2; Saskatchewan, 2; Alberta, 2; British Columbia, 2; total, 22; who should devote their attention to the conservation of resources, firstly by drawing attention to waste of lands, forests,

minerals or water power. Secondly, by drawing attention to a lack of development of natural resources. Thirdly, by drawing attention to desirable improvements in various industries or measures for protecting the public health. Fourthly, to indicate general schemes of economic and lasting development.

Lt.-Col. Ruttan: I have much pleasure in seconding that resolution and I would suggest an addition that would indicate why that committee has been formed, that is, that the Society may understand and that the conservation commission may understand that we are to keep in touch with them and assist them in the work.

Mr. Coutlee: That is accepted certainly.

Mr. Leofred: In the choice of the members I would suggest that the local branches be consulted and their approval obtained, where a local branch exists.

The President: I think in all these matters the council takes into consideration the suggestions and the approval of the different branches.

Mr. John Kennedy: What is meant by the expression, "devote their attention?" Is that just as ordinary committee work?

The President: Yes, it is only committee work.

Mr. Coutlee: My idea is that as different matters come before the members of the society in their ordinary work, that they should report them to the committee so that the committee may act and be of assistance to the commission.

Mr. Leofred: I suppose the members of the committee will have to be experts in the different lines indicated?

The President: I think so. The council will have to take that into consideration. You all heard last night what Mr. Sifton said and the resolution is plain. Are you readv for the question? Carried.

Mr. Higman: Mr. President, with regard to the establishment of a Canadian National Committee in connection with the International Electrotechnical Commission, in 1904, at St. Louis, at the International Electrical Congress it was declared desirable to bring this International Commission into existence, and the following resolution was passed:—"That steps should be taken to secure the operation of the Technical Societies of the world by the appointment of a representative commission to consider the question of the standardization of the nomenclature and ratings of electrical apparatus and machinery," and as the Government delegate on that occasion I was requested to bring this to the notice of the Canadian Technical Societies. I wrote to the secretary of this society and in response to that communication Dr. Owens was appointed a member of the proposed Canadian Committee, and I believe also another gentleman was appointed. They attended a meeting of the International Congress in London, but Dr. Owens failed to follow up the work and complete his committee. The council in London have requested me to nominate a committee, but in order that we may be legally and technically established I come back to the society for confirmation. I therefore nominate the following to be the Canadian National Committee of the International Electrotechnical Commission:—Messrs. H. T. Barnes, William Archibald Duff, L. W. Gill, L. A. Herdt, O. Higman, A. B. Lambe, John Murphy, R. T. Rosebrugh, J. J. Wright, and a representative each of The Canadian Westinghouse Company, The Canadian General Electric Company, Allis-Chalmers-Bullock, Ltd.

I may also say that this involves nothing so far as the Canadian Society is concerned. It is simply a technical legal matter that will have to go back to the original resolution and I am simply asking the Society to confirm these names, not to father the committee in any respect, there will be no obligation so far as this society is concerned.

Mr. Ker: I move, if I can get a seconder, that the nominations made by Mr. Higman to be members of the proposed Canadian National Committee of the International Electrotechnical Commission be and are hereby confirmed.

The President: Before that resolution is put; in reference to the last three, they are not members of this society. I do not know whether this society has power to confirm nominations except in connection with its own members.

Mr. Higman: I point out that this is not a committee of the Society. It is simply a request to confirm something that we wish to do initially to establish ourselves. We may be able to increase or diminish the number or make any changes hereafter, but at present we are unable to start. That is our difficulty.

Lt.-Col. Anderson: Mr. Chairman, this is a matter that I do not profess to know anything about but it looks as if we might be committing the society without knowing it. Would it not be better to have that resolution considered by council first. I would vote against the motion in its present form, not that I have any objection to it per se, but it seems to me there has been no opportunity to consider what this leads to. Why did not council bring it before the meeting?

Mr. Higman: The present commission, in order to get a Canadian Committee established, asked me to nominate it and get it confirmed by some of the Canadian societies. The Secretary's letter of May, 1906, is to the effect that Dr. Owens was appointed a representative of this society to the Committee on Standardization. So that it has been before the council and they recognized our efforts.

Mr. Ker: Mr. Chairman, I think it would be sufficient to say that at the first meeting in London some rules were proposed and adopted and it was decided that these local committees should be formed by the technical societies. It was thought only fair to this society that they should be asked to approve of the formation of that commission. That is practically all that is asked. Mr. Higman was asked to act, because no steps were taken to appoint a committee. If it is objectionable, we would strike off the names and simply ask the approval of the society to the formation of that committee. The work to be carried out by that commission is principally one of notation. The text books are practically illegible because each writer uses a notation of his own and different countries have different notations. If we say that National Standardization of notation is important, International Standardization is much more important. That is one of the works this commission intends to do.

The President: Mr. Ker as mover of that resolution will read out the members of it that are members of the Canadian Society of Civil Engineers.

Mr. Higman: I do not know whether they are all members or not. Dr. Barnes and Prof. Rosebrough I imagine are not. We might strike out the names and get the confirmation of the society without them.

Dr. Galbraith: Mr. President, this matter is not very clear to many members of the meeting. I think it would be better to refer this proposition to the council for consideration.

Mr. Higman: If it is the general wish of the meeting that it should be presented to the council I shall certainly be very glad to withdraw the motion.

Dr. Galbraith: Then I beg to move, seconded by Mr. Jamieson, that this proposition be referred to the council for consideration. Carried.

The President: There are a few matters I would like to suggest to you. First the increase of fees to the branches. That question was discussed on Tuesday. It is thought that the society cannot afford to increase these grants. It occurred to me that the members of branches should pay the same fee as the Montreal members, and then we would get a rebate of a little more than the $2 we get at present.

Lt.-Col. Ruttan: This is a matter that requires careful consideration and I think it would be better to refer it to the council and ask them to report at the next annual meeting. I move that the matter of increased payments to branches and the financial relation of the branches to the parent society be considered by the council for the coming year and that the council be requested to report at the next annual meeting.

Mr. John Kennedy: Mr. President, I would like to second that and to add that council should consider the advisability of increasing the fees of the membership as a whole. Our fees are very low as compared with other societies. In the American Society they are $15 per year; the British Institution practically the same. Our fees for all except those at headquarters are only $8 a year. That does not give us enough money to do some of the things we want to do. Our committees, as has been mentioned over and over again, are crippled for want of money. I am doubtful about giving money to run all over the country, but no committee can carry on its work without a good deal of clerical assistance. We must either have an increase in the clerical staff which can be called upon for such services, or else occasional assistance must be employed. Also money does not go as far as it did. Just simply the question of the advisability of increasing the fees might be put in this motion and in that way I would second it.

(Concluded Next Week).

CONSTRUCTION NEWS SECTION

Readers will confer a great favor by sending in news items from time to time. We are particularly eager to get notes regarding engineering work in hand and projected, contracts awarded, changes in staffs, etc. Printed forms for the purpose will be furnished upon application.

TENDERS PENDING.

In addition to those in this issue.

Fuller information as to these tenders pending may be found in the issues of the Canadian Engineer referred to.

Place and Work.	Tenders close.	Issue of.	Page.
Wetaskiwin, Alta., gas well	Feb. 15.	Jan. 14.	46
Winnipeg, Man.,, electric equipment	Feb. 15.	Jan. 14.	39
Winnipeg, Man., fence, gates	Feb. 28.	Jan. 21.	65
Toronto, Ont., conduits, manholes	Feb. 8.	Jan. 21.	46
London, Ont., electrical apparatus	Feb. 25.	Jan. 28.	91
Vancouver, tile, line	Feb. 15	Jan. 28.	91

TENDERS.

Quebec, Que.—The Harbour Commissioners will receive tenders up to February 7th for the construction of a landing shed, 450 feet long by 80 feet wide, to be situated on the Point-a-Carcy Pier. Drawings and specifications may be seen at the harbour engineer's office. James Woods, sec.-treas.

Montreal, Que. — Tenders will be received up to 10th February, 1910, for (1) heating and ventilating, (2) switchboard and power wiring, in connection with the Montreal Technical School. Plans and specifications may be seen in Room 43, Street Railway Chambers, or at the office of J. S. Archibald, architect, 59 Beaver Hall Hill. W. J. White, secretary-treasurer.

Chatham, Ont.—Tenders will be received up to 4 p.m. Monday, 7th February. 1. For electric supplies for the city electric light plant. 2. For board of Works supplies—sewer pipe, brick, sand, gravel, cement, castings, lumber and hardware. 3. For sweeping, cleaning and removing dirt and sweepings from the several paved streets in the city. 4. For sprinkling the various streets in the city as provided by by-law. 5. For all granolithic sidewalks which may be laid in the city during the year 1910. W. G. Merritt, clerk.

Fort William, Ont.—Tenders will be received up to Thursday the 10th February for supply of brass goods, lead pipe, pig lead and service boxes. John Wilson, assistant city engineer.

Ottawa, Ont.—Tenders will be received until Tuesday, March 1st, for the purchase and removal of a 60,000 imperial gallon wooden tank, mounted on a steel trestle 90 feet high, at the Ottawa pumping station. Newton J. Ker, city engineer. (Advertisement in this week's Canadian Engineer.)

Ottawa, Ont.—Tenders will be received until 5 p.m. Monday, February 28, for the construction of piers, abutments and approaches for a highway bridge across the Culbute Channel of Ottawa River at Chapeau, Allumette Island, County of Pontiac, Que. Plans, specifications and form of contract can be obtained from Napoleon Tessier, secretary, Department of Public Works, Ottawa.

Ottawa, Ont.—Tenders for s.s. "Vidette," now on the way at White Horse, Yukon Territory, will be received up to Tuesday, 15th February. Particulars: American bottom; hull, Douglas fir throughout, 98 feet over all; beam, 18 feet over all; draft, 3 feet over all; gross tonnage, 134 tons; Net tonnage, 67 tons; two engines, 60-horse-power each, non-condensing, 9-inch cylinders, 3 feet 3 inch stroke of piston; boiler, shell or flue type, internally fired, made in 1905; house, cedar 18 bunks; dining room 14 feet by 11 feet and large galley. Fred. White, Comptroller R.N.W.M. Police, Ottawa.

Owen Sound, Ont.—Tenders will be received up to February 14 for the erection and completion of a church building for the West Side Methodist Church. James S. Russell, architect, Stratford, Ont. James C. Miller, chairman building committee.

Toronto, Ont.—Tenders will be received until Tuesday, February 22, for cast iron pipe as follows:—

465	lineal feet	42-inch	diameter
465	" "	66 "	"
160	" "	36 "	"
8	" "	6 "	"

including all specials. G. R. Geary (Mayor), chairman, Board of Control. C. H. Rust, city engineer. (Advertisement in this week's Canadian Engineer.)

Toronto, Ont.—Tenders will be received up to noon Tuesday, March 8, for supply of underground cable. Specifications may be seen and forms of tender obtained at the electrical department, City Hall, Toronto. G. R. Geary (Mayor), Chairman Board of Control.

Toronto, Ont.—Tenders will be received until Tuesday, February 15th, for one ten-inch water meter. G. R. Geary, (Mayor) Chairman, Board of Control. C. H. Rust, City Engineer.

Toronto, Ont.—Tenders will be received up to noon on Tuesday, February 8, for the construction of sewers on the following streets:—Keele, Indian Road, Garden Avenue, Glendale Avenue, Algonquin Avenue, Wright Avenue, High Park Boulevard, Westminster Avenue, Geoffrey Avenue. G. R. Geary (Mayor), Chairman Board of Control, City Hall, Toronto. C. H. Rust, city engineer.

Winnipeg, Man.—Tenders for supply of quantity of brass goods for waterworks service, will be received up to Tuesday, February 8th. M. Peterson, secretary, Board of Control.

Winnipeg, Man.—Tenders for the supply of 2,000 tons of bituminous slack coal, delivered at the siding at McPhillips Street pumping station, will be received up to Monday, February 7th. M. Peterson, secretary, Board of Control.

Moose Jaw, Sask.—Until February 21st, tenders will be received for two 2-horse street sprinklers with steel tanks. State capacity and weight. W. F. Heal, city clerk.

Saskatoon, Sask.—Tenders will be received until Monday, February 14th, for the following f.o.b. Saskatoon:—100 lbs. 1 inch Palmetto packing; 75 lbs. ¾-inch Palmetto packing; 35 lbs. ½-inch Palmetto packing; 20 dozen hand hole gaskets; 5 dozen man-hole gaskets; 25 lbs. spiral packing, ⅝-inch; 10 lbs. spiral packing, ½-inch; 50 lbs. spiral packing, ¾-inch. J. H. Trusdale, city clerk.

Calgary, Alta.—Tenders will be received until February 5th for excavations for a court house. John Stocks, Deputy Minister of Public Works, Edmonton, Alta.

Lethbridge, Alta.—Tenders for fire salvage will be received until Monday, February 7th, for the following power plant material. Bids will be received on all or any part. All material must be removed from the site within three months from the date of tender:—Two 300 horse-power Robb Armstrong engines; two generators, two exciters; two Robb Mumford boilers; three Robb return tubular boilers; one Babcock Wilcox water tube boiler; one 250 horse-power feed water heater; one fan engine and fan complete with housing; 10-inch steam piping; one small lathe. George W. Robinson, secretary-treasurer.

Yorkton, Sask.—Tenders for post office fittings, Yorkton, will be received until Wednesday, February 16. Plans and specifications to be seen on application to James Christie, clerk of works, Yorkton, and Napoleon Tessier, secretary, Department of Public Works, Ottawa.

Victoria, B.C.—Tenders are invited for 75 hydrants required by the fire department.

Victoria, B.C.—Tenders are invited for 150,000 gallons of creosote required for the treatment of wood blocks. G. H. Bryson, acting city engineer.

Nelson, B.C.—Tenders will be received up to February 10th for the following material, f.o.b. Nelson:—123 tons of 56-pound rails, with all necessary fish plates and bolts; 32 kegs spikes; 5½ ×9-16 inch; 600 tie plates suitable for 56-pound rails; 1 left-handed turnout, consisting of split rail switch, frog and two guard rails, with all necessary rods and sliding plates. Separate tenders may also be put in for 123 tons 56-pound relaying rails, with all necessary fish plates and bolts. Tenderers to state when delivery can be made. E. B. McDermid, secretary, Nelson Street Railway Company.

CONTRACTS AWARDED.

Halifax, N.S.—The contract for building a boat for the quarantine service at Halifax has been awarded to Philip & Son, Dartmouth, England, for $22,600. The highest tender was that of Toronto Shipyard, Toronto, $39,850. The New Burrell-Johnson Iron Company wanted $32,750. The others ranged from $28,000 to $35,000.

Howick, Que.—As noted in this column last week, the Western Bridge and Equipment Company, of Chatham, Ont., have been awarded a contract, at $15,548.50, by the municipal council of the Parish of Tres St. Sacrament, for furnishing material and building concrete abutments and for the erection of the iron and steel superstructure of the Allen's Corners Bridge. Following are the tenders:—

Entire Structure.

Western Bridge and Equipment Co., Chatham, Ont.	$15,548
Jenks-Dresser Company, Sarnia, Ont.	18,150
Phenix Bridge Company, Montreal, Que.	18,350
Laurentian Construction and Engineering Company, Montreal	18,500
Canadian Siegwart Beam Company, Montreal (less piling)	18,550

Superstructure Only.

Dominion Bridge Company, Montreal	$ 8,937
Jenks-Dresser Company, Sarnia, Ont.	9,970
R. MacMannus & Company, Hamilton, Ont.	10,200
Structural Steel Company, Montreal	15,400

Concrete Abutments Only.

T. Lemoine & Fils, Montreal	$ 7,300
R. T. Smith & Company, Westmount, Que.	7,400
New Lattice Bridge and Concrete Works, Chatillon, Que.	8,800
Laurentian Construction and Engineering Company, Montreal	9,200
Henry Williams, Cornwall, Ont.	9,952
John H. Leahy & Company, Montreal, Que.	10,250
James A. McBain, Ormstown, Que.	10,600

Montreal, Que.—The following tenders were received for fire fighting apparatus:—(a) 5,000 feet double jacket cotton hose, rubber lined, 2½ inches in diameter, with couplings, "Higby" thread; Canadian Fire Hose Company, Montreal, "Keystone," $1.10; "Patrol," $1; "Standard," 95 cents per foot: (b) One steam fire engine, capacity, 800 United States gallons per minute:—

Canadian Fire Engine Co., London, Ont.	$4,500
American LaFrance Engine Co., Elmira, N.Y.	5,450
Waterous Engine Works Co., Brantford, Ont.	5,300
(c) One 75-foot aerial ladder truck	
American LaFrance Engine Company	5,280
W. E. Seagrave, Walkerville, Ont.	5,400

Toronto, Ont.—The Milton Pressed Brick Company have been awarded the contract for special bricks, required by the works department, at $1.50 per thousand.

Toronto, Ont.—Contract for reinforcing rods for Wilton Avenue Bridge has been awarded to Clarence W. Noble. Following is a list of the tenders:—Timber piles supplied and driven to 30 feet, 18, 21, 23½, 24, 25, 29, 34, 52 cents per lineal foot. Wakefield sheet piling, 6 × 12, supplied and driven to 16 feet, 35, 36, 38, 45, 48, 50, 52 cents per lineal foot. The lowest tender was accepted.

Winnipeg, Man.—The J. D. McArthur Company, Ltd., have received the contract for the erection of the C.P.R. bridge over the South Saskatchewan River at Outlook, Sask. The structure will be a little more than 3,000 feet in length and 146 feet in height. The bridge will be a combined railway and general traffic structure, according to the present agreement. The details of this arrangement have not yet been completed. The traffic attachment will be beneath the railway bridge and will be twenty feet wide.

Winnipeg, Man.—The contract for the piers of the joint railway bridge across the Assiniboine River has been awarded to Thomas Kelly & Sons, Winnipeg, and the construction work will commence at once. The bridge which will carry the Canadian Northern and Grand Trunk Pacific Railways will be just east of the Main Street Bridge, about half way to the present railway bridge across the Assiniboine, and completed will be 454 feet in length. The cost of the work will be in the neighbourhood of $50,000. It is understood that the bridge will be of the deck plate girder type. There will be one section of 44 feet at the north end which will be a through span, then two of the deck plate sections, each 80 feet in length. The central span will be 90 feet in length, of what is known as the Strauss trunnion lift pattern, instead of a swing span as in other river bridges across the Red and Assiniboine. At the south end there will be two more deck plate spans of 80 feet each.

Victoria, B.C.—The McLaughlin-Buick Company will probably receive the contract for a 40 horse-power automobile and chemical, with 200 feet of hose for the fire department.

RAILWAYS—STEAM AND ELECTRIC

Woodstock, N.B.—The C. P. R. will erect a new stone or brick station here at a cost of $20,000 or $30,000.

Montreal, Que.—The Canadian Northern Railway will have an uptown station in Montreal. A terminal will be built at Osborne Street, adjoining the Canadian Pacific Railway's Windsor Street Station.

Montreal Que.—At the G. T. P. offices figures have been given showing that 923 miles of steel are now down on the main line west of Winnipeg. This is more than half way from Winnipeg to the coast. Taking off a hundred miles on the west end, where steel is being laid now, and adding it to the finished line, would make 1,023 miles of track down, out of 1,750 miles west of Winnipeg, leaving only a little over 700 miles of road to be completed to open the way to Prince Rupert.

Toronto, Ont.—The work of abolishing grade crossings between Bathurst Street and the Humber will begin on May 1st and will be completed within two years, at an estimated cost of $2,000,000. The Grand Trunk Railway has decided to elevate four tracks and the city will pay one-third of the cost of elevating two tracks, the railway bearing the cost of the rest. The C. P. R. only possesses running rights over the G. T. R. tracks.

Toronto, Ont.—The promoters of a new radial railway to run between Toronto and Orillia are applying to the Legislature for incorporation. The particulars give the name of the concern as the Monarch Company and the intention is to run a local service between Toronto and Orillia and a "limited" between Barrie and this city. The proposed line parallels the Metropolitan as far as Aurora, where it turns, passing through Holland Landing, Bradford, Deerhurst, Churchill, Stroud and Allandale. A number of branches are proposed, one to western shore of Lake Simcoe in the summer, and another to Markham. It is proposed to capitalize the company at one million dollars with bonds to the amount of $2,500,000. The incorporators are Messrs. W. H. Price, Chas. M. Garbey, Jas. F. Coughlin, N. R. Lindsay and Steffan F. Adalia, the latter representing French capital.

Edmonton, Alta.—There are still eight miles of track to be completed on the Grand Trunk Pacific before the track laying machine will reach Wolf Creek bridge. An engineer will reach the city within a few days to complete the main surveys for the location of the high level bridge, and on the completion of his work the construction of the superstructure of the bridge will be commenced. The contract for the superstructure is held by John Gunn & Sons of Winnipeg, the price being $500,000. The entire bridge will cost $1,500,000.

Vancouver, B.C.—The Great Northern has let the concontract for another 30 miles of road from Princeton to this side of the construction work. Some time ago it was announced that the contract for 50 miles of road from the Abbotsford side had been let to Foley, Welch & Company, who have secured this new contract, and together with the

latest contract let there is now left but a distance of about 34 miles of road to be constructed over the Hope Mountain to form the connecting link in the line.

SEWAGE AND WATERWORKS.

Moose Jaw, Sask.—J. Darlington Whitmore, city engineer, in his annual report urges the construction of a covered reservoir, with a capacity of two million gallons, at an estimated cost of $36,000, which includes the cost of a pump. The construction of another septic tank to cost $25,000 is also recommended, as well as storm sewers estimated to cost $20,000.

Calgary, Alta.—Twenty miles of water mains will be laid here this year, the pipe already having been purchased. Water commissioner Graves favors metering the supply.

Vancouver, B.C.—In their report on the water supply, Messrs. Hermon & Burwell, the consulting engineers suggest an alternative of a tunnel under or a bridge over the First Narrows for the water mains.

Kamloops, B. C.—The construction of another reservoir of the same capacity as the present one has been recommended by the chairman of the Water and Light Committee. R. H. Lee, city engineer.

MISCELLANEOUS.

Brockville, Ont.—The counties council recently decided to expend $200,000 on the construction of roads, and a commission was appointed on Friday to engage an engineer. Write Warden Morris.

Peterboro, Ont.—Chairman Morgan of the Fire, Light and Water Committee is considering the advisability of purchasing a new chemical engine. The committee recently decided what supplies they will purchase for this year.

Toronto, Ont.—The Works Committee have struck out of the city engineer's estimates the item of $30,000 for an asphalt plant in the northwest part of the city.

Victoria, B.C.—Estimates of the fire department have been passed, including hose $2,500; hydrants, $5,000; fire alarm system, $2,500; apparatus, $3,000.

St. John, N.B.—A press despatch from Ottawa states that Edmundston, N. B., will be a divisional point on the Grand Trunk Pacific and that the town agrees to install waterworks.

Port Arthur, Ont.—A committee of the City Council has been appointed to develop a scheme for instituting a gas plant here, and an inducement will be offered several companies with whom the city has been in communication.

Preston, Ont.—The by-law to raise $18,000 for the installation of a hydro-electric distribution plant was carried on Monday.

Toronto, Ont.—The asphalt to be used by the Works Department during 1910 will be supplied by the California Asphalt Agency at $24.92 a ton. About 1,000 tons are used in the course of a year. About thirty tons will be purchased from the Canadian Mineral Rubber Company at $23.19 a ton, and a similar amount from D. W. Campbell at $22.06 a ton, to be used as an experiment with a view of granting the 1911 contract to one of them if their material is satisfactory.

CURRENT NEWS.

Prince Albert, Sask.—Applications will be received up to Monday, January 31st, for the position of sanitary inspector for the City of Prince Albert. Salary $75 per month. C. O. Davidson, city clerk.

Prince Albert, Sask.—City of Prince Albert, Sask., is advertising for tenders for sanitary inspector. Applications should be sent to C. O. Davidson, city clerk, Prince Albert, Sask.

Regina, Sask.—Under the provisions of the new Public Health Act, the government has appointed a bureau of public health constituted as follows: Commissioner of public health, Dr. M. M. Seymour, Regina; sanitay engineer, T. Aird Murray, Toronto; council of public health, the commissioner, Dr. W. J. McKay, Saskatoon; Dr. E. E. Meek, Regina; Dr. A. R. Turnbull, Moose Jaw; the city health officers respectively for the cities named, and F. W. Whybia, V.S., of Prince Albert.

Point Grey, B.C.—The council of Point Grey, a district municipality of British Columbia, on the southern and western boundaries of the City of Vancouver, invite applications for the position of municipal engineer. Point Grey will probably become the residential suburb of the city of Vancouver. Since its severance from the district municipality of South Vancouver two years ago it has developed rapidly. Last year a Roads Loan By-law for $280,000 was negotiated and the 5% bonds issued for this loan realized 104⅛. Only $85,000 has been expended, yet the public demand for the development of the municipality has been so urgent that another by-law for similar purposes to the amount of $300,000 has received the assent of the voters, and bonds for this will soon be placed on the market. The Council have also pressing on them, the consideration of domestic water, storm water, sewerage and transportation problems and it would seem that an engineer of experience would have a fine scope to exercise his ability and enhance his reputation.

Nanaimo, B.C.—The Coal City of Vancouver Island is making great strides in municipal matters. During the past year a water supply scheme costing approximately $120,000 was practically completed, and in a report by the City Engineer, Allan Waters, on the water supply, with reference to a proposed sewerage scheme, published locally, it is estimated that the total daily water supply available will be one million gallons. The population is just under 7,000. The ratepayers have passed a by-law to carry out a sewerage scheme at an estimated cost of $200,000. A new bridge has been erected at one of the approaches to the town at a cost of $5,000. Improvements to the electric lighting, cement sidewalks, are also among the new works projected for the ensuing year. With a good harbor, excellent coaling facilities, its noted herring fishing industries, and the good agricultural lands in the neighborhood, the progress of the city should be assured.

London, Eng.—The Secretary of State for India in Council will make not less than 25 appointments of assistant engineers in the Public Works Department of the Government of India next summer. Applications for the appointments must be made on a printed form to be obtained from the Secretary, Judicial and Public Department, India Office, Whitehall, London, and be returned so as to reach him not earlier than March 1st, 1910, or later than Saturday, April 30th, 1910. No applications received after the latter date will be considered.

PERSONAL.

The Municipal Filtration Company of New York City, have removed to 133 West 27th Street.

Mr. Charles T. Main, engineer, of Boston, Mass., has moved to larger offices in the new Boston Safe Deposit and Trust Company's building.

Mr. W. J. Spence has received the appointment of Registrar in the University of Manitoba, made vacant by the resignation of Mr. D. M. Duncan.

Mr. T. Harry Mace has opened an office as consulting engineer at 630 Confederation Life Building, Toronto, Ont. Mr. Mace has had wide experience in engineering contracting both in Toronto and Calgary.

Prof. A. P. Coleman of the University of Toronto has been awarded the Murchison Medal, which has been received from the Royal Geological Society of London, England. The medal was first donated by Sir Frederick Murchison and is awarded annually to some person who has made valuable contributions to geological knowledge.

SOCIETY NOTES.

Ontario Good Roads Association.—The Executive of the Ontario Good Roads Association has decided to hold the annual Good Roads Convention in Toronto on the 2nd, 3rd and 4th of March. The sessions will be held in the county buildings. All couny and township councils will be asked to send delegates, also the Granges and other farmers' associations, and the Boards of Trade.

American Society of Mechanical Engineers.—The New York monthly meeting for February, on Tuesday evening, February 8, at 8.15, in the Engineering Societies Building, will be devoted to the dedicated of a bronze memorial tablet to Dr. Robert H. Thurston, the first president of the American Society of Mechanical Engineers. All associates and former students of Dr. Thurston are earnestly invited to attend these exercises to show their esteem for him as a friend and in recognition of his brilliant career as an engineer and educator.

Canadian Railway Club, Montreal.—The eighth annual dinner of the Canadian Railway Club was held at the Windsor Hotel, Montreal, on Friday, January 29th, when about 175 members and guests were present. Mr. H. H. Vaughan, assistant to the president of the C.P.R., and president of the club, occupied the chair, and had with him at the guest table the following gentlemen:—Messrs. H. O. Keay, J. S. Russell, T. McHattie, Professor A. Stansfield, Professor R. J. Darley, E. Lichtenhein, W. D. Robb, Dean Adams, Cy Warman, William McNab, A. A. Maver, S. King, A. A. Goodchild, A. D. Wheatley, Fred Gardner. The toast list contained four toasts—the King, Railways, Guests, and Railway Supply Men. There was all through the programme a generous interspersing of songs, comic recitations and violin selections. The speeches were in no case too long, being for the most part short and crisp, and to the point. The Railways were proposed by Mr. Cy. Warman, who reviewed briefly the work of railways in Canada. The railways, he said, had been a mighty factor in the development of countries. Wherever the railway went it carried with it progress and prosperity. The present agricultural expansion would have been impossible without it. It had been an educational force of incalculable value. It made for peace. He asked them to drink prosperity to that much maligned institution to which they owed so much—the railway.

Mr. H. H. Vaughan, in his address, spoke of the prosperous condition of the Railway Club. At the present moment the club had over 600 members.

Mr. Vaughan also spoke of the formation last year of the Railway Club at Winnipeg and wished it every success. This development of railway clubs testified to the spirit of solidarity in the railways. The Canadian Railway Club had endeavored to appeal to men in the operating and engineering departments. It was in the mechanical department that the progress of recent years had been striking. The size of locomotives had advanced by leaps and bounds. To-day the locomotive of 400,000 pounds was no novelty. Steel passenger cars were superseding others. He looked forward to equal progress in the future.

Mr. W. D. Robb, superintendent of motive power, G.T.R., proposed "Our Guests," which was replied to by Dean Adams, of McGill University. Dean Adams in the course of his reply, paid especial attention to the value of technical education, and showed how the man with a trained mind along the proper lines, would have an immense advantage over his less fortunate brother, who, so to speak, rose from the ranks. In support of this, Dr. Adams pointed to the numerous graduates of McGill University, who were holding high and responsible positions throughout the world. He expressed his desire and willingness to receive advice from the club, with regard to the conduct of their railway department, and hoped that they might work more closely together, to the mutual advantage of all.

"The Railway Supply Men" was proposed by Mr. T. McHattie, and responded to by Mr. Fred. Gardner and Mr. F. Ditchfield.

NEW INCORPORATIONS.

Five mining companies, with $5,000,000, and 13 industrial with $856,000 capital, have been incorporated by the Ontario Government according to this week's Ontario Gazette.

The mining concerns are: Porcupine Gold Reef Mining Co., Limited, head office, Toronto, capital $1,000,000; the Nipigon Hematite Ore Company, Limited, Nipigon, $1,000,000; the Ross-Ballard Mines, Limited, Renfrew, $1,000,000; Porcupine Goldfields, Limited, Toronto, $500,000, the Brantford Mining Co., Limited, Brantford, $500,000

Some of the industrials are: The Renfrew Machinery Co., Ltd., Renfrew, $250,000; the Canadian Dustproof Window Shade Co., Ltd., London, $1,000,000; the Munn Lumber Co., Ltd., Orillia, $100,000; C. A. Dunham Co., Limited, Toronto, $100,000; the Esdale Press, Limited, Ottawa, $60,000; Mines and Stocks, Limited, Toronto, $40,000; Fort William Ice and Fuel Co., Limited, Fort William, $40,000; the Colonial Furniture Co., Limited, Berlin, $40,000; the Cobalt Mining Stock Exchange, Limited, Bracebridge, $40,000; the Molesworth Independent Telephone Co., Limited, Molesworth, $5,000.

The name of the Elmira Agricultural Works Co., Limited, is changed to the Elmira Machinery and Transmission Co., Limited, and the name of the Ontario Soap and Oil Co., Limited, to Sovereign Varnishes and Oils, Limited. The stock of the Trenton Cooperage Mills, Limited, is increased from $40,000 to $200,000. The Cobalt Light, Power and Water Co., Limited, is granted permission to issue bonds to the extent of $75,000.

Last week's new incorporations in Ontario include:—

The Giroux Lake Mines, Limited, one million dollars, heald office, Parry Sound.

Massada Silver Mines, Limited, Ottawa, $500,000.

The Rib Lake Mining Company, Toronto, $40,000.

Canadian Gray Motors, Limited, Walkerville, to manufacture and deal in automobiles, with a share capital of $100,000.

The Canadian Carriers, Limited, Hamilton, to manufacture carriers. Capital, $50,000.

International Dredge and Dock Company, Toronto, $50,000. Provisional directors, William A. Lydon, Walter Cahill, Harry C. Wild.

The Montreal River Transportation Company, Toronto, $40,000.

Jordan Co. operative company, Jordan, $10,000, to manufacture and sell machinery and to carry out a cold storage business.

The Great Lakes Dredging Company, of Toronto, takes its head office to Port Arthur, and is authorized to "distribute its property in specie among its shareholders."

The Grand Trunk Pacific Dock Company, with a capital stock of $150,000, has been organized on the west coast. The officers are:—President, Chas. M. Hays, of the G.T.R., Montreal; vice-president, Capt. J. S. Gibson, of the McCabe and Hamilton Stevedoring Company; secretary-treasurer, Henry Philips, Montreal; assistant secretary, Somers Hayes Smith. One of the first undertakings of the new company will be the construction of the new docks at Seattle, Victoria and additional docks at Prince Rupert.

The St. James Construction Company, contractors and builders, Montreal, capital, $125,000, is incorporated in the name of C. A. Duclos, K.C., W. L. Bond, J. J. Meagher, and J. E. Conlen, advocates.

COMING MEETINGS.

American Society of Engineering Contractors.—Feb. 24-26, 1910. Annual convention at Chicago, Ill. Secretary, Daniel J. Hauer, Park Row Building, New York, N.Y.

National Brick Manufacturers Association. — February 7-12. Annual convention, Pittsburg, Pa. T. A. Randall, secretary, Indianapolis.

National Association of Cement Users.—February 21-25. —Annual meeting, Chicago, Ill. George C. Wright, secretary. Address communications to Edw. E. Krause, Asst. to President, Harrison Building, Philadelphia, Pa.

Mr. H. B. Lake, C. P. R. chemist, recommends as a solution of the dust problem, the use of salt magnesium chloride. He intimates that there are other substances than oil, which cost far less, which are equally effective and which are in constant use in the large cities of Europe. A solution of salt magnesium chloride to a strength of thirty per cent. is used in ordinary water. This solution is colorless, non-poisonous and will not stain or grease ladies' clothes, as oil will. Moreover, the solution is well adapted to this climate, as it can be supplied in hot or cold weather, remaining fluid at fifty-three below zero. The water evaporates, leaving a dark colored film of salt on the surface of the road, and it does not render the surface slippery, even when applied to asphalt. The cost of making the experiment in this city would be insignificant. All that would be necessary would be a sufficient quantity of this salt to make a few water carts full of the solution.

MARKET CONDITIONS.

Following the quotations of the various articles listed in the markets will be found in brackets numbers, thus (10). These numbers refer to the list number of advertisers on page 3 of this issue and will assist the reader to quickly find the name and address of a firm handling any particular article. Buyers not able to secure articles from these firms at the prices mentioned will confer a favor by letting us know.

Montreal, February 1st, 1910.

Although denials are heard here and there, there is little reason to doubt that makers of pig-iron in the United States have accepted lower prices for third quarter than they were previously asking. The result has certainly been astonishing. Those who had been keeping in close touch with the situation had expressed the view that the sales during January would be exceptionally large—some even thought they might reach 500,000 tons. It is now stated that they exceeded that quantity, so that they were 25 per cent. more than for the entire first quarter of 1909. The concessions made in prices towards the end of the month accelerated the buying movement and were mainly responsible for the large tonnage contracted for. Much interest is being taken in the reported reduction in price. Some seem to attach considerable significance to it while others merely say that there is no evidence of weakness in the situation. They claim that there is no reason why anyone should have paid the prices asked for iron for delivery over the third quarter, their view being that makers should not have asked 50c. more per ton for third quarter than for second quarter as they have been doing. Manufacturers of agricultural implements and railway equipment are still in the market for considerable quantities of malleable castings, and, in the east, the business pending for gray foundry iron for electrical works and manufacturers of machinery and hardware, is large. There is still much talk of the congestion in railway traffic in the eastern district, the congestion being mainly due to the simultaneous arrival of a number of cargoes of foreign iron ore. Bar iron is quiet and the range in price is wide. The output of coke in the Connellsville district is very large, in fact it reached a record during the month of February. Large contracts have been made at lower prices than furnace men had been demanding. It would seem that nearly all the recent business has been for early shipment.

The markets in Great Britain continue to show a healthy tone. Demand from Continental points is keeping up well, and now that the elections are over the home demand is likely to show a considerable improvement, also. In fact, cables show that makers are optimistic, inasmuch as prompt replies are demanded and offers are not left open.

The local market shows little or no alteration. The foundry and general trade is being supplied from imported iron, inasmuch as there is not sufficient Canadian-made iron available. This situation will be relieved somewhat next fall, when the additional furnaces being installed at Sydney, the Soo, and Midland, are in operation, but even then it is thought the production will be considerably less than the consumption.

As to the market for finished and semi-finished products, there is practically no change. Bar iron and steel are meeting with but indifferent demand, and the same may be said of sheets and plates and similar lines. Merchants are almost in despair concerning prices, inasmuch as these show no evidence whatever of an advance. They claim, however, that the advance cannot be delayed much after the opening of navigation—if that long—inasmuch as the present stocks were only purchased to last till about that time, and any further purchases can only be made at advanced prices. The market is very steady and inclined to be dull.

Antimony.—The market is steady at 8 to 8¼c. (111).

Bar Iron and Steel.—The market promises to advance shortly. Bar iron, $1.85 per 100 pounds; best refined horseshoe, $2.10; forged iron, $2; mild steel, $1.85; sleigh shoe steel, $1.85 for 1 x ⅜-base; tire steel, $1.00 for 1 x ⅜-base; toe calk steel, $2.35; machine steel, iron finish, $1.90; imported, $2.20. (111, 119).

Building Paper.—Tar paper, 7, 10, or 16 ounces, $1.80 per 100 pounds; felt paper, $2.75 per 100 pounds; tar sheathing, 40c. per roll of 400 square feet; dry sheathing, No. 1, 30 to 40c. per roll of 400 square feet; tarred fibre, 55c. per roll; dry fibre, 45c. (See Roofing; also Tar and Pitch). (164).

Cement.—Canadian cement is quotable, as follows, in car lots, f.o.b., Montreal:—$1.30 to $1.40 per 350-lb. bbl., in 4 cotton bags, adding 10c. for each bag. Good bags re-purchased at 10c. each. Paper bags cost 2½ cents extra, or 10c. per bbl. weight. (26, 86, 164).

Chain.—Prices are as follows per 100 lbs.:—¼-inch, $4.90; 5-16-inch, $4.40; ⅜-inch, $3.70; 7-16-inch, $3.50; ½-inch, $3.25; 9-16-inch, $3.20; ⅝-inch, $3.15; ¾-inch, $3.10; ⅞-inch, $3.05; 1-inch, $3.05.

Coal and Coke.—Anthracite, egg, stove or chestnut coal, $6.75 per ton, net; furnace coal, $6.50, net. Bituminous or soft coal: Run of mine, Nova Scotia coal, carload lots, basis, Montreal, $3.85 to $4 per ton; cannel coal, $9 per ton; coke, single ton, $5; large lots, special rates, approximately $4 f.o.b., cars, Montreal

Copper.—Prices are strong at 14 to 14¼c.

Explosives and Accessories.—Dynamite, 50-lb. cases, 40 per cent. proof, 15c. in single case lots, Montreal. Blasting powder, 25-lb. kegs, $2.25 per keg. Special quotations on large lots of dynamite and powder. Detonator caps, case lots, containing 10,000, 75c. per 100; broken lots, $1; electric blasting apparatus:—Batteries, 1 to 10 holes, $15; 1 to 20 holes, $25; 1 to 30 holes, $35; 1 to 40 holes, $50. Wire, leading, 1c. per foot; connecting, 50c. per lb. Fuses, platinum, single strength, per 100 fuses:—4-ft. wires, $3; 6-ft. wires, $3.54; 8-ft. wires, $4.08; 10-ft. wires, $5.

Galvanized Iron.—The market is steady. Prices, basis, 28-gauge, are:—Queen's Head, $4.10; Colborne Crown, $3.85; Apollo, 10¾ oz., $4.05. Add 25c. to above figures for less than case lots; 26-gauge is 25c. less than 28-gauge, American 28-gauge and English 26 are equivalents, as are American 10¾ oz., and English 28-gauge. (111).

Galvanized Pipe.—(See Pipe, Wrought and Galvanized).

Iron.—The outlook is strong. The following prices are for carload quantities and over, ex-store, Montreal, prompt delivery; No. 1 Summerlee, $21.50 to $22 per ton; selected Summerlee, $21 to $21.50; soft Summerlee, $20.50 to $21; Clarence, $19.50 to $20; Carron, No. 1, $21.50 to $22, and Carron special, $21 to $21.50. (111).

Laths.—See Lumber, etc.

Lead.—Prices are about steady at $3.55 to $3.65.

Lead Wool.—$10.50 per hundred, $200 per ton, f.o.b., factory.

Lumber, Etc.—Prices on lumber are for car lots, to contractors, at mill points, carrying a freight of $1.50. Red pine, mill culls out, $18 to $22 per 1,000 feet; white pine, mill culls, $16 to $17. Spruce, 1-in. by 4-in. and up, $15 to $17 per 1,000 ft.; mill culls, $12 to $14. Hemlock, log run, culls out, $13 to $15. Railway Ties; Standard Railway Ties, hemlock or cedar, 35 to 45c. each, on a 5c. rate to Montreal. Telegraph Poles: Seven-inch top, cedar poles, 25-ft. poles, $1.35 to $1.50 each; 30-ft., $1.75 to $2; 35-ft., $2.75 to $3.25 each, at manufacturers' points, with 5c. freight rate to Montreal. Laths: Quotations per 1,000 laths, at points carring $1.50 freight rate to Montreal, $2 to $3. Shingles: Cedar shingles, same conditions as laths, X, $1.50; XX, 2.50; XXX, $3. (112).

Nails.—Demand for nails is better and prices are firmer, $2.40 per keg for cut, and $2.35 for wire, base prices. Wire roofing nails, 5c. lb.

Paints.—Roof, barn and fence paint, 90c. per gallon; girder, bridge, and structural paint for steel or iron—shop or field—$1.20 per gallon, in barrels; liquid red lead in gallon cans, $1.75 per gallon.

Pipe.—Cast Iron.—The market is unsettled and uncertain, as dealers are compelled to meet competition from all sources. Prices are easy and approximately as follows:—$31 for 6 and 8-inch pipe and larger; $32 for 5-inch and 4-inch at the foundry. Pipe, specials, $3 per 100 pounds. Gas pipe is quoted at about $1 more than the above. (74, 188).

Pipe.—Wrought and Galvanized.—Demand is much better and the tone is firm, though prices are steady, moderate-sized lots being: ¼-inch, $5.50 with 69 per cent. off for black, and 48 per cent. off for galvanized; ⅜-inch, $5.50, with 59 per cent. off for black and 44 per cent. off for galvanized; ½-inch, $8.50, with 69 per cent. off for black, and 59 per cent. off for galvanized. The discount on the following is 71½ per cent. off for black, and 61½ per cent. off for galvanized; ¾-inch, $11.50; 1-inch, $16.50; 1¼-inch, $22.50; 1½-inch, $27; 2-inch, $36; 2½-inch, $57.50; 3-inch, $75.50; 3½-inch, $95; 4-inch, $108.

Plates and Sheets.—Steel.—The market is steady. Quotations are: $2.20 for 3-16; $2.30 for ¼, and $2.10 for ¼ and thicker; 12-gauge being $2.30; 14-gauge, $2.15; and 16-gauge, $2.10. (111).

Rails.—Quotations on steel rails are necessarily only approximate and depend upon specification, quantity and delivery required. A range of $30.50 to $31 is given for 60-lb. and 70-lb.; 80-lb. and heavier, being $30; rails, per gross ton of 2,240 lbs., f.o.b. mill. Re-laying rails are quoted at $27 to $29 per ton, according to condition of rail and location. (73).

Railway Ties.—See lumber, etc.

Roofing.—Ready roofing, two-ply, 70c. per roll; three-ply, 95c. per roll of 100 square feet. Roofing tin caps, 6c. lb.; wire roofing nails, 5c. lb. (See Building Paper; Tar and Pitch; Nails, Roofing). (164).

Rope.—Prices are steady, at 9c. per lb. for sisal, and 10½c. for Manila. Wire rope, crucible steel, six-strands, nineteen wires; ¼-in., $2.75; 5-16, $3.75; ⅜, $4.75; ½, $5.25; ⅝, $6.25; ¾, $8; ⅞, $10; 1-in., $12 per 100 feet. (132).

Spikes.—Railway spikes are firmer at $2.45 per 100 pounds, base of 5½ x 9-16. Ship spikes are steady at $2.85 per 100 pounds, base of ⅝ x 10-inch, and ⅝ x 12-inch. (132).

Steel Shafting.—Prices are steady at the list, less 25 per cent. Demand is on the dull side.

Telegraph Poles.—See lumber, etc.

Tar and Pitch.—Coal tar, $3.50 per barrel of 40 gallons, weighing about 500 pounds; roofing pitch, No. 1, 70c. per 100 pounds; and No. 2, 55c. per 100 pounds; pine tar, $8.50 per barrel of 40 gallons, and $4.75 per half-barrel; refined coal tar, $4.50 per barrel; pine pitch, $4 per barrel of 180 to 200 pounds. (See building paper; also roofing).

Tin.—Prices are unchanged, at 32½ to 33c.

Zinc.—The tone is steady, at 6 to 6¼c.

CAMP SUPPLIES.

Beans.—Prime pea beans, $1.85 per bushel. (38).

Butter.—September and October creamery, 26c.; dairy, 22 to 23c.

Canned Goods.—Per Dozen.—Corn, 80 to 85; peas, $1.05 to $1.15; beans, 75 to 80c.; tomatoes, 82½ to 90c.; peaches, 2s, $1.65, and 3s, $2.65; pears, 2s, $1.60, and 3s, $2.30; salmon, best brands, 1-lb. talls, $1.87½, and flats, $2.02½; cheaper grades, 95c. to $1.65.

Cheese.—Late makes, 11¼ to 11¾c.; finest makes, ½c. more.

Coffee.—Mocha, 20 to 25c.; Santos, 15 to 18c.; Rio, 10 to 12c. (38).

Dried Fruits.—Currants, Filiatras, 5¾ to 6¼c.; choice, 8 to 9c.; dates, 4 to 5c.; raisins, Valentias, 5 to 6c.; California, seeded, 7½ to 9c.; Sultana, 8 to 10c. Evaporated apples, prime, 9¼ to 9¾c.

Eggs.—No. 1 candled, 26c.; selects, 29 to 30c.; new laid, 35c.

Flour.—Manitoba, 1st patents, $5.70 per barrel; 2nd patents, $5.20; strong bakers, $5.

Molasses and Syrup.—Molasses, New Orleans, 27 to 28c.; Barbadoes, 40 to 50c.; Porto Rico, 40 to 45c.; syrup, barrels, 3¼c.; 2-lb. tins, 2 dozen to case, $2.50 per case.

Potatoes.—Per 90 lbs., good quality, 50 to 60c.

Rice and Tapioca.—Rice, grade B., in 100-lb. bags, $2.95 to $3; C.C., $2.90. Tapioca, medium pearl, 4¼ to 4¾c.

Rolled Oats.—Oatmeal, $2.45 per bag; rolled oats, $2.20, bags.

Tea.—Japans, 20 to 38c.; Ceylons, 20 to 40c.; Ceylon, greens, 19 to 25c.; China, greens, 25 to 50c.; low-grades, down to 15c.

Provisions.—Salt Pork.—$30 to $32 per bbl.; beef, $15 per bbl.; smoked hams and bacon, 15 to 18c. per lb.; lard, 17c. for pure and 12c. for compound. (38).

Fish.—Salted.—Medium cod, $7 per bbl.; herring, $5.25 per bbl.; salmon, $15.50 per bbl., for red, and $14 for pink. Smoked fish.—Bloaters, $1.10 per large box; haddies, 7½c. per lb.; kippered herring, per box, $1.20 to $1.25.

Toronto, February 3rd, 1910.

In the metals market a moderate but steady consumptive demand can be reported, which is pretty well for this season of the year. More activity is reasonably certain when spring comes and navigation opens, for building promises to be active. Transportation companies both on land and water are looking for an active spring movement, the production of manufacturers must be large. Money is not scarce; and the flotation of new schemes or the amalgamation of established ones are proceeding with much assurance.

In the United States there is feverish activity in some industrial directions. This is chastened in others, however, by the hanging-back in the securities market, to await the result of the tobacco case and other trust matters in the Supreme Court. The United States Steel Corporation, it is true, has made a phenomenally successful report for the December quarter, but as against that is to be placed the "meat strike," and the effect it is having on packers and retail butchers. Clearly, the stock market has received a chill, after the fever of last week. Reports come of continued large orders in iron and steel, but by no means so large in the department of railway equipment as was hoped or believed. The situation cannot be called clear. Many stock operators expect the air to be electric until the Supreme Court returns to work after a three weeks' vacation.

The following are wholesale prices for Toronto, where not otherwise explained, although for broken quantities higher prices are quoted:—

Antimony.—Demand quiet at 9c. per 100 lbs. (111).

Axes.—Standard makes, double bitted, $8 to $10; single bitted, per dozen, $7 to $9.

Bar Iron.—$2.00 to $2.10, base, per 100 lbs., from stock to wholesale dealer. Market supply limited. (111).

Bar Mild Steel.—Per 100 lbs., $2.10 to $2.20.

Boiler Plates.—¼-inch and heavier, $2.20. Boiler heads 25c. per 100 pounds advance on plate. Tank plate, 3-16-inch, $2.40 per 100 lbs.

Boiler Tubes.—Orders continue active. Lap-welded, steel, 1¼-inch, 10c.; 1½-inch, 9c. per 10 foot; 2-inch, $8.50; 2¼-inch, $10; 2½-inch, $10.60; 3-inch, $11 to $11.50; 3½-inch, $18 to $18.50 per 100 feet.

Building Paper.—Plain, 30c. per roll; tarred, 40c. per roll. Demand is good for spring requirements.

Bricks.—A very active season has closed, and prices are as below. Prospects excellent for business in 1910. Price at some yards $9 to $9.50, at others, $9.50 to $10 for common. Don Valley pressed brick move also freely. Red and buff pressed are worth $18 delivered and $17 at works per 1,000.

Broken Stone.—Lime stone, good hard, for roadways or concrete, f.o.b., Schaw station, C.P.R., 75c. until further notice, per ton of 2,000 lbs., 1-inch, 2-inch, or larger, price all the same. Not much doing. Broken granite is selling at $3 per ton for good Oshawa. (164).

Cement.—The figure of $1.60 may now be quoted at Toronto in car lots per barrel without bags. A large contract recently closed by the city was at $1.57. In smaller parcels $1.70 is asked by city dealers, plus bags, (26, 86, 169).

Coal.—Retail price for Pennsylvania hard, $7.25 net, steady. This price applies to grate, eggs, stove, and chestnut; only pea coal is cheaper, namely, $6.00. These are all cash, and the quantity purchased does not affect the price. Soft coal is in good supply, American brokers have been covering the ground very fully In the United States there is an open market for bituminous coal and a great number of qualities exist. We quote. Youghiogheny lump coal on cars here, $3.70 to $3.80; mine run, $3.60 to $3.75; slack, 2.65 to $2.85; lump coal from other districts, $3.40 to $3.70; mine run 10c. less; slack, 2.50 to $2.70; cannel coal plentiful at $7.50 per ton; coke, Solvey foundry, which is largely used here, quotes at from $5.75 to $6.00; Reynoldsville, $4.90 to $5.00; Connellsville, 72-hour coke, $5.50.

Copper Ingot.—The speculative movement has been very great and it is not easy to forecast the future. The price here is higher at 14½c. per lb., and the demand active.

Detonator Caps.—75c. to $1 per 100; case lots, 75c. per 100; broken quantities, $1.

Dynamite, per pound, 21 to 25c., as to quantity. (83.)

Roofing Felt.—A good prospect for spring trade at an unchanged price, which is $1.80 per 100 lbs.

Fire Bricks.—English and Scotch, $30 to $35; American, $25 to $35 per 1,000. Fire clay, $8 to $12 per ton.

Fuses.—Electric Blasting.—Double strength 4 feet, $4.50; 6 feet, $5; 8 feet, $5.50; 10 feet, $6. Single strength, 4 feet, $3.50; 6 feet, $4; 8 feet, $4.50; 10 feet, $5, per 100 count. Bennett's double tape fuse, $6 per 1,000 feet.

Iron Chain.—¼-inch, $5.75; 5-16-inch, $5.15; ¾-inch, $4.15; 7-16-inch, $3.95; ½-inch, $3.75; 9-16-inch, $3.70; ⅝-inch, $3.55; ¾-inch, $3.45; ⅞-inch, $3.40; 1-inch, $3.40, per 100 lbs.

Iron Pipe.—A steady request at former prices:—Black, ¼-inch, $2.03; ⅜-inch, $2.25; ½-inch, $2.63; ¾-inch, $3.28; 1-inch, $4.70; 1¼-inch, $6.41; 1½-inch, $7.70; 2-inch, $10.26; 2½-inch, $16.39; 3-inch, $21.52; 3½-inch, 27.08; 4-inch, $30.78; 4½-inch, $35.75; 5-inch, $39.85; 6-inch, $51.70. Galvanized, ¼-inch, $2.86; ⅜-inch, $3.08; ½-inch, $3.48; ¾-inch, $4.43; 1-inch, $6.35; 1¼-inch, $8.66; 1½-inch, $10.40; 2-inch, $13.86, per 100 feet. (74, 188).

Lead.—An active demand at firm prices, say $3.75 to $3.85 per 100 lbs.

Lime.—Retail price in city 35c. per 100 lbs. f.o.b., car; in large lots at kilns outside city 22c. per 100 lbs. f.o.b. car without freight. Demand is moderate.

Lumber.—Prices continue steady, and city demand moderate. We quote dressing pine $32.00 to $35.00 per M; common stock boards, $26 to $30; cull stocks, $20; cull sidings, $17.50; Southern pine dimension timber from $30 to $45, according to size and grade; finished Southern pine according to thickness and width, $30 to $40. Hemlock in car lots, $16.50 to $17; spruce flooring in car lots, $22 to $24; shingles, British Columbia, are higher ,we quote $3.10; lath growing scarce and stiffening, No. 1, $4.40, white pine, 48-inch; No. 2, $3.75; for 32-inch, $1.60.

Nails.—Wire, $2.35 base; cut, $2.60; spikes, $2.85 per keg of 100 lbs.

Pitch and Tar.—Pitch, unchanged at 70c. per 100 lbs. Coal tar dull at $3.50 per barrel. This is the dead season.

Putty.—In bladders, strictly pure, per 100 lbs., $2.25; in barrel lots, $2.10. Plasterer's, $2.15 per barrel of three bushels.

Ready Roofing.—Little doing; prices are as per catalogue.

Roofing Slate.—Most of the slate used in Canada comes now from Pennsylvania or Maine, the Canadian supply being slender and mostly from the Rockland quarries of the Eastern Townships in Quebec. There is a great variety of sizes and qualities, so that it is difficult to indicate prices. But No. 1 Bangor slate 10 x 16 may be quoted at $7 per square of 100 square feet, f.o.b., cars, Toronto; seconds, 50c. less. Mottled, $7.25; green, $7.

Pig Iron.—There is great activity and prices are maintained. Clarence quotes at $21 for No. 3; Cleveland, $20.50 to $21, Summerlee, for winter delivery, $22.50 in Canadian pig, Hamilton quotes $19.50 to $20 per ton. Producing plants are everywhere busy, and there is considerable business in prospect for 1910.

Plaster of Paris.—Calcined, New Brunswick, hammer brand, car lots, $1.95; retail, $2.15 per barrel of 300 lbs.

Rope.—Sisal, 9½c. per lb.; pure Manila, 10½c. per lb., Base.

Sewer Pipe.—

	4-in.	6-in.	9-in.	10-in.	12-in.	24-in.
Straight pipe per foot	$0.20	$0.30	$0.65	$0.75	$1.00	$3.25
Single junction, 1 or 2 ft. long	.90	1.35	2.70	3.40	4.50	14.65
Double junctions	1.50	2.50	5.00	....	8.50	.....
Increasers and reducers		1.50	2.50	....	4.00	.....
P. traps	2.00	3.50	7.50	....	15.00	.....
H. H. traps	2.50	4.00	8.00	....	15.00	.....

Business quieter; price, 73 per cent. off list at factory for car-load lots; 65 per cent. off list retail. Small lots subject to advance. (52, 84, 138).

Steel Beams and Channels.—Quiet.—We quote:—$2.50 to $2.75 per 100 lbs., according to size and quantity; if cut, $2.75 to $3 per 100 lbs.; angles, 1¼ by 3-16 and larger, $2.50; tees, $2.80 to $3 per 100 pounds. Extra for smaller sizes of angles and tees. (30, 41, 50, 4, 176, 127, 132, 145, 118, 119).

Steel Rails.—80-lb., $35 to $36 per ton. The following are prices per gross ton, for 500 tons or over; Montreal, 12-lb. $45, 16-lb. $44, 25 and 30-lb. $43.

Sheet Steel.—We do not alter prices as yet; American Bessemer, 10-gauge, $2.50; 12-gauge, $2.55; 14-gauge, $2.35; 17, 18, and 20-gauge, $2.45; 22 and 24-gauge, $2.50; 26-gauge, $2.65; 28-gauge, $2.85. Quite a good demand exists, and there is prospect of higher prices.

Sheets Galvanized.—Apollo Brand.—Sheets 6 or 8 feet long, 30 or 36 inches wide; 10-gauge, $2.90; 12-14-gauge, $3.00; 16, 18, 20, $3.10; 22-24, $3.25; 26, $3.40; 28, $3.85; 29, $4.15; 10¾, $4.15 per 100 lbs. Fleur de Lis—28-gauge, $4; 26, $3.80 per 100 lbs. A very large tonnage of all sorts has been booked. The feeling is toward an advance. (111).

Tank Plate.—3-16-inch, $2.40 per 100 lbs.

Tool Steel.—Jowett's special pink label, 10½c. Cammel-Laird, 16c. "H.R.D." high speed tool steel, 65c. (4).

Tin.—The price is now steady at 34½ to 35c.

Wheelbarrows.—Navvy, steel wheel, Jewel pattern, knocked down, $21.60 per dozen; set up, $22.60. Pan Canadian, navvy, steel tray, steel wheel, $3.30 each; Pan American, steel tray, steel wheel, $4.25 each. (132).

Zinc Spelter.—A very active movement continues, and a large business is being done. Price very firm at $5.75 to $6 per 100 lbs.

CAMP SUPPLIES.

Beans.—Hand picked, $2.25; prime, $2.15. (38).

Beets.—85c. a bag.

Butter.—Dairy prints, 23 to 24c.; creamery rolls, 29c. per lb.

Canned Goods.—Peas, $1.10 to $1.50; tomatoes, 3s, 85c. to 95c.; pumpkins, 3s, 80 to 85c.; corn, 80 to 85c.; peaches, 2s, white, $1.50 to $1.60; yellow, $1.90 to $1.95; strawberries, 2s, heavy syrup, $1.90 to $1.95; raspberries, 2s, $1.90 to $1.95. (38).

Carrots.—60c. and 65c. a bag.

Cheese.—Large, 12¾c.; twins, 13c.

Coffee.—Rio, green, 11 to 12½c.; Mocha, 21 to 23c.; Java, 20 to 31c.; Santos, 11 to 15c.

Dried Fruits.—Raisins, Valencia, 6 to 6¼c.; seeded, 1-lb. packets, fancy, 7½ to 8c.; 16-oz. packets, choice, 7 to 7½c.; 12-oz. packets, choice, 7c.; Sultanas, good, 5 to 6c.; fine, 6 to 7c.; choice, 7 to 8c.; fancy, 8 to 9c.; Filiatras currants, 6½ to 7c.; Vostizzas, 8½ to 9c.; uncleaned currants, ¼c. lower than cleaned. California Dried Fruits,—Evaporated apricots, 15 to 16c. per lb.; prunes, 60s to 70s, 7 to 7½c.; 90s to 100s, 6½c.; evaporated apples, 8c. (38).

Eggs.—Cold storage, 28c.; new laid, 37c. per dozen, in case lots.

Flour.—Manitoba Flour.—Quotations at Toronto are:—First patents, $5.60; second patents, $5.10; strong bakers', $4.90; 90 per cents., Glasgow freights, 28s. 6d. Ontario Flour.—Winter wheat patents, for export, $4.20 to $4.25, in buyers' sacks outside.

Lard.—Tierces, 16¼c.; tub, 16¼ to 16½c.; pails, 16½ to 16¾c. per lb., market firm.

Molasses.—Barbadoes, barrels, 37 to 45c.; Porto Rico, 45 to 60c.; New Orleans, 30 to 33c. for medium.

Onions.—$1.25 a bag.

Potatoes.—Best, 65 and 70c. a bag.

Turnips.—45c. the bag.

Pork.—Market uncertain. Short cut, $29 per barrel; mess, $27.

Rice.—B. grade, 3½c. per lb.; Patna, 5 to 5¾c.; Japan, 5 to 6c.

Salmon.—Fraser River, talls, $2; flats, $2; River Inlet, $1.55 to $1.75.

Smoked and Dry Salt Meats.—Long clear bacon, 14½c. per lb., tons and cases; hams, large, 14 to 14½c.; small, 16c.; rolls, 14½ to 14¾c.; breakfast bacon, 18c.; backs (plain), 18¾ to 19c.; backs (peameal), 18c. to 19c.; shoulder hams, 13c.; green meats out of pickle, 1c. less than smoked. Market steady.

Spices.—Allspice, 16 to 19c.; nutmegs, 30 to 75c.; cream tartar, 22 to 25c.; compound, 15 to 20c.; pepper, black, pure Singapore, 14 to 17c.; pepper, white, 20 to 30c

Sugar.—Granulated, $4.95 per 100 lbs. in barrels; Acadia, 4.85; yellow, $4.55; bags, 5c. lower.

Syrup.—Corn syrup, special bright, 3¼c. per lb.

Teas.—Japans, 20 to 35c. per lb.; Young Hysons, 16 to 35c.; Ceylons, medium, 16 to 45c.

THE HORSE MARKET.

The local market is about as usual. Some choice top drafters were sold at $256.

In Chicago the best drafters, 1,700 lbs. and over, are going anywhere from $275 to $500 each, while light drafters of 1,550 to 1,650 lbs. are bringing $250 to $325. Farm workers are going at $140 to $185.

Winnipeg, February 1st, 1910.

Enquiries received on this market and the very satisfactory way that orders are coming in reflect the splendid conditions prevailing throughout the whole country. Ideal weather is being experienced in the West, and any outside work has had a good opportunity to rush things. In Winnipeg last week on one large building bricklayers could be seen working in their shirt sleeves, and on the whole the West is experincing an ideal winter.

The local iron and steel plants report greatly increased business and with a number of large bridges as well as many big buildings to be erected this year and the enormous National Transcontinental Shops now under construction by the Manitoba Bridge & Iron Works, the steel industry in the West will have a good year. Cement is an uncertain quantity yet, and several dealers spoken to do not know where they are at in regard to arrangements for this year, or since the merger took place. Railway supply dealers are looking forward to a good year, and already considerable activity is being shown. No change in quotations has taken place during the week. Prices remain firm and are as follows:—

Anvils.—Per pound, 10 to 12½c.; Buckworth anvils, 80 lbs., and up, 10¼c.; anvil and vice combined, each, $5.50 (111, 132).

Axes.—Chopping axes, per dozen, $6 to $9; double bits $12.10 oer dozen.

Barbed Wire.—4 point and 2 point, common, $3.15 per cwt.; Baker, $3.20; Waukegan, $3.30.

Bar Iron.—$2.50 to $2.60.

Bars.—Crow, $4 per 100 pounds. (119.)

Beams and Channels.—$3 to $3.10 per 100 up to 15-inch. (4, 30, 41, 50, 118, 119, 127, 132, 145, 176.)

Boards.—No. 1 Common Pine, 8 in. to 12 in., $38 to $45; siding, No. 2 White Pine, 6 in., $55; cull red or white pine or spruce, $24; No. 1 Clear Cedar, 6 in., 8 to 16 ft., $60; Nos. 1 and 2 British Columbia spruce, 4 to 6 in., $55; No. 3, $45.

Bricks.—$10, $11, $12 per M, three grades.

Building Paper.—4½ to 7c. per pound. No. 1 tarred, 84c. per roll; plain, 60c.; No 2 tarred, 62½c.; plain, 56c.

Coal and Coke.—Anthracite, egg, stove or chestnut coal, $9.75 large lots to $10.50 ton lots, net; Alleghany soft coal; carload lots, basis, Winnipeg, f.o.b., cars, $6 per ton; cannel coal, $10.50 per ton; Galt coal, $2 f.o.b., carload lots, $9 single ton; coke, single ton, $7 at yard; large lots, special rates. American coke, $11 to $11.50 a ton; Crow's Nest, $10 a ton.

Copper Wire.—Coopered market wire, No. 7, $4 per 100 lbs.; No. 6, $4; No. 10, $4.06; No. 12, $4.20; No. 14, $4.40; No. 16, $4.70.

Copper.—Tinned, boiler, 26½c.; planished, 29½c.; boiler and T. K. pits, plain, tinned, 45 per cent. discount.

Cement.—$2.25 to $2.50 per barrel, in cotton bags.

Chain.—Coil, proof, ¼-inch, $7; 5-16-inch, $5.50; ⅜-inch, $4.90; 7-16-inch, $4.75; ½-inch, $4.40; ⅝-inch, $4.20; ¾-inch, $4.05; logging chain, 5-16-inch, $6.50; ⅜-inch, $6; ¼-inch, $8.50; jack iron, single, per dozen yards, 15c. to 75c.; double, 25c. to $1; trace-chains, per dozen, $5.25 to $6.

Dynamite.—$11 to $13 per case.

Hair.—Plasterers', 80 to 90c. per bale.

Hinges.—Heavy T and strap, per 100 lbs., $6 to $7.50; light, do., 65 per cent.; screw hook and hinge, 6 to 10 inches, 5¼c. per lb.; 12 inches up, per lb., 4¼c.

Galvanized Iron.—Apollo, 10¾, $4.90; 28, $4.70; 26, $4.30; 22, $4.10; 24, $4.10; 20, $4; 18, $3.95; 16, $3.90; Queen's Head, 28, $4.90; 26, $4.70; 24, $4.30; 22, $4.30; 20, $4.10 per cwt.

Iron.—Swedish iron, 100 lbs., $4.75 base; sheet, black, 14 to 24 gauge, $3.75; 24-gauge, $3.90; 26-gauge, $4; 28-gauge, $4.10. Galvanized—American, Lead Wool.—$10.50 per hundred, $200 per ton, f.o.b., Toronto.

Lumber.—No. 1 pine, spruce, tamarac, British Columbia fir and cedar—2x 4, 2 x 6, 2 x 8, 8 to 16 feet, $26.00; 2 x 20 up to 32 feet, $36.50.

Nails.—$4 to $4.25 per 100. Wire base, $2.85; cut base, $2.90.

Picks.—Clay, $5 per dozen; pick mattocks, $6 per dozen; clevishes, 7c. per lb. (132.)

Pipe.—Iron, black, per 100 feet, ¼-inch, $2.50; ⅜-inch, $2.80; ½-inch, $3.40; ¾-inch, $4.60; 1-inch, $6.60; 1¼-inch, $9; 1½-inch, $10.75; 2-inch, $14.40; galvanized, ½-inch, $4.25; ¾-inch, $5.75; 1-inch, $8.35; 1¼-inch, $11.35; 1½-inch, $13.60; 2-inch, $18.10. Lead, 6½c. per lb.

Pitch.—Pine, $6.50 per barrel; in less than barrel lots, 4c. per lb.; roofing pitch, $1 per cwt.

Plaster.—Per barrel, $3.

Roofing Paper.—60 to 67½c. per roll.

Rope.—Cotton, ¼ to ½-in. and larger, 23c. lb.; deep sea, 16½c.; lath yarn, 9¼ to 9¾c.; pure Manila, per lb., 13¾c.; British Manila, 11¾c.; sisal, 10½c. (132.)

18 to 20-gauge, $4.40; 22 to 24-gauge, $4.65; 26-gauge, $4.65; 28-gauge, $4.90; 30-gauge, $5.15 per 100 lbs. Queen's Head, 22 to 24-gauge, $4.65; 26-gauge English, or 30-gauge American, $4.90; 30-gauge American, $5.15; Fleur de Lis, 22 to 24-gauge, $4.50; 28-gauge American, $4.75; 30-gauge American, $5. (119.)

Spikes.—Basis as follows:—1¼ 5 and 6, $4.75; 5-16 x 5 and 6, $4.40; ⅜ x 6, 7 and 8, $4.25; ½ x 8, 9, 10, and 12, $4.05; 25c. extra on other sizes.

Steel Plates, Rolled.—3-16-in., $3.35 base; machinery, $3 base; share, $4.50 base; share crucible, $5.50; cast share steel, $7.50; toe calk, $4.50 base; tire steel, $3 abse; cast tool steel, lb., 9 to 12½c.

Staples.—Fence, $3.40 per 190 lbs. (119).

Timber.—Rough, 8 x 2 to 14 x 16 up to 32 feet, $34; 6 x 20, 8 x 20, up to 32 feet, $38; dressed, $37.50 to $48.25.

Tool Steel.—8½ to 15c. per pound.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

Copies of these orders may be secured from the Canadian Engineer for a small fee.

9130—December 17—Authorizing the C.N.Q. Railway to construct its line and tracks across Ste. Clair Rd., St. Sauveur Parish, Quebec County, P.Q.

9131—January 4—Directing the M.C.R.R. to protect fourteen crossings on its line of railway in Colchester, Tilbury East, Maidstone, Tilbury W., Rochester, Raleigh, Aldborough, Molton, Howard, Oneida, and Sandwich East Townships by watchmen from 7 a.m. to 7 p.m., each day.

9132—January 3—Approving of Standard Freight Tariff G.N., C.R.C. No. 663 of the Vancouver, Victoria & Eastern Railway between all stations on its line.

9133—January 4—Authorizing the C.P.R. to construct spur for the Standard White Lime Company at Beachville, Ontario.

9134—January 4—Amending Order 8896, dated October 7th, 1909, approving plans of certain crossings on the Toronto-Sudbury Branch of the C.P.R. by striking out the figures "119.67" where they occur in third line of operative part of said Order, (Moor's Road Crossing) and substituting therefor the figures "118.45."

9135—January 3—Authorizing the Government, Province Alberta, to place its wires across tracks C.P.R. at mileage 79.6 on its MacLeod Branch, Alberta.

9136—January 4—Authorizing the Dereham Telephone Company, Limited, to place its wires across track C.P.R. at Lot 7, Dereham Township, Ont.

9137—January 3—Authorizing the Canada Permanent Mortgage Corporation to place its electric wires across the G.T.R. at Queenston Quarry Siding, Stamford Township, Ontario.

9138—January 3—Authorizing the Bell Telephone Company to place its wires across the telegraph lines of the G.T.R. at P. C. Hammon, Ont.

9139—January 4—Authorizing the Bell Telephone Company to place its wires across telegraph lines and track of C.P.R. at public crossing on London Road, 2½ miles east of Chatham Station, Ont.

9140 to 9142 Inc.—January 4—Authorizing the Bell Telephone Company to construct its lines across the C.P.R. at public crossing 75 yards west of Melrose Station, Ontario, at public crossing 3½ miles east of Chatham Station, and at public crossing immediately south of Streetsville Station, Ont.

9143—December 21—Authorizing the town of St. Louis, P.Q., to extend highway across C.P.R. company's tracks where it intersects Atlantic Ave.

9144—January 4—Authorizing the C.N.O. Railway to construct sidings from the main line of the G.T.R. to right-of-way of C.N.O. Railway near point of crossing of said companies in Concession D, Scarboro Township, Ontario.

9145—January 5—Amending Order No. 8755, dated November 25, 1909, authorizing the C.N.O. Railway to place its lines and tracks across and to connect with tracks of G.T.R., near Brooklin, Lot 23, Concession 4, Whitby Township, Ontario, by adding three additional clauses re junction track; cost of protection; and switching charge.

9146—January 5—Authorizing the Capital Rural Telephone Company to place its wires across C.N.R., east of Regina, Sask., between Sections 21 and 22, Township 17, R. 19, west 2nd Meridian.

9147—January 5—Authorizing the Bell Telephone Company to place its wires across the track of Hamilton Radial Electric Railway at public crossing on Beach Road, Kenilworth Avenue, Hamilton, Ont.

9148 and 9149—January 4—Authorizing the Manitoba Government Telephones to place wires across the C.P.R. at public crossing 2½ miles northwest Portage la Prairie, Man., and the C.N.R. at public crossing on Archibald Street, St. Boniface, Man.

9150—January 5—Approving G.T.P. Railway proposed road diversion in Sec. 12, Tp. 48, R. 14, west 4th Meridian, District North Alberta, Alta.

9151—January 5—Authorizing J. P. Edwards to cross, by means of overhead crossing, tracks of the C.P.R., Sault Ste. Marie Branch, Lot 1, Con. 11, Baldwin Township, Ont.

9152 and 9153—January 4—Authorizing J. P. Edwards on behalf Department Public Works, of Ontario, to cross, by means of overhead crossing, the tracks of the C.P.R. Soo Branch, in Hallam Township, Ont., and in Drury Township, Ontario.

9154—January 4—Authorizing the C.P.R. to construct proposed bridge No. 1658 at Riviere a la Graisse, P.Q.

9155—January 5—Authorizing the V. V. & E. Railway to open for carriage of traffic portion of its line from Keremeos, to Princeton, B.C.

9156—January 3—Directing that Dominion Express Company restore rate of one-quarter cent. per pound on newspapers carried out of Winnipeg, Man.

9157—January 5—Authorizing the C.N.O. Railway to cross with its lines and tracks under and divert the lines and tracks of G.T.R. near Brighton, Ont.

9158—January 7—Authorizing the C.N.Q. Railway to construct its railway across boundary road between Parish Ste. Julienne and St. Alexis and St. Jacques, Montcalm Co., P.Q.

9159—January 7—Authorizing the C.N.Q. Railway to divert public road on Lots 175, 176 and 177, in Parish Cap Sante, at mileage 38.80 west from Quebec Bridge, P.Q.

9160—January 6—Directing all railways subject to jurisdiction of Board within six months from date of Order construct upon their lines in Manitoba, Sasaktchewan, and Alberta at stations other than regular agency stations, from or to which freight (L. C. L.) and passenger traffic is carried suitable shelters or waiting rooms for the accommodation of freight and passengers.