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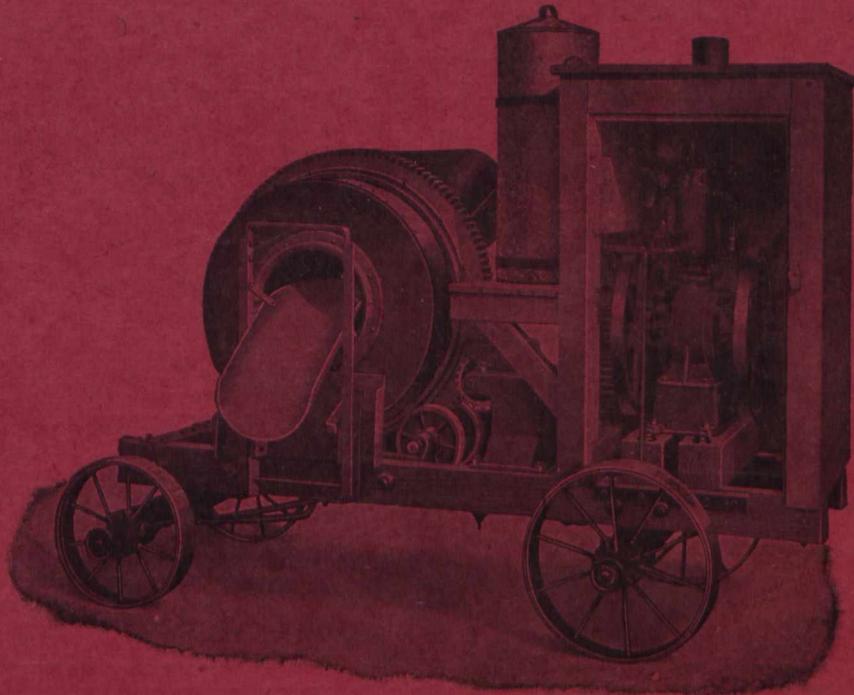
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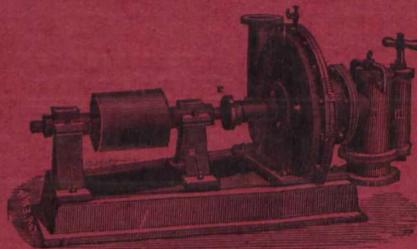
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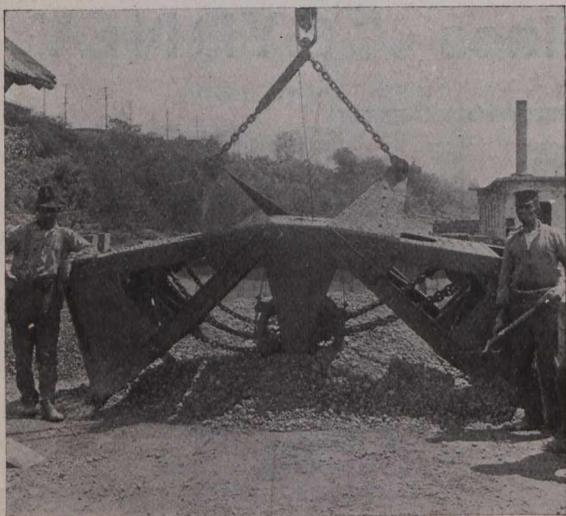
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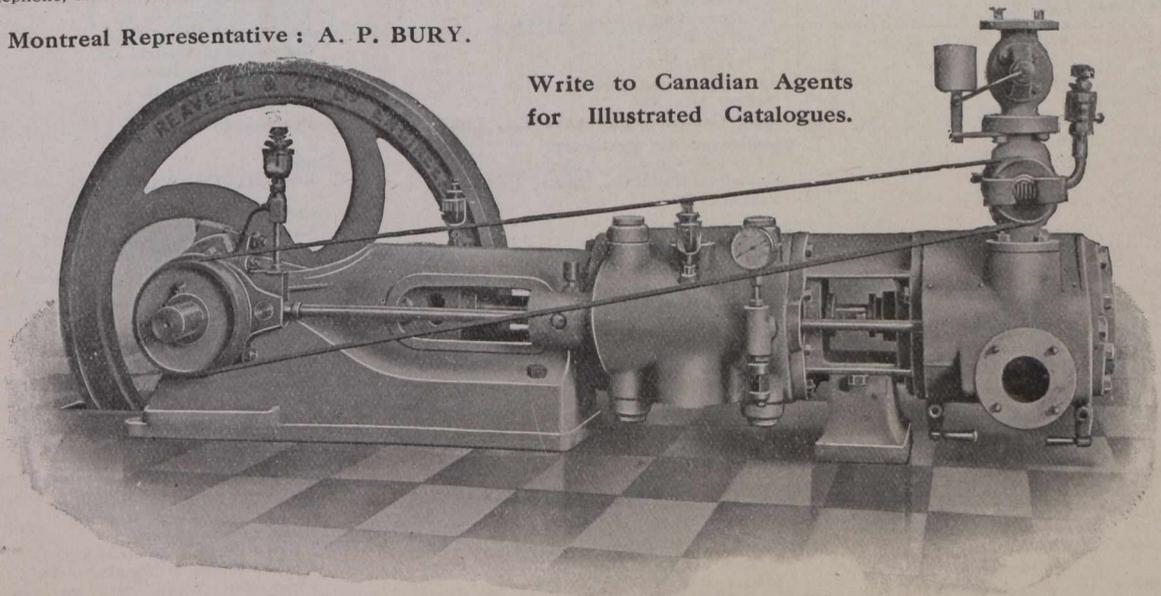
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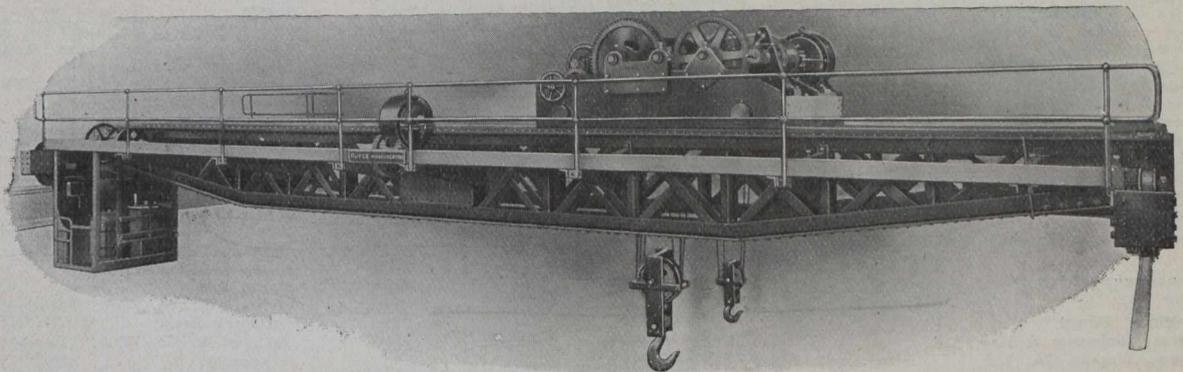
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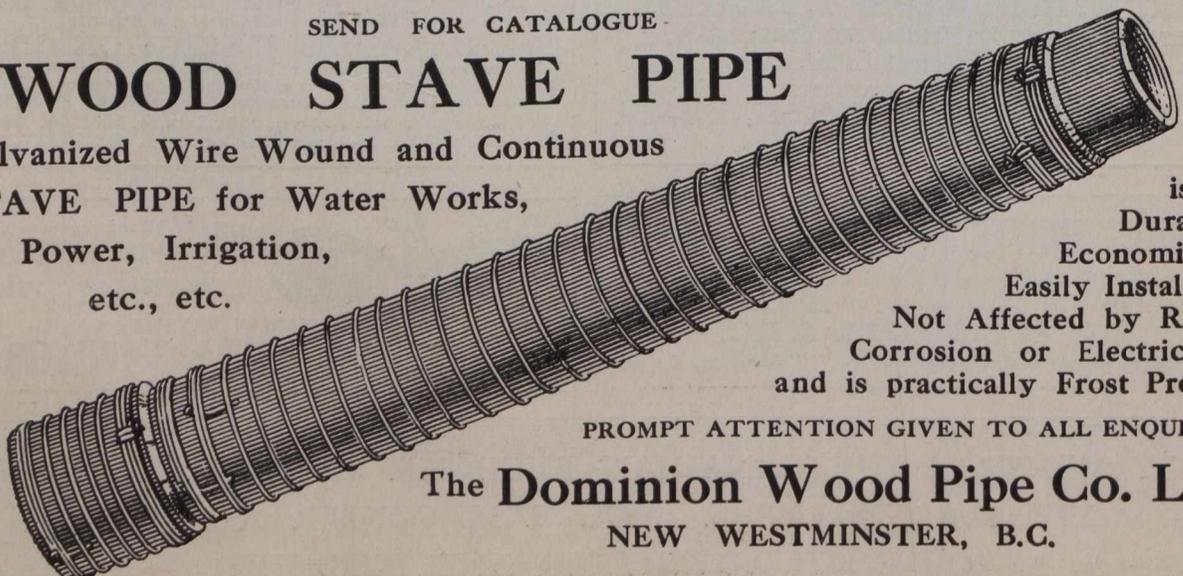
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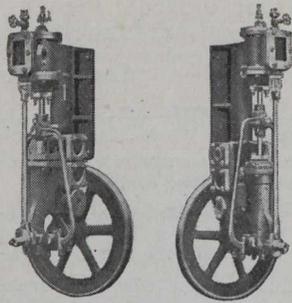
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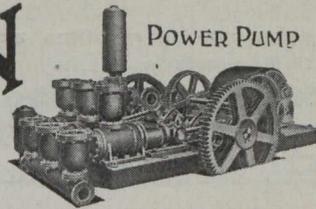
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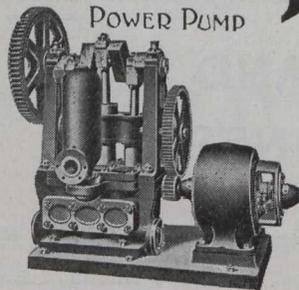
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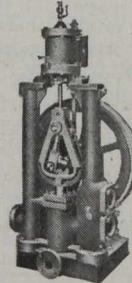
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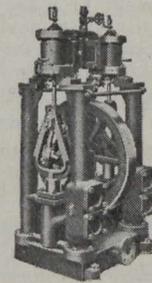


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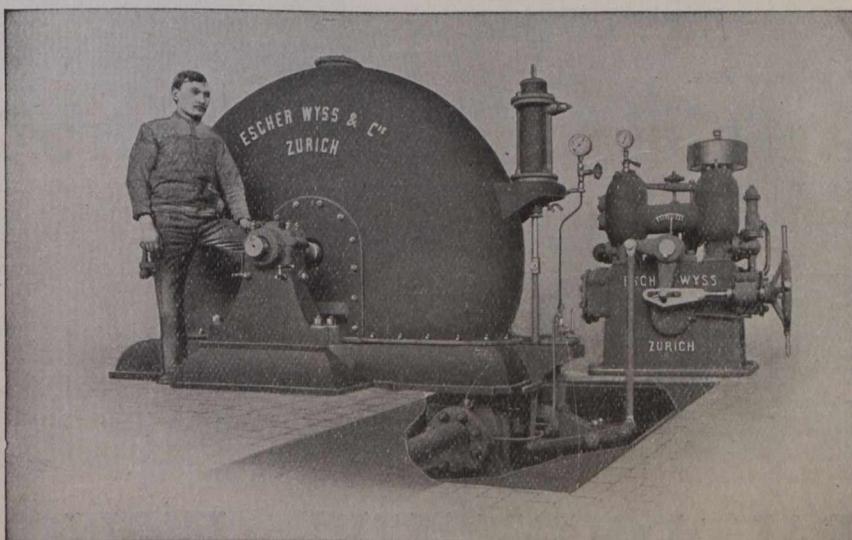
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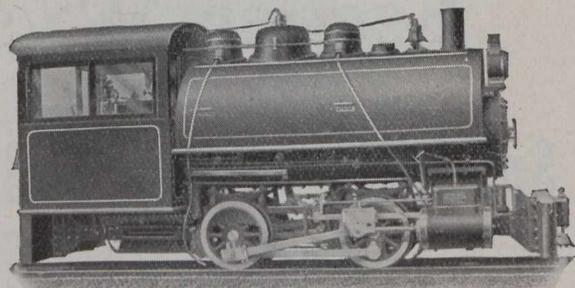
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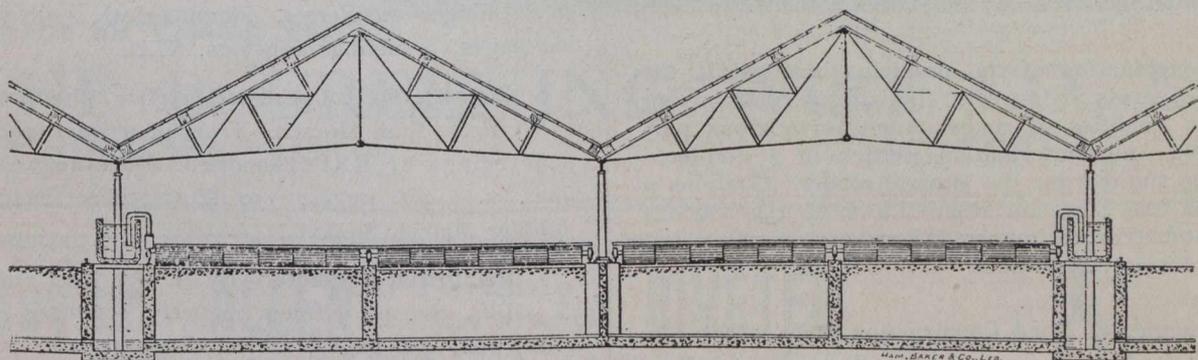
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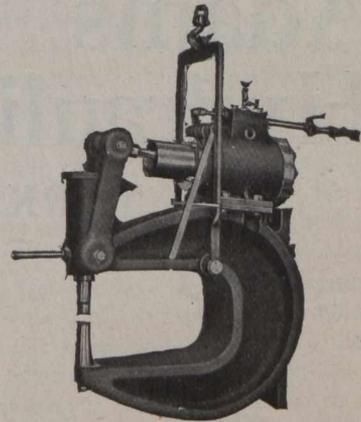
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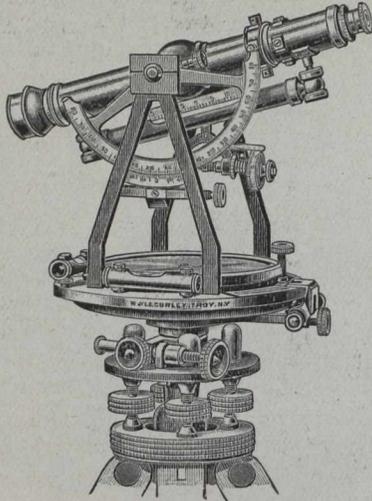
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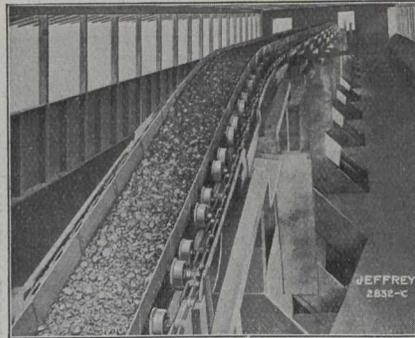


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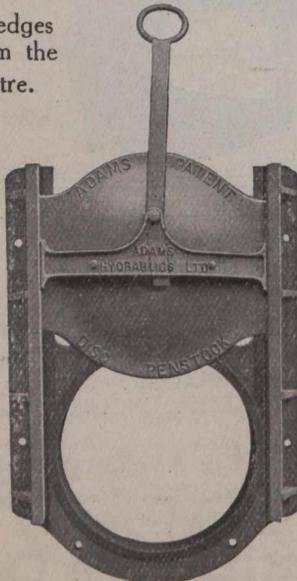
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CANADIAN SOCIETY OF CIVIL ENGINEERS'

Twenty-Fifth Annual Meeting.

(Continued from last issue.)

At the present moment the cities of Saskatchewan and many of the smaller towns have voted large sums of money for the installation of sewage disposal plants, and in every case the main feature of these installations is the final treatment of the sewage effluence by hydrochloride sterilization. I do not think myself that it would have been possible to obtain majority votes for the issue of these debentures if all that we could have promised the people was the removal of an æsthetic nuisance and no elimination of disease infection. The point made by the report that the onus of purifying domestic water supply should be entirely met by the cities and towns using that water may apply to cities of a size and wealthy enough to install elaborate and efficient water purification plants accompanied by a laboratory and an efficient bacteriologist or chemist. But how about the smaller communities and the isolated farmer? Is it practical to ask the latter to install methods of water purification, and is it not better to put into effect methods of preventing disease contamination of the waters, on the principle that prevention is better than cure?

A great number of typhoid epidemics in the West have been traced in their origin to milk supplies, and these supplies from small rural communities or isolated farms where city-polluted water has been used for rinsing out the milk cans. We had only last year at Moose Jaw a case in point where a farmer located on the Moose Jaw Creek, nine miles below Moose Jaw, delivered milk in Moose Jaw, in cans rinsed by creek water. The result was a typhoid epidemic which could be located practically to those people who used this milk; thus the city of Moose Jaw, because it did not disinfect its sewage, handed out typhoid germs to Moose Jaw Creek, which were again handed back to Moose Jaw, mixed with milk. This point of the necessity of obtaining a water free from typhoid germs which are the product of intestinal discharges is the main factor in inducing communities in the West to provide efficient methods of sewage disposal.

That the committee's report should state that it is impracticable to install sewage disposal systems which will bring about this desired result, is, I think, somewhat unfortunate, in view of the intense experimental work and practical findings of Bernard Phelps and of Professor Dunbar, of Hamburg, which have proven to the sanitary world that it is possible and eminently practicable to produce sterilized sewage effluence at very small cost.

John Kennedy: I think Mr. Murray has, in some respects, misunderstood me. We know perfectly well that as a chemical and bacteriological problem it is entirely possible to chemically purify sewage, but we know as practical men it is unwise for one community to trust to another in this respect. Mr. Murray has said himself, that although a municipality may purify its effluence and make it entirely chemically and bacteriologically pure, there may be some man washing milk cans in a dairy yard which will pollute the stream and make it poisonous, and he cannot be got at

Mr. Hazen has been quoted. Within three or four days there has been published in the newspapers Mr. Hazen's own reports and he says that dealing with the question of water purification in Ottawa the establishment of a purification works at Aylmer would be no use as a practical question. He says they may purify their sewage to-day and some man pollute it to-morrow. In dealing with Ottawa he assumes that no matter what Aylmer does, Ottawa should purify its own water. We have arrived at the point where engineers and others differ. Should we try to keep all our streams pure? Should any effluence that is put in be entirely chemically and bacteriologically pure? In dealing with all discharges from cities and from farm yards, dairies and everything, in a country which is being more thickly settled all the time, should each city take care of the small percentage of water which is used for the water supply of that city? It is a mere question; if the water is reasonably pure the intestinal life of bacteria will pretty generally die out from one place to another and from one river to another, but as a problem it is enormously cheaper and safer for each city to take care of its own water supply than it is to depend on all the accumulated pollution in a city along any stream to depend on its purity and put their lives in the hands of other people that way. That is the practical problem. We all know it is easy as a simple scientific problem to purify sewerage. You can take abominable stuff and purify it, but it is not nice and it is not safe. That is just the point where engineers differ on these things. It is a matter of practicality and economy, and which is the best way to do it? The report takes that view that it is best to keep the waters reasonably pure and that each city should purify its own. It may be best to merely receive the report and let the discussion go on, for it is an unsettled problem, and perhaps we are not quite arrived at the point where we can act.

James White: In October last we had a conference at Ottawa, called at the request of the Sanitary Committee, and as a result of their report last session we invited the public health officers of each province and the public health officers of the various departments of the Government to meet at Ottawa.

It may be of interest to Mr. Murray to know that there was a motion unanimously passed recommending the various provinces in the Dominion to adopt the policy of the prevention of pollution of streams as recently inaugurated in the Province of Saskatchewan. Of course, as Mr. Kennedy has pointed out as to whether the city should or should not treat the sewage as a complicated one. Mr. Balcourt last session brought in a sweeping bill providing that every municipality should treat its sewage. Any slight consideration of the effect outside of that will show that it simply defeats its own end. You cannot ask every municipality to treat its own sewage, but I think every municipality and town and city that can afford it should treat its own sewage. Here is Aylmer, emptying millions of gallons of sewage into the Ottawa River. That is, to my mind, a scandal. Then there

is Guelph, who put in a septic tank system, which was condemned, because it gave no efficiency in the removal of pathogenity. Then when a remodelled system is put in the objection was that they were not working it properly; the sewage was flowing over a jelly-like mass and then into the stream, absolutely untreated and unaffected. Of course, Senator Balcourt's bill was not considered last session, but this session he will introduce a bill which will allow a certain amount of latitude under which the municipalities should treat their sewage, but the general idea is to compel all municipalities who can afford it to install within a reasonable time a reasonable system of sewage treatment.

T. Aird Murray: In connection with the Saskatchewan River we have had three or four tests, and the only time we have had any intestinal bacteria is after the flowing of the ice and the only town which discharges any sewage in any quantity is Edmonton, three or four hundred miles above Prince Albert. We talk about rivers purifying themselves in this country, but in many of these towns the sewage is poured on to solid ice, and when the ice melts we get pieces of paper coming from Edmonton down to Prince Albert, and it is generally about that time that we get an outbreak of typhoid. While water may chemically purify itself in running streams, unfortunately it does not do it pathogenically. With reference to the Niagara River, Dr. Amyot, the Ontario Provincial Bacteriologist, has made several experiments and bacteriological examinations of the river, which prove that the organic matter discharged with the sewage of Buffalo is practically oxidized by the fall and rapids, and, in fact, at Niagara-on-the-Lake the Niagara River is chemically pure. On the other hand, the number of bacteria in the water, both intestinal and otherwise, is practically the same at Niagara-on-the-Lake as it is above the fall, and we, unfortunately, know that in connection with the military camps held at Niagara-on-the-Lake we have outbreaks of intestinal inflammation among the soldiers who drink this water. Curious, however, to relate, as soon as we get into the quiet water of the lake, about nine or ten miles from the mouth of the river, we obtain a water which is bacterially pure. This simply means that bacteria are carried along in running streams, but in quiescent water they fall to the bottom by gravitation or sedimentation. The question then of the ultimate purification of water in rivers is not worthy of any discussion and forms no factor in the case.

C. H. Rust: I would move that the report be received, but not adopted.

John Kennedy: I second that.

The President: Gentlemen, it has been moved and seconded that this report be received. I think I would like to say something myself on that question if I may be allowed a few moments. There are two schools of prevention of diseases from contaminated water. One of them, I think, fully represented by Mr. Aird Murray, thinks that the difficulty may be overcome by purifying all the sewage; another of whom I think Messrs. Hazen and Whipple may be taken as a sample, approves that the water supplies of the cities should be purified. I do not suppose that in most cases either of these systems would fully meet the requirements. It is a matter to which you cannot apply any general remedy. That is, you cannot state a remedy that is applicable to all cases. Take an instance of our own case—the city of Winnipeg. We had typhoid epidemics here every fall of what was at the time called Red River fever, before we had any sewers at all emptying into the rivers. The towns in the United States to the south of us—Moorehead, Fargo, Grand Forks, Crookston, among the largest—sent down practically unpurified sewage

into the Red River; we get that here. Now, what would be the practical advantage of our purifying our sewage and dumping it into a polluted river?

The points of Mr. Murray as to the contamination below Moose Jaw through the farmers' milk supply I have no doubt is a thing that happened very often. On the other hand, if Moose Jaw had purified its sewage, there are cases of typhoid on that stream occurring constantly below there over which there is no control whatever. So, as Mr. Kennedy says, it would not be safe to rely simply on the purification of sewage by towns.

Mr. Murray: You have a lot of cases, on Moose Jaw Creek, in all these small towns, but was not that probably caused by drinking that water? Typhoid germs only come from the human intestines and only come from sewage. If you could get that out you could eliminate the number of these cases occurring on these streams.

President: It is possible you would eliminate a good many cases but would you give a false confidence to these people living below the town? Take the case of Yellowgrass. Is there a stream there?

A Member: And was there any indication of where that came from—is there any town above? In southern Manitoba on streams where there are no towns whatever there are many serious epidemics of typhoid. Each case should be taken on its merits and then everything that medical men and engineers can do should be done. If you leave this matter entirely in the hands of the medical men of the country they will only see one particular thing; they do not combine with that, knowledge of other things in connection with the problem. In passing legislation we should be careful indeed that we do not do more harm than good; that we do not do an injustice to some of the towns by putting them to unnecessary expense, and anything that is done should be done after careful professional advice. I think so far as this Society has gone and so far as the Committee has gone the report and the information they have collected is most valuable, and I agree the report should not perhaps be adopted as it stands, but that the Committee should be continued and that the matter should be further investigated and brought up during the next meeting. (Applause.)

Mr. Wilson: In support of what Mr. Murray has been saying, during the last six or eight weeks the medical health officer of Moose Jaw made a raid on the dairymen entering the city in the morning, and from samples of milk taken it was found 90 per cent. of the milk brought into the city from points on the river below Moose Jaw was contaminated with intestinal bacteria and in the design for our works which we intend to put in this summer we are making provisions for treating the effluent, as we look at it as a measure of self-defence, as our milk comes from the dairymen below the city.

Mr. Rust: We all recognize the work of Dr. Hodgetts and Dr. Amyot have done, but what I was suggesting was these medical men should have the assistance of engineers in the plans.

Mr. McElstone: In connection with the C.P.R. irrigation work at Calgary, cases have come to my notice where irrigation canals running through forty miles of country have been the means of typhoid epidemics among the farmers and ranchers along these irrigation ditches, where the water has been used for watering the stock and in many cases for domestic purposes.

Colonel Anderson: Following up your recommendation that the Committee should be continued, I have prepared a motion that the standing and special committees of the Society be re-appointed for the coming year, with power to

replace members unwilling or unable to serve by other members, and with power to add to their numbers. That this just a blank resolution to cover all these conditions.

Mr. John Kennedy: This is a special committee.

Colonel Anderson: Well, standing on special committees; put in the word "special" there.

President: We will put the motion to receive this report first. (Motion to receive report carried.)

President: Colonel Anderson's motion is now in order. (Colonel Anderson's motion carried.)

President: There is only one remaining report of committees to be considered, and that is a report of the committee on the International Electro-Technical Commission.

Mr. L. A. Herdt: The report of this committee may have been a little more complete. I would like to add a word in addition to what has been done by that commission. The first aim of this commission is to establish and get an electric language. At the present time there is a great deal of difficulty in reading electrical books because of the difference in the terms of expression. For example, the letter "C" in all books in French and German and so forth stands for "current." Where in English the letter "I" is used. The intention is to standardize these symbols. The other work is to standardize electrical machinery. An electric man buying a hundred kilowatt machine does not know what he is buying until he knows the diameter of that machine. We are trying to get at some means of standardizing this matter. This is being carried on principally by correspondence. As you will see by that report, most of the countries have committees, and there is considerable amount of work being carried on. The work is going on very satisfactorily and if the committee is allowed to continue we hope to do some better work this year and hope to send a delegate to the next convention, which is being held in Italy some time this year.

President: Any further discussion on this report?

Mr. Mountain: I move the report be carried and the committee continued, and investigations.

Mr. William Kennedy, Jr.: I second that. (carried.)

President: That closes the order paper for to-day. I might say this evening the ladies of the Woman's Canadian Club, of Winnipeg, are giving a reception and musicale for the members of this society and the ladies accompanying them, in the drawing room of the hotel, and they will be pleased to see all members some time during the evening. It begins, I believe, at half past eight.

To-morrow morning at a quarter to nine the train will leave for Point Du Bois. There is also an excursion to the Grand Trunk Pacific shops some time during the morning, and also to the dam at St. Andrew's Rapids some time during the day. Members can procure tickets for all of these excursions at the office. Professor McLeod has asked what the luncheon arrangements are for the all-day excursion. The City of Winnipeg has kindly provided a dining car on the train and it will be open for some hours to allow all an opportunity to take lunch.

Mr. Irvine: May I ask if the Committee on standardization of cast iron water pipe is still in force or discharged?

President: It was stated that that committee had carried out their duties and the report was issued, and I do not see that there is any reason for continuing this committee.

Mr. Irvine: There was a motion brought in that all committees be continued.

President: This one would be excepted.

(A motion to adjourn at 5.35 was carried.)

The third session was held on Thursday, January 26th, 1911, at 10 a.m. Colonel H. N. Ruttan, president, in the chair.

Chairman: Gentlemen,—The first order of business is the consideration of resolution of the annual meeting of 1909, page 97 of the Minute Book, relating to the printing and forwarding to branches of the reports of the various committees, before they are submitted to the Council. I would ask Professor Macleod to read that resolution, and to explain that it is impracticable to carry it out. The trouble is that it is hard to get those reports in and get them printed for the annual meeting, and an attempt to get them two months before that seems to be quite out of the question.

Secretary: The resolution in question is as follows:—

(Resolution read).

There would be no difficulty whatever in so far as sending the papers out to the branches is concerned, if only committees could be induced to report in time. It would really be necessary to have the reports in hand for the Council meeting, two months before the annual meeting—that is the November Council meeting. That has not been found possible. Then whether branches would be willing to send representatives to Montreal for the purpose of representing the views of branches is a question that seems doubtful. These are two difficulties in the case: first of all, to get all the papers to the branches, then getting anyone to come in and represent the views of the branches afterwards.

Mr. J. Kennedy: What do you wish us to do about it? That appears to be an excellent resolution: it appears to have no penalty attached to it, we don't have to go to jail if it is not carried out. It is sometimes very hard—I know in the committee that I happen to be on, the committee on Stream Pollution, I don't think the committee was lax at all—it takes a long time to get the information in certain cases. The year goes round so quickly, that we don't always get it done.

Mr. White: I understand the objection is that submitting them to the branches would entail unnecessary delay, and possibly the margin of time allowed would not permit them being printed before the annual meeting. Would it not be better that a compromise be permitted, that is to say that the reports be sent to the branches and that they should be asked to report at the earliest possible date, the Council simply waiting a reasonable time till the reports were received from the branches, and the branches were allowed to express their opinions.

Chairman: In order to bring the matter before the meeting, I think a motion for reconsideration should be passed. If, upon reconsidering it, it is decided to again place it upon the Minute Book, of course that can be done.

Mr. White: Well then, to bring it to a head I move a reconsideration of the resolution.

Mr. Lamb: I second that. Motion carried.

Chairman: While Mr. White is writing out a motion, the next order of business might be gone on with—the Announcement re Students' Prizes.

Mr. J. Kennedy: Before the committee matter is entirely left off, I think the Committee on the Pollution of Streams should be continued and a little enlarged, and have some members put on who have had their attention directed particularly to that. I would like to see yourself, Mr. Chairman, and Mr. Rust added to that, and also Mr. Murray. I think it would be a great benefit to the committee if those whom I have mentioned were put on that—a continuation of the committee and a continuation of the work.

Chairman: The resolution passed gives power to add to the number.

Mr. Rust: I wanted to move that Mr. Kennedy be added to the Committee on Transportation. Mr. Kennedy has taken such an interest in transportation matters and I think he would be of great assistance to the society if he was on that committee.

Mr. Mountain: That committee has power to add to their number.

Chairman: I would suggest that Professor Edwards' name be added to the Committee on Sewage Disposal.

Secretary: There were students' papers sent in this year in the General Section and in the Mechanical Section. There are no papers for the Electrical and Mining Sections. The examiners appointed to consider the General Section recommend that the award be made in that section to W. H. Martin for a paper on Water Purification with special reference to Water Filtration, and the examiner in the Mechanical Section recommends an award to E. M. Webb for his paper on the Westinghouse Steam Turbine. Report adopted.

Chairman: The next matter is a resolution of the Ottawa branch re the formation of a standing committee on Good Roads Construction.

Secretary: I have not the exact wording of the resolution here, but from memory—possibly I may be corrected—I may state it was simply a resolution asking that this meeting of the society appoint a standing committee on the construction of good roads in Canada. While it is being discussed, I will get the exact wording.

Chairman: What shall we do with the resolution?

Mr. Mountain: I think that I was the mover of that in the Ottawa branch. It was during an address by Mr. A. W. Campbell, now Deputy Minister of Railways and Canals, formerly known as "Good Roads Campbell." The idea of the branch after hearing his address was that there was a good deal of money squandered by incompetent men all over this country in making good roads, possibly not so much in the West as in the East. You possibly here do it under the Department of Public Works in the different provinces. There it is done largely by the townships, and the idea of the branch was that if we got a standing committee for the construction of good roads—and streets we included—that it would be a benefit for the country at large for the money expended, and perhaps might assist the engineer in being a party to this expenditure of money. In other words, the money that the public would vote, would be properly used. It was quoted at that meeting in the discussion of the paper, the enormous amount of money devoted to municipalities and the large amount wasted for the reason of no scientific basis on which to build roads and so on.

The resolution was as follows: "Resolved that a committee be appointed to consider the question of good road and street construction and maintenance, and draw up a standard of classification and specification. Motion carried.

The matter of appointing a committee was referred to the incoming council.

Mr. White: I beg to move, seconded by Mr. Lamb:—

"That as branches of the society are forming in all parts of Canada, that copies of all reports of committees appointed at the annual meeting be sent to the branches as soon as practicable after receipt with the request that they be considered at an early date, as great a length of time as possible being allowed the branches for such consideration."

Chairman: I suppose it would be understood, if the branches did not report within a certain time, that the Council

would go on with the usual routine in connection with those reports?

Mr. White: That was my idea.

Mr. Mountain: In theory Mr. White's resolution is all right, in practice everybody who has been on the Council for any length of time knows that it does not work. The gentlemen that we have asked to work on the different committees no doubt devote a great deal of their time and sometimes are not able to complete the reports at what Mr. White calls an early date. Now, I have known it to constantly occur that it is usually at the meeting before the annual meeting that we get these reports in. Now, it seems to me it is impossible to send those reports out to the branches to discuss them. In other words, I think that that work might very well be left to the Council of the parent society. The branches must not forget that they send representatives to the Council, and they act for them there. In other words, it is getting your machinery so complicated in this society that instead of having one parent office where this work is all done, you will get it duplicated.

Mr. White: In reply to Mr. Mountain, I would like to say that he has to a certain extent misunderstood the tenor of my resolution. This reference to the consideration at an early date did not refer in any way to the date at which the committees should file their reports, it simply provides that if the branch does not report at an early date, it ipso facto approves of the tenor of that report.

So far as representatives of the branches being heard at the Council, each branch, of course, is represented on Council, and I have not the slightest doubt in my mind that if necessary the branches would be willing to send a delegate. I don't think that is at all necessary, I think in most instances that the branches would not do anything more than approve the reports, but it would at least give them the opportunity of filing any objections that they might wish to make.

Mr. Mountain: I thoroughly understood what Mr. White said. The reports don't come in in time to turn them over to the branches before they must go out for this meeting, that is what I mean, and if there is any machinery by which this meeting can get them in in time, they ought to put it to work.

Mr. Rust: It seems to me the Council are the proper body to take up these matters to discuss them. There are branches in all the large centres, but there are large parts of the Dominion where there are no branches at all, and I cannot see that we are going to gain anything, and it is going to probably delay matters considerably. I cannot quite agree with Mr. White that this is necessary.

Secretary: Would the object of Mr. White's resolution be met by simply sending a copy of the report to the branches as soon as that copy can be printed, and give the branches all the opportunity that time will permit of to discuss the report in advance of the annual meeting, and send up recommendations to the annual meeting instead of having these recommendations considered by the Council. The difficulty is, as I have said already, one of time, and some time must necessarily elapse between receiving the reports and sending out copies of them. If you take the case of the report on Stream Pollution, the time required to print that is very considerable because it was an intricate report. I don't think you could get that printed in the ordinary course under ten days, and the report to be typewritten would be a very burdensome affair.

Mr. Duggan: Isn't the genesis of this question the fact that the members would like to consider these reports some time before they are brought before the annual meeting, and they are asked to pass upon them. There are a great

many of the reports which are sent in which are merely expressions of opinion, and act as a guide to the engineering profession, stating what has been done, but there are others in the matter of specifications and standards which are of very great importance to guide the future work of the engineers. Now, I think a great many of the members would like to consider those reports in advance of the annual meeting so that they might come up prepared to discuss them and vote upon them, intelligently. We have had an instance of that at this meeting; some of the reports were only sent in at the last minute and could not be fully discussed. I think the wish of the society would probably be better carried out if these reports were sent out at least a month in advance of the annual meeting. This is merely a suggestion.

Mr. White: We all will concede that it is often impossible to carry out these things in practice. There is no desire on the part of the branches to embarrass the work of the Council of the society. So far as having these things typewritten is concerned, a hundred typewritten copies for each branch is a lot of work, but I presume the head office have a multigraph or a mimeograph, by which you can run off a very large number of copies. If these reports were received just before the annual meeting or just in time to consider them in Council, obviously it is not possible to carry out the principle of holding them for a considerable length of time until they have been considered by the branches, and the reports of the branches have been received. It seems to me that there is a compromise that we can have that whenever possible, that the reports shall be reproduced in some shape or form, printed or multigraphed or mimeographed, and sent to the branches.

Mr. Duggan: It does not seem to me that that really improves the situation. I beg to move an amendment that the Council should not put forward any reports for adoption at the annual meeting unless they have been printed and mailed to members at least, say, one month in advance.

Mr. Rust: I will second that.

Mr. J. Kennedy: It seems to me that is a little dangerously hard and fast. There are some reports that could come in very well at the annual meeting and be passed upon. Others, again, as to standards, specifications and other things, could be laid over for discussion at the annual meeting. We ought not to tie ourselves up too tight. It seems to me Mr. White's resolution is pretty good, and if it could be practicable to distribute reports to the members to meet Mr. Duggan's idea, but the last part of it, to tie ourselves up that we shall not present anything here that does not come in a month in advance, would restrict us too much. Under certain conditions it ought to be left to the discretion of the Council whether that should be done.

Secretary: As under the present arrangement the January meeting takes place about two weeks before the annual meeting, would Mr. Duggan in his resolution substitute the Council meeting preceding the annual meeting, which would give the Council an opportunity of approving the reports.

Mr. Duggan: Anything practicable.

Prof. Galbraith: Does that apply to the reports of the annual meeting or the reports of committees?

Secretary: What I have been saying refers to the reports of committees of the society, sometimes called standing committees of the society. These are to report through the Council to the meeting. There is another resolution passed at the Toronto meeting providing the sending of reports to this meeting, they must be approved by the Council.

Col. Anderson: It appears to me that this discussion has been useful in this way that it shows on the one hand

a difficulty that the Council labor under of getting in reports as early as they would like to get them in. It shows on the other hand, that the members feel that there should be some opportunity for discussing those reports before the annual meeting, so that definite action might be taken at the annual meeting. I think that the ends that we want to secure have been already pretty well secured by the very publicity that has been given to the matter by this discussion. The branches of the society that have been formed have been doing good work; they are making the interest in the work of the society more lively than it has been possible by discussion at headquarters only, and I think possibly the whole matter might be left in the shape of suggestions to Council. It is inevitable from our organization that a great deal of active work of the society must fall upon the Council. At the same time the more that that work can be distributed throughout the whole membership of the society, the better for the society as a whole. Now, if the Council will simply take this discussion as suggesting to them that as far as possible they should circulate the several reports in time to have them considered before the annual meeting, so that at the time of the annual meeting the members will be in position to deal with them, definitely, I think all the ends we want to secure will have been arrived at.

Mr. Montague: There is another point, that there are a great many of our members, specially in the far west, who are only able to get to annual meetings on occasional intervals. These reports of the society which we found on our chairs when we came in to the meeting, contain a great many matters of interest to members who have not been able to come. The fact of those reports being at the meeting and adopted at the meeting precludes any possibility of those members contributing anything to the discussion, and Mr. Duggan's suggestion that those reports be submitted, if possible, a month in advance, would allow those members who cannot attend the meeting, an opportunity to present what discussion they desire, and I think on that score alone, Mr. Duggan's suggestion that the reports be sent out if possible a month in advance, is worthy of consideration.

Secretary: While the motion is being worded, I don't know if everybody here remembers that these reports are sent out to the membership at least in advance of the annual meeting. This year it was not possible to send them out in sufficient time to get into the hands of western members before the meeting. They were in the hands of the eastern portion of the society about three days before we left for Winnipeg.

Mr. J. Kennedy: An important consideration that grows out of this is that we ought to be careful in the selection of the committee or more especially careful in the selection of the chairman of the committee, that he should be an active, energetic man, not too much absorbed in his own professional duties, a man who will push up his committee and come to a conclusion as early as possible. Some of us are too busy, and some of us are too negligent, to get it in until near the time. The foundation of the trouble is, I believe, not getting the reports in in time to the Council.

Secretary: If the meeting will remember, there was a recommendation made by the committee on Usefulness to the society of which Mr. Marshall was chairman, that so far as possible, the work of the several committees should be considered by sub-committees residing, all of them, in the same centre. For example, if there was a committee on some transportation subject, there is one group that would work on a certain point in Winnipeg, another group located in Toronto that would work there, and so on. I don't know

whether that is a feasible suggestion or not, but that was one of the recommendations of the Committee on Usefulness to the society.

Chairman: I will ask the secretary to read the amendment.

Secretary: "Amendment moved by Mr. Duggan, and seconded by Mr. Rust: That reports of committees of the society be printed and mailed to all members of the society at least four weeks previous to the annual meeting, and only reports so printed and mailed shall be considered at the annual meeting."

While I am on my feet again, I may say that that means that the reports must be in hand before the November meeting of Council, because another resolution requires that no reports be sent out which are not approved by the Council.

Mr. Mountain: There should be another meeting in December of Council. Any committees that cannot report in December will have to be put over.

Prof. Galbraith: Was that resolution that the secretary mentioned that was passed two years ago that the reports of committees should not be sent out until they had been approved by the Council, was that the exact wording of it? I think the meaning of it was this, that the reports of these committees should not be submitted to the annual meeting before being approved by the Council. I don't think it was intended to say that they should not be sent out.

Secretary: You are right in that. I am wrong in that detail. The intention was that they should receive the final approval of Council before being sent in to the annual meeting.

Member: Might I suggest in order to simplify the handling of the reports that copies of the committees' reports be sent to the branches at the same time as they are sent to the Council, which would probably save a week or so in handling through the mail.

Chairman: I will put the amendment first. Amendment carried.

Chairman: There is a matter which Mr. Kennedy wishes to bring up.

Mr. Wm. Kennedy, jr.: Mr. President and Gentlemen,—I have no resolution to offer in this matter, but it is a matter that I think should be explained, and explained by some of us who have come from what I might call the "Storm Centre." It is with regard to the city engineer, the City Engineer's Department in Vancouver, one of those common waves of public criticism that was in Vancouver last autumn, and as all municipal engineers will know, the criticisms from the public on the engineering of a city or a municipality are not generally very fair, not from the reason, I think, that the public intends to be unfair as a majority, but because they are not posted, they don't know the facts, they don't know the inner workings of the City Engineer's Department, they don't know what his instructions are, and his directions, and in this case there was and has been ever since last autumn a great deal of criticism on the city engineer's work at Vancouver by the public. It became a proper thing to cry down the city engineer, and, of course, the candidates for election took up the matter, and were prepared to sacrifice the engineer. The city engineers will understand that pretty well, I think. They carried it on to such an extent that the Vancouver branch of the Canadian Society of Engineers saw fit to virtually step in and do what they could to state what they considered unfair treatment of the city engineer. Immediately after the election, the city engineer, who had remained quiet all the time, and is, of course, not in a position to reply to every public criticism, sent a letter to the newly elected Council asking that in justice to himself and in justice to those who had supported

him throughout the past year, that an investigation board of engineers should be appointed, to investigate the affairs of the city engineer, and to report to the Council, or if the city chose to appoint an investigation committee under the Public Utilities Act, and he stated plainly, and in a manly way, that in the event of the finding of this committee going against him, if that decision was adverse to him, that they could consider the communication that he had sent in as his resignation. The newly elected mayor, as his privilege is there to appoint the committees of the Council for the year, that was one of the first things they did. He appointed an investigation committee to consider the affairs of the City Engineer's Department, and to report, and I believe I am right in stating that that committee were adverse to the city engineer, and picked out for that end as far as we can discern, except one man, and within 24 hours they brought in a report, which was worded to the effect that after making a thorough investigation of the affairs they had decided to recommend to the Board of Works that steps be taken to procure a supervising engineer to take over the engineering of the city. That report, as I stated, I think, went out within 24 hours of the time they were appointed, to the Board of Works. The Board of Works called a meeting a week ago last Monday evening, at 7.30, and within 30 minutes had adopted that recommendation and passed it on to the council, which sat at 8.30 the same evening and the engineers of Vancouver, the branch of the Canadian Society had a delegation there to appear before the Council to get a hearing and ask for a fair investigation of the city engineer, that he had asked for an investigation and we considered it was only British fair play that he should get it. (Hear, hear). There were, I believe, four members of the Council that spoke very well, very strongly and very favorably of the city engineer and of the very unfair criticism and of the unfair treatment that was being meted out to him, and that was likely to go through that evening. We were heard. There were two of us, the chairman of the branch, Mr. Webster, and myself as a member of the Executive Committee were heard at the Council and we asked, as I have just stated, but the recommendation was railroaded through in spite of everything. Now it has seemed to us that this is a very opportune time to bring this matter before this society, and the reason I do not wish to make any resolution on the matter is that I might, perhaps, be considered as biased in the matter, and if the gentlemen present here see fit to bring in a resolution and to endorse what the branch has done out there or to assist the city engineer and protect him against this unfair treatment, I am sure the branch at Vancouver will be exceedingly glad. I would like, Mr. President, that Mr. Cartwright may be heard. I may have overlooked some matter in this business. I might say I hold in my hand a newspaper account of the proceedings that I have just described that took place a week ago last Monday night, and it is a very fair account. It gives a report of the proceedings of the investigating committee, the Board of Works and the city engineer. Any of you that wish to see it will be very welcome to do so.

Mr. Cartwright: Mr. President, I would like to endorse what Mr. Kennedy has said. There is only one thing on my mind and that is, a couple of years ago there was an investigation made into the city engineer's affairs at Vancouver and he cleared himself of every charge. (Hear, hear). The man that was opposed to him—the alderman who was opposed to him—was going by hearsay on a great many charges and when he called for an investigation, he found nobody who could back him up and make his charges stick, and when the investigation was closed, he turned around and has been the engineer's best friend ever since, and I

don't think there is anything in the charges that have been brought against him. In fact there has been nothing definite stated; the only thing stated against him lately is that he carries out his instructions. (Laughter).

Mr. James White: To bring the thing to a head I desire to move a resolution in the following language: "That the Canadian Society of Civil Engineers have been credibly informed that the City Council of Vancouver has advertised for a supervising engineer, and has refused the present incumbent of the position an investigation, and that the Canadian Society of Civil Engineers censure the action of the City Council of Vancouver as an action opposed to all ideas of British fairplay." I might say in moving that, I consider it better for someone not connected with Vancouver to propose this resolution. Everyone who has had anything to do with a City Council and aldermen knows what their ideas are respecting engineers and what their ideas of fairplay are, as a rule, when dealing with engineers.

Mr. Edwards: I think the word "censure" should be left out. I should think our position should be one of making a recommendation to our own members. We should be able to convince the city of Vancouver that the Society of Civil Engineers is a body to be reckoned with and I think a word might be said to the branches and perhaps the other societies across the border, and this would perhaps be the only way to deal with the matter. (Applause).

Mr. James White: It seems to me that the resolution should empower the secretary, or some machinery be set in motion whereby this society at its annual meeting calls the notice of its members to this state of affairs and practically recommends to them that they have nothing to do with the matter.

Mr. Mountain: While I was pleased to hear from Mr. Kennedy of the way the Vancouver branch defended their brother whom they thought in distress, I must say I think any resolution passed here by the parent society might be taken reasonable exception to. These men—the Vancouver Council—may or may not have had some reason for the action they took in not permitting the engineer to defend himself. I think it means that they did not know very much about their ground and that their defence should be left to their own conscience.

Mr. John Kennedy: I do not know much about this matter beyond what has been stated here, but before I think we are in a position to pass upon it, I think we should know a great deal more than we do. (Hear, hear). On the face of it it appears one would gather the impression there is something quite plain and clear in the matter and the mayor has appointed a committee and the committee found the matter so clear that they did not need anything more to satisfy them; and, in the Council, on the representations which were made, there were only four who stood up for him and the matter was put through. I do not know what it is all about or what the charge was, but the impression gathered was that there must have been something so clear that it went through right off without there being anything further needed. One can hardly imagine it was so utterly and entirely unjust, and yet, on the other hand, the branch who knew all about the matter protested it. It is a puzzle altogether, and before we act upon it we should know a great deal more about it, on both sides, to base a judgment upon.

Mr. Lamb: I heartily agree with the views expressed by Mr. Kennedy in the matter, and although there is no doubt that the society must stand by a brother in good standing if he is ill-treated or badly treated, as this engineer seems to have been, yet we should, as a body and as a society be cognizant of all the facts before placing ourselves

in the position of passing a resolution for which we may be afterwards criticised. It appears to me, sir, that the resolution as moved by Mr. White may be changed in some way that a committee could be formed to look into this matter. I think after the manner in which the branch in Vancouver has brought the matter to our attention, we cannot do otherwise than take some decided action in the matter. I think this can be best done by the appointment of a committee who would look thoroughly into the question and report to the Council, and then we would be travelling, I consider, on a safer ground and formulate a resolution which the investigation warrants.

Mr. Duggan: I do not agree with Mr. Mountain's views. I think we should, not as a society, but as a lot of brother engineers gathered together, take the part of a brother engineer in trouble. As a society we are simply an organization banded together to further our profession in a scientific way. We keep strictly out of politics and we have endeavored up to the present, I think, to keep out of all controversial questions whatever. It is true we approached the government, but only for the sake of advancing our profession as a whole and not for the interests of any one individual, and I think any resolution of the society dealing with this matter would be entirely out of place.

Mr. William Kennedy, jr.: I would like to ask Mr. Duggan if he thinks that whether the Canadian Society of Civil Engineers, or a branch of the Canadian Society of Civil Engineers, see plainly an injustice done to one of the members, it is true that we should not take any action to defend him and to see that he gets justice done to him.

I might have pointed out, when I was on my feet before, that the engineer's reputation is at stake there and there is no charge against the man—not a solitary charge. The committee that was appointed was almost entirely new members, most of them, I think, had never been on the Council before, and it was impossible for them to know what the conditions of the department were, whether he had justification for doing what he did or leaving undone what he left undone; it was impossible for them to obtain the facts without a longer consideration. It is true that it was popular for the public to condemn the man, but they did not know what they were doing. The fact of the matter is, the city is going ahead at a phenomenal rate and it is a very difficult thing for any man to keep up to it, and leave the streets—that is where the complaint came—leave the streets in such a condition that they would not inconvenience a good many people. It is easy to find fault with a man for something of that kind, at some time, I know, whether he is to blame or not. Not one member of the Board of Works under whose direction he worked for the last year had a word of fault to find with him, and the only member that was left on the new Council was in his defence—spoke for him—and I will be disappointed if this society does not see its way clear to take some action in a case of that kind. Of course I do not think they should take action without knowing something of the facts—without satisfying themselves of the facts; but if these are the facts that have been stated, surely we ought to do something for a member who is ill-treated in this way and his character damaged. They are advertising—or at least they are seeking for a man to take his place, and they have not notified him that his services are not satisfactory or that they propose to dispense with them.

Mr. R. C. Smith: If this society is to be considered as a higher court, how many higher courts would give a decision on the recommendation of a lower court? I think it is a little hasty for this society to pass a resolution in the way that is stated. I do think a committee might be appointed to either talk with the branch in Vancouver or possibly have

some talk with the Council before anything definite is done. This is a big society and I do not think that in this country or in the United States any higher court would pass a sentence on any person by merely taking a suggestion from a lower court or a recommendation from them. Not that this is a court, but this is the main body of the Canadian Society of Civil Engineers and they have heard a report from a smaller body.

Mr. William Kennedy, jr.: It has been brought to my attention that I have left it as a sort of a mystery why the man should be treated this way. Now I may state that the mayor who has just been re-elected has been to all appearances at enmity with the engineer. He was opposed to him from the time the mayor was elected in the first place, and he has been re-elected and he publishes a newspaper, and he makes use of the newspaper to the detriment of the engineer.

Mr. Edwards: I do not see that we are called upon to pass on whether the Council has advertised for another supervising engineer or not, but it seems to me that it is within our province to pass a resolution calling upon any Council employing an engineer, to give him a fair hearing. I had this discussion with a gentleman on the train. It seems to me that that is the point that he asked for—a body of engineers, or a commission under the "Utility Act"—men who he knew were experts, to pass on this case, and he would pass in his resignation, if he was found against.

Mr. William Kennedy, jr.: The delegation did not say one word against the course that the engineer had been pursuing and did not say claim that he had not been doing rightly. It was set forth that, like the public, we were not in a position to judge whether he had done the right thing or done the wrong, but he did think he should have the hearing he had asked for, and that is what was entirely ignored.

Mr. White: With reference to what was said by Mr. Edwards, I think if you will read the second sentence of my resolution you will find it covers the case exactly, "that this society regrets that the City Council has refused this man an investigation, which is opposed to all ideas of British fairplay."

Professor Edwards: I second that.

The secretary reads the motion as follows:—

"That the Canadian Society of Civil Engineers has been credibly informed that the City Council of Vancouver has advertised for a supervising engineer, and has refused the present incumbent of the position an investigation and that the Canadian Society of Civil Engineers regret the action of the City Council of Vancouver as an action opposed to all ideas of British fairplay."

Mr. Lamb: I wish to move an amendment to this resolution. I propose a committee of, we will say, four members appointed by the president, be formed to-day, to inquire into this matter and report to the meeting to-morrow morning.

Mr. Muckleston: I will second that motion.

Mr. White: I wish to withdraw my motion in favor of the amendment.

President: With the permission of your seconder.

Mr. Lamb: I do not wish to say that I am opposed to the members of the Vancouver branch, but it is to strengthen their end if anything, and it is that the members here be made more fully acquainted with the facts.

Mr. John Kennedy: I understand now a little more clearly how it is from conversations I have had with those around me. I do not like to make assertions but it comes upon me the mayor and the city engineer had some trouble, and the mayor was a newspaper proprietor, so he used his newspaper to malign him, or some milder word; and then appointed a committee and put the thing in that fashion, and the city engineer put himself in a bad position when he said

he would abide by the decision of the committee without knowing what the committee was going to be, and who it was; and the awkward part of it is, he said he would resign if the committee decided against him, and the committee did report against him, and now he wants the whole question gone over again, and it is a mixed up thing and I think this committee would do good if it would confer with the Vancouver members and then we would be able to deal with the matter in a more intelligent manner to-morrow morning. The amendment passed.

Prof. Edwards: Through the lateness of our train we were four hours late, and I would ask if there are some of the members in the Council who are interested in branches, that we be given an opportunity of meeting members of the Council. I think possibly to-morrow morning some notice should be posted that the members of the Council would meet together for an hour. I am from Edmonton, where we have no branch of the society. I know I am out of order.

Secretary: I think it should be done earlier than to-morrow.

Mr. Mountain: As chairman for the nominating committee for 1911, I have heard a good deal of criticism (hear, hear, and laughter), how the nominating committee carried out its duties. It was carried out, as you know, under the new by-laws, and under the new laws it says the committee—that is, alluding to the nominating committee—shall nominate officers and councillors so as to provide that the members remaining on the council be a president, a vice-president, and six councillors residing in district No. 1; two other vice-presidents and 18 other councillors, of which two shall be resident in each of the other districts, 2, 3, 4, 5, 6 and 7. As chairman of the nominating committee I interpreted that. Now sir, I interpret that—probably wrongly—to mean you must provide a sufficient number. We did so. A good many members of the nominating committee sent in their list in the same way without asking any question and evidently concurred in the same view of that by-law as the chairman did. Now I would like to have the ruling or the feeling of the society on this, because it has been very keen for the last couple of days and I would like to have it eliminated or concurred in.

Secretary: I might say there is a resolution of Council coming up in connection with the matter. Would you like to have that now or later?

Mr. Lamb: Will this resolution in Council cover it? I understand it will increase the number of names included.

Col. Anderson: While the secretary is out I might say for the information of the younger members, that the nature of the list sent out by our nominating committee in which we have every confidence, really mean the nominating committee elect the new Council. If you sent out the number of men exactly who are to be elected, the chances are ten to one that enough votes will be received for the slate as sent out without any charge as to other members. The Ottawa branch this year sent in a separate slate. I understand the result of that was half the ballots were invalidated so far as the Ottawa election was concerned. A good many men not in the Ottawa section sent back their ballots without any names crossed out, and in that case the ballots were invalidated as far as the Ottawa centre was concerned. Under the old regulation the nominating committee selected a number of men, say 25, to fill 18 places. That gave the members in outside places an opportunity of choosing their own names among those 25 by scratching out 7 names, and there was a semblance at all events of choice. With the new ballot there is absolutely no choice at all. We have to take the men that are selected for us by the nominating committee and that is the reason I am pointing it out.

think that might be overcome if four names were sent for each centre instead of three, or something of that kind.

Dr. Galbraith: We are following out what the American society do.

Mr. Mountain: There is no doubt under this ballot the nominating committee do practically nominate the officers for 1911.

Col. Anderson: Elect?

Mr. Mountain: Well, I do not say that, I prefer "nominating." The nominating committee is in the best position to know what the Council should be. They know how close certain prominent men in the society have come for election to the different offices and the following year they are usually given it. The outside members will not know that.

Mr. James White: Do you contend the nominating committee should practically elect the council?

Mr. Mountain: No, I do not say that. I say they are in the best position to judge of the nomination.

Mr. James White: I think that is a very fine difference indeed. I quite agree with the statement of Colonel Anderson, there should be four. The great trouble in a society is that the tendency is, certain men get into office and hold office year after year, and nobody has a show, and the society is apt to arrive at the stage of dry rot. I think the nominating committee should nominate four or five; not three—preferably five.

Dr. Galbraith: Although I did not attend the meeting of the nominating committee, I sent in my vote by letter, and having no opportunity to consult with other members of the nominating committee I took the same interpretation that Mr. Mountain expressed of this by-law. Since coming to Winnipeg I have been told that there is another interpretation which may be given to it. The words that I have referred to are these: "the committee shall nominate officers and councillors so as to provide that the members," and so on—"so as to provide." It has been explained to me that that does necessarily mean that the nominating committee shall nominate only the exact number of officers, that they may nominate more; the words "so as to provide" being wide enough to cover that. It is a pity if we have to change the by-laws, but if we are agreed to that interpretation of it it will relieve us of one of the great difficulties, and leave the nominating committee fairly free unless you wish to bind them to always do that and always appoint more. That will necessitate the amendment of the by-law.

R. F. Uniacke: In order to cover the discussion of the nominating committee I would like to move the following resolution and bring it to a head: That the nominating committee in placing nominations on the ballot should be instructed to name two more than the number capable of being elected—the exact men.

Dr. Galbraith: Does that apply to all the officers, from the president down, or simply to councillors?

Mr. Uniacke: I intended that simply to apply to the councillors.

The Secretary: I expected this business to come up to-morrow morning, and the resolution of the Council to which I referred is with some papers due to come up to-morrow morning, but the resolution is, in effect, this: it is a resolution of Council, as I have stated, recommending that future nominating committees shall name two members for each office other than the president—two members—not two in addition; two members. As soon as possible I will get the resolution and bring it up, but that is the sense of it. Two members for each office—six vice-presidents in all; two resident at headquarters and four resident elsewhere; and six for each of the districts outside of headquarters of whom there will

be 12; that is when a full Council has to be appointed. Next year there will only have to be one from each of the districts, so that two would be nominated from each district and four headquarters.

President: Does that cover the same ground as your motion, Mr. Uniacke?

Mr. Uniacke: In view of the secretary's explanation, I would withdraw my motion. I would ask the secretary to state that over again, please.

Secretary: Hereafter, the nominating committee will only have to name one-third of the total number of the officers. In order to carry out the resolution I speak of, it will be necessary for them to name two members as nominated for each of the districts, the purpose being to elect one, except for district No. 1, where there are six councillors always to be on the Council and two to be elected each year, as there will have to be four named and one vice-president named under that resolution that I speak of. (Applause).

Dr. Galbraith: Is it understood that the purpose of the nominating committee, the president voting in person and the others voting by ballot, are to vote only for those members of the Council which apply to their several districts, or to vote upon the whole number? I do not think it is quite clear.

A Member: The whole number, of course.

Mr. James White: To make the matter clear; do I understand that the recommendation in Council is such that it should have been carried out this year; instead of having three members on the ballot in this particular case there would have been six?

The Secretary: Yes, this year. Next year there will be one instead of two.

John Kennedy: This whole matter is a source of continual dissatisfaction. We have never been able to get a by-law that we were satisfied with two years in succession. (Laughter). On the American side the Civil Engineers have had the same difficulty. The nominating committee—and I have been unfortunate enough to be on it sometimes and sometimes the chairman is always blamed—and I thought the by-law was reduced on the whole to pretty good shape as it is, so that the nominating committee, as on the American side, appoints just the number, and anybody else may put on one if he likes. He surely won't get elected, though; that's certain. The nominating committee can get to work and work away the whole year and they can confer with the members of their district and all other branches, and the members of each district, if they can only think of it, can influence the nomination and through their members can really get the right sort of representation if they have the nominating committee. I thought it was in pretty good shape, if the members of the district will set about the matter before the last voting day, and see about the nominations through the members of their district. There are two systems to this matter of asking a greater number of members to stand than are needed for the election, and that is to say, it is a most indelicate thing, beginning with the president, to ask two presidents to stand and run against each other. I know that is not the purpose, but in the next degree it is the same for the vice-presidents. It is a very awkward thing, indeed, to ask a prominent member of this society to put himself on as a candidate when he knows others will be up and if he wants to be elected at all or cares anything about it, he has to canvass or get somebody to canvass for him. The same for councillor.

The Board of Trade in Montreal, it seems to me, have a better system altogether. That is, up to a certain time nominations may be made by any member of the society. Up to within a month or two of the elections any member may

nominate another member, then the nomination closes. Then a ballot is put out, with the names of all those that are nominated up to that time, and every member selects as he chooses out of that. Either that, or put the whole thing in the hands of a judicious nominating committee who can study the matter for a year and give us an exact list. I do not think there is any way between that is really satisfactory. We have had all this matter before. We worked away three or four years under this system and I think we had twenty-four members nominated, out of which we had to select some sixteen, or something of that kind. And we weren't half satisfied with that, and we put it into this shape, and we no sooner get it into this way than we want it some other way.

The President: I understand, Mr. Uniacke and Mr. White have withdrawn their motions, so there is nothing before the meeting. If there are no further resolutions, I would declare the matter closed, and disposed of satisfactory to the members. (Hear hear.)

Mr. Uniacke: I understand this matter is coming up further to-morrow, as to action taken between the Council and the branches, and that would mean the discussion will be open again.

The President: I suppose there is no harm in continuing the discussion to-morrow morning when the other branch of the subject comes up. Mr. Chace has been called away and is unable to go on with the paper he was to have read this morning. It is now half-past twelve. We might, perhaps, take up the next paper on the list. It is a paper by Professor Edwards on the Sterilization of Water Supply.

Professor Edwards: I might say the paper, as presented, was really presented in connection with a report which has already been made in connection with a matter of purification of streams, and so on, and is not really in proper shape. I think, if I might, with the permission of the chairman, outline certain of the findings of the paper and allow the paper to stand over until printed, with the details of the construction, and so on. The paper is really giving the practical workings of the plant and is not understandable without the apparatus, I was not familiar with the apparatus we would have here this forenoon, and it cannot be shown without the slides.

The President: Is the suggestion of Professor Edwards agreeable to the meeting?

The Members: Yes.

Professor Edwards: The paper is really a description of the practical portion of a sterilizing plant, the results obtained, and the methods of procedure and so forth, and as I say, practically depends on the plant and so on, which I have with me, and if any member wishes to see it I will be pleased to show it, but when the paper is published it will explain this. The paper deals with a typhoid epidemic which broke out at Strathcona, about the first of November. The disease increased very rapidly and we had practically 80 cases amongst a population of 5,000 within that month. I was called in, in connection with the Board of Health, and we decided to sterilize the water supply immediately as a prevention, and at the same time investigate the epidemic; and the paper gives a report of the method of investigation and the results obtained, and so on. That is, we took the cases of typhoid and tabulated them and from that tabulated statement came to the conclusion that the water supply was contaminated. It seems to me we had a bacterial analysis made, and that showed also contamination of the water supply. I think there is one interesting point. We put in an emergency plant immediately. That plant was put in in sixteen hours, and so sixteen hours after the Board of Health met that night at ten o'clock, the next morning we

started at about ten o'clock and by two o'clock the next morning we had the water sterilized, and that, I think, is an interesting feature of the work. (Applause.)

Now I have photographs of that emergency plant here, if any of you care to see them. It consisted of a candy pail, two barrels, and two tubs made by sawing off two other barrels, and pipe, etc., necessary to lead the water to the suction pipe of the high-lift pumps. The bleaching powder was mixed in the candy pails and—

A Member: Were those whiskey barrels?

Professor Edwards: No; they were oil barrels, as a matter of fact. The solution was allowed to stand in these barrels and then carried by pipes to the overflow of the tubs and from there delivered through a small orifice running under constant head and delivered to the intake end of the suction pipe of the pumps.

A Member: Then you treated at the suction end?

Professor Edwards: Right at the bottom of the suction. So the solution mixed as it went through the pumps, and then was delivered right to the city mains. I might omit the actual description of the operation of the permanent plant; there are one or two features I would like to call your attention to. When I came to design the plant I could not get the details of other plants, and the overflow, as outlined in plants described, did not seem to be satisfactory. Since it is advisable as quickly as possible to separate out the insoluble portion of the bleaching powder which has no chemical efficiency, an arrangement was devised whereby by means of rising current and varying indensity the insoluble portion might be retained and washed by water, afterwards overflowing into the storage tanks. This consisted of a double cone, the water being fed into the lower cone and rising in the upper, and flowing through a two-inch pipe into the solution tanks. By this means the powder was held suspended in the neck of the upper cone, and thoroughly washed by the overflowing water. Upon turning off the feed water the insoluble portion could be wasted, and so not be of any further trouble in the treatment.

The President: Gentlemen, I am sure we are all very much obliged to Professor Edwards for the very valuable paper which he has just read. It is now nearly one o'clock and I would suggest that the discussion be left until the afternoon meeting at three o'clock.

Before the meeting breaks up, I would like to state that I have appointed the following committee to act in connection with the investigation of the charges against the Vancouver engineer: Mr. John Kennedy, Mr. C. H. Rust, Mr. Mountain, and Dr. Galbraith.

Mr. Mountain: With your permission, Mr. President, I would like to have my name withdrawn. I am entirely at variance with the action.

The President: With the action of appointing a committee to report?

Mr. Mountain: Yes.

Mr. Rust: While I would be pleased to act, I would point out that the City Engineer of Vancouver is one of my former assistants and I would like not to be thought biased in anything I would say about him. Probably you would better keep me off the committee. I am satisfied of what I know of Mr. Clement, everything he has done is perfectly honest and straightforward, and probably you better leave me off the committee.

Mr. Mountain: I asked you to relieve me because I felt in taking this step the actions of the society are apt to be misconstrued; I cannot see, for the life of me, if a municipality does not want an engineer why they cannot dismiss him.

(Continued on Page 285).

CONCRETE SECTION

DESIGN AND COMPUTATIONS FOR A CELLULAR REINFORCED CONCRETE DAM.*

By George J. Bancroft.

Briefly, the dam is built in the general outline of a solid concrete dam; but instead of being solid concrete, it is built like a honeycomb, the cells being vertical. The dam will be somewhat thicker than a solid concrete dam, owing to the difference in weight between earth and concrete. After the concrete work is finished, the cells are filled with earth and rocks laid down in water, so in the end the dam is practically a solid mass. Figure 1 indicates the construction.

To illustrate the manner in which this dam works out, I will take a specific instance. In this case the dam is 185 ft. high and 1,370 ft. along the crest. The material in this dam is proportioned with due consideration to all the strains that may come upon it. The principal strains are: (a) the pressure of the water when the reservoir is full; (b) the pressure of the earth filling when the reservoir is empty; (c) the weight of the superimposed material on the foundations.

The dam is considered, for the sake of calculation, as consisting essentially of a face wall supported in the rear by buttresses. The auxiliary walls which are parallel to the face wall and which complete the enclosure of the cells are considered only as supports to prevent the buckling of the buttresses, as resistance to shear strain and as weight to resist overturning. Their great stiffening effect on the entire structure, and their support and assistance to resisting the strain of the water pressure is not considered. Moreover, the strength of the earth filling in shear and its supporting effect in resisting transverse and longitudinal pressure is disregarded because I wished the structure to be strong enough to withstand all strains without counting on this assistance.

The computations are, therefore, as follows: (1)—The proportioning of the dam as a whole so as to resist overturning; (2)—The proportioning of the face wall; (3)—The proportioning and spacing of the buttresses; (4)—The proportioning and spacing of the walls parallel to the face wall, which we will call the auxiliary walls.

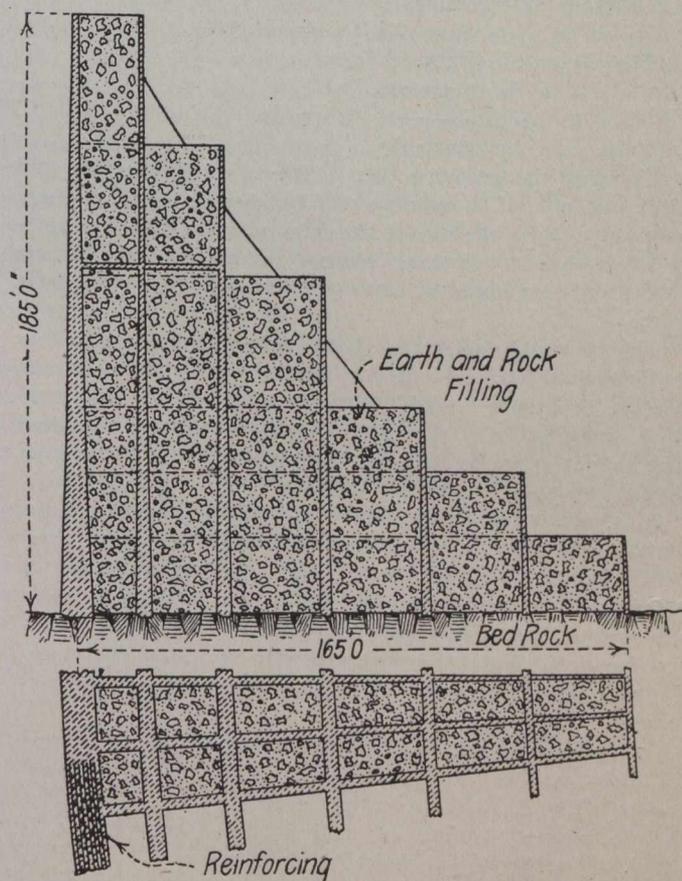
In a measure, these problems are worked backward, for the general form of the dam and the general nature of the strains suggest a certain arrangement, which is assumed at the outset, although the proof of its fitness is the last thing arrived at in the course of the calculations. Thus it is assumed that the cells will be 20 ft. as measured longitudinally on the face wall, and will, of course, be narrowed as the radial buttresses approach the centre of curvature of the dam. As measured transversely to the dam, the first tier will be 20 ft., the second 25 ft., and the third and balance, 30 ft., measurements being centre to centre of retaining walls. The spacing of these walls was decided upon after several calculations to determine the maximum economy in the proportionment of concrete and earth. The only way to decide this matter seemed to be by the "cut and try" method, so five different designs were figured out, and the one presented gave the best results. I think it is self-evident that the face part of the dam should have more concrete and less earth-filling than the rear part, and our "cut and try" calculations verified this assumption. Several formulas were found, which almost fitted this case, and it is entirely possible that theoretic perfection may yet be

*Abstract of a paper read before the Colorado Scientific Society.

attained, but the present design is sufficiently attractive from a practical standpoint.

As mentioned above, the nature of the several problems continually involves using the ultimate result in the primary calculation. It is therefore more simple, and better suited to the purpose of this article, I think, to assume the entire design as shown on the cross sections presented herewith, and proceed with the calculations to ascertain what the factors of safety may be.

(1)—To ascertain the factor of safety of the entire dam to resist overturning. To do this the dam is considered in progressively increasing segments, beginning at the top and going down, the last segment being the entire dam. The width of the base of each segment is determined by the graphic method given by Bulkeley on p. 184 of "Facts, Figures and Formulae for Irrigation Engineers." The factor of safety consists in the fact that the resultant falls in the middle third of the base of the dam and also in the fact that the dam is arched against the water pressure.



It is evident that for the dam to yield, all the longitudinal walls must be crushed by the longitudinal component of the water thrust and that the buttress walls must be crushed by the overturning moment. By calculations given later on, it will be seen that the factor of safety in the buttresses is 8, without reinforcing. To this must be added the factor of safety protecting the crushing of the longitudinal walls. These walls are supported every 20 ft., at least, by the transverse walls so they cannot yield by buckling, neither can the dam as a whole yield by buckling, if properly curved, as in this case, and not too long in proportion to its thickness.

For the purpose of finding out what factor of safety is contributed by arching the dam against the water, two horizontal segments will be considered, namely, the top

10 ft. and the bottom 10 ft. Measured at right angles to the line of pressure, the upper segment is 1,270 x 10 ft. and the walls meet the buttresses at an angle of 35° to the line of pressure.

The strain then is

$$\frac{10}{2} \times 10 \times 1,270 \times 62.5 = 3,968,750 \text{ lbs.}$$

62.5 being the weight of a cubic foot of water.

This strain is met by two abutments, so it is proper to divide this in two.

$$\frac{3,968,750}{2} = 1,984,375 \text{ lbs.}$$

As it does not meet the abutment parallel to the line of pressure, but at an angle of 35° it should be multiplied by the secant of 35°.

$$1,984,375 \times 1.22 = 2,420,937 \text{ lbs.}$$

This strain is met by two walls having a total cross-section of 17.5 ft. Each foot will, according to Kidder (p. 227, Architect's and Builder's Pocket Book) resist 440,000 lbs., without reinforcement.

$$17.5 \times 440,000 = 7,700,000$$

The factor of safety, then, is

$$\frac{7,700,000}{2,420,937} = 3 \text{ approx.}$$

Figuring the bottom 10 ft. in the same manner, we find a factor of 1½. The average will be about 2¼. It is more important to have the top of the dam supported by the arching effect than the bottom, because in this case the bottom is short and so wedged in between cliffs that it is abundantly secure.

The factor of safety in the buttresses alone is 8. As the dam could not yield in one way without yielding in the other, it is proper to add these two factors of safety together, making a total of 10¼, which will be increased about 12 per cent. by the reinforcement (total, 16) and an unknown amount by the earth filling.

It is, of course, conceivable that the distribution of the material might be so at variance with the changes of pressure in depth that the above calculations, with regard to the factor of safety of the arch, would not hold. This matter, however, has been closely considered and each horizontal cross-section has been designed with regard to the shearing strain, which is closely related to the strains above considered.

(2)—The proportioning of the face wall. In this case it is assumed that the water comes flush with the top of the dam. The parapet or extra height of any dam varies with the nature of the case and in this recitation it is omitted. The theoretical width of the face wall at the top is zero. It is, however, designed to be 2 ft. thick to resist wave action. The entire width on top, counting earth filling and enclosing walls, will be 23 ft. 4½ ins. As the pressure against this wall varies as the depth, and as the top is unnecessarily thick, the bottom is the place to test the factor of safety. In so doing, we will neglect the strengthening effect of the bedrock key.

The face wall is divided into vertical panels by the buttresses, the one in the centre measuring 20 ft. horizontally and 185 ft. vertically. These panels may be considered as consisting of horizontal slabs or simple beams being supported at each end and being subjected to a uniform load between supports. When the reservoir is full, there will be a pressure on the outside of each slab equal to the weight of the water over the slab considered. When the reservoir

is empty, the weight of the earth filling may press outwardly against the slab. The water pressure is easily figured and the maximum possible pressure of the earth filling can be readily ascertained, but there are other possible strains not so easily estimated. There is an indeterminable strain due to a possible slight yield of the dam by reason of its elasticity and this yielding may cause a strain considerably greater than the pressure that caused it. Thus, supposing that the pressure against the dam should be increased by a violent flood or earthquake, the dam would then be forced against the abutments and the elasticity of the curved walls would allow a little yielding such that the face would be a little out of the perpendicular. This condition would add to the strain on the slab in question a small percentage of the superimposed dead weight. As this is an indeterminable factor, it is necessary to have an unusually high factor of safety in the face wall.

The following notation and formula are used in computing the water pressure on the slab:

g=centre of gravity of outer surface of slab exposed to water pressure.

d=vertical distance from g to water surface, measured in feet=184.5.

A=area of slab exposed to pressure measured in sq. ft.

w=weight of a cubic foot of water in lbs.

L=length between supports in inches=168.

W=total pressure on slab.

In this case

A=14 sq. ft. (The slab is 20 ft. long centre to centre of buttresses, but only 14 ft. long in the clear.)

D=184.50.

w=62.50 (approximately).

It is evident that

$$W = A \times w \times D = 14 \times 184.50 \times 62.50 = 161,437.$$

The pressure moment in inch pounds=

$$\frac{W.L}{8} = \frac{161,437 \times 168}{8} = 3,390,177 \text{ in. lbs.}$$

Weight of face wall, central slab =

$$\frac{8 + 2}{2} \times 184 \times 20 \times 150 = 2,760,000 \text{ (approx.).}$$

One-fourth weight of dirt above floor =

$$\frac{17.5 \times 13 \times 110 \times 80}{4} = 500,500$$

Total weight = 3,260,500 lbs.

Our beam therefore must stand a pressure of 3,390,177 in. lbs. and the foundation for this segment must be strong enough to carry a load of 3,260,000 lbs.

The following are the notations, formulas and respective dimensions used in the formulas to calculate the strength of the face wall as assumed above.

The coefficients have been calculated to correspond to the material used, both with regard to concrete and steel. Concrete will be first-class 1:3:5 mixture and steel of good quality. See Webb and Gibson, "Reinforced Concrete," pp. 49 and 50.

Mo=Ultimate resisting moment in inch pounds.

b=breadth of slab transverse to pressure=12".

d=depth from the face under compression to the centre of gravity of the steel reinforcement, in this case=82" as shown later.

C=compressive strength of concrete in lbs. per sq. in. =2,700 in our case. (Webb and Gibson.)

(Continued on Page 293).

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The Canadian Engineer absorbed The Canadian Cement and Concrete Review in 1910.

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PROGRESS ESTIMATES.

The contractor, when bidding on a job, figures carefully, but nevertheless he recognizes that in each contract he enters upon there is so large an amount of uncertainty that what should be clean-cut business is frequently considerable of a gamble.

In each agreement a provision is made for progress estimates, which usually amounts to eighty or eighty-five per cent. of the work completed at the end of each month. On this understanding the contractor installs his plant and opens up his work. It may be for the first month or two his estimates are large and the profits fair, when suddenly, for some unexpected reason, his monthly estimate drops below what he has been expecting. A careful survey of the work would indicate that perhaps his estimate is only seventy or seventy-five per cent. of what it should be. Should this method of estimating continue for two or three months, the contractor is very likely to find himself embarrassed because of the necessity of further financial arrangements.

It is never wise for a contractor to act hastily in forming his conclusions as to the insufficiency of his estimate, but we believe where the contractor is sure of his ground and can demonstrate clearly that he is being badly treated in the matter of low estimates, he should at once take strong ground in this matter and inform the party responsible that if full payment is not forthcoming at once the work will be stopped. If this has not the desired effect, proper notice should be given and the work stopped immediately, and not proceeded with until money due is paid and a guarantee that in the future the estimates will be satisfactory.

Many engineers are very careful in the matter of estimates, but where the contractor has a large plant on the ground and large quantities of raw materials in store, we believe it is a serious breach of contract on the part of the engineer to not give the contractor the full value of his estimate. In fact, we believe that this clause referring to the percentage of progress estimates should receive much fuller attention from the engineers, and if this were done there would be fewer breaches of contracts and less necessity for the contractor to be a quitter, and, what is worse, frequently a heavy loser.

THE CONSOLIDATED MUNICIPAL ACT.

One of the most important Acts of the Ontario Legislature for the municipal engineers to be familiar with is the Municipal Consolidated Act of Ontario. This Act has been revised and consolidated, and is now issued in complete book form for the use of engineers and clerks, and for those who have charge of municipal work is a very convenient, and, in fact, a necessary volume.

In connection with this Act the Honorable the Provincial Secretary has introduced at this session of the Legislature certain amendments, which, if they become law, will have a noticeable effect upon the method of carrying out municipal work in Ontario.

One of the most important is that in the case of street extension and bridges; where the estimated cost is over \$30,000, interested property owners may appeal over the head of the council to the Ontario Railway Municipal Board, and without their approval the work may not proceed.

Another important new clause is the one extending the initiative to the council now possess in connection with sidewalks and sewers to street extensions and bridges.

In the securing of local improvement petitions it has frequently happened that the person signing has requested the removal of his name from the petition, and by so doing could have his name removed. The new clause provides that, except in case of fraud, the name cannot be withdrawn.

A new section gives the Ontario Railway Board power to approve forms of by-laws and other proceedings under the Act, and anything so approved will not be open to question on the ground that it is not in the form required by the provisions of this Act.

MR. C. H. RUST AND PROVINCIAL BOARDS OF HEALTH.

At the annual meeting of the Canadian Society of Civil Engineers, Mr. C. H. Rust (this year's president), while the report of the Sewage Committee was under discussion, remarked as follows:—

"There is another matter, too, which I think the Society should take up, and that is the question of the formation of these various Provincial Boards of Health. They are, in nearly every case, composed almost entirely of medical men, not represented at all by engineers, and we have to go before them with plans of which they understand nothing."

If the above remarks had been confined to Ontario instead of generally to "these various Provincial Boards of Health," Mr. Rust would have been more beside the mark.

True, the Ontario Provincial Board of Health has endeavored to pronounce medical opinion upon engineering plans for several years, much to the general disgust of engineers engaged in sewerage and water supply work. It is evident that the Ontario Provincial Board of Health are about to continue to give medical advice upon engineering plans. We find that a new Board has lately been appointed. We look in vain through the list for the name of any man who may be said to represent sanitary engineering. Here is the list:—

- Dr. Adam Wright, Toronto, chairman.
- Dr. D. B. Bentley, Sarnia.
- Dr. Geo. Clinton, Belleville.
- Dr. W. H. Howey, Sudbury.
- Dr. Paul J. Maloney, Cornwall.
- Dr. James Roberts, Hamilton.
- Dr. J. W. S. McCullough, secretary.

The above list is composed of a number of medical gentlemen, with a special medical training, who shall probably meet at intervals, and, amongst their other duties, carefully stare in profound bewilderment at plans and designs for sewerage works, sewage disposal works, water supply propositions, complicated with pumping machinery, and may be intricate mechanism for water purification.

Possibly, before the meeting of the Board, the Board's inspector, another medical gentleman, may have visited the localities where the proposed works are to be located, in order to satisfy the Board that such localities really exist.

No doubt, this is the farce to which Mr. Rust publicly referred to at the annual meeting. But is it fair that all and the several Boards of Health of the other Provinces be included?

The chairman of the committee which presented the report on sewage disposal, and which Mr. Rust was there and then referring to, has served several years as a

member of the Quebec Provincial Board of Health. Mr. R. S. Lea, M. Can. Soc. C.E., is not the only exception. In the Province of Saskatchewan another member of the Canadian Society acts in an advisory position on the Bureau of Public Health. Also, in Alberta, a sanitary engineer appears practically to control the Provincial Board of Health, even to the extent of obtaining appropriations for trying out his own engineering fads.

However, apart from the sweeping character of Mr. Rust's indictment upon the composition of Boards of Health, there is a question of serious moment. Sewage disposal and water purification problems are new in Canada. The country is just awakening to the necessity of active measures for maintaining the purity of water supplies. The demand not having existed in Canada for engineers trained in this special line of work, it is to be expected that we have not many members of the Society who have devoted much attention to this branch. Boards of Health have existed in the past for the prevention of disease, it is natural that questions of sewage disposal and water purification, which are preventive measures, should be referred to such bodies. It will, however, be unfortunate for the practical effectiveness of such engineering schemes if such Boards of Health do not recognize the necessity of the direct co-operation of the engineering profession. On the other hand, it will be unfortunate for the engineering profession if it does not recognize the co-operation of the medical man, the chemist and the bacteriologist, in order to formulate the basic requirements which call for engineering structures.

THE GREAT LAKES AND SEWAGE.

"Take our cities situated on the Great Lakes and on large rivers, the best purification you can have there is the water itself. It is much cheaper, and probably a great deal more efficient, than any works you can put up." (Mr. C. H. Rust, City Engineer of Toronto; discussion on Sewage Disposal Committee's Report, annual meeting of Canadian Society of Civil Engineers, Winnipeg).

It is absolutely true that if the Great Lakes and large rivers of Canada are to be used for nothing else than for purposes of sewage disposal, such would prove both cheap and efficient.

It is absolutely untrue that if the Great Lakes and large rivers of Canada are to be used for purposes of water supply as well as sewage disposal, that such would prove both cheap and efficient.

Here we have the engineer speaking from the standpoint of chemical purity only. Here we have the engineer taking no cognizance whatever of bacterial impurity. Here we have the old, stale proposition laid before us of the action of large bodies of water and their capability to reduce the tendency to putrescibility in sewage without reference to the newer knowledge of the transmission of typhoid infection by water.

Putrescibility may come, and putrescibility may go, but bacteria go on for ever, may be somewhat of an exaggeration, but it is a safe assumption in sanitary engineering.

How can the City Engineer of Toronto state that our Great Lakes and rivers are the most efficient means of dealing with sewage when we have as follows:—

Toronto city sterilizing its lake water supply in order to kill the typhoid germs supplied to the lake by Toronto sewage.

Montreal city sterilizing its St. Lawrence River water supply in order to kill the typhoid germs supplied by the sewage of towns and cities above Montreal.

Ottawa city suffering from typhoid, and in a panic rushing to sterilization in order to kill the typhoid germs supplied by the sewage of Aylmer and other towns above Ottawa.

Pembroke.—A record in the past three years of over three hundred cases of typhoid by drinking the water of the Allumette Lake, receiving the sewage of its own town, and only saved from a continuance of typhoid by continued sterilization of the water.

If Toronto could so diffuse its sewage throughout Lake Ontario so that every cubic foot of water would receive its equal share of sewage, it would then be impossible to trace the pollution.

Toronto does not do such thing; it simply uses one small, little portion of Lake Ontario, and contaminates that portion to the extent of over 5,000 bacteria per c.c., while there should only be from 8 to 10 per c.c.

The large rivers, by means of ice and general flow, convey bacteria and the germs of disease practically any distance. It is a fact that, while the Niagara River chemically purifies itself by oxidation in passing over the Falls and through the Rapids, no bacterial purification takes place.

Statements such as the above, based upon the principle of sewage disposal by dilution, are not in line with present conclusions and up-to-date knowledge of the subject of sewage disposal.

The Toronto Branch of The Canadian Society of Civil Engineers

96 KING STREET WEST

Programme for February, 1911

FRIDAY, 10th, 8 p.m.

Joint Meeting of the Toronto Branch of the Canadian Society of Civil Engineers and the Toronto Section of the American Institute of Electrical Engineers. The following papers presented to the Canadian Society of Civil Engineers will be read by Messrs. N. R. Gibson and A. L. Mudge.

"Hydro Electric Power Development of the British Canadian Power Company," by N. R. Gibson, A.M. Can. Soc. C.E., A. L. Mudge, A.M. Can. Soc. C.E. and S. M. Waldron, Stud. Can. Soc. C.E.

"Hydro Electric Power Development for the City of Winnipeg," by W. G. Chace, A.M. Can. Soc. C.E.

THURSDAY, 23rd, 8 p.m.

"Aesthetics in Bridge Design." Illustrated Address by Prof. C. R. Young, A.M. Can. Soc. C.E.

Papers will be fully illustrated with lantern slides.

H. E. T. HAULTAIN,
Chairman.

A. C. D. BLANCHARD,
Secretary,
City Hall, Toronto, Ont.

ONTARIO GOOD ROADS ASSOCIATION.

The annual meeting will be held Wednesday, Thursday, and Friday, March 1st, 2nd and 3rd, 1911, at the York County Municipal Building, Adelaide Street East, Toronto. The programme will be as follows:—Wednesday, March 1st, morning session, 10.30.

Address of Welcome.—G. R. Geary, Mayor of Toronto; R. T. Bull, Warden of York; Controller Ward, Toronto.

President's Address.—W. H. Pugsley, Richmond Hill.

Secretary's Report.—J. F. Farewell, K.C., Whitby.

"Brief Sketch of the Good Roads Movement in Ontario,"—J. F. Beam, Black Creek.

Appointment of committees.

Afternoon Session, 2 p.m.

Address.—Hon. John Morrissy, Minister of Public Works, New Brunswick.

"Why Toronto voted \$100,000 for York Roads."—L. H. Clarke, Toronto Board of Trade; W. G. Trefhewey, Toronto Board of Trade.

"Good Roads and the Fruit Trade."—L. A. Hamilton, Lorne Park.

"The Niagara Boulevard."—John H. Jackson, C.E., Superintendent, the Queen Victoria Niagara Falls Park.

"Road Management."—T. L. Kennedy, Reeve of Toronto Township.

"Road Systems."—W. A. McLean, C.E., Provincial Engineer of Highways.

Thursday, March 2nd, morning session, 10 a.m.

"New York State Roads."—Geo. C. Diehl, Engineer of Erie County, Buffalo, N.Y.

"Design and Cost of Concrete Bridges."—C. R. Wheelock, C.E., Engineer of Peel County, Orangeville.

"Shop Fabrication and Erection of Highway Bridges."—L. J. Street, C.E., Toronto.

"Highway Bridges from the Investment Point of View."—C. R. Young, C.E., Toronto.

Afternoon Session, 2 p.m.

Address.—Hon. J. I. Reaume, Minister of Public Works.

Address.—Geo. H. Gooderham, M.P.P., Toronto.

"Cost of Primary Transportation."—R. H. Jupp, County Engineer of Simcoe.

"County Road Systems."—Herbert J. Bowman, C.E., Waterloo County; T. J. Lammiman, County Road Superintendent, Oxford County; W. R. Cummings, Carleton County; John A. Sanderson, Warden, Leeds and Grenville; Geo. M. Fox, Warden of Wellington County; W. B. Russ, Lincoln County; J. L. Taylor, Wentworth County; and other county representatives.

Friday, March 3rd, morning session, 10 a.m.

Address.—A. McGillivray, Highway Commissioner of Manitoba.

"Township Road Methods."—Walter Scott, ex-Reeve of Markham; R. W. Longmore, Reeve of Ernesttown; J. C. Rose, Clerk of Orillia Township; Thos. W. Allan, Reeve of North Grimsby; Wm. B. Bridgman, Reeve of Saltfleet; F. H. Lowery, Reeve of Niagara Township; other township representatives.

Afternoon Session, 2 p.m.

"Tile Drainage of Roads."—Charles Talbot, County Engineer, Middlesex.

"Road Drainage and Drainage Laws."—F. J. Ure, C.E.,
Woodstock.

"Roads of Coleman Township."—H. I. Routley, C.E.,
Haileybury.

Reports of committees. Election of officers.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

(Continued from Page 280).

The President: I would say it is quite competent for the committee to report on the line you have expressed, if they wish to.

Mr. Mountain: I must say I am too strongly biased to go on that committee. It would not be fair to the body for me to go on.

A member: Couldn't Mr. Mountain bring in a minority report, if he wishes, after having heard the facts?

The President: Perhaps I am at sea as to the resolution. I understood that this committee was to be appointed to look into the facts and advise this society whether they should do anything or not; that is the view I take in connection with this. I should think Mr. Mountain's report would be of value to the society.

Mr. C. H. Rust: I would be pleased to act, but I thought you would like my know my position.

Mr. John Kennedy: That should be valuable to us—Mr. Rust's knowledge.

Mr. Rus: Then I will act.

Dr. Galbraith: That is the meaning I took out of the resolution, that the minds of this committee should be open. If this is a private affair and will not be going outside, I have no objection to going on the committee and trying to be as fair to the engineer as I can.

The President: The printed reports on Tuesday's proceedings will be ready for this afternoon. The meeting will adjourn until three o'clock this afternoon.

(The meeting adjourned at 12.45, to resume at 15 o'clock.)

The fourth session of the society met at 3 p.m., Jan. 26th, 1911, President H. N. Ruttan in the chair.

Chairman: The secretary informs me that the first item on the programme is the president's address. I will be pleased to read that now, and the copies will be distributed.

Col. Anderson: I would move that Mr. Mountain take the chair while you are speaking.

Mr. Mountain accordingly took the chair, and President H. N. Ruttan then read his address.

Prof. Darley: I think the society is to be congratulated not only on the very successful year which it has had under Colonel Ruttan's presidency, but also on the presidential address which he has given us at the conclusion of his year. It is an address which some of us would like to have had a little longer perhaps, but which is no mere collection of platitudes. In my opinion, it affords a great deal of food for thought, and is an example of the kind of advice and instruction which should be given by the engineering profession to the public. I should like, sir, to move a very hearty vote of thanks to Colonel Ruttan for the address which he has just given.

Mr. W. Kennedy: I would like to second the motion which has been proposed by Mr. Darley, and in doing so, I think that this matter is very timely present, especially with the Railway Commission that is now in force with the power to regulate rates and to control the business of the railways and other transportation companies, so we don't fear if a

line is located in any particular place, having too great power or being in a position to, I might say, prey upon the public, and although this address is very short—comparatively short—I think it has initiated a very good subject, and one that requires a great deal of thought and study. I have much pleasure in seconding the motion. (Applause.)

Mr. Mountain: You have heard the motion proposed by Professor Darley, seconded by Mr. William Kennedy, that a hearty vote of thanks be extended Colonel Ruttan for his address. I might say before I put the motion that it gives me great pleasure to have been present at this annual meeting presided over by Colonel Ruttan. I have sat with him on many occasions in the Council, and he has added dignity and courtesy to the body. It is a great pleasure, I am sure, to all of us to have been with him in this city during this year. In my opinion, he has had the banner year of the association, and I feel proud that I was the mover in the Council of the resolution having the annual meeting at Winnipeg.

Now, sir, it is not probably proper to go into a discussion on the president's address, but this is a mighty live question at the present moment. In fact it is agitating the House of Commons now in Ottawa, and very much along the lines laid out in our president's address. Therefore, gentlemen, I wish that you will receive this address with hearty appreciation. I therefore put the motion for a hearty vote of thanks to the president. (Loud applause.)

Mr. Mountain: President Ruttan, it is needless for me to add anything more. You have heard the applause from the members of the association, in returning thanks to you, sir, for your very able address. I may say that the society wish you every success, and are only too pleased to have you with us on the Council for we hope many years to come.

President Ruttan: Mr. Chairman and Gentlemen,—In thanking you for the very hearty manner in which you have received this address, I may say a word of apology as to its length, or as to its shortness rather. The questions are so large that when I came to write the address, I found that if I were going thoroughly into detail, if I were going any length into detail, it would be much too long for any occasion so I had the choice of doing that or of making my address simply a text, which could be discussed and enlarged upon in the future, if there is anything in it worthy of attention. I thank you, Mr. Chairman, for the kind expressions of your opinion as to the Winnipeg Convention. I have not been at very many of the conventions, but I think with you that this certainly has not been behind any of them, and I hope—I cannot expect to have you here every year—but I hope in the near future you will be able to come here again, and we will be able perhaps to give you even a better reception and better facilities for meeting than you have at the present time. (Applause.)

Colonel Ruttan then resumed the chair.

Chairman: I will now ask Mr. Chace to read his paper on The Municipal Hydro-Electric Works of the City of Winnipeg at Point du Bois Falls.

Mr. Chace: I was going to ask you to consider the papers as being read, but it might be as well perhaps to glance over the principal headings and comment slightly upon those before showing you a set of slides which may be of advantage to those who did not accompany us yesterday, and upon which I can probably make some explanations which the size of the gathering yesterday prevented me from making to very many. I must first say that it is only because of the extreme urgency of Mr. Smith's other business that he himself did not read this paper and present it, and it was at his request that it was done as it has been. He

is very much disappointed at not being present and able to enjoy the convention.

Mr. Chace then went over his paper with explanatory remarks and afterwards put a number of slides on the screen.

Mr. Herdt: All I have to say is, I am sorry you did not come to the city twelve months from now, when we could have shown you this plant in operation. We expect to give the city of Winnipeg very cheap power in twelve months from this date. In answering a number of questions proposed to me yesterday in connection with this plant, some engineers have asked me why this plant is not made at a higher voltage and why we didn't use a lower frequency. The first problem that enters the mind of the electrical engineer in designing a plant of this kind is the voltage to be carried, and second, the frequency to be used.

The citizens are a year and a half later than they expected to be in getting power from the Winnipeg Electric Railway Company's plant, through a break-down in the generating station at Lac du Bonnet. We have used their experience and guarded against a similar occurrence in connection with our works. We are operating practically the same voltage as they are operating, and operating on the same frequency as they are operating. The two lines go so close together, if in a case of emergency and the transmission lines going down, through some break-down of the towers, we could still help each other. We are somewhat fighting each other at the present time, but it is not likely to last for long, and once they find we are in operation, and that we can help them out and they can help us out in a case of trouble, I am sure we will be the best of friends. The fact of the matter is, the question of frequency and the question of voltage was decided principally on the question of safety and unity of operation between the two systems. Besides that, the fact that the transmission line is only 77 miles long, a voltage of 66,000 and possibly 72,000 is a very good voltage to use; a voltage of 1,000 volts a mile is a fair figure. Another 25 cycles would require a larger number of changes and as the city is wired for voltage coming in at 60 cycles, it will do away with the change of a large amount of machinery. I would point out substantial construction we have had in connection with the underground conduit system. The supporting of the tiles with mortar has, I would point out, been used only in one other city so far as I know, and that is in the city of Toronto, using 12,000 volts and carrying 12,000 kilowatts. The employment of a little concrete and mortar around the tiles added only about four per cent. to the cost of the conduit construction, and on account of the better conduit construction the cable manufacturers who had to give us a guarantee of five years on their cable, were able to cut down the cost of guarantee on the cables fifteen per cent. As the cost of cable construction is greater than the cost of conduit construction, we have made a good saving.

I have also to congratulate Mr. Chace on how he has brought out the points of this plant. It has been before the citizens for the last two and a half or three years, and they were expecting to get their power quickly, and we could see the nature of what has been to us a work of exceeding interest, which we hope will give great satisfaction to the citizens of Winnipeg. (Applause.)

**Proceedings of session of Friday morning, Jan. 27th, 1911,
9.30 o'clock.**

President: The first order of business is the receiving of the report of the nominating committee.

Secretary McLeod: This should be explained, perhaps.

The procedure for these nominations are in the hands of the Council. The committee are to arrange for the names to be submitted to the annual meeting from time to time. The proposal for the resident councillor for district No. 1 is made by the resident members of the Council, and the name recommended is Mr. J. M. R. Fairbairn. (Applause.)

No regular means have been adopted to get a suggestion for district No. 2. This is the lower provinces and the United States and some gentlemen, the resident councillor in Montreal suggests a name, the name of Professor E. A. Stone, but possibly some of the representatives of that district here may wish to put up another name. The Quebec Branch recommends for district No. 3 A. R. Decary. The Ottawa Branch recommends for district No. 4 James White. The Toronto Branch for district No. 5 recommends A. C. D. Blanchard. I have not received any suggestions for nominations for districts 6 and 7.

President: Professor Brydone-Jack, any nominations for district No. 6, Manitoba?

Prof. Brydone-Jack: I nominate Mr. J. A. Heskett.

President: Someone from the west suggest a name for district No. 7. Any representative of the Vancouver Branch here suggest a name for district No. 7?

Mr. G. Kennedy, Jr: I would recommend the name of Mr. C. E. Cartwright, Vancouver.

President: Are there any other suggestions in connection with these nominations? No. 2 seems to be the only one that the Council are not quite sure about. That is New Brunswick, the lower provinces and the United States; if there is no objection I would suggest that some one move to confirm the names submitted.

President: Moved by Mr. Mountain and seconded by Mr. John Kennedy that the names as read be confirmed. (Carried.)

President: The next item is the naming of the Good Roads Committee; it would be very difficult to do that in a meeting like the present and it might be well to consider leaving that nomination for the incoming council, and not take the time now. What is your pleasure in connection with the Good Roads Committee, gentlemen?

Mr. John Kennedy: The incoming Council.

President: It has been moved by Mr. John Kennedy that the mater be left to the incoming Council; will some one second that resolution?

Mr. Duggan: I second that. (Carried.)

President: The next item is the report of the committee re the Vancouver City engineer.

Mr. John Kennedy: We have carefully considered over this rather complex question and have come to the conclusion that we really cannot interfere with it. It is, in the first place, contrary to our practice hitherto, and several cases of the kind have come up, not so formally as this, but in varying ways, have come up, and the society has felt it uniformly really impracticable to interfere with them, and contrary to the spirit of our constitution and the whole action of the society. That is to say, that we are a scientific body and not a trade union. And then in discussing the matter more fully with the Vancouver members who are familiar with the matter and from reading the newspaper accounts we felt that it was a controvertic question, and although there was nothing in the world against the character of our professional brother, Mr. Clements, yet there were questions as to his efficiency and after all it settles down to the question as to whether we have a right to interfere between an engineer and his employers; whether they have not the right to say rightly or wrongly, whether their judgment is right or wrong—that they do not want a certain employee. It appears Mr. Clements is not dismissed,

but they are only considering whether they shall have some other engineer or make some other different arrangement or have some other engineer over him, and we came to the conclusion that we could not break over the practice and interfere.

Just one other consideration is that it was urged that Mr. Clements had not been fairly treated inasmuch as he had no opportunity of replying at the investigation or had no opportunity to be heard. Just the same, if we were to take any action, we could not do so without the Council of Vancouver being heard. We would be treating them in just the same position; so we felt it was impracticable for the society to deal with the matter at all, no matter how much personally we might feel, how much aggrieved we might be, as to any wrong treatment Mr. Clements has been obliged to submit to. We all know how it is ourselves. I suppose we have all one after another been subject to some such thing as that and had to fight through it as best we could. Mr. Mountain has a resolution in his hand and he has kindly promised to read it for me.

Mr. Mountain: Mr. President. Our committee begs unanimously to report that the society has not hitherto dealt with questions which have arisen between its members and their employers and that there appears to be no sufficient reason why it should do so in the present case. Signed, John Kennedy, chairman; John Galbraith, Charles Rust, and G. A. Mountain.

President: Gentlemen, you have heard the resolution, what is your pleasure?

Mr. John White: Before you vote on this I would like to say a few words. I move a resolution respecting this matter, seconded by Professor Edwards, and the discussion was participated in by a number of others and a committee was formed consisting of four gentlemen who have all expressed their opposition to the proposal. Under the circumstances it is not surprising to me that the committee was unanimous. I think it is regrettable that the matter was dealt with in that way; but that is not the point. The point is merely this: this man was refused an investigation. There is no question whatever of his competency or incompetency. There is no question whether the city of Vancouver had a right to dismiss him or reduce his salary; they could take whatever action they might see fit. But I do not think it is giving a man British fair-play to refuse him an investigation. It has been said that the city's side of the case has not been heard. The city's side of the case certainly, so far as it affects the question of his competency or the reverse, has not been heard; it is not necessary it should be heard. The only question is whether the society should or should not take action with respect to the action of the city of Vancouver in refusing to give him the investigation he had urged, and to which in any case he is certainly entitled.

I propose to move an amendment, that this society regrets that the City Council of Vancouver has refused to grant the City Engineer the investigation requested by him.

Prof. Edwards: My name stands connected with this matter in being the seconder of the first motion. I think a few of Mr. White's remarks were a bit unfair to the committee. It is not my recollection that the four gentlemen expressed themselves as being quite opposed to the matter at the time; I think one member spoke quite frankly as being opposed to the principle, and the other gentlemen expressed themselves as having an intimate knowledge of the gentleman in question, and in fact of having a personal affection for the gentleman in question; and as seconder of the original motion I would like to put myself on record as being quite in favor of the committee's report. (Applause)

Mr. John Kennedy: I thought the resolutions yesterday were all withdrawn, and a committee appointed, and that the resolutions this morning would come in as new resolutions on the question of receiving the committee's report and not as an amendment to anything yesterday; that is, if I am right.

President: I think you are quite right in that, Mr. Kennedy. Mr. White's amendment is now moved in opposition to the adoption of the committee's report. There is nothing of yesterday's discussion remaining. Are you ready for the question, gentlemen?

Mr. G. A. Kennedy, Jr.: I think it is due to me to at least thank Mr. White for the resolution he has brought in both yesterday and to-day. After discussing the question with the committee that was appointed last evening, I could not see my way clear to vote for Mr. White's resolution. I think I expressed it clearly enough yesterday that we have great sympathy for Mr. Clements and that everybody in the Vancouver district has also, but I have to confess also that I would not like to be a party to any interfering between the employer and the employee unless that we have an actual right to do it. The resolution this morning is greatly modified, and there is one result I hope you will confer in this matter, and that is that it will be known that the matter has been brought up here and discussed and that the action of the Council, if the case has been as reported, does not find favor with the engineers present, at least.

President: Any further discussion? If not, I would put the amendment first.

Mr. Cartwright: As I understand the matter, the matter will not go any further than the records of the society. There will not be any action taken by the Council towards the city of Vancouver and no recommendation made to them?

President: There is nothing in the motion or the amendment requiring any further action. I will put the amendment first.

All in favor of the amendment kindly make a show of hands.

Secretary: I make it 26.

President: Now all in favor of the amendment please hold up their right hand.

Secretary (counting): I make it 25.

President: Against the amendment please hold up the hand.

Prof. Brydone-Jack: I think it should be perfectly understood in this vote that only voting members are allowed to vote, that is, members or associate members.

President: I think that is understood.

Prof. Brydone-Jack: I do not think it is quite understood.

President: We will take the vote once more as there seems to be some doubt about it—corporate members and associate members, voting.

Secretary (counting): 26.

President: All against the amendment, please stand up.

Secretary: (counting: 24 I make it.

President: I declare the amendment carried, 26 to 24.

Mr. James White: I move that a copy of the resolution be sent to the city council of Vancouver.

Mr. McCarthy: Gentlemen, we are getting on delicate ground. It is all right for the society to put on their records a resolution of that nature, but certainly we should not communicate with the city council of Vancouver any more than we should communicate with the Canadian Pacific Railway in case of their dismissing any of their employees, if they are so disposed. I think it is absolutely the same; the fact that it is a municipal council dismissing

their engineer is not any more wrong than a corporation getting rid of one of their staff.

Mr. James White: I rise to a point of order. I think the only business before this meeting is whether this should be sent to the city council of Vancouver. It is not a question of whether it is right or wrong.

President: That is right. It has been moved by Mr. White that the city council be forwarded a copy of the resolution which has just been passed. Any seconder to that?

Mr. Ferguson: I second that.

Prof. Edwards: I think the former speaker was quite in order.

President: Yes. Did you get through, Mr. McCarthy?

Mr. McCarthy: Yes.

President: It has been moved that the city council of Vancouver be notified of the resolution passed by this society.

Prof. Edwards: Is it possible that this matter might be left over? I do not know whether this is a full meeting of the society present.

Secretary: We can never tell when we are full. (Laughter.)

Prof. Edwards: I think it is a rather serious matter.

President: I might say I quite agree with the remarks of Mr. Edwards, but this is a full meeting of the society so far as we can make it one. It is a slim meeting; there is not one-half nor one-third of the members present at the present moment. But I do not see that that can be helped. Are you ready for the question, Mr. Kennedy?

Mr. G. A. Kennedy, Jr.: I would like to say, Mr. President, that I would like Mr. White to withdraw that request. I would very much rather see the copy of the resolution sent to the engineer. If the matter is published as it was in this morning's paper, which rather surprised me as I did not know that these meetings were so open as that, to have this published in that way I do not think it will be very long until the news gets to Vancouver and the councils and all the people will know about it.

Mr. Uniacke: Mr. President, I would say that I would feel myself obliged to vote against the motion of Mr. White to send a copy of the resolution to Vancouver to the Vancouver City Council, for this reason: our resolution would be either ignored, or we would receive an answer from the council of Vancouver which would put the society in a very undignified position. (Hear, hear.) I would suggest, if there is any movement of that kind, that it be sent to the Vancouver Branch of this society.

Mr. James White: I wish to amend my resolution along the lines suggested by Mr. Kennedy, and that is, that the copy of the resolution be sent to the city engineer of Vancouver.

President: Gentlemen, you have heard the motion, are you ready for the question?

Mr. John Kennedy: I think Mr. President we ought to just let this matter drop with the record on the books. We are meddling between employers and employees in a way that we ought not. A mere resolution put upon our books like the former one does not do us much harm, but to send it out—for it will get out, you know. If it is sent to the engineer he will surely make use of it and put it in the papers and we are just in the same case; we are meddling with matters we have no business with and publishing it to the world, too. I think that we'd better let the matter drop. In other words, that this motion should not pass.

Mr. Fetherstonhaugh: I would like to ask if there is any precedent in the previous acts of the society for taking any steps in such a matter as this. It seems to me that the engineers have for a great many years been endeavoring to raise the standard of the profession and raise the standard

of this society and it is not to be regarded as a trades union or a society formed for the purpose of protecting people in their relations between them and their employers. It is a technical society pure and simple, and I think it is a great mistake if we take the step at the present time of starting to interfere between employees and employers (applause and cries of 'Hear, hear').

President: Is there any further discussion? I might just say, gentlemen, that I agree entirely with the report made by the committee on this matter—not that I do not sympathize with Mr. Clements—I do not suppose there is any member of this society who has had more experience in this kind of thing than I have had personally, and I would very much regret to have to appeal to the society to go out of its legitimate business to interfere between myself and my employers. However, that is neither here nor there. Mr. Uniacke's remarks I think are most pertinent, and I think the society would place itself in a very unenviable position if this matter is carried any further. All in favor of Mr. White's motion—and I would like to have the reporter read the motion so all may be sure what it is. (Mr. White's amendment to his own motion read.) Now the motion is that a copy of the resolution be sent to the city engineer of Vancouver.

Mr. John Kennedy: Was that accepted by the seconder?

Mr. Ferguson: Yes.

President: All in favor please stand up.

Secretary (counting): Thirteen.

President: Contrary please stand up.

President: Motion is lost. There is one paper on Cobalt Power Steam to be read by Mr. Munroe. I might say, as our time is very limited, a time not to exceed fifteen minutes has been allotted to that paper.

(The paper was read by Mr. Munroe and illustrated by means of stereoptican views of the site and works.)

President: It has been moved by Mr. John Kennedy and seconded by Mr. Legrand that a hearty vote of thanks be tendered to Mr. Munroe for his very interesting paper. (Carried.)

President: I have very much pleasure in conveying to you the thanks of the society for the paper which you have just read, Mr. Munroe.

President: The next business is the receiving of the report of the scrutineers.

Secretary: I will read the ballot for amendment to by-laws: "January 24, 1911. Ballot for amendment to by-laws. We, your scrutineers, beg to report that all the various amendments to by-laws, as per attached list, have been carried by requisite majority. (Signed) J. G. Legrand, chairman; F. P. Shearood, T. W. White, H. A. Bowman, M. P. Blair."

President: The report of the scrutineers as to the election of officers.

Secretary: The report of the scrutineers is in the form of the number of votes cast for each candidate. The votes cast for president, electing Mr. C. H. Rust, were 348. (Applause.) The votes cast for vice-president were: Mr. Holgate 319; Mr. Dodwell, 333; Mr. Schwitzer, 322.

Secretary: The votes cast for Councillor for District No. One, are as follows: Mr. Herdt, 337; Mr. Johnson, 339; Mr. Kelly, 341; Mr. Shanly, 338; Mr. Sullivan, 340; Mr. Vaughan, 335. There were scattering votes for six others.

For District No. Two: Mr. Archibald, 342; Mr. Doane, 342; Mr. McColl, 340. Scattering votes for six others.

For District No. Three, there were: Mr. Doucet, 342; Mr. Morkill, 341; Mr. Parent, 340. Scattering votes for four others.

For District No. Four, there were: Mr. Coutlee, 237; Mr. MacPherson, 198; Mr. Stewart, 192. There are three

others who received high votes: Mr. Chapleau, 99; Mr. Dion, 89; Mr. Uniacke, 79; and three other scattering votes; so the first three are elected.

For District No. Five, there were: Mr. Haultain, 343; Mr. Rogers, 289; Mr. Stewart, 233; Mr. C. L. Fellows, 31. However, Mr. President, an error was made by the nominating committee in nominating Mr. Rogers, who, unfortunately, resides outside of the district.

Dr. Galbraith: What would be the decision in that case?

President: As Mr. Rogers does not reside with in the district, his election cannot of course be confirmed. The three elected are Messrs. Haultain, Stewart and Fellows.

Secretary: Then there are scattering votes for twelve others.

For District Number Six, there are: Mr. Brydone-Jack, 340; Mr. Heskett, 339; Mr. Legrand, 336, with scattering votes for eight others.

For District Number Seven, there were: Mr. Busted, 342; Mr. Dennis, 343; Mr. Kennedy, 337, with scattering votes for seven others. (Signed). "E. P. Fetherstonhaugh, G. E. Howie, A. R. Dufresne, L. B. Elliott."

President: I would ask the secretary to be good enough to read a telegram from the Montreal solicitor with reference to the election of the vice-president.

The Secretary: I sent a telegram to Mr. A. Falconer, who is the legal adviser of the society, in Montreal, regarding the election of Mr. Schwitzer as a vice-president, and I received a reply. My wire was lacking somewhat in definiteness, and in a second wire I asked him to look into it further. He replies: "Montreal, January 26th, 1911. C. H. M. McLeod, Esq., Canadian Society Civil Engineers, Winnipeg. Have given questions further examination and consideration and am strongly confirmed in opinion that there was no election, and retiring vice-president holds over. Am also of opinion that by-laws do not permit of special election, and that retiring vice-president must remain in office for another year unless he resigns. (Sgd.) A. Falconer."

The by-laws not allowing special election, I presume he means the by-laws of the society in general, because the by-laws do permit of filling a vacancy when one occurs, by the Council.

President: What we should do at present is to declare the first two elected, and leave the matter open for further consideration of the Council before action can be taken.

John Kennedy: It requires that the former vice-president shall remain in office; but there were three vice-presidents.

The Secretary: Yes; that is the dubious point.

The President: There are a great many points which will require to be carefully looked into before that matter can be decided, and if at present we declare the two first vice-presidents elected I think that is about as far as we can go. I would ask the secretary to read out the names of the vice-presidents and councillors who have been elected, when a motion confirming that election will be in order.

Secretary: As president, Mr. C. H. Rust; as vice-presidents, Messrs. Holgate and Dodwell; as councillors representing District No. 1, Messrs. Herdt, Johnson and Kelly, Shanly, Sullivan, Vaughan; District No. 2, Archibald, Doane, McColl; District No. 3, Doucet, Morkill, Parent; District No. 4, Coutlee, MacPherson, and Stewart; District No. 5, Messrs. Haultain, Stewart, and Fellows; District No. 6, Messrs. Brydone-Jack, Heskett, and Legrand; District No. 7, Messrs. Busted, Dennis and Kennedy.

President: Would some one move a resolution confirming the election of these gentlemen and asking for the destruction of the ballot?

Mr. Shearwood: I have much pleasure in moving that resolution, including the destruction of the ballots.

Mr. McCarthy: I second that. (Carried.)

President Ruttan: I would now ask Mr. Rust, the newly elected president, to take the chair. (Applause.)

President C. H. Rust: Gentlemen, I can hardly find words to express to you my appreciation and my thoughts in being elected to this very high position. I little thought when I became a member of this society in 1887 that I would have attained to this position. I can assure you I will do the utmost I can to further the interests of this society. I thank you, gentlemen.

Now gentlemen we have some votes of thanks to move, and the first one is to the Canadian Pacific Railway. Dr. Galbraith will you kindly move a vote of thanks to the Canadian Pacific Railway Company?

Dr. Galbraith: Mr. President, I have very much pleasure in being charged with the moving of this vote of thanks. If it had not been for the generosity of the Canadian Pacific Railway Company, the meeting in Winnipeg would not have been what Winnipeg deserves. The kindness in giving the haulage of the train from Montreal and supplying the train itself, and in supplying a special car for those members in the neighborhood of Toronto, and during our excursion, and giving the train to Lac du Bonnet, is one that I am sure this society is deeply grateful for. It is true that engineers have done a great deal for the Canadian Pacific Railway, and it is also true that the Canadian Pacific Railway Company has done a great deal for engineers. (Hear, hear). I have much pleasure, then, in moving this vote of thanks, and I am quite sure it will be heartily adopted by the meeting. (Applause.)

Mr. McCarthy: I second that motion.

The President: You have heard the resolution, gentlemen. What is your pleasure? (Carried.)

President: The next vote of thanks to be tendered is to the Mayor, Aldermen, and Board of Control of the city of Winnipeg.

Mr. G. A. Mountain: The pleasant duty devolves upon me for moving this vote of thanks. I am sure I voice the feelings of the entire meeting when I say how much we are indebted to the kindness and courtesy of the Mayor and Aldermen and Board of Control of the city of Winnipeg for the magnificent reception they gave us at the luncheon on the opening day. It was a grand affair; we never had anything like it in the history of this society. They also extended to us an opportunity of seeing and entertaining us at the Point du Bois municipal works, and that was an education in itself, seeing that magnificent construction. Now, sir, I am sure that a few words suffice, but our feelings are really very deep indeed. We owe a debt of gratitude to the Mayor and Aldermen and Controllers of the city of Winnipeg for the magnificent way in which they have entertained us, and I am sure we will all go away feeling that we have had the banner year of all meetings we have ever had. I have much pleasure, sir, in moving a vote of thanks to the Mayor and Aldermen and Board of Control of the city of Winnipeg. (Applause.)

Mr. Lamb: I have much pleasure in seconding this motion, and would like to say that as the Mayor and Aldermen of the city of Winnipeg represent the citizens, the magnificent reception which they have assisted so materially in giving us, is only one more sample of the whole-souled manner in which the Western people, and particularly the people of Winnipeg, do things whenever they set out to do them. (Hear, hear.) I have a great pleasure in seconding this resolution. (Applause.)

President: You have heard this resolution, gentlemen; what is your pleasure? (Resolution carried amid great applause.)

President: The next is the vote of thanks to the officers and members of the Manitoba Branch of this society.

Mr. Duggan: Mr. President, I have much pleasure in moving a hearty vote of thanks to the officers and members of the Manitoba Branch. We are a very large number of visiting members, more, probably, than on any previous occasion, and I know I have heard nothing but praise from every one of the visiting members for the hospitality and excellence of our entertainment. I think it is almost a by-word. Instead of commenting on the weather, you meet a man in the morning and he says: "How well things are going, and what splendid entertainment is provided for us!" Personally, it has been my misfortune to be removed from the activity of the society for a great many years, and so I am a sort of Rip van Winkle—

Secretary: I am glad you have come out. (Laughter).

(Continuing), I am glad to be back under the hospitable arrangements and goodfellowship provided by the Manitoba Branch of this society, and I have great pleasure in moving this hearty vote of thanks.

Mr. Norman McLeod: I second that.

Secretary: Before that resolution is put, may I add a word of thanks to the members who granted their able assistance to the secretary? That assistance has been almost admirable, and left us with almost nothing to do, and I am under great obligation to the gentlemen who were so kind as to assist us in this work. (Motion carried.)

Mr. Dancer: I have very much pleasure in thanking the meeting for the manner in which this motion has been received, on behalf of the Manitoba Society, and I would like to express our feelings at having the meeting held here, and the high sense of honor we feel on account of the 25th annual meeting being held in Winnipeg, an honor which has never been experienced by any city previously, west of the Great

(Continued on Page 299).

CANADIAN SOCIETY OF CIVIL ENGINEERS.

SOME POINTS BEARING ON ITS FUTURE USEFULNESS

William Storrie, Assoc. M. Inst. C.E.

At the annual meeting of the Canadian Society of Civil Engineers recently held in Winnipeg, two matters came up for discussion in which reference was made to the practice adopted by the Institution of Civil Engineers, London, England. The questions under discussion were:—

(a) The advisability of printing the best of the papers read before the various branches of the Society in the transactions issued by the Society, and

(b) The advisability of raising the standard for admission to the class of Student and Associate Member of the Society.

As both these questions will have a decided bearing on the future good and standing of the Society, and as considerable doubt exists as to the practice adopted in the Institution of Civil Engineers, it will be well to state the actual conditions existing there.

The question of printing the papers read before the branches has frequently been the cause of discussion in the parent body. The Institution has six branches or Associations of Students, as they are called, and they correspond very closely in their aims to those of the Canadian Society's branches. In each association the president, vice-president and treasurer are elected from the members or associate members,

and the members of council and secretary are elected from the students. Under the constitution a student remains as such until he is twenty-six years of age. In general, these associations hold meetings twice a month during the winter time, and many excellent papers come up for discussion, but on no consideration whatever will the parent body publish those papers in the transactions. The writer has intimate knowledge of the meetings of the Glasgow Association of Students, and occasionally when an excellent paper is read, a motion is passed to have the paper printed, at the Association's expense, and distributed amongst the members, so that each member of the Association secures a copy of the paper as read, but it does not go out to the Institution as a whole.

The advisability of raising the standard for admission is one which demands careful consideration if the standing of the Society and its members are to be recognized by the general public as a guarantee that the engineer connected with this body has had the necessary training and experience. In this respect the qualifications for admission are much more rigid in the Institution than in the Society. Generally speaking, the Constitution of the Institution, with reference to the admission to the various grades of membership is as follows:—

Students shall be persons not under eighteen years of age, who are, or have been, trained under a corporate member (full member, or associate member) of the institution, and such persons may continue as students until they attain the age of twenty-six years. If the candidate can produce a certificate of having passed the entrance examination, or the degrees of certain engineering colleges recognized by the council, he will be exempt from the studentship examination. If the candidate cannot produce this certificate he must sit a written examination which includes papers on the following subjects:—

English,
Mathematics,
A Language,
And either Physics, Chemistry or Geometrical Drawing.

Associate Members.—Every candidate for admission as an associate member must be twenty-five years of age, and be able to satisfy the council as to his training and experience. In general we must have been trained under or acted as assistant to a corporate member for a period of five years, and must be at the time of his application actually engaged in the design or in the construction of such works as are comprised within the profession of a civil engineer as defined by the charter. A certificate of practical training signed by a corporate member under whom the candidate received the training must be submitted. If the candidate has followed a regular engineering course extending over a period of at least three years in a college recognized by the council, and obtained an engineering degree therefrom, then he is exempt from the associate membership examination, and after two years' practical training is eligible for election. Otherwise he must sit a written examination which includes papers on the following subjects:—

General knowledge, comprising a paper to be written in the form of an essay. Usually three subjects are given so that a choice can be made.
Applied Mechanics,
Strength and Elasticity of Materials,
Theory of Structures or Magnetism and Electricity,
Geodesy,
Hydraulics.

The two last subjects are optional, and certain other subjects may be taken instead.

Members.—Every candidate for election or transfer into the class of members shall be more than thirty-three years of age, and shall come within one of the following conditions:—

He shall either be an associate member of the institution or shall have fulfilled the conditions necessary for associate membership. He shall have had, further, five years' employment in positions of responsibility for the design or execution of important engineering work, and shall be so engaged at the time of his application for election or transfer; or,

He shall satisfy the council that he has had suitable education and training as a civil engineer; and he shall have had, further, at least fifteen years' employment in positions of responsibility for the design or execution of important engineering work, being so engaged at the time of his application for election, and he shall have acquired a considerable degree of eminence in the profession of a civil engineer.

The above clearly shows that no one can be connected with the institution unless he has had a thorough training and the necessary experience. As an institution there are still some things to be desired in its administration, notably the publication of the best papers read before the branches, and also a greater effort to be more useful to those of its members resident abroad. It may be of interest to know that each of the colonies has a representative on the council of the institution, the Canadian representative being Mr. Hugh David Lumsden, M. Inst. C.E., Ottawa. Whether the time has come or the necessity exists for the Canadian Society to raise the standard for admission, the writer is not in a position to judge; but its consideration is well worth the time involved, and any move in this direction will tend to raise the standing of the society in the eyes of the general public, who, after all, are our employers. As to the publication of the best papers read before the branches, this also demands consideration, and in agreeing to this the usefulness of the society to its members will be greatly increased.

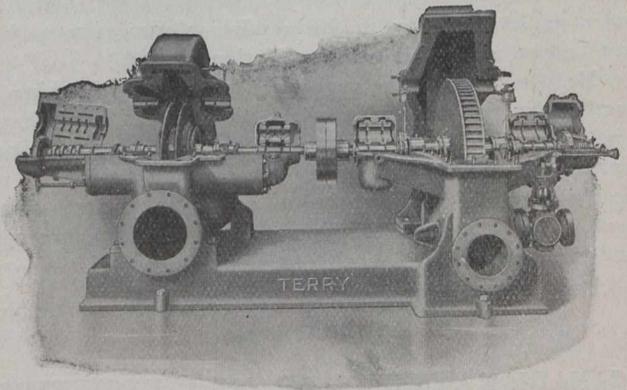
TURBINE DRIVEN CENTRIFUGAL PUMPS FOR CONSTRUCTION WORK.

The centrifugal pump direct connected to a steam turbine is being put to a great variety of uses, more especially in connection with power house work. There is, however, a field for this unit which has not perhaps been as thoroughly exploited as its virtues deserve, that is for pumping out foundation pits, caissons and coffer dams. In some cases the centrifugal pump is being used for this service belted to an engine, but the efficiency of such a unit must necessarily fall far below that possible with a direct connected set. The principal advantage of these units for work of this description is in their ability to stand hard knocks. Both turbine and pump are so exceedingly simple and strongly built that they are most adaptable to rough and ready installations such as are necessarily found in construction work. Heat, cold and dampness affect their operation not at all, and it is not necessary to have either very dry steam for the operation of the turbine, or water free from grit and small stones for the pump, there being no valves on either machine and the moving parts consisting simply of the rotor of the turbine and the impeller of the pump. There is practically nothing to get out of order in either machine so that repairs are reduced to a minimum. In construction work it is essential to have machinery which can be moved

about with the least amount of labor, and the light weight of the turbine driven pump is a strong argument in its favor.

The high speeds at which centrifugal pumps operate compared to the reciprocating units make it possible to obtain the same capacity with a much smaller pump. The usual practice is to have both turbine and pump mounted on a common base plate to which each is securely bolted. With a coupling of the flexible type connecting the two shafts it is possible to transport the entire outfit with very little trouble. When set in place it is only necessary to connect up the water pipes for the pump and the steam and exhaust line for the turbine.

Some idea of the enormous capacity of these units may be gathered from the fact that one such unit operating at 1,500 revolutions per minute handles 300 gallons per minute against 55 ft. total head. This pump is what is known as a 3-inch pump, that is, the diameter of the discharge line is 3 inches. The pump itself stands about 16 inches in height and the diameter of the impeller is only about 8 inches. Of course for service of this kind a single stage pump would be used, as a greater head than 100 to 150 ft. is practically never met with, and a single stage pump of this kind is capable of operating against a pressure of 60 to 50 lbs.



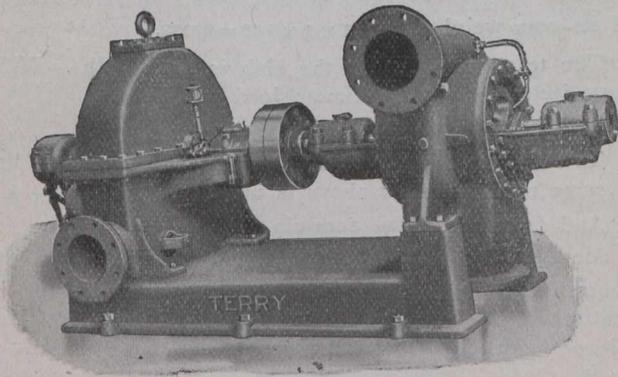
without any trouble. For higher pressures than this it is usual to use double stage or even multiple stage pumps. In such a case there are usually sufficient stages to correspond to one stage for every 50 lbs. pressure.

The accompanying photographs show two different types of single stage centrifugal pumps direct connected to Terry steam turbines. These units are manufactured by the Terry Steam Turbine Co., of Hartford, Conn. The idea is quite prevalent that steam turbines must either run at tremendously high speeds, say 20,000 or 25,000 revolutions per minute, or else they must be multiple stage machines. Of course, this idea is due to the impressive speeds which were attained by the first single stage turbines where the entire velocity of the steam was given up to the rotor of the turbine in one passage through the buckets. In the turbines illustrated in this article, however, the advantage of compactness of a single stage machine is combined with the moderate speeds of a multiple stage turbine by means of return chambers. In emerging from the nozzle the steam has been expanded down to a pressure approximately the same as the exhaust, and has of course acquired an enormous velocity corresponding to this drop in pressure. Instead, however, of giving up all this energy to only one bucket on the wheel the steam is made to pass alternately through a bucket and the return chamber, until its energy is completely dissipated. Thus the velocity is transferred to the rotor in several distinct impulses, each acting on a different bucket in return, and hence the resulting peripheral velocities are

far lower than in the case of the original single stage turbines. These turbines are usually supplied with two or more nozzles, each controlled by a hand valve. Additional power may be secured by opening more nozzles. The number of nozzles in operation does not, however, affect the speed, as this depends solely upon the initial pressure and the pressure of the exhaust.

The governor is of the fly-ball type, mounted on the end of the horizontal shaft and completely enclosed so that there is small possibility of its being damaged. The design is such, however, that should an accident happen to the governor the throttle valve is promptly closed so that running away is an impossibility.

Aside from its compactness and light weight the chief recommendation of the turbine to the contractor is its simplicity. The only mechanism outside the casing of the machine is the set of levers leading from the governor to the governor valve on the steam intake pipe, and these are constructed of very heavy and durable sections. The fact that there is no high pressure steam present inside the casing practically precludes the possibility of steam leakage. The glands need not be so tight as would be the case with high pressure steam, and therefore the possibility of the shaft seizing or becoming scored by the packing is reduced to a minimum.



In all kinds of construction work below the ground level the troubles caused by seepage are usually the most important, and the absolute necessity for keeping such work free from water should make the question of a proper pumping outfit a paramount one to the contractor. Already the centrifugal pump is being used largely for dredging work, digging dirt, gravel, and stones from the bottom of a water way without the slightest trouble. It is essentially the machine for handling large quantities of water which is laden with foreign matter of various kinds. The lack of valves and the large open passage ways of this type of pump permit it to handle rough and heavy material which could not possibly go through a reciprocating pump without doing a great deal of damage.

Although the electric motor adapts itself to driving centrifugal pumps, in a great many cases, it is entirely out of place in the circumstances obtaining on most construction work. The folly of using an electric motor where it is liable to be rained on or covered with dust and dirt on occasion is certainly evident, but such conditions as this will not affect the operation of a steam turbine in the slightest. It is therefore pre-eminently the machine for this kind of work. Not only is it the best motive power for the centrifugal pump under almost any circumstances, but it shares with the latter the highly important qualification of being able to work under the worst conditions, and to stand any amount of hard knocks.

DESIGN AND COMPUTATIONS FOR A CELLULAR REINFORCED CONCRETE DAM.

(Continued from Page 282).

E_c = Initial modulus of elasticity of concrete = 3,000,000.

E_s = Modulus of elasticity of steel = 30,000,000.

E_s 30,000,000

R = Ratio of Moduli = $\frac{E_s}{E_c} = 10$

E_c 3,000,000

S = Tensile strength of steel = 55,000 lbs.

p = Percentage of steel =

$\frac{7 C^2 R}{12 S (CR + .667 S)}$

$\frac{7 \times 2,700^2 \times 10}{12 \times 55,000 (2,700 \times 10 + .667 \times 55,000)}$

$\frac{7 \times 2,700^2 \times 10}{12 \times 55,000 (2,700 \times 10 + .667 \times 55,000)}$

$\frac{7 \times 2,700^2 \times 10}{12 \times 55,000 (2,700 \times 10 + .667 \times 55,000)} = .0121$

$12 \times 55,000 (2,700 \times 10 + .667 \times 55,000)$

Webb and Gibson p. 62.

This percentage of steel amounts to $96 \times 12 \times .0121 = 13.94$ sq. ins. of steel for each tabular segment 1 ft. thick. This may be done by placing 6 round bars, $1\frac{1}{8}$ in. in diameter, in layers 6 ins. apart and spaced 4 ins. from each other, beginning 4 ins. from the face. This gives a value to d of 82 ins.

K = Ratio of depth from compressive face to neutral axis to the total effective depth, d .

K = From table on page 61, Webb and Gibson, = .424.

Y = Distance from compressive face to centre of gravity of compressive stresses.

$Y = .357 Kd = .357 \times .424 \times 82 = 12.4$.

(See Webb and Gibson, p. 59).

$M_o = p b d S (d - Y) = .0121 \times 12 \times 82 \times 55,000 \times (82 - 12.4) = 48,016,750$.

In other words, our slab will withstand a pressure of 48,016,750 in. lbs., and the maximum normal load that can come on it is 3,390,177 in. lbs.

The above calculations show that when the reservoir is full, the face wall has a factor of safety against normal water pressure alone of about 14, considering the face wall as a simple beam supported at both ends, but it is also a cantilever. Owing to the reversal of pressure when the dam is empty the wall must be reinforced on both sides and hence with regard to the buttresses it is both simple beam and cantilever, which doubles the factor of safety, making it 28, and this is disregarding entirely the fact that the face wall is backed up with earth which, in turn, is held in place by all auxiliary walls. It is evident, I think, that so far as the important feature of water pressure is concerned, the face wall is more than amply strong.

It has been suggested that the dirt filling of the cells would act as a liquid in exerting pressure, because this filling will be packed with water. I think this extreme view is unwarranted; nevertheless, it is easy to compare the relative strains of external and internal pressure by assuming such a condition. We have taken 110 lbs. per sq. ft. as the weight of a cubic foot of water-packed earth and rock. The weight of a cubic foot of water is commonly taken at 62.5 lbs. If, then, the earth filling were a liquid, it would exert a pressure greater than that of water in proportion to the relative weights or

$$\frac{110}{62.5} = 1.76$$

The earth column is, however, divided by the sill-floor so that we have 105 ft. of earth as against 184.5 of water.

The factor safety, then, will vary inversely as the relative height and weights— $\frac{105 \times 110}{62.5 \times 184.5} = 1.003$.

In other words, the face wall as designed is equally strong to resist internal or external pressure, even if the earthen filling is regarded as a liquid. It is obvious, however, that the horizontal reinforcing of the buttress must be fastened by tie bars to those of the face wall and be strong enough to prevent parting, so it is planned to hook the horizontal reinforcing bars of the buttress over the horizontal bars of the longitudinal walls.

The next test in order is to ascertain what crushing strain this wall will stand.

Kidder gives the crushing strength of unreinforced concrete (1 part cement, 2 parts sand, 6 parts broken rock), at 440,000 lbs. per sq. ft. As we have in the bottom slab 20 x 8 ft.=160 sq. ft., the resisting strength is 70,400,000 lbs., while, as previously computed, the weight above this slab is only 3,260,500, and so we have a factor of safety of 20 when disregarding the reinforcement.

The face wall is then abundantly strong from all stand-points.

We will now consider the buttresses. These are subjected to two main strains. There is shear strain and pressure exerted by the overturning moment and the direct water pressure. As in this design the resultant of the graphical computation of the overturning moment strikes the base line $\frac{1}{4}$ the distance from the toe, it is sometimes assumed that all of the resultant pressure is applied along the imaginary line of the resultant and is met by the resistance of the buttress wall equidistant on both sides of this line. This means that the pressure will gradually increase from face to rear and the extreme rear will bear twice the average pressure. As the buttress is 165 ft. long and 3 ft. thick at bottom, we have 165 x 3 = 495 sq. ft. of material in compression and each square foot will stand 440,000 lbs., (not counting the reinforcement), or a total of 217,800,000 lbs., which acts through a moment arm of 110 ft., the product being 23,958,000,000. The water pressure on the panel supported by this buttress is 21,332,720 lbs., (as shown above), which acts through an arm of moment of 61.6 ft., the product being 1,314,067,272, the factor of safety by this method of computation being 17, on the average or 8 $\frac{1}{2}$ for the rearmost portion. This will be much increased by the reinforcement and by the supplementary resistance of the earth filling and auxiliary walls. Perhaps a better way to figure the factor of safety of the buttresses is as follows:

The water pressure acts in a horizontal line inducing shear strain. The strength of concrete in shear is one-half what it is in compression.

Owing to the fact that these buttresses are tightly held on both sides by the auxiliary walls and the earth filling, they cannot yield by buckling and if they yield at all, it must be of shear or crushing. We may, therefore, double all the horizontal pressure and add to it all the vertical pressure and if the wall is sufficiently strong in compression it surely will be in shear. When considered in this way, however, it is proper to consider all the material that will be in shear. This includes a segment of the face wall 20 ft. wide, and a similar segment of all the auxiliary walls.

There will be a total of 910 sq. ft. of reinforced concrete to resist the shear and pressure. This material, disregarding the reinforcement is capable of standing a pressure of 910 x 440,000 = 400,400,000.

| | |
|---|-------------------|
| The total pressure is as follows: | Lbs. |
| Double the water pressure as given above..... | 42,665,440 |
| Weight of auxiliary walls..... | 3,150,000 |
| Weight of buttress | 3,073,750 |
| Weight of each above sill-floor | 2,002,000 |
| Weight of face wall | 2,760,000 |
| Total | 55,641,190 |

As the power of resistance is 400,400,000 lbs., and the maximum strain 55,641,190 lbs., it is plain that we have a factor of safety of 7.1, which will be much increased when the reinforcement of the concrete and the resistance of the earth filling are considered.

Thus it will be seen that the lower section of the dam as designed is amply strong. In the same way each section taken at 5, 20 and 40-ft. intervals has been checked and the dam is abundantly strong on each section.

The arched floor is calculated as a horizontal slab, which must be able to carry the dirt filling. Taking a 1-ft. segment, the load will be.

$$1 \times 20 \times 80 \times 110 = 176,000 \text{ lbs.}$$

and its own weight = 20 x 1 x 1 x 150 = 3,000.

The total weight upon the slab is 179,000 lbs. With a safety factor of 4, the ultimate load will be

$$4 \times 179,000 = 716,000 \text{ lbs.}$$

To compute the required thickness of the arched floor, the same nomination as above is used.

And from the above formula,

$$M_o = p b d S (d - Y), \text{ we deduce,}$$

Assuming that P = 1 per cent. and D = 12, we find from equation (6) Webb and Gibson that Y = .357 Kd. From table on page 61 we find K = 422, so Y = .151d and d - x = .849 d.

As $M_o = 716,000$ lbs., we obtain

$$d = \sqrt{\frac{.0121 \times 12 \times 55,000 \times .849}{716,000}} = \sqrt{\frac{716,000}{6,780}} = \sqrt{118} = 11 \text{ ins.}$$

The sill-floor, then, will be 1 ft. thick, assuming that the reinforcing is 1 in. from the surface. It will also be arched to increase its strength.

The reinforcing for each part of the dam has been figured out as given above for the face-wall. Although there was some variation in results it was not sufficient to adopt different percentages for different parts of the dam, and 1 per cent. is a good average reinforcement for all parts but the face wall which will be 1.2 per cent. on each side or 2.4 per cent. altogether.

In the particular instance given above, a solid concrete dam will require 300,000 cu. yds. of concrete. The cellular dam will require 300,000 cu. yds. of dirt filling and 50,000 cu. yds. of reinforced concrete.

| | |
|---|-------------------|
| 300,000 cu. yds. concrete at \$5 | \$1,500,000 |
| 300,000 cu. yds. dirt at 20c. | 60,000 |
| 50,000 cu. yds. reinforced concrete at \$12 | 600,000 |
| Total | \$ 660,000 |

THE ENGINEERS' LIBRARY

Supplement to THE CANADIAN ENGINEER.

62 Church St., Toronto, Ont.

BOOK REVIEWS.

Road Making, The Art of; by Harwood Frost, B.A. Sc. Published by The Engineering News Publishing Co., New York. Size 6 x 9; pp. 550; price \$3.00.

This work is written in non-technical language suitable for the general reader, and treats of the various problems and operations in the construction and maintenance of roads, streets and pavements.

In this book the author has endeavored to give, in a style suitable for the non-technical reader, an exposition of the technical and financial problems involved in the location and construction of roads; of the various roadmaking materials, of the machinery and methods used in roadmaking, control and prevention of road dust, and in the cleaning and sanitation of roads and streets; and also a description of the various roads and pavement constructions with their advantages and limitations.

The use of the automobile has made the road problem one of importance to every citizen, but the literature on the subject has, up to the present, been confined to technical treatises prepared for engineers and engineering students, and has been either too cyclopedic or too specialized in its nature to be of interest to the general reader. Mr. Frost has produced a résumé of the latest and best practice and has met the need of a semi-popular road book that should be of value to every man who uses the roads and is interested in their preservation and improvement.

A valuable part of the book is the Digest and State-Aid Laws, showing what the several states are doing towards the improvement of their own road systems.

To many, an interesting feature is the Bibliography, covering twenty-eight pages and listing all works of historical and practical value on this subject published since 1583.

The volume is divided into three parts, namely: Part one, which is devoted to the resistance of traction; part two, road and pavement economics; part three, principles underlying the selection of pavements for different purposes.

Part two deals with country and suburban roads and in the 240 pages much valuable information and details of construction are given. Part three has to do with city streets and pavements, and in addition to chapters on the different kinds of standard pavements, attention is given to side-walks, curbs, and street cleaning.

The volume is well illustrated with diagrams and pictures which are practical in their application.

Engineers' Manual. Published by W. & L. E. Gurley, Troy, N.Y. Size 5 x 7; pp. 500; free.

This manual is a combination of a catalogue and a treatise on the field instruments used by engineers and surveyors, and manufactured by Gurley's.

As a catalogue, it contains descriptions and illustrations of a complete line of surveyors' necessities, dimensions, weights and prices given, and such are very useful and convenient as matters of reference.

As a manual, it treats of the uses of the different instruments, and to the young engineer is particularly valuable because it gives briefly, but clearly, methods for adjusting instruments in the field.

The book would be of great interest and service to engineers and surveyors, and Gurley's will gladly send it to those interested.

Electricians' Operating and Testing Manual. Published by Henry C. Horstmann and Victor H. Tousley. Size 5 x 7; pp. 360; flexible cover.

The object of this work is to instruct the practical electrician in the management, operation and testing of the more important electrical devices in use.

Almost every line of industry, great or small, now has much to do with electric motors and lights, to say nothing of the ever increasing number of small isolated plants using gas or gasoline engines in connection with electrical generators.

From observation of many such plants in actual operation it has long been apparent to the authors that some handbook giving in a condensed, simple manner, all of the instructions needed for the intelligent installation and operation of electrical devices is greatly needed.

The method adopted has been that of familiarizing the student with the underlying principles governing the design of motors, dynamos, arc lamps, etc., rather than go overmuch into details on the construction of particular commercial forms. It is confidently believed that the student who has mastered the general theory of dynamos, motors, etc., will have no difficulty in comprehending such variations in their application as he may meet with.

In order to avoid unnecessary bulkiness and to give the reader as much of the necessary information as possible within the limits of the space, all catalogue cuts have been omitted; it being assumed that the reader is familiar with the general appearance of motors, arc lamps, storage battery, etc.

The work is well illustrated and has a complete index.

Rock Drills. By Eustace M. Watson, McGraw-Hill Book Company, New York. Cloth, 6¼ x 9¾ ins.; 358 pp.; illustrated; \$4.

This book is a collection of articles that have appeared on rock drill work and rock drills. The author has gathered together and presented transcriptions of the leading makes of drills upon market in England, South Africa, Australia and America. Drills of both piston and hammer types referred to and some details of their actual use are given. At the same time, as stated in the preface, the book is intended to assist the engineer and manager to choose machines most suited to his particular needs, and to maintain and work them at the highest efficiency.

The first four chapters deal with the history, and describe the mechanical construction of piston, hammer and electric drills of leading makes. The next five chapters contain information as to the operation and handling of various drills; drills designed to use air expansively; notes on the practical applications of the philosophy of rock drilling; and repairs and methods of maintenance of drills.

Two chapters are devoted to explosives and theories of blasting. The author has described the various explosives commonly known and gives detailed information as to their use and handling. The chapter on the Theory of Blasting is a very valuable résumé of the literature published on that subject. The five remaining chapters of the book deal with examples of rock drill work; methods of drilling used for various classes of work; some drill tests; the subject of dust and its prevention; and notes on the use and consumption of compressed air and steam in connection with rock drill work.

The Canadian Almanac. Published by Copp-Clark Co., Toronto; pp. 500; size 6 x 9; price 60c.

The 1911 edition represents the 64th year of publication of this useful office assistant. The issue is edited by A. W. Thomas and contains a full and authentic commercial, statistical, astronomical, departmental, ecclesiastical, educational, financial and general information.

The engineer and surveyor will find it particularly useful because of its Star Table and its Table of Declination and Right Ascensions, and also the Polar Star Transit. The issue contains the Canadian Traffic, the Canadian Post Offices and a large number of Municipal officials of Canada, together with a complete statement of the Dominion and Provincial Departments.

The Electrical Pocket Book and Diary. Published by the Technical Publishing Company, 55 Chancery Lane, London, Eng. Size $3\frac{1}{2}$ x 6; pp. 600; price 65c.

In presenting the new issue of The Practical Engineer Electrical Pocket Book to the public, the proprietors desire to place on record the success of the foregoing editions. The progress made in connection with the practice of electrical engineering during the preceding twelve months has demanded that several sections should be revised. Less important matters have had to give way to new items and thus enhance its value to electrical engineers, draughtsmen, and others.

The articles on the dynamo, etc., have again undergone revision by Mr. C. C. Hawkins, M.A. (Oxon). Among alterations and additions which now appear are: Notes on the Ward-Leonard, Ilgner, and Westinghouse rotary-converter equalizer systems; balancers and boosters; metallic filament lamps; Edison storage cell; re-arrangement of wire tables and synopsis of the 1909 Electric Lighting Act.

It would be impossible to publish here a full list of the contents of this most convenient pocket book; sufficient it is to say that the index contains almost 3,000 references. In addition to this large quantity of editorial matter the book contains a number of pages of very interesting advertisements referring especially to the electrical trade.

The Practical Engineer Pocket Book and Diary. Published by the Technical Publishing Co., 55 Chancery Lane, London, Eng.; size $3\frac{1}{2}$ x 6; pp. 700; price 65c.

The demand during the current year for The Practical Engineer Pocket Book has eclipsed all past records, the book being dispatched to every part of the world.

It is only a few years ago when it was considered that at 600 pages the extreme limit in bulk had been reached, but now we have to record an enlargement to over 700 pages. While this increase has been made, obsolete and less important matter has had to give way to new, which has been carefully selected in order to present a book having the maximum of utility.

It may be noted that the new matter includes Notes on Stoker Systems, Calorimeters, Fuel Economizers, Thermal Storage Superheaters, Bearing Pressures, Recent Practice in Ball and Roller Bearings, Cup Leathers, Chain Drivings, the Magnetic Clutch, also Pyrometry, Pneumatic Tools, the Extensometer; Tables of Flange Dimensions, Pinion and Music Wire, Zinc and Lead Gauges, Solders and Alloys. Revisions have been extensive and affect such articles as Accurate Gauging in the Shop, Pattern Allowances for Machinery, Belt Factors, Gas and Oil Engine Ignition and Tests, Water Turbines, etc., etc.

Care has been taken to make the list of Advertisers' Specialties as complete as possible, and it is hoped that

readers will kindly mention this pocket book when making their inquiries.

This pocket book has been more especially designed for the Mechanical Stationary Engineer, and for them the information it contains is most valuable. The pocket book is carefully cross indexed and in addition to the editorial matter there is some eighty pages of carefully selected advertisements.

Cement (and how to use it). Edited under the supervision of William A. Radford. Pages 361; size 6 x 9; price \$1.00.

The work is a simple and comprehensive treatment of what is known as "Cement," including both the Portland and the natural cements. The volume presents rather the practical side than the technical side of the uses of cement and concrete. It is written as nearly as possible in non-technical English, and would serve as a practical guide, not only to the experienced worker in concrete, but also to the novice. The use of mathematical and engineering formulæ has been avoided in this work. Useful information and practical working tables which are deduced from the results of much labor and experience of engineers are freely used.

An elaborate introduction opens the book, which treats of the history and development of cement.

The importance of every builder, contractor, engineer and everyone of kindred professions possessing to some real degree a reliable knowledge of the character and uses of the various cements, can be readily seen, for as the author says, "Cement is stronger and more durable than natural stone, unaffected by fire or moisture, capable of adaptation to any position or condition, workable by unskilled labor, lending itself easily to any form of ornamentation, vermin proof, cleanly and comparatively inexpensive, ranks among the foremost of the valuable gifts to mankind from the treasure house of modern scientific and technical research."

The introduction is a treatise on this important material and as emphasis to his statement he gives the history of cement which is apparently rich in strong examples of its stability and surprisingly old as a building material. The surprising development of the cement industry is also an interesting feature dealt with in the opening pages of the book. The manufacture of Portland cement and the chemical requirements of a good Portland cement are discussed. A section upon the proper selection of aggregates for concrete is very interesting from a practical standpoint. The matter of testing is gone into at some length and illustrations of descriptive nature appended, showing simple testing machines, and method of applying tests. A description of the various mixtures of concrete is given and useful tables for facilitating the solution of practical problems, which present themselves in the mixing. Much valuable information can be gathered regarding the matter of depositing concrete, protection after placing and the bonding of old and new concrete work. A section on waterproofing of concrete merits notice. In this a general discussion of the subject of waterproofing is given and the various methods at present in use are briefly described. The machinery and tools used in concrete work are also dealt with. A considerable portion of the book is given up to a discussion of cement in building construction, concrete foundation work, concrete sub-floors, cement plaster and stucco work, concrete blocks, and up-to-date systems of house construction, being some of the topics considered. Concrete sidewalks construction, together with the various methods in use, are discussed and the problems met with

in every modern community are therein dealt with briefly. The farmer is now appreciating the use to which concrete may be put in supplying the constructional needs so vital to the proper development of any farm from a utilitarian, as well as from an aesthetic standpoint. To this growing class among the users of concrete a section concerning concrete on the farm will appeal. In it helpful advice is given as to where concrete can be used to advantage in farm building work.

A treatment on reinforced concrete is contained in the last 85 pages of the book. In this section the author discusses the time of setting, the cost and the general principles of reinforced concrete design. The various systems of reinforcement are described very fully and the structures for which the use of reinforced concrete is advisable in construction, are given some space. This portion of the book is especially well filled with descriptive sketches and plans of reinforcement forms, steels and systems.

The book contains several attractive and instructive plates and has plenty of descriptive material about concrete novelties, which it would be impossible to mention here. While many of the subjects taken up are briefly treated with, nevertheless fundamental and valuable information on that subject is given. It should be of value to all who desire further knowledge of cement and its uses and who do not care to study at too great a length in order to obtain the few fundamental facts they seek for.

Walker's Loose Leaf Pocket Book. By Norman R. Corke. Published by John A. Hart Co., McIntyre Block, Winnipeg, Man. Size 4 x 6; price \$4.00.

In these days when the best of the so-called engineer's pocket books contain over a thousand pages and weigh about a pound-and-a-half, and even then may not contain the particular information which the user would wish to have in a convenient form for carrying in the pocket, most engineers have reverted to the original plan of carrying manuscript notes compiled by themselves, and specially adapted to the requirements of their own professional work.

The present work is the outcome of experiments with various forms of loose-leaf and other note books, which the author put to the test of actual use during a period extending over several years. After giving a fair trial to the various forms of note books, the author decided that the present book, owing to its beautiful mechanical construction, size and adaptability, was from all points of view the most suitable for the purpose. However, to make the book perfect it was necessary that it should have a certain number of printed pages, containing the most generally useful tables, formulae, etc., so as to leave the user to make only those notes which his particular requirements called for. Owing to the enterprise of the publishers, this book is now made available for the use of all engineers who wish to have a pocket book which can be conveniently carried in the hip or jacket pockets, and which can be used as a general note book, in addition to its special use as an engineers' pocket book.

In compiling the necessary tables and other matter, the author endeavored to give only those which are most generally useful to engineers, and has compressed such matter into the smallest possible space, and has so arranged it as to make reference easy. The tables in particular have been so arranged by suitable ruling, type, etc., that their use is made simple and rapid. To add to the convenience of the book a special section paper has been prepared; this paper is divided into centimetre, half centimetre and millimetre squares, distinguished from one another by a suitable variation in the thickness of the lines, and is printed with

orange-tinted ink on one side only of a special thin paper, so that curves, etc., drawn on it with Indian ink may be reproduced by blueprinting in the usual manner. The plain, blank pages may also be used for making blueprint copies of any diagrams, or matter, of which more than one copy may be desired. The section, blank, and ruled pages may be obtained either with or without metallic eyelets, so that the user may make his notes on either one or the other, according to whether the notes are for permanent or only for temporary use.

Engineering Workshop Machines and Processes. By F. Zur Nedden, translated and revised by John A. Davenport, M.Sc. (Vict.), with introduction by Sir. Alex. B. W. Kennedy. Published by Constable & Co., Ltd., London. Size 6 x 8 $\frac{3}{4}$; price \$1.80.

This work, as the author states, is a book for the use of young engineers and students. The author introduces his main topic, the manufacture of iron and steel, by showing the necessity for having different grades of these and their real use in the machine. The first chapter gives a few general remarks upon the question of the machine and its preceding drawn plan. A few pages are devoted in the second chapter to the modern engineering works, and in the third chapter the author starts his main discussion with a treatise on the raw material, taking up some of the necessary physical laws or properties of metals. The working of the material, including discussion of forging, casting, and the composition of what is ordinarily termed iron. This is followed by discussion of process of iron manufacture from the ore through the blast furnace and refining process, and puddling process. The Bessemer, Thomas and Siemens-Martin processes of steel manufacture are briefly outlined, their chief feature shown and commented upon. A mention is made of the cementation process, electric furnace and a list of special steels are given; and the chapter concludes with discussion on rolling, drawing, pressing, etc., comments which would be of great assistance in obtaining a proper knowledge of workshop processes. The book further deals with the foundry and the pattern shop, some topics discussed being the sand, molding material, cores, striking boards, wasters, fusibility, separation of gas and dressing.

Useful hints are appended to stimulate observation. In a chapter on forging he discusses thoroughly under three heads (a) the smithy; (b) boiler shop; (c) tool smithy and hardening, the various numerous processes and steps taken in the forging shop. After a general discussion of the machine shop, the author gives a rather full discussion of the types of machines, taking up the lathe, the boring and turning mills, the planing and slotting machines, the milling machines and the drilling machines and grinding machines. A discussion on the measuring, marking off, fitting, erecting and testing, concludes the book. In each case thorough and valuable practical information is given.

Though not directly connected with the subject at hand an interesting appendix to the book takes up the report of a committee appointed by the Council of The Institution of Civil Engineers, dealing with the education and training of engineers. It includes the opinions of a great variety of engineers upon the various phases of the question.

PUBLICATIONS RECEIVED.

Dust Preventives and Road Binders.—By Prevost Hubbard. Published by John Wiley & Sons, 43-45 East 19th St., New York City. Size 6 x 9; pp. 416.

Technical Dictionaries.—By Alfred Scholmann. Published by Constable & Co., Ltd., 10 Orange St., Leicester Square, W.C. London. Size 7 x 5; pp. 706; price \$3.00.

The Art of Roadmaking.—By Harwood Frost, B.A.Sc. Published by The Engineering News, 220 Broadway, New York. Size 7 x 10; pp. 544; price \$3.00.

American Waterworks Association.—Published by Mr. John M. Diven, 14 George St., Charleston, S.C. Size 6 x 9; pp. 303.

Surveying Manual.—By Messrs. Pence & Ketchum. Published by Engineering News Publishing Co., New York, N.Y. Size 5 x 7; pp. 256.

Proceedings of the American Mining Congress.—Published by the American Mining Congress at the office of the Secretary, Denver, Colo. Size 6 x 9; pp. 392.

Freight Train Resistance; Its Relation to Car Weight. By Edward C. Schmidt, has just been issued as Bulletin No. 43 of the Engineering Experiment Station of the University of Illinois. This bulletin presents the results of tests made upon freight trains to determine their resistance. The results show that the average weight of the cars composing the trains exerts upon train resistance an even greater influence than is exerted by variations in train speed. Copies of Bulletin No. 43 may be obtained gratis upon application to W. F. M. Goss, Director of the Engineering Experiment Station, University of Illinois, Urbana, Illinois.

CATALOGUES RECEIVED.

Friction Clutches.—The Carlyle-Johnson Machine Co., Manchester, Conn. Catalogue "E," 1911, 35 pages, 4½ x 7. An issue of 25,000. The catalogue is enclosed in a handsome cover of two-toned blue, with a clutch cut and company monogram embossed thereon, and is filled with attractive illustrations showing the Johnson Clutch, factory views, etc. The inside pages have an attractive blue border, to correspond with the blue cover; this border being made up of reduced cuts of Johnson Friction Clutches, with the headings at the top of the company name and address, as always used in their trade paper advertising.

Ventilating Fans.—The Jeffrey Manufacturing Co., Columbus, Ohio, and Montreal, Que., have just issued a new catalogue on centrifugal fans for ventilation purposes. The catalogue contains in addition to other matter, fans showing the application of the different types of fans. Capacities and other important machinery data are also given, as well as a complete report of the tests.

ENGINEERING SOCIETIES.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—414 Dorchester Street West, Montreal. President, Col. H. N. Ruttan; Secretary, Professor C. H. McLeod.

Chairman, A. E. Doucet; Secretary, P. E. Parent. Meetings held twice a month at Room 40, City Hall.

TORONTO BRANCH.—06 King Street West, Toronto. Chairman, A. W. Campbell; Secretary, P. Gillespie, Engineering Building, Toronto University, Toronto. Meets last Thursday of the month.

MANITOBA BRANCH.—Chairman, J. E. Schwitzer; Secretary, E. Brydone Jack. Meets first and third Fridays of each month, October to April, in University of Manitoba, Winnipeg.

VANCOUVER BRANCH.—Chairman, Geo. H. Webster; Secretary, H. K. Dutcher, 40-41 Flack Block, Vancouver. Meets in Engineering Department, University

OTTAWA BRANCH.—Chairman, A. A. Dion, Ottawa; Secretary, H. Victor Brayley, N. T. Ry., Cory Bldg.

MUNICIPAL ASSOCIATIONS.

ONTARIO MUNICIPAL ASSOCIATION.—President, Mr. George Geddes, Mayor, St. Thomas, Ont.; Secretary-Treasurer, Mr. K. W. McKay, County Clerk, St. Thomas, Ontario.

UNION OF ALBERTA MUNICIPALITIES.—President, H. H. Gaetz, Red Deer, Alta.; Secretary-Treasurer, John T. Hall, Medicine Hat, Alta.

THE UNION OF CANADIAN MUNICIPALITIES.—President, W. Sanford Evans, Mayor of Winnipeg; Hon. Secretary-Treasurer, W. D. Light-hall, K.C., ex-Mayor of Westmount.

THE UNION OF NEW BRUNSWICK MUNICIPALITIES.—President, Mayor Reilly, Moncton; Hon. Secretary-Treasurer, J. W. McCready, City Clerk, Fredericton.

UNION OF NOVA SCOTIA MUNICIPALITIES.—President, Mr. A. E. McMahon, Warden, King's Co., Kentville, N.S.; Secretary, A. Roberts, Bridgewater, N.S.

UNION OF SASKATCHEWAN MUNICIPALITIES.—President, Mayor Hopkins, Saskatoon; Secretary, Mr. J. Kelso Hunter, City Clerk, Regina, Sask.

CANADIAN TECHNICAL SOCIETIES.

ALBERTA ASSOCIATION OF ARCHITECTS.—President, E. C. Hopkins, Edmonton; Secretary, H. M. Widdington, Strathcona, Alberta.

ASSOCIATION OF SASKATCHEWAN LAND SURVEYORS.—President, J. L. R. Parsons, Regina; Secretary-Treasurer, M. B. Weeks, Regina

ASTRONOMICAL SOCIETY OF SASKATCHEWAN.—President, N. McMurphy; Secretary, Mr. McClung, Regina.

BRITISH COLUMBIA LAND SURVEYORS' ASSOCIATION.—President, W. S. Drewry, Neison, B.C.; Secretary-Treasurer, S. A. Roberts, Victoria, B.C.

CANADIAN ASSOCIATION OF STATIONARY ENGINEERS.—President, Charles Kelly, Chatham, Ont.; Secretary, W. A. Crockett, Mount Hamilton, Ont.

CANADIAN CEMENT AND CONCRETE ASSOCIATION.—President, Peter Gillespie, Toronto, Ont.; Vice-President, Gustave Kahn, Toronto; Secretary-Treasurer, Wm. Snaith, 57 Adelaide Street, Toronto, Ont.

CANADIAN CLAY PRODUCTS' MANUFACTURERS' ASSOCIATION.—President, W. McCredie; Secretary-Treasurer, D. O. McKinnon, Toronto.

CANADIAN ELECTRICAL ASSOCIATION.—President, N. W. Ryerson, Niagara Falls; Secretary, T. S. Young, Canadian Electrical News, Toronto.

CANADIAN FORESTRY ASSOCIATION.—President, Thomas Southworth, Toronto; Secretary, James Lawler, 11 Queen's Park, Toronto.

CANADIAN GAS ASSOCIATION.—President, Arthur Hewitt, General Manager Consumers' Gas Company, Toronto; J. Keillor, Secretary-Treasurer, Hamilton, Ont.

CANADIAN GAS EXHIBITORS' ASSOCIATION.—Secretary-Treasurer, A. W. Smith, 52 Adelaide Street East, Toronto.

CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.—President, W. Doan, M.D., Harrietsville, Ont.; Secretary-Treasurer, Francis Dagger, 21 Richmond Street West, Toronto.

CANADIAN MINING INSTITUTE.—Windsor Hotel, Montreal. President, Dr. Frank D. Adams, McGill University, Montreal; Secretary, H. Mortimer-Lamb, Montreal.

CANADIAN RAILWAY CLUB.—President, H. H. Vaughan; Secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

CANADIAN STREET RAILWAY ASSOCIATION.—President, D. McDonald, Manager, Montreal Street Railway; Secretary, Acton Burrows, 157 Bay Street, Toronto.

CANADIAN SOCIETY OF FOREST ENGINEERS.—President, Dr. Fernow, Toronto; Secretary, T. W. H. Jacombe, Ottawa.

CENTRAL RAILWAY AND ENGINEERING CLUB.—Toronto, President, J. Duguid; Secretary, C. L. Worth, 409 Union Station. Meets third Tuesday each month except June, July, August.

DOMINION LAND SURVEYORS.—President, Thos. Fawcett, Niagara Falls; Secretary-Treasurer, A. W. Ashton, Ottawa.

EDMONTON ENGINEERING SOCIETY.—President, Dr. Martin Murphy; Secretary, B. F. Mitchell, City Engineer's Office, Edmonton, Alberta.

ENGINEERING SOCIETY, TORONTO UNIVERSITY.—President, A. D. Campbell; Corresponding Secretary, A. H. Munroe.

ENGINEER'S CLUB OF TORONTO.—06 King Street West. President, C. M. Canniff; Secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter months.

INSTITUTION OF ELECTRICAL ENGINEERS.—President, Dr. G. Kapp; Secretary, P. F. Rowell, Victoria Embankment, London, W.C.; Hon. Secretary-Treasurer for Canada, Lawford Grant, Power Building, Montreal, Que.

INSTITUTION OF MINING AND METALLURGY.—President, Edgar Taylor; Secretary, C. McDermid, London, England. Canadian Members of Council:—Prof. F. D. Adams, J. B. Porter, H. E. T. Haultain, and W. H. Miller, and Messrs. W. H. Trewartha-James and J. B. Tyrrell.

MANITOBA LAND SURVEYORS.—President, George McPhillips; Secretary-Treasurer, C. G. Chataway, Winnipeg, Man.

NOVA SCOTIA MINING SOCIETY.—President, T. J. Brown, Sydney Mines, C.B.; Secretary, A. A. Hayward

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, S. Fenn; Secretary, J. Lorne Allan, 14 Victoria Road, Halifax, N.S.

ONTARIO PROVINCIAL GOOD ROADS ASSOCIATION.—President, W. H. Pugsley, Richmond Hill, Ont.; Secretary, J. E. Farewell, Whitby.

ONTARIO LAND SURVEYORS' ASSOCIATION.—President, H. W. Selby; Secretary, Killaly Gamble, 703 Temple Building, Toronto.

ROYAL ARCHITECTURAL INSTITUTE OF CANADA.—President, F. S. Baker, F.R.I.B.A., Toronto, Ont.; Hon. Secretary, Alcide Chausse, No. 5 Beaver Hall Square, Montreal, Que.

ROYAL ASTRONOMICAL SOCIETY.—President, Prof. Alfred T. de Lury, Toronto; Secretary, J. R. Collins, Toronto.

UNDERGRADUATE SOCIETY OF APPLIED SCIENCE, MCGILL UNIVERSITY.—President, H. P. Ray; Secretary, J. P. McRae.

WESTERN CANADA IRRIGATION ASSOCIATION.—President, Wm. Pierce, Calgary; Secretary-Treasurer, John T. Hall, Brandon, Man.

WESTERN CANADA RAILWAY CLUB.—President, Grant Hall; Secretary, W. H. Rosevear, 109 Chestnut Street, Winnipeg, Man. Second Monday, except June, July and August, at Winnipeg.

CANADIAN SOCIETY OF CIVIL ENGINEERS.

(Continued from Page 291).

Lakes. When we first thought of having the meeting here in Winnipeg we determined to do our best, if possible, to make it the best meeting of the twenty-five. We also felt it due to the society, and as a tribute to our society, and to our president, Colonel Ruttan, (applause.) We also wanted to show the Easterners what we could do, here. If we have met with any success, it is owing to the efforts in the first place of our late comrade, J. E. Schwitzer, who induced the Canadian Pacific Railway to give free transportation, and also to our indefatigable secretary, Professor Brydone-Jack, and to the members of the committees who were appointed to look after the details, and who gave time and services so willingly for the good work. If our efforts have met with your approbation we are more than satisfied. We trust the members will take away with them such kindly remembrances of Winnipeg they will be induced to visit us again before long, and I am sure they will receive a hearty welcome. (Applause.)

President: The next vote of thanks is to the Grand Trunk Railway, and to the railways of the Eastern Passenger Association, and to the Canadian Northern Railway.

C. W. Dill: I move a vote of thanks to the Grand Trunk Railway, the Canadian Northern Railway, and the railways of the Eastern Passenger Association for the many privileges and courtesies extended to this society on this, its 25th annual meeting.

Mr. Powell: I second that motion. (Carried.)

The President: The next is a vote of thanks to the Winnipeg Electric Railway Company.

Mr. James White: I have much pleasure in moving, seconded by Mr. Cartwright, that a vote of thanks be tendered to the Winnipeg Electric Railway Company for the courtesies extended by them during the twenty-fifth annual meeting of the society. I have much pleasure in moving this vote of thanks for the transportation which they have so kindly favored us with, over their lines during our visit here.

Mr. Cartwright: I have much pleasure in seconding this motion. (Carried.)

The President: The last, but not the least, is the vote of thanks to the Manitoba Club for their hospitality extended to us.

Mr. Uniacke: It is my pleasure to move the vote of thanks to the Manitoba Club for the courtesy and hospitality extended by them to us during our visit to the Club. It has frequently been my pleasure and privilege to be entertained at this happy home on my frequent visits here on other occasions, and it has always been a bright spot in my memory the pleasures I have received through their hospitality, and for the same reason I think that I am voicing the sentiments of this society that, when this goes down in history as the banner meeting of the Canadian Society of Civil Engineers the efforts of the Manitoba Club through the influence and kind hospitality of our retiring president has been one of the bright spots on our visit to Winnipeg. (Applause.)

I can hardly say that the epigram in the menu that was put at our banquet, referring to the president in regard to this, was being a little more voicable than elegant, but it applies just the same. (Laughter.)

Mr. James White: I have pleasure in seconding the motion. (Carried.)

President: Now, gentlemen, before we adjourn I wish all the members would return the unused street railway tickets that they have. They are no use to anyone, and we would like to have them returned. There will be a meeting of the Council after we adjourn.

John Kennedy: I have been waiting for a resolution of thanks to the retiring president. I think we owe a great deal of gratitude (hear, hear), to the retiring president for the admirable way in which he has presided over the doings of the society during the past year, and we have felt his hand in all ways during this very successful meeting, and I wish I could just say what I would like to say, about my gratitude to the retiring president. I think it was just due to the society to have the prominent municipal engineer as previous president, and Mr. Ruttan has certainly fulfilled our utmost desires in that respect. I had a little growl against you, President Rust, because, as chairman of the nominating committee I wanted you to stand for presidency as a municipal engineer, but you wouldn't, but now we have had Colonel Ruttan instead.

Secretary: Now we have them both. (Applause.)

Mr. Mountain: I have much pleasure in seconding the motion of Mr. Kennedy. I am sure I again voice the unanimous feelings of the society that we ought to be congratulated on the manner in which the retiring president carried the society through his year. I have much pleasure in seconding that motion. (Carried.)

President Rust: Colonel Ruttan, I wish to convey to you the vote of thanks of this society in slight appreciation of your efforts as president. I can only add to what Mr. Kennedy has said how much we appreciate the work you have done for us, and how much we appreciate coming to Winnipeg during the time you were president. (Applause.)

Retiring President Ruttan: Mr. President, I thank you very sincerely for the kind words which you have spoken, and for the way in which the vote of thanks has been given by the meeting. It has been a pleasure and a delight to me, and I am sure to the members of the Winnipeg Branch, to have you with us, and we have done our best to make your stay pleasant. There is only one thing, which perhaps I may do as my first act after vacating the honored position: which you now occupy, sir, and that is to move a vote of thanks to the ladies of the Women's Canadian Club of Winnipeg, who were so kind as to give a musical for the society on Tuesday evening last. (Applause.)

Dr. Galbraith: I have much pleasure in seconding the vote of thanks to the Women's Canadian Club. I am sure that our wives, and daughters, and sweethearts, and ourselves, owe a great deal to the pleasure of this meeting for the kindness of the ladies of Winnipeg. (Carried.)

The President: Is there any other business to bring up?

Mr. McCarthy: I would like to ask up to what date the transactions of the society have been printed and distributed?

The Secretary: The first volume of the last year, only the last volume is not printed. The first volume of 1910.

Mr. G. McCarthy: I would like to move that the same procedure be adopted as is in vogue with the American Society, and, I think, the British Society, and that is, that a card be sent to the members asking all who receive the proceedings if they would wish them bound.

The Secretary: That is supposed to be the arrangement, but possibly we are at fault in not having notified the members of it. There is an old and standing arrangement that any member who desires to have his volumes bound can do so upon paying the cost of binding.

Mr. McCarthy: I wish I had known it. I have been a member of the society for a number of years, and did not know it before.

President Rust: We will now declare the meeting of the society closed.

(The meeting adjourned at 11.15 a.m.)

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.

Further information may be had from the issues of The Canadian Engineer referred to.

| Place of Work. | Tenders Close. | Issue of. | Page. |
|--|----------------|-----------|-------|
| Calgary, Alta., apartment block... | Feb. 18. | Feb. 2. | 269 |
| Calgary, Alta., brick and stone building | Feb. 16. | Feb. 2. | 269 |
| Mount Laurier, P.Q., water supply | Feb. 20. | Jan. 26. | 65 |
| Monterrey, N. L., Mexico, gas plant | Mar. 1. | Feb. 2. | 66 |
| North Vancouver, B.C., supply of water pipe | Feb. 13. | Feb. 2. | 269 |
| Ottawa, Ont., examining warehouse, Toronto | Feb. 13. | Feb. 2. | 65 |
| Ottawa, Ont., civic supplies | Feb. 14. | Jan. 26. | 66 |
| Ottawa, Ont., waterworks supplies | Feb. 14. | Jan. 26. | 66 |
| Ottawa, Ont., steel tug boat | Feb. 13. | Jan. 26. | 235 |
| Ottawa, Ont., wharf at Ste. Famille | Feb. 20. | Jan. 26. | 235 |
| Ottawa, Ont., wharf | Feb. 13. | Jan. 19. | 203 |
| Ottawa, Ont., marine boiler | Feb. 15. | Jan. 12. | 66 |
| Ottawa, Ont., twin screw steel steamer | Feb. 15. | Dec. 29. | 821 |
| Ottawa, Ont., departmental bldg | Feb. 28. | Jan. 5. | 131 |
| Pembroke, Ont., laying and jointing intake pipe | Feb. 13. | Jan. 26. | 66 |
| Pembroke, Ont., laying and jointing water mains | Feb. 13. | Jan. 26. | 66 |
| Regina, Sask., telephone supplies | Feb. 9. | Feb. 2. | 269 |
| St. Thomas, Ont., clear water reservoir | Feb. 13. | Feb. 2. | 269 |
| South Middleton, Ont., school-house | Mar. 15. | Jan. 12. | 163 |
| Strathcona, Alta., engine, boilers and generator | Mar. 1. | Jan. 26. | 65 |
| St. George de Beauce, Que., iron and concrete bridge | Feb. 13. | Jan. 26. | 235 |
| Toronto, Ont., concrete paving, etc. | Feb. 13. | Jan. 26. | 235 |
| Toronto, Ont., low level interceptor | Feb. 7. | Jan. 5. | 60 |
| Toronto, Ont., right to cut pulp-wood | Apr. 10. | Jan. 19. | 203 |
| Victoria, B.C., supply of valves and pig-lead | Mar. 3. | Feb. 2. | 269 |
| Winnipeg, Man., supply of asphalt | Mar. 1. | Jan. 26. | 235 |

TENDERS.

St. John, N.B.—Tenders will be received until February 15th, 1911, for all or any portion of the Star Line Steamship Co., Ltd., used and employed by the said company on its river steamer service between St. John and Fredericton, N.B. J. R. Stone, curator, St. John.

Montreal, Que.—Tenders will be received until the 22nd of February, 1911, for the dredging plant, including the following:—Dredge "Premier," drill scow, tug "Beaver," dump scows, and sundry articles. F. W. Sharp, chartered accountant, curator, Montreal.

Montreal, Que.—Tenders will be received until February 7th, 1911, for the supply of castings in steel, iron and brass. David Seath, Secretary; Mr. F. W. Cowie, Chief Engineer, Montreal.

Ottawa, Ont.—Tenders will be received until February 27th, 1911, for the erection of a public building at Listowel, Ont. R. C. Desrochers, Secretary, Department of Public Works, Ottawa, Ont.

Ottawa, Ont.—Sealed tenders will be received until the 14th day of February, 1911, for alterations and additions to post-office fittings, Thetford Mines, Que. R. C. Desrochers, Secretary, Department of Public Works, Ottawa.

Ottawa, Ont.—Tenders will be received until February 28th, 1911, for the construction of a public building at Tillsonburg, Ont. R. C. Desrochers, Secretary, Department of Public Works, Ottawa.

Ottawa, Ont.—Sealed tenders will be received until Wednesday, the 1st of March, 1911, for a schooner for the Department of Naval Service. G. J. Desbarats, Deputy-Minister of Naval Service, Department of Naval Service, Ottawa.

Ottawa, Ont.—Sealed Tenders will be received until March 17th, 1911, for the manufacture and delivery at Toronto, Canada, free of all charge, of one or more motor trucks. G. C. Anderson, Superintendent Mail Contract Branch, Post office Department, Ottawa.

St. Catharines, Ont.—Tenders will be received until February 28th, 1911, for cast iron pipe, special castings, gate valves, and pig-lead. Alex. Milne, Superintendent, St. Catharines. (Advertisement in The Canadian Engineer).

Hamilton, Ont.—Tenders will be received until Thursday, February 9th, 1911, for supplying the corporation of the city of Hamilton with sewer pipe, lime, sewer brick, castings, asphalt, creosoted wooden blocks, Portland cement, gravel, lumber, lead pipe, pig-lead, iron pipe, valves, hydrants, brass work, extension boxes, granite blocks, and 78-inch cement pipe. Geo. H. Lees, Mayor, Chairman Board of Control, City Hall, Hamilton, and S. H. Kent, City Clerk, Hamilton.

Kingston, Ont.—Tenders will be received until February 11th, 1911, for rubble stone required by the corporation of the city of Kingston, during the year 1911. H. B. R. Craig, city engineer, Kingston.

Eglington, Ont.—Tenders will be received until February 16th, 1911, for the supply of, approximately, 1,000 of 30-ft., 100 of 35-ft., and 50 of 40-ft. cedar poles for an electric light line in the town of North Toronto. W. C. Norman, Town Clerk, Eglington, Ont. (Advertisement in The Canadian Engineer).

Toronto, Ont.—Tenders will be received until February 18th, 1911, for all the trades, with the exception of masonry, concrete work, structural steel and terra cotta, required for the erection and completion of the Surgical Wing in connection with the General Hospital. Darling & Pearson, 2 Leader Lane, Toronto.

Toronto, Ont.—Tenders will be received until February 15th, 1911, for the erection of a fireproof building. Curry & Sparling, 90 Yonge Street.

Toronto, Ont.—Offers will be received until February 13th, 1911, for the purchase and removal of the following houses, viz.:—Empress Crescent, 10, 22, 24; Dunn Avenue, 57. Geo. A. Mitchell, Master of B. & B., Room 414 Union Station, Toronto.

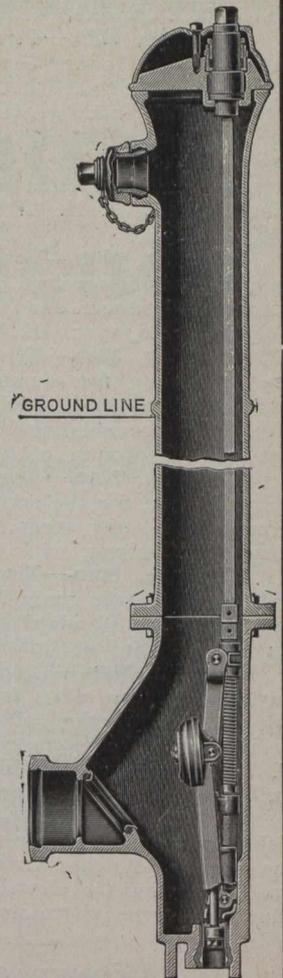
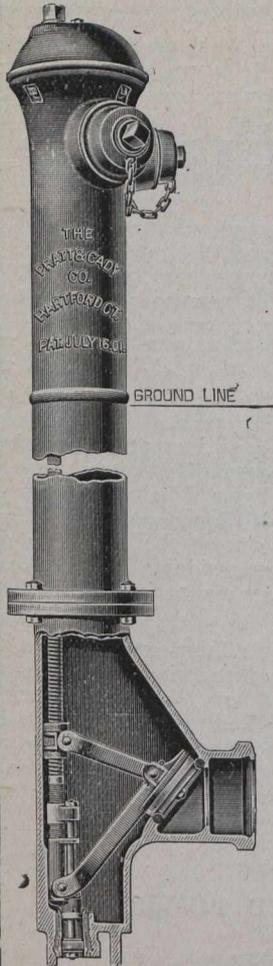
Welland, Ont.—Tenders will be received until the 21st day of February, 1911, for the purchase, en bloc, of the assets of the Robertson Machinery Company, Limited, Welland. J. F. Cross, Welland, Ont., Assignee.

Fort William, Ont.—Tenders will be received until March 2nd, 1911, for the supply of 280 35-foot and 20 40-foot cedar poles. W. L. Farquharson, manager, Fort William.

Winnipeg, Man.—Tenders will be received until Wednesday, February 22nd, 1911, for the following items:—Specification No. 63, conduit, 1911. Specification No. 64, construction of conduit runs, 1911. M. Peterson, Secretary,

HYDRANTS and VALVES CAST IRON PIPE

INDICATOR VALVE POSTS PIPE and FITTINGS

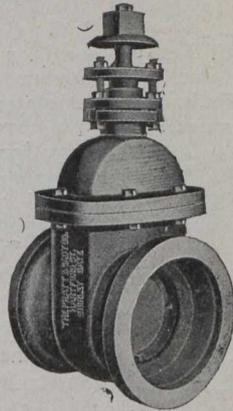


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Never necessary to
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lifted out for inspection.

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Continuous Stave Pipe

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Full Particulars and Estimates Furnished.

Board of Control Office, Winnipeg. (Advertisement in The Canadian Engineer).

Winnipeg, Man.—Tenders will be received until February 15th, 1911, for the construction of stone and cobble stone pillars at Oakdale Park. F. H. Stewart & Company, Suite 216, Nanton Building, Winnipeg.

Winnipeg, Man.—Tenders will be received until February 14th, 1911, for the different trades in connection with the erection and completion of the Selkirk Avenue Building for the Y.M.C.A. J. H. G. Russell, architect, McArthur Building, Winnipeg.

Winnipeg, Man.—Tenders for construction material and supplies will be received at the office of the commissioners, corner McDermott and Charlotte, Winnipeg, up to noon, February 14th, 1911. F. C. Paterson, chairman.

Winnipeg, Man.—Tenders will be received until February 13th, 1911, for plumbing, heating, ventilating and gas fitter's work required in the St. Johns' Telephone Exchange, city, for the commissioners of the Manitoba Government Telephones. Chairman of Commission, Winnipeg.

Winnipeg, Man.—Tenders will be received until February 9th, 1911, for the supply of a quantity of lead pipe, delivered f.o.b., city yards. M. Peterson, secretary, Board of Control, Winnipeg.

Winnipeg, Man.—Tenders will be received until March 3rd, 1911, for the manufacture and deliver of a motor car for the use on standard gauge railway track. M. Peterson, secretary, Board of Control, Winnipeg.

Dauphin, Man.—Tenders will be received until the 25th day of February, 1911, for all labor and material necessary for the construction of two reinforced concrete highway bridges, to be constructed in the town of Dauphin. A. H. F. Stelck, chairman, Public Works Committee; H. F. Caldwell, mayor; J. W. Johnston, town clerk, Dauphin.

Pincher Creek, Alta.—Tenders will be received until February 20th, 1911, for the issue of \$22,000 debentures of the town of Pincher Creek, for the purpose of purchasing and improving the electric light plant of the town. G. D. Plunkett, secretary-treasurer, Pincher Creek.

CONTRACTS AWARDED.

Fredericton, N.B.—The contract for the construction of a retaining wall at Brick Yard Cove, on Little Lepreaux Road, Charlotte Co., has been awarded to Mr. Whitman Brewer, St. Marys Ferry, Cork Co., N.B., the amount being about \$2,400.

St. Thomas, Ont.—The contract for building the breakwater at Port Burwell has been awarded to Mr. Hogan, who built the breakwater at Port Colborne. The contract price is \$234,000.

Kingston, Ont.—A contract for the supply of cement to the city has been awarded to the Frontenac Lumber & Coal Co., Kingston, Ont., at \$1.59 per barrel of 350 lbs., f.o.b. car, or in their storehouse. Other tenders received were from the S. Anglin & Co., Kingston, Ont., at \$1.62; and John Corbett, Kingston, Ont., at \$1.64.

Fort William, Ont.—The contract for pipe for the new waterworks extension was let to the Canada Iron Corporation, lowest bidder getting the contract. The accepted tender was \$37.50 per ton for regular pipe and \$60.00 per ton for specials. The Kerr Engine Company got the contracts for 12, 10, 8 and 6-inch valves, and the Canadian Fairbanks Company the contract for 14 and 18-inch valves.

Winnipeg, Man.—The contract for the excavation work of the dam on the Bow River at Bassano, Alberta, has been awarded by the Canadian Pacific Railway to the firm of Janse McDonnell & Co., and the concrete work will be done by the firm of Walker, Fyshe & Co.

Medicine Hat, Alta.—The Alberta Clay Products Company has been awarded the contract for supplying the fire coping for the Parliament buildings. The contract calls for a hundred and sixty cars of this material aggregating about three hundred tons.

Vancouver, B.C.—The contract for the construction work on the section of the C.N.R. between Popkum and Hope has been awarded to the Northern Construction Company, which already holds the contract for the first section from Port Kells to Popkum.

RAILWAYS—STEAM AND ELECTRIC.

Montreal, Que.—In connection with extensive developments planned at St. John, N.B., it is understood that the C.P.R. will shortly call for large tenders for timber to be delivered for the building of a station at that port, for the renewal of tracks and extension of terminal buildings on the property the company recently acquired at a cost of over \$1,000,000.

Ottawa, Ont.—The annual meeting of the Ottawa Electric Railway Company was held recently, under the chairmanship of Thomas Ahearn, president of the company. The report showed gross earnings of the year 1910 to have been \$748,708.75, an increase of \$71351.64 over 1909. The net earnings were \$277,229.11, an increase of \$79,374.18. The number of passengers carried was 16,987,334. The statistical statement shows that about 16,000,000 more passengers were carried in 1910 than in the first year of the company's operation and that gross receipts have increased from \$71,698.99 to \$748,708.75. The old board of directors were re-elected as follows: T. Ahearn, Peter Whelen, George P. Brophy, Hon. George A. Cox, W. Y. Soper and Thos. Workman. Subsequently the directors elected the following officers: President, T. Ahearn; vice-president, W. Y. Soper; secretary-treasurer, James D. Fraser; superintendent, J. E. Hutcheson.

Vancouver, B.C.—The dredge is busy scooping out the mud and slime from the bottom of the river to fill in the land, at the southern end of the New Westminster bridge for the British Columbia Electric Railway Company. With the completion of this part of the work the company will commence the erection of a car barn and the construction of trackage to take care of its Fraser Valley traffic or that part of it developing from the new Chilliwack line.

LIGHT, HEAT AND POWER.

Fredericton, N.B.—John E. Stewart, Andover, it is stated, is promoting a company which will seek legislation at the approaching session of the legislature for incorporation, with power to erect and maintain a dam across the St. John River, at or near the Hawkshaw bridge, 40 miles above Fredericton, to develop electricity for light, heat and power purposes, and to transmit the same. The company, known as the St. John River Electric Power Company, will seek rights to purchase, expropriate or otherwise acquire rights, easements, franchises and privileges necessary for the operation of the company.

Toronto, Ont.—That the electric wiring in all buildings, including private houses, should be subject to inspection, is the view taken by Hon. J. S. Hendrie because of the number of fires and accidents which have been caused throughout the province by defective wiring for electric lights. The hydro-electric commission is now investigating the subject. At the last session of the legislature, the commission was authorized to make regulations in regard to electric wiring but the question now arises as to whether or not this applies to wiring in buildings. If it is found that it does not, Col. Hendrie will introduce a bill this session, which would give the commission authority to issue such regulations at the present time. The only inspection of electric wiring in buildings is conducted by the Underwriters' Association where insurance is applied for.

SEWAGE AND WATER.

Toronto, Ont.—It is interesting to note that more bacteria are found in water at the taps than at the pumping station, as shown by Dr. Nasmith's experiment during January. On January 16th, as seen in table, after being dosed with chlorine and allowing it an hour to travel to the pumping station, the record sample showed just two colonies of bacteria. At the City Hall tap it had risen to 22. The following are the results of tests taken during the month:—

Don't Bond Your Contract by Binding Your Friends

The London Guarantee and Accident Company,
Limited, will act as Surety for Due Performance of
Contract as a Business Proposition.

YOU DON'T LIKE TO REFUSE A FRIEND when he asks you to endorse his note. Yet you know if you do write your name on the back of that note you will be responsible. If necessary you will have to pay. And it doesn't seem fair of your friend to ask it. You get nothing for running the risk. It's not business.

Same thing when you are looking for a bondsman—same thing exactly, only the other way on. You ask a favor. You strain the bonds of friendship. Guarantee bonds should have nothing to do with friendship. They should be arranged as a straight business proposition, like insurance for accident. A small premium will guarantee your bonds and provide satisfactory surety, as required by municipalities, railways and other corporations. The London Guarantee and Accident Company will act as your surety—not as a favor but as a matter of business. And our guarantee carries the prestige of a strong British Company and thirty years' establishment in Canada.

Full particulars as to rates, etc., furnished promptly on request.

London Guarantee and Accident Company, Limited

*THE ONLY BRITISH COMPANY IN CANADA ISSUING
GUARANTEE BONDS FOR PERFORMANCE OF CONTRACT*

Corner of Yonge and Richmond Streets - TORONTO, Ont.

"Performance of Contract"
Insurance.

Employers Liability
Insurance.

Health and Accident
Insurance.

Colonies of bacteria per cubic centimeter:

| | Shore crib. | Pumping station. | City Hall tap. |
|--------|-------------|------------------|----------------|
| Jan. 3 | 510 | 12 | 9 |
| " 4 | 720 | 7 | 13 |
| " 5 | 97 | 1 | 3 |
| " 6 | 220 | 19 | 17 |
| " 7 | 270 | 7 | 4 |
| " 9 | 300 | 77 | 13 |
| " 10 | 350 | 39 | 10 |
| " 11 | 270 | 16 | 41 |
| " 12 | 640 | 8 | 11 |
| " 13 | 540 | 7 | 7 |
| " 14 | 760 | 117 | 126 |
| " 16 | 2,120 | 2 | 22 |
| " 17 | 370 | 5 | 3 |
| " 19 | 80 | 22 | 3 |
| " 20 | 390 | 1 | 5 |

Coli-communi (traces of sewage, known as the typhoid germ) were very seldom found at the pumping station, but frequently showed up in the samples at the shore crib. The chlorine treatment seems to be sufficiently effective to kill them off. The effect of the chlorine treatment is here shown:

Samples taken January 20—
Shore crib where water is untreated:

| Hour. | Coli per c.c. | Coli per c.c. | Bacteria per c.c. |
|---------|---------------|---------------|-------------------|
| 9 a.m. | Present | Present | 390 |
| 11 a.m. | Present | Present | 430 |
| 11 a.m. | Present | Present | 160 |

Pumping station after treatment:

| Hour. | Coli per c.c. | Coli per c.c. | Bacteria per c.c. |
|---------|---------------|---------------|-------------------|
| 4 a.m. | Absent | Absent | 2 |
| 10 a.m. | Absent | Absent | 1 |
| 11 a.m. | Absent | Absent | 1 |
| 12 a.m. | Absent | Absent | 3 |

Tap, when people drink it:

| Hour. | Coli per c.c. | Coli per c.c. | Bacteria per c.c. |
|---------|---------------|---------------|-------------------|
| 12 a.m. | Absent | Absent | 5 |

CURRENT NEWS.

Montreal, Que.—The extent to which the movement for the early construction of the Georgian Bay ship canal has grown was well shown at the annual meeting of the Canadian Federation of boards of trade and municipalities held recently, in the city council chamber. When the body was first organized a couple of years ago only eighty-five boards of trade and municipalities were affiliated. This has now grown to a total of 175 with additions being made right along. The one aim of the body, is of course, to press by every means possible an early commencement of the canal.

Montreal, Que.—The damming of the Long Sault Rapids, the project for which the Illuminum Company of the United States is seeking authorization at Washington and Ottawa, does not find much favor with Mr. John Kennedy, the consulting engineer of the Montreal Harbor Commission. He believes it would seriously hurt Canadian control of the navigable St. Lawrence.

Montreal, Que.—A valuable course of lectures is now being given in the Faculty of Applied Science by Dr. Hans Grether on the computation of secondary stresses in bridge trusses and other frame structures. This course is being attended by a few of the undergraduates, all the members of the McGill Engineering staff and about thirty outside engineers, the majority of whom are graduates of the university. Dr. Grether, formerly of the University of Karlsruhe, Germany, has, for the last two years been assistant engineer on the Board of Engineers, in connection with the Quebec bridge.

Ottawa, Ont.—The government has called for tenders for the construction of the ten new vessels of the Canadian navy contemplated in the initial building programme, viz.,

four Bristols, and six destroyers of the latest improved type. The tenders are not publicly advertised, since, following the rule of the admiralty, details have to be kept secret and only firms in whom the department have confidence and who might be bona fide tenderers will have access thereto. Letters have been sent to all the leading British and Canadian firms who are in a position to tender, inviting them to inspect the plans and put in tenders. It is stipulated that all the vessels must be built in Canada. Tenders must be in by April next.

Ottawa, Ont.—Hon. Mr. Graham, Minister of Railways, in explaining the situation regarding the proposed Quebec bridge announced that the choice now lay between the tenders of the British Empire Bridge Company of England and the St. Lawrence Bridge Company of Canada, an amalgamation of Walkerville, and the Lachine Bridge Companies. Hon. Mr. Graham also announced that all the designs provided for a bridge with a width of eighty feet, and a height of a hundred and fifty feet above high water. The question of substituting a tunnel for the bridge, he said, had been considered, but the views of the engineers were against it, chiefly because the banks were so high that the approach would be remote from the water and the expense would consequently be very great.

Lindsay, Ont.—Recently a staff of men representing the Hamilton Bridge Company, Hamilton, arrived here for the purpose of commencing work on the bascule bridge over the Scugog, to replace the old Wellington Street structure. This new structure of the bascule type, is the first of its kind, to be erected in this part of the province. The material has been loaded on the cars and it is expected here any day.

Port Arthur, Ont.—The city council received a letter from Mr. F. H. Keefer, city solicitor, saying that he was sailing for England in two or three weeks, and would be prepared while there to arrange for the financing of the establishment of a gas plant in Port Arthur. He wanted some authority from the council to act. Mr. John Coares, of Canon Street, London, E.C., England, wrote, saying that he hoped the new council would be able to shortly open negotiations for the establishment of a gas plant. Both these letters were referred to the gas committee of the council for further consideration. A letter was read from the Kamloops Power Company, asking for a profile map of the country between Port Arthur and Dog Lake dams, as the company was considering the establishment of a wireless station at Dog Lake for the facilitation of the work at the dams. It was referred to the engineer.

Kingston, Ont.—Deputations from the council and board of trade were recently sent to Ottawa to petition for the dredging of the inner harbor and construction of a new bridge from Bell's Island to Pittsburgh shore.

Elk Lake, Ont.—Following the recent enthusiastic meetings here and at Gowganda, it has been arranged that a strong delegation will go to Toronto to meet the members of the Ontario Cabinet and urge the immediate necessity for a railroad to Elk Lake and Gowganda. With better railway access there are many new properties which will be at once placed on a highly paying basis.

Buffalo, N.Y.—At a notable gathering of Canadians and Americans at the meeting of the West Side Business Men and Taxpayers' Association in Buffalo, recently, it was proposed to build a bridge across the Niagara River between Fort Erie and Buffalo, to commemorate the 100 years of peace which has existed between Canada and the United States. It was suggested by Mr. German, M.P., Welland, that the proposed bridge could be built at a cost of \$800,000.

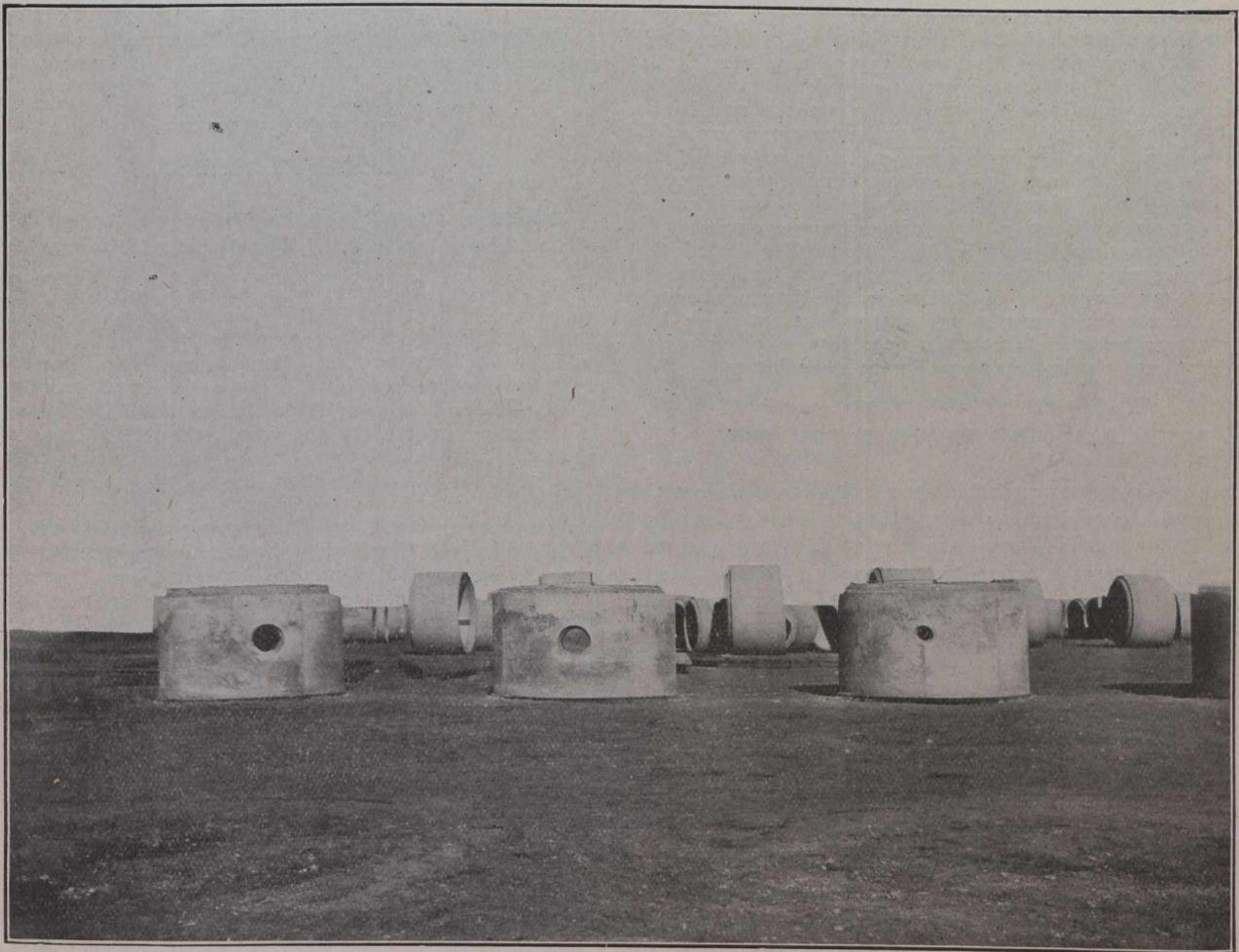
Winnipeg, Man.—Tenders were called yesterday for the new public baths over which the various committees and the board of control have been quarrelling for the last two weeks. The motion to that effect was made by Controller Waugh and the specifications used will be those drawn up by William Bruce, architect. It is figured that the building will cost in the neighborhood of \$75,000.

Winnipeg, Man.—Names for fifteen new stations on the Grand Trunk Pacific Railway immediately eastward from Prince Rupert have been officially approved by the head office at Winnipeg. The names with their mileage eastward

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CONCRETE PIPE

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MANITOBA, SASKATCHEWAN and ALBERTA.—F. H. McGavin Co., Limited, Winnipeg
BRITISH COLUMBIA.—Pacific Lock Joint Pipe Co., Seattle, Washington

from Prince Rupert follow: Prince Rupert, 00.00; Sockeye, 16.61; Tyee, 21.28; Essington, 26.49; Skeena, 32.36; Phelan, 37.61; Quinsa, 46.41; Kosiks, 52.62; Salvus, 57.99; Hubert, 62.14; Exstews, 69.54; Shamos, 75.31; Lakelse, 82.30; Kitsum, 88.36; Eddy, 94.32; Copper River, 100.29.

Vancouver, B.C.—At the meeting of the civic bridge committee held recently, Engineer Moss reported that the new Cambie Street bridge would be completed during the coming outdoor working season. The substructure contractors had completed their work on the north shore up to the draw span and had ten pairs of pedestals to finish on the south shore. The contractors for the superstructure had been delayed because part of their equipment being held up at Winnipeg, but they would be laying steel within a month. The committee passed bills for steel for the bridges totalling \$28,000.

New Westminster, B.C.—Pile driving at Port Mann in preparation for the big wharves to be built there, which has been delayed on account of the inclement weather, is being resumed this week. Two pile-driving outfits are being sent to Port Mann by the C.N.R. contractors.

New Westminster, B.C.—In the opinion of Mr. A. O. Powell, harbor engineer, the best expenditure the city of New Westminster could make just now would be that looking towards the formation of a plan to lay out the city harbor so that all future expenditure on its improvement would be along uniform lines. After sizing up the situation he met the members of the council in a short session recently, and laid a proposition before them involving the expenditure of \$15,000 for drawing up a plan of harbor improvement to which the city should work in the future. He stated that the cost of such a plan would be money well spent, saving the city many thousands of dollars in the future when the shipping of the city grew to the extent that extensive harbor improvements were absolutely necessary. Judging from the present outlook that time was in the near future.

SOME BUILDING FIGURES FOR 1910.

The following statement is interesting as showing the building business done in some of the large Canadian centres. Among twenty-one Canadian cities Toronto stands first with the largest value to her credit, and Winnipeg, which is next, stands some distance behind. The figures are as follows:—

| | |
|---------------------|--------------|
| Hamilton | \$ 2,604,605 |
| Montreal | 15,815,859 |
| Kingston | 220,092 |
| Prince Albert | 667,475 |
| St. Thomas | 286,650 |
| London | 805,074 |
| Moose Jaw | 1,060,290 |
| Winnipeg | 15,106,450 |
| Ottawa | 3,040,900 |
| Regina | 2,350,965 |
| Fort William | 2,381,125 |
| Calgary | 5,589,594 |
| Halifax | 471,140 |
| Sydney, N.S. | 347,554 |
| Toronto | 21,127,783 |
| Saskatoon | 2,646,496 |
| Edmonton | 2,159,106 |
| Lethbridge | 1,160,985 |
| Vancouver | 13,150,365 |
| Victoria | 2,271,695 |
| Port Arthur | 1,062,616 |

PERSONAL.

An English firm manufacturing switchgear and making a specialty of the construction of high and low tension three-phase switchboards and motor control panels require agents to represent them in the Dominion. The principal will be

in Canada about the end of February. If any firm desirous of taking up this agency will write to The Canadian Engineer we shall be pleased to hand their communication to this gentleman.

Mr. F. P. Cutchins has assumed his new duties as the superintendent of the C.P.R. eastern division with headquarters at Montreal. Before leaving North Bay he was tendered a banquet by the officers and employees of the Lake Superior division, of which he had been general superintendent for several years.

Mr. S. L. Trusler is appointed passenger trainmaster of the middle division of the G.T.R. to supervise the movement of passenger trains, with headquarters at Toronto.

Mr. H. W. Matthews is appointed passenger trainmaster of the western division of the G.T.R., to supervise the movement of passenger trains, with headquarters at Detroit, Mich.

Mr. H. M. Gain is appointed passenger trainmaster of the eastern division of the G.T.R. to supervise the movement of passenger trains, with headquarters at Montreal, Que.

Mr. Willis MacLachlan, assistant electrical engineer of the waterworks department, London, Ont., has tendered his resignation. It will take effect at once.

SOCIETY NOTES.

Canadian Mining Institute, Thirteenth Annual Meeting.

—The annual meeting of the Canadian Mining Institute, this year, will be held at the Chateau Frontenac, Quebec, on Wednesday, Thursday and Friday, March 1st, 2nd and 3rd next, and it should be here noted that not only members, but the public, are welcome to attend the sessions. To that end special transportation concessions have been secured from the Eastern Canadian Passenger Association, and reduced fares will be granted on the Standard Certificate plan. The meeting, which, by the way, is the thirteenth of these annual events, promises to be an exceptionally interesting one, judging from the character of the provisional programme. There will be a series of papers on the asbestos industries of the world, including contributions by Dr. J. S. Diller, of the United States Geological Survey, and Prof. Richardson, of Syracuse University, dealing with the asbestos deposits of the United States; a contribution from Russia, and another from South Africa. Another series of papers deals with the iron industry, the president of the institute, Dr. Frank D. Adams, having undertaken to discuss the iron deposits of the world; while Mr. J. E. Hardman, M. A. B. Willmott, Prof. Baker, and others will contribute papers on Canadian occurrences. Dr. A. E. Barlow, the chairman of the Commission appointed by the Quebec government last summer to investigate the mineral possibilities of the Chibougamou region, will give an illustrated address on the result of this reconnaissance. An interesting discussion is expected on the origin of petroleum from the presentation of a paper by Mr. Eugene Coste, the distinguished authority on the subject in Canada, whose views will probably be debated by Dr. Becker, of the United States Geological Survey, and Mr. Robert Anderson, who, it is announced, has an important message to convey regarding the occurrence of petroleum in California. A paper on the new district of Porcupine will be presented by Mr. A. G. Burrows, of the Bureau of Mines, Ontario; while Mr. C. W. Knight, assistant provincial geologist of Ontario, will give an illustrated address on "Recent Underground Development Work at Cobalt." Of value also will be a paper by Mr. Robert Harvie, on "A Discovery of Telluride Gold Ores at Opasatica, and Their Probable Relations to the Gold Ores of the Porcupine District." Papers on copper include a contribution by Dr. Alfred C. Lane, of Tufts College, Massachusetts, on "The Copper Deposits of the Keweenaw Peninsula Compared with Similar Canadian Deposits"; while Mr. W. M. Brewer, of Vancouver, B.C., writes on "Copper Mining on the British Columbia Coast." Of special interest to geologists will be a paper by Dr. W. G. Miller, discussing "The Depth at which Gold is Deposited in Economic Quantities"; while the practical application of geology to engineering will be demonstrated in a lecture to be delivered by



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HIGHWAY officials who use "Pioneer" Road Asphalt and employ our simple, practical methods of construction are building **Model Roads**. For making durable macadam roads—roads so durable that automobile traffic cannot cause them to disintegrate—"Pioneer" Road Asphalt holds the record.

It is endorsed by road experts because its use insures both greater durability and lower cost of maintenance than is the case where oils and ordinary asphalts are used.

"PIONEER" Road Asphalt

Highway officials have had enough of mere "cheapness." The high purpose of to-day is to build roads that will *endure* and they know that in the making of that kind of roads the *best materials* must be employed and the *best methods of construction* must be followed.

Coal tar pitch, oils and the variously concocted by-products labeled "asphalt" have been tried and found wanting. The results are too small—the cost is too great.

Waterproof macadam road construction of the highest type costs so little that every taxpayer should demand its use. Every Engineer, Highway Commissioner and road enthusiast in the country should have our specifications and full

particulars regarding "Pioneer" Road Asphalt.

This material is not an experiment. It has an established record. It has made good. It is a genuine asphalt—a natural mineral product, entirely free from adulterants and always uniform.

It makes a road that is waterproof, auto-proof and dust-proof—a road which will not "bleed" in summer nor crack in winter.

The permanency of "Pioneer" Asphalt has been demonstrated particularly by its 15-year record as a filler for brick pavements. In macadam road construction it has been equally successful and its use means true economy.

We shall be very glad to mail our specifications on request.

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No. 1 Toronto Street - - - - - Toronto, Ontario

Dr. J. F. Kemp, of Columbia University. Other distinguished engineers and geologists, in addition to those already mentioned, who it is expected will be in attendance and will participate in the proceedings, include Dr. James Douglas, Dr. A. R. Ledoux, Mr. Benj. B. Lawrence, the well known consulting mining engineer of New York; Prof. H. E. Gregory, of Syracuse University; Dr. Heinrich Ries, of Cornell University, and Mr. W. R. Ingalls, editor of the "Engineering and Mining Journal," of New York. Business, however, will not constitute the only feature of the meeting, since ample provision has been made for amusement and relaxation. Thus, on the Wednesday afternoon a visit will be paid to Montmorency Falls; while on the Thursday evening there will be a smoking concert, at which suitable refreshments will be provided, and on Friday evening the annual dinner will be held.

The annual convention of the Alberta Association of Architects was held recently in Calgary. There were thirty members present, including architects from Lethbridge, Edmonton, and other points. The meeting was held in the board of trade assembly rooms, and Mr. Henderson, Edmonton, presided. Reports of the past year were read and adopted. The officers for 1911 are: Hon. president, E. C. Hopkins, Edmonton; president, S. M. Lang, Calgary; secretary, L. M. Gotch, Calgary; hon. secretary, R. W. Lines, Edmonton; treasurer, D. S. McElroy, Calgary; examiners, G. M. Lang, W. S. Bates, James Henderson, L. M. Gotch, and R. W. Lines; auditors, A. Pierie and J. J. Ogara; librarian, R. W. Lines.

ENGINEERS' CLUB OF TORONTO.

The officers of the Engineers' Club, of Toronto, as recently elected, are as follows: President, Capt. Killaly Gamble; first vice-president, Mr. Willis Chipman; second vice-president, Mr. H. E. T. Haultain; third vice-president, Mr. Chas. H. Hays; directors, Messrs. J. J. Ashworth, R. A. Baldwin, C. H. Acton Bond, C. H. Burke, W. A. Bucke, C. M. Canniff, W. E. Douglas, E. A. James, L. J. Street, Jas. B. Tyrrell and T. S. Young; secretary-treasurer, Mr. R. B. Wolsey. The club has now a membership of about 400. It has secured possession of the property to the east of the old club rooms and has greatly enlarged the quarters, taking in the floor below, where a large dining-room has been opened.

OBITUARY.

Mr. Roderick McLennan, C.E., died at his residence, 115 Avenue Road, Toronto, February 2nd, 1911. Mr. McLennan was a native of the county of Glengarry, having been born there on the 5th of June, 1823. He was a son of the late Donald (Masen) McLennan, who came to Canada from Rosshire, Scotland, about 1802, and settled in Glengarry. The late Roderick McLennan was educated at Williamstown High School, and subsequently at Montreal, and spent the early part of his life in the southern States, where he was engaged as an engineer on the survey and construction of the Savannah, Albany & Gulf Railways, also on the Georgian Central and South Western Railways. On returning to Canada he was engaged on the preliminary survey and construction of the Intercolonial Railway, later on exploring and surveying in British Columbia from Kamloops to Leather Head Pass. In 1872 he passed through Chilcoton Plains and was district engineer for the government railways between Port Arthur and Winnipeg, afterwards Chief Engineer for Construction for the C.P.R. on the Lake Superior division.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

- 12781—January 18—Authorizing Hydro-Electric Commission to place wires across wires of C.P.R. at Mutual and Carnegie Streets, town of Ingersoll, Ont.
12782—January 18—Authorizing town of Galt, Ont., to maintain sewer under track of G.T.R. on George Street.

12783—January 18—Directing British Yukon Railway Company, the British Columbia Yukon Railway Co., the Pacific and Arctic Railway & Navigation Co., and the White Pass & Yukon Railway Co., upon application of Board of Trade of Dawson, Y. T. Disallowing Joint Freight Tariff C.R.C. No. 9, between Skaguay, Alaska and White Horse Y. T. Disallowing Joint Passenger Tariff C.R.C. No. 3 between Skaguay and White Horse and directing that railway companies substitute therefor joint tariffs of freight and passenger tolls based on a reduction of at least one-third in each case, to become effective not later than April 1st, 1911. Directing that freight passenger tolls (if any) now existing lower than tolls hereby ordered shall not be increased by reason of this Order. See Order 7246, June 16th, 1909.

12784—January 19—Approving location of Calgary & Edmonton Ry. Co. (C.P.R.) from a point on the eastern boundary of Sec. 26, Township 36, Range 12, west 4th at mileage 100, Province of Alberta, to a point on the located line of the Moose Jaw North-westerly Branch of the applicant company in Sec. 23, Township 34, Range 23, west 3rd, at mileage 221.9 in the Province of Saskatchewan.

12785—January 18—Authorizing G.T.P. Branch Lines Co. to cross C.P.R. Arcola Branch at Griffin, Sask., interlocking plant to be installed before August 15th, 1911.

12786—January 18—Refusing application for interswitching at Ingersoll, Ont., which was reserved in order of the Board No. 10805, of June 6th, 1910.

12787-88-89—January 19—Authorizing Farmers' Telephone Co., Ltd., to install telephones in C.P.R. stations at Hartland, East Florenceville, and Woodstock, N.B.

12790—January 20—Approving location of C.P.R. (being revision of location) previously approved by Orders Nos. 3428 and 10150, dated August 13th, 1907, and April 12th, 1910, said revision being from a point in Sec. 12, Township 32, Range 27, west 2nd Meridian, at mileage 89.8 (from Regina) to a point in Section 29, Township 33, Range 27, west 2nd Meridian, Province of Saskatchewan, at mileage 100.1.

12791—January 20—Authorizing C.P.R. to construct tracks of its Regina, Saskatchewan & North Saskatchewan Branch across tracks of G.T.P. at mileage 118, from Regina in north-west ¼ of Section 28, Township 32, Range 27, west 2nd Meridian, Saskatchewan, interlocking plant to be installed by July 31st, 1911.

12792—January 20—Approving revised location of C.N.O.R. on the north-east ¼ of Lot 11, Concession 3, Township of Hope, County of Durham, Ont., mileage 62.27 to 62.82.

12793—January 21—Authorizing C.P.R. to construct spur to premises of Toronto Carpet Co. across Liberty St., city of Toronto, Ont.

12794—January 20—Approving agreement between Bell Telephone Co. and South Bruce Rural Telephone Co., Ltd., for interchange, tolls, etc.

12795 to 12798 Inc.—January 20—Authorizing Hydro-Electric Commission to maintain wires across wires of Bell Telephone Co. at Avery Lane, in town of Norwich, Ont., at Lot 15, Concession 4, Township of South Norwich, at Edinburgh Rd., Township of Guelph (Guelph College Line), at Edinburgh Road, Township of Guelph, (College Line).

12799—January 20—Authorizing South River Electric Co. to cross with wires track and wires of the G.T.R. at Main Street, South River.

12800—January 20—Authorizing C.P.R. to construct spur line to premises of Dean & Charles, and siding for Toronto Laundry Machine Co., in block of land south-east of intersection of Dundas St. and Sorauren Ave., Toronto, Ont.

12801—January 20—Authorizing city of Regina, Sask., to construct subway at Broad Street, under C.P.R., city to close Hamilton St., \$5,000 to be paid to city from Railway Grade Crossing Fund, (see Order 12798, of January 9th, 1911.)

12802—January 23—Authorizing Hydro-Electric Commission to cross with wires, wire of G.N.W. Tel. Co. at Lot 6, Con. "A," Township of London, County of Middlesex, Ont.

12803—January 23—Authorizing Seymour Power & Electric Co. to cross with wires, wires of Bell Telephone Co. at Lot 22, Con. 2, Township of Rawdon, County of Hastings, Ont.

12804—January 23—Authorizing C.N.O.R. to construct bridge over Lavens Creek, Township of Thurlow, County of Hastings, Ont.

12805—January 23—Authorizing C.N.O.R. to construct bridge over creek at station 2176.29, Township of Thurlow, County of Hastings, Ont., mileage 131.36 from Ottawa.

12806—January 23—Authorizing C.P.R. to construct siding across Jeffreys St., in the city of Chatham, Ont., to premises of American Pad & Textile Co.

12807—January 24—Authorizing G.T.P. Branch Lines Co. to divert road on its Calgary Branch in the south ¼ of Sec. 27, Township 29, Range 24, west 4th Meridian, District of South Alberta, Alta.

12808—January 24—Authorizing G.T.P. Branch Lines Co. to construct its railway across the highway on its Yorkton extension, in the north-west ¼ of Section 13, Township 26, Range 4, west 2nd Meridian, District of Yorkton, Sask.

12809—January 24—Authorizing G.T.P. Co. to divert road in the east half of Section 16, Township 53, Range 17, west 5th Meridian, District of North Alberta, Province of Alberta.

12810—January 24—Authorizing Dominion Atlantic Railway Co. to reconstruct bridge across the Gaspereaux River, at Horton Landing, in the County of Kings, N.S.

MARKET CONDITIONS.

Halifax, N.S., February 6th, 1911.

Weather conditions at the opening of the New Year have not been such as would encourage a large volume of trade. The price situation is steady, and it is expected the values will continue firm. Imported pig-iron is very steady in price, and an increase in metal prices is expected.
Axes.—Ordinary chopping axes, single bit, \$6.50 per dozen, double bit, \$11. Special brands, prices on application to jobbers.

THE FOUNDATION COMPANY

LIMITED

BANK OF OTTAWA BUILDING

MONTREAL, CANADA

RECENT CONTRACT



Dominion Express Building, Montreal

THIS OFFICE BUILDING WILL BE BUILT UPON

PNEUMATIC CAISSON FOUNDATIONS

THESE WILL BE

THE DEEPEST FOUNDATIONS IN THE CITY

The Pneumatic Caissons in this Foundation will be carried
down to Bed Rock 90 feet Below Street Level

We Invite Inquiries in Reference to Cost and Design of Difficult Foundation Work.

Bar Iron.—The market for bar iron is open, but the situation is firm, and prices range as high as \$2.25 base.

Black Sheet Iron.—This commodity is in good demand. We quote 24-gauge, \$2.40.

Cast Steel.—The market is steady at 10 to 15c., according to makers.

Cement.—Stocks are low and market is steady, \$2 per bbl.

Coil Chain.—The jobbing prices of English proof chain in Halifax are as follows: 3-16 x 4, \$7.15; 3-16 x 3, \$6.25; ¼, \$5.35; 5-16, \$4.30; ¾, \$3.90; 7-16, \$3.85; ½, \$3.60; ⅜, \$3.60; ¼, \$3.50; ⅙, \$3.50; 1, \$3.50; 1½, \$3.50.

Fencing Wire.—We quote: Plain, twisted and galvanized at \$3.25 per 100 lbs.; barb at \$2.75 per 100 lbs.; bright staples in 100-lb. kegs at \$3, and in 50-lb. lots, \$3.25. Galvanized staples are 25c. extra.

Galvanized Sheet Iron.—The wholesale prices are as follows: 16 to 20-gauge, \$3.45; 22 to 24, \$3.80; 26, \$4.30; 28, \$4.55. These prices are for less than case lots.

Ingot Tin.—The tin market as usual is a fluctuating one, and the present price is about 38c. net cash.

Lead Pipe.—Quotations here are open, and the price quoted to-day is about \$4.75 for ordinary jobbing quantities.

Linseed Oil.—Raw is fully worth \$1.20, and boiled, \$1.25 per gallon. Orders are small, stocks low, and the outlook firm.

Nails.—Nails are firm. Wire nails, \$2.45, and cut nails, \$2.60. Business in this line is reported fairly active.

Peavies.—There is a better enquiry than last year. Prices are unchanged at \$11 to \$13 per dozen, according to make, but we are advised that there will be an advance.

Pig Lead.—We quote \$4.25 for English and \$4 for Canadian. The outlook is for higher prices.

Pipe.—Wrought iron, 1-in., \$5.25.

Roofing Paper.—The demand is good. Tarred paper, \$1.70 per 100 lbs.; three-ply roofing 90c. per 100 lbs.; two-ply roofing, 65c.; sheathing paper, 30 cents per roll; tarred sheathing, 40 cents per roll.

Rope.—The price of cordage for next spring's supplies is unchanged. For large lots dealers should write jobbers for quotations. Small lots are as follows: Sisal, 9½c. base; lobster rope, 9½c.; British manilla, 9½c.; base, best manilla, 10½c. base.

Sheet Lead.—The price of sheet lead is also very firm, 3 lbs. and heavier, \$4.75 per cwt., in rolls, and \$5.75 in smaller quantities.

Steel.—Tire, \$2.50; spring, \$2.70; machine, \$3.25; toe calk, \$3.50; sleigh shoe steel, \$2.50; the above are all base prices.

Tin Plates.—I. C. coke, \$3.95 to \$4.10; I. C. charcoal, \$4.75; I. X. charcoal, \$5.50.

Turpentine.—Prices now quoted are as high as \$1 to \$1.10 in bbls., and \$1.05 to \$1.15 in smaller quantities. The market is open.

White Lead.—For Canadian pure, in 50 and 25-lb. irons, \$6.25 is being asked. Brandram's B.B. genuine in 25, 50, and 100-lb. irons, \$7.35, and B.B. No. 1, \$6.10. The trade expect prices to be much higher before long.

Zinc.—This commodity is very firm, \$7.50 for casks and \$8 for smaller quantities. Spelter is \$2.75 per cwt.

Montreal, February 8th, 1911.

The decision of the Interstate Commerce Commission has been awaited with considerable interest on the other side of the border. It is believed that it will be handed down during the latter part of this month. The iron and steel trade in particular feels itself interested in the nature of the decision, but where the iron and steel trades are effected it follows that general business conditions will be influenced also, no doubt. Should the decision be favorable to the railways, the result will be more satisfactory to the iron and steel trades, as it no doubt would mean the purchasing of very large quantities of steel rails, structural steel, and various other iron and steel products which are used more especially, by railways for the building of cars, locomotives and other equipments. Whether the decision is favorable or otherwise, it is sure to have a good effect, for the simple reason that the railways will then know what to expect. It is the uncertainty rather than anything else which is inducing the companies to hold back orders—if such are being held back.

A large number of steel manufacturers hold to the opinion that the bookings in February will average somewhat above what they were in January. They do not anticipate a large increase in business until the Interstate Commerce Commission has rendered its opinion in the matter of freight rate increases.

The United States Steel Corporation is operating at about 55 per cent. of its blast furnace capacity at the present time. The increase is due to an exhaustion of pig-iron stocks and an increase in mill capacity.

At Pittsburg, an improvement in the iron and steel business all along the line is predicted by manufacturers who say the present year will show an increase of 15 per cent. to 20 per cent. over last year.

"The last week has witnessed a wonderful improvement in the amount of the business actually placed, and the outlook has changed," declared James A. Campbell, President of the Youngstown Sheet & Tube Co. "The manufacturers who were decidedly pessimistic a few months ago are confident that conditions will continue to improve. Buyers are now coming into the market more freely."

At Sharon, Pa., all departments of the Ohio works of the Carnegie Steel Co. are running, and the Grenville plant is working for the first time in several weeks. The South Sharon plant has started up again after a several days' shut down.

Chairman Gary's statement that Steel Corporation bookings were 30,000 tons daily, in January, to the 27th, against 22,000 tons, daily, in December, presages a gain of more than 200,000 tons in bookings for the month and as shipments average only a slight increase the recent forecast of from 100,000 to 200,000 tons' gain in unfilled orders for January 31st, is given additional support. This will be the first gain for a year.

Reports from England are most encouraging, although prices do not seem to have advanced to any great extent as yet. Demand is waking up somewhat, and shipments of pig-iron for export are being made.

The local trade continues dull though quite as active as merchants anticipated for this time of the year. Merchants are quite optimistic

concerning the future, and all are looking forward to active business during the coming season. Prices are holding steady and no changes of importance have been reported during the week.

Bar Iron and Steel.—Trade is reported first-class. Bar iron, \$1.90 per 100 pounds; best refined horseshoe, \$2.15; forged iron, \$2.05; mild steel, \$1.95; sleigh shoe steel, \$1.95 for 1 x ½ base; tire steel, \$2.05 for 1 x ¾-base; toe calk steel, \$2.75; machine steel, iron finish, \$2.00; imported, \$2.05.

Antimony.—The market is steady at 8¼c.

Building Paper.—Tar paper, 7, 10, or 16 ounces, \$1.80 per 100 pounds; carpet felt, \$2.50 per 100 pounds; tar sheathing, 36c. per roll of 400 square feet; dry sheathing, No. 1, 28c. per roll of 400 square feet; tarred fibre, 55c. per roll; dry fibre, 45c. (See Roofing; also Tar and Pitch).

Cement.—Canadian cement is quotable, as follows, in car lots, f.o.b. Montreal:—\$1.35 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.

Chain.—The market is unchanged, being now per 100 lbs., as follows:—¼-in., \$5.30; 5-16-in., \$4.70; ¾-in., \$3.90; 7-16-in., \$3.65; ½-in., \$3.55; 3-16-in., \$3.45; ⅜-in., \$3.40; ¼-in., \$3.35; ⅙-in., \$3.35; 1-in., \$3.35.

Coal and Coke.—Anthracite, eggs, stove or chestnut coal, \$7 per ton, net; furnace coal, \$6.75, 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 easy at 13¼c.

Explosives and Accessories.—Dynamite, 50-lb. cases, 40 per cent. proof, 45c. 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 5,000, 75c. per 100; broken lots, \$1; electric blasting apparatus:—Batteries, 1 to 10 holes, \$15; 1 to 20 holes, \$25; 20 to 30 holes, \$35; 1 to 40 holes, \$50. Wire, leading, 1c. per foot; connections, 50c. per lb. Fuses, platinum, single strength, per 100 fuses:—4-ft. wires, 33; 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, 10¼ oz., \$4.04. 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 10¼ oz., and English 28-gauge.

Galvanized Pipe.—(See Pipe, Wrought and Galvanized). The following quotations are now given, basis of carloads, ex-store:—No. 1 Summerlee, \$21.50 to \$22 per ton; selected Summerlee, \$21 to \$21.50; soft Summerlee, \$20.50 to \$21; Carron special, \$21 to \$21.50; Carron soft, \$20.50 to \$21; Clarence, \$18.50 to \$19; Cleveland, \$18.50 to \$19.

Laths.—See Lumber, etc.

Lead.—Prices are firm at \$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, \$17 to \$21 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, 2-in. by 4-in. or cedar, 35 to 45c. each, on a 5c. rate to Montreal. Railway Ties, 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 carrying \$1.50 freight rate to Montreal, \$2 to \$3. Shingles: Cedar shingles, same conditions as laths, X, \$1.50; XX, 2.50; XXX, \$3.

Nails.—Demand for nails is steady and prices are: \$2.40 per keg for cut, and \$2.30 for wire, base prices. Wire roofing nails, 5c. lb.

Paints.—Roof, barn and fence paint, \$1.25 to \$1.45 per gallon; girder, bridge, and structural paint for steel or iron—shop or field—\$1.45 to \$1.55 per gallon, in barrels; liquid red lead in gallon cans, \$2 per gallon.

Pipe—Cast Iron.—The market shows a firm tone and trade is said to have been most satisfactory. Prices are firm, and approximately as follows:—\$33 for 6 and 8-inch pipe and larger; \$34 for 3-inch and 4-inch at about \$1 more than the above.

Pipe—Wrought and Galvanized.—Demand is about the same, and the tone is firm, though prices are steady, moderate-sized lots and being: ¼-inch, \$5.50, with 63 per cent. off for black, and 48 per cent. off for galvanized; ¾-inch, \$5.50, with 63 per cent. off for black, and 48 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 72½ per cent. off for black, and 62½ per cent. off for galvanized: 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27. On the following the discount is 73½ per cent. for black, and 63½ per cent. for galvanized: 2-inch, \$36; 2½-inch, \$57.50; 3-inch, \$75.50. Discount on the following is 71½ per cent. off on black, and 61½ per cent. off for galvanized: 1-inch, \$95; 4-inch, \$1.08.

Plates and Sheets.—Steel.—The market is steady. Quotations are: \$2.20 for 3-16; \$2.30 for ¼, and \$2.10 for ⅜ and thicker; 12-gauge being \$2.20 14-gauge, \$2.15; and 16-gauge, \$2.10.

Rails.—Quotations on steel rails are necessarily only approximate and depend upon specification, quantity and delivery required. A range of \$27 to \$30 per ton, according to condition of rail and location.

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).

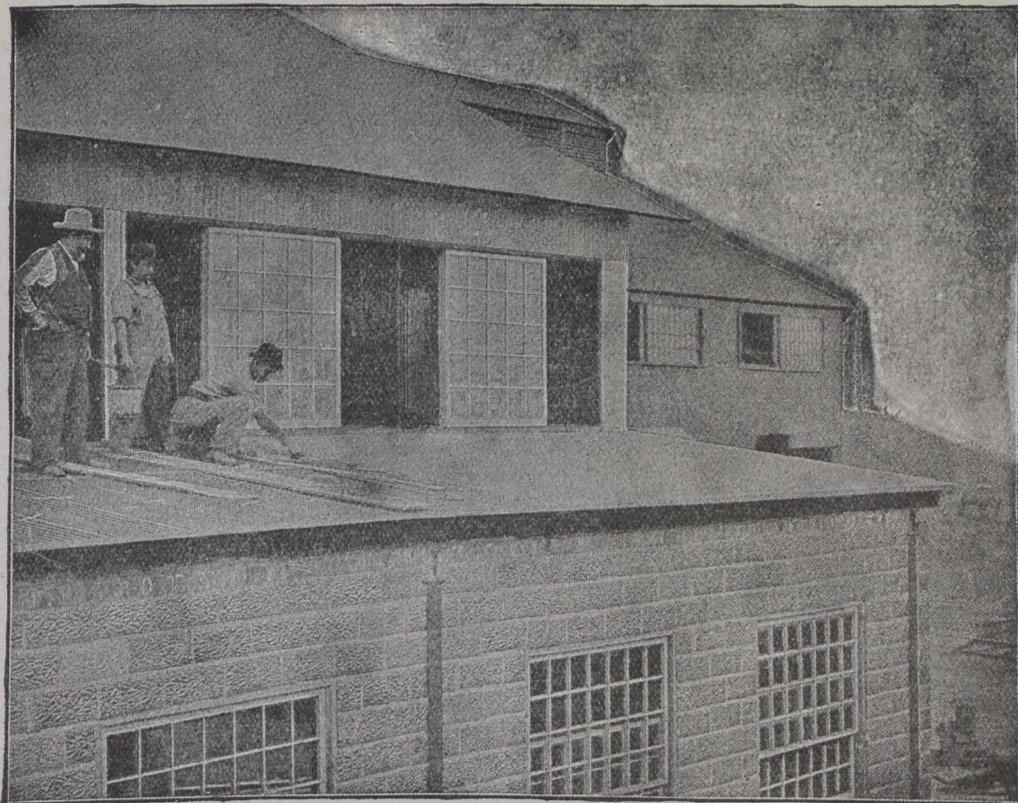
Rope.—Prices are steady, at 9c. per lb. for sisal, and 10½c. for Manila. Wire rope, crucible steel, six-strands, nineteen wires; ¼-in., \$2.75; 5-16, \$3.75; ¾, \$4.75; ½, \$5.25; ⅜, \$6.25; ¼, \$8; ⅙, \$10; 1-in., \$12 per 100 feet.

Spikes.—Railway spikes are steady, at \$2.45 per 100 pounds, base of 3½ x 0-16. Ship spikes are steady at \$2.85 per 100 pounds, base of ½ x 10-inch, and ¼ x 12-inch.

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, \$4 per barrel of 40 gallons, weighing about 500 pounds; roofing pitch, No. 1, 75c. per 100 pounds; No. 2, 55c. per



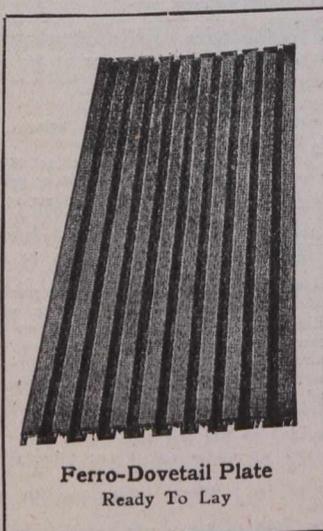
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PEDLAR FERRO-DOVETAIL

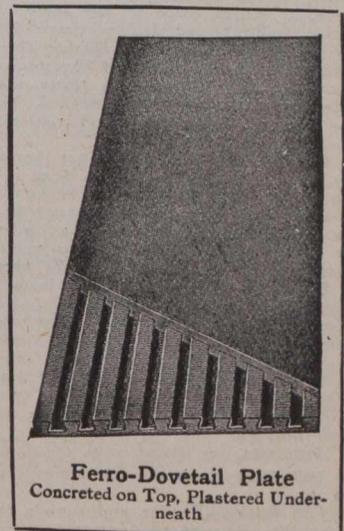
Plates, which have been laid to form a roof. The under side of these plates is plastered. This is a good example of a roof that is both fireproof and timeproof—the two qualities in which Pedlar Ferro-Dovetail Plates stand preeminent. A roof in which Ferro-Dovetail Plates are used, made of steel and cement, has not an ounce of combustible material in it. The steel plates being concreted on the upper side and plastered on the lower side, are so perfectly protected, that gases, acid fumes, atmospheric conditions or any other injurious influence cannot harm them.

Ferro-Dovetail floors show no deflection under loads far exceeding the possible requirements. There is no form of floor construction to be compared with Ferro-Dovetail Plates for factories, warehouses, freight depots, breweries, bridges, subways, tunnels, coal bunkers, public halls, etc., etc.

As Pedlar Ferro-Dovetail Plates embody an idea that is new to many architects and builders, we have published a profusely illustrated book dealing with them. This book covers the specifications, the uses to which these plates may be put, and the methods of using them. If you are interested in the subject, we would like to send it to you. On receipt of your request for bulletin No. 70, we will gladly mail you a copy free. Write for it.



Ferro-Dovetail Plate
Ready To Lay



Ferro-Dovetail Plate
Concreted on Top, Plastered Underneath

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PORT ARTHUR
45 Cumberland St.
VICTORIA
434 Kingston St.

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A

100 pounds; pine tar, \$9.50 per barrel of 40 gallons; refined coal tar, \$4.50 per barrel, pine pitch, 3c. per lb.; rosin, 3/4c. (See building paper, also roofing).

Tin.—Prices are firm at \$44.

Zinc.—The tone is easy, at 6 1/4c.

CAMP SUPPLIES.

Beans.—Prime beans, \$1.85 to \$1.90.

Butter.—Fresh made creamery, 24 to 26c.

Canned Goods.—Per Dozen.—Corn, \$1.00; peas, \$1.20 to \$2.00; beans, \$1.00; tomatoes, \$1.45; peaches, 2s, \$1.90; and 3s, \$2.90; pears, 2s, \$1.80; and 3s, \$2.40; salmon best brands, 1-lb. talls, \$2.07, and flats, \$2.25; other grades, \$1.40 to \$2.10.

Cheese.—The market ranges from 11 to 12c., covering all Canadian makes.

Coffee.—Mocha, 22 to 30c.; Santos, 18 to 21c.; Rio, 15 to 18c.

Dried Fruits.—Currants, Filiatras, 6 1/4 to 9 1/4c.; dates, 5 1/4c.; raisins, Valentias, 7 1/4 to 8 1/4c.; prunes, 8 1/2 to 12c.

Eggs.—No. 1 eggs are 26c.; selects, 30c.; new laid, 50 to 60c.

Flour.—Manitoba, 1st patents, \$5.60 per barrel; and patents, \$5.10, strong bakers', \$4.90.

Molasses and Syrup.—Molasses, New Orleans, 27 to 28c.; Barbados, 34 to 36c.; Porto Rico, 40 to 43c.; syrup, barrels, 3c.; 2-lb. tins, 2 dozen to case, \$2.25 per case.

Potatoes.—Per 90 lbs., good quality, 85 to 95c.

Rice and Tapioca.—Rice, grade B, in 100-lb. bags, 3 1/4 to 3 1/2; Tapioca, medium pearl, 5 1/2 to 8c.

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

Sugar.—Granulated, bags, \$4.60; yellow, \$4.20 to \$4.45; Barrels 5c. above bag prices.

Tea.—Japans, 20 to 38c.; Ceylons, 20 to 40c.; Ceylon, greens, 19 to 25c. China, green, 14 to 50c.

Fish.—Salt fish.—No. 1 green cod, \$8 to \$9 per bbl.; herring, \$4.50 per bbl.; salmon, \$8.50 per half barrel. Smoked fish.—Bloaters, \$1.25 per large box; haddies, 8c. per lb.; kippered herring, per box, \$1.20 to \$1.40.

Provisions.—Salt Pork.—\$24 to \$31 per bbl.; beef, \$18 per bbl.; smoked hams, 14 to 19c. per lb.; lard, 14 to 15c. for pure, and 11 1/2 to 12c. per lb. for compound; bacon, 13 to 18c.

Toronto, February 8th, 1911.

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

Antimony.—The demand is less active, and the price remains unchanged at \$8.50.

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

Bar Iron.—\$2.05 to \$2.15, base, per 100 lbs., from stock to wholesale dealer. Free movement.

Bar Mild Steel.—Per 100 lbs., \$2.15 to \$2.25. Sleigh shoe and other take same relative advance.

Boiler Plates.—1/4-inch and heavier \$2.20. Boiler heads 25c. per 100 pounds advance on plate. Tank plate, 3-16-inch, \$2.40 per 100 pounds.

Boiler Tubes.—Orders continue active. Lap-welded, steel, 1 1/4-inch, 10c.; 1 1/2-inch, 9c. per 100 feet; 2-inch, \$8.50 to \$9; 2 1/4-inch, \$10; 2 1/2-inch, \$10.50; 3-inch, \$12.10; 3 1/2-inch, \$15; 4-inch, \$19.

Building Paper.—Plain, 27c. per roll; tarred, 35c. Nothing doing.

Bricks.—In active movement, with very firm tone. Price at some yards \$5.50, at others, \$10.00 to \$11.00 for common. Don Valley pressed brick are in request. 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., 70c. until further notice, per ton of 2,000 lbs., 1-inch, 2-inch, or larger, price all the same. Rubble stone, 55c. per ton, Schaw station, and a good deal moving. Broken granite is selling at \$3 per ton for good Oshawa, or Quebec Province. In October and November competition forced prices of limestone up to 90c., the city and the province competing for several thousand tons. But the reservoir and the hydro-electric being both supplied, normal prices have been resumed. One quarry (Maloney's) will run all winter to supply stone for the Island.

Cement.—Car lots, \$1.65 per barrel, without bags. In 1,000 barrel lots, \$1.55. In smaller parcels \$1.90 is asked by city dealers. Bags, 40c. extra.

Coal.—Anthracite egg and stove, \$7.25 per ton; chestnut, scarce, \$7.50; pea coal \$6.00 per ton. In the United States there is an open market for bituminous coal and a great number of qualities exist. We quote: Yonghoheny lump coal on cars here, \$3.75 to \$3.80; mine run, \$3.65 to \$3.70; slack, \$2.75 to \$2.85; lump coal from other districts, \$3.55 to \$3.70; mine run 10c. less; slack, \$2.60 to \$2.70; canal 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 \$5.10; Connellsville, 72-hour coke, \$5.00 to \$5.25. Nut coal is very scarce.

Copper Ingot.—The market has reached a firm basis, and holders are quite stiff at \$1.50 per 100 lbs. There is a good demand.

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

Dynamite, per pound, 21 to 25c., as to quantity

Felt Roofing.—Not much moving, price continues as before, \$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.—1/4-inch, \$5.75; 5-16-inch, \$5.15; 3/4-inch, \$4.15; 7-16-inch, \$3.95; 1/2-inch, \$3.75; 9-16-inch, \$3.70; 3/8-inch, \$3.55; 1/2-inch, \$3.45; 3/4-inch, \$3.40, per 100 lbs.

Iron Pipe.—A steady request at former prices:—Black, 3/4-inch, \$2.03; 1/2-inch, \$2.25; 3/8-inch, \$2.63; 1/4-inch, \$3.28; 1-inch, \$4.70; 1 1/4-inch, \$6.41; 1 1/2-inch, \$7.70; 2-inch, \$10.26; 2 1/2-inch, \$16.39; 3-inch, \$21.52; 3 1/2-inch, \$27.08; 4-inch, \$30.78; 4 1/2-inch, \$35.75; 5-inch, \$39.85; 6-inch, \$51.70. Galvanized, 1/2-inch, \$2.86; 3/8-inch, \$3.08; 1/2-inch, \$3.48; 3/4-inch, \$4.43; 1-inch, \$6.35; 1 1/4-inch, \$8.66; 1 1/2-inch, \$10.40; 2-inch, \$13.86, per 100 feet.

Pig Iron.—We quote Clarence at \$20.50, for No. 3; Cleveland, \$20.50; Summerlee, \$22; Hamilton quotes a little irregular, between \$19 and \$20. Any change must be upward.

Lead.—A fair business is doing at prices unaltered from \$3.75 to \$4. **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.—Demand less brisk, because of the late season of the year, but prices are not materially altered. Pine is good value at \$32 to \$40 per M. for dressing, according to width required; common stock boards, \$28 to \$33; 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 is in demand and held quite firmly, we quote \$17.50 to \$18; spruce flooring in car lots, \$22 to \$24; shingles, British Columbia, are steady, we quote \$3.10; lath, No. 1, \$4.60; white pine, 48-inch, No. 2, \$3.75; for 32-inch, \$1.85 is asked.

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, \$3.50 per barrel. Season is over.

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

Putty.—In bladders, strictly pure, per 100 lbs., \$2.60; in barrel lots, \$2.10. Plasterer's, \$2.15 per barrel of three bushels.

Ready Roofing.—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 10x16 may be quoted at \$7 per square of 100 square feet, f.o.b., cars, Toronto; seconds, 50c. less. Mottled, \$7.25; green, \$7, with a prospect of advance. Dealers are fairly busy.

Rope.—Sisal, 9 1/2c. per lb.; pure Manila, 10 1/2c. per lb., Base.

Sand.—Sharp, for cement or brick work, \$1.05 per ton f.o.b., cars, Toronto siding.

| Sewer Pipe.— | 4-in. | 6-in. | 9-in. | 12-in. | 24-in. |
|----------------------------------|--------|--------|--------|--------|--------|
| Straight pipe, per foot | \$0.25 | \$0.40 | \$0.65 | \$1.00 | \$3.25 |
| Single junction, 1 or 2 ft. long | 1.00 | 1.60 | 2.60 | 4.00 | 13.00 |
| Double junctions | 1.25 | 2.00 | 3.25 | 5.00 | 16.25 |
| Increasers and reducers | | 1.60 | 2.60 | 4.00 | 13.00 |
| P. & H. H. traps | 2.00 | 3.20 | 6.50 | 15.00 | |
| Bends | 0.75 | 1.20 | 1.95 | 3.00 | 9.75 |

Above is the October list, as changed. The retail price is less 65 per cent. off these figures on all sizes 9 inches and under, or less 60 per cent. off these figures on anything over 9 inches. For car-load lots 73 per cent. off list at factory. Demand normal.

Steel Beams and Channels.—Active.—We quote:—\$2.75 per 100 lbs., according to size and quantity; if cut, \$3 per 100 lbs.; angles, 1 1/4 by 3-16 and larger, \$2.50; tees, \$2.80 to \$3 per 100 pounds. Extra for smaller sizes of angles and tees.

Sheet Steel.—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, \$2.55; 26-gauge, \$2.65; 28-gauge, \$2.80. A very active movement is reported at unchanged prices.

Sheets Galvanized.—Apollo Brand.—Sheets 6 or 8 feet long, 30 or 16 inches wide; 10-gauge, \$3.00; 12-14-gauge, \$3.00; 16, 18, 20, \$3.20; 22-24, \$3.35; 26, \$3.50; 28, \$3.95; 29, \$4.25; 30 1/2, \$4.25 per 100 lbs. Fleur de Lis—28-gauge, \$4.10; 26, \$3.80 per 100 lbs. Active and firm at these prices.

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

Tool Steel.—Jowett's special pink label, 10 1/2c. Cammel-Laird, 16c. "H.R.D." high speed tool steel, 65c.

Tin.—The market is cornered, stocks are light and prices are advanced to 45c. to 46c.

Wheelbarrows.—Navy, steel wheel, Jewel pattern, knocked down, \$21.60 per dozen; set up, \$22.60. Pan Canadian, navy, steel tray, steel wheel, \$3.30 each; Pan American, steel tray, steel wheel, \$4.25 each.

Zinc Spelter.—Demand not so brisk, and the market easier at \$6.

CAMP SUPPLIES.

Beef.—By carcasses, \$8.50 to \$9.50.

Butter.—Butter is firmly held since last issue, dairy prints are 21 to 23c., creamery prints, 27 to 28c. per lb.

Canned Goods.—Peas, \$1.35 to \$1.75; tomatoes, 3s, \$1.35 to \$1.40; pumpkins, 3s, 97 1/2c.; corn, 95c. to 97 1/2c.; peaches, 2s, \$1.87 1/2; yellow, \$1.82 1/2 to \$1.87 1/2; strawberries, 2s, heavy syrup, \$1.80; raspberries 2s, \$1.80 to \$1.97 1/2.

Cheese.—Moderately firm, large, 12 1/4c. to 13c.; twins, 13c. to 13 1/4c.

Coffee.—Rio, Green, 15 to 16c.; Mocha, 23 to 25c.; Java, 25 to 31c.; Santos, 16 to 17c.

Dried Fruits.—Raisins, new, Valencia, 8 to 8 1/4c.; seeded, 1-lb. packets, fancy, 8c.; 16-oz. packets, choice, 7 1/4c.; Sultanas, good, 8 1/4c.; fine, 9 1/4c.; choice, 10 to 11c.; fancy, 12c.; Filiatras currants, cleaned, 7 1/2 to 8c.; Vostizzas, 9 to 10c.; uncleaned currants, 7 to 7 1/2c.

Eggs.—Strictly new-laid, 30c.; storage, 23c. dozen.

Flour.—Prices unchanged thus far; thus, Manitoba flour, first patents, \$5.20; second, \$4.70; strong bakers', \$4.60; Ontario flour winter wheat patents, \$3.90; \$4 per barrel.

Feed.—Bran, \$22 per ton; shorts, \$23 to \$24 per ton.

Lard.—Tierces, 3 1/2c. up abroad, and we quote 13c. here; tubs, 13 1/4c.; pails, 13 1/4c.

Molasses.—Barbados, barrels, 37 to 45c.; West Indian, 27 to 30c.; New Orleans, 30 to 33c. for medium.

Pork.—Not much doing, short cut, \$26 to \$26.50 per barrel; mess, \$1 off, heavy, \$22 to \$22.50.

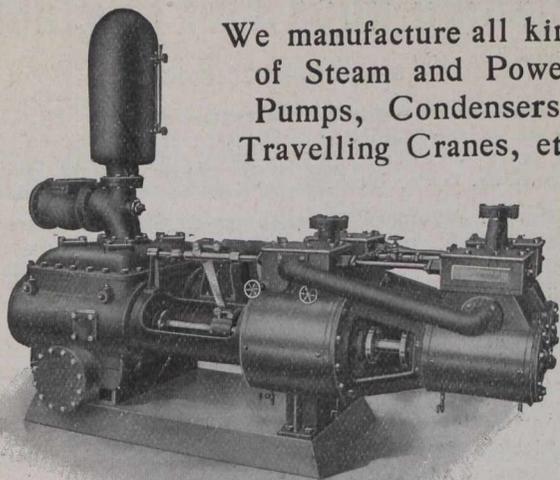
Rice.—B. grade, 3 1/2c. per lb.; Patna, 5 to 5 1/4c.; Japan, 5 to 6c.

Salmon.—As before stated. We quote Fraser River, talls, \$2.05; flats, \$2.20; River Inlet, \$1.90; cohoes, \$1.70.

Smoked and Dry Salt Meats.—Long clear bacon, 12 to 12 1/2c. per lb., tons and cases; hams, large, 14 to 15c.; small 16 to 16 1/2c.; rolls, 12 to 13c.; breakfast bacon, 17 to 18c.; backs (plain), 19 to 20c.; backs (pea-meal), 19 to 20c.; shoulder hams, 14c.; green meats out of pickle, 1c. less than smoked.

Spices.—Allspice, 18 to 19c.; nutmegs, 30 to 75c.; cream tartar, 25 to 28c.; compound, 18 to 20c.; pepper, black, pure Singapore, 14 to 17c.; pepper, white, 25 to 30c.

Sugar.—Granulated, \$4.45 per 100 lbs., in barrels; Acadia, \$4.35; yellow, \$4.05.



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TORONTO HORSE MARKET.

The local horse market is a little slack, but this is the usual feature of the January trade. Farm workers, especially mares, which cannot be bought below \$250, have the call.

Desirable drafters, 1,700 lbs. and over, are going at \$225 to \$325, lighter drafters \$175 to \$225, and chunks, 1,350 to 1,500 lbs., at \$150 to \$200.

Winnipeg, February 6th, 1911.

Market conditions in Winnipeg are still quiet, but extensive plans are being laid for this year. Wholesale hardware houses are busy, and are filling large orders for country trade. Things are being held up somewhat, however, on account of storms and the very cold weather, which is blocking the railways in every direction.

The local iron works are already busy on work for spring erection, and it looks as though they would be kept going up to full capacity all year. Lumber and other supplies are naturally dull just now, but great preparations are being made for the coming season.

The coal and wood dealers are doing a great business at present, and at some points throughout the West a shortage of fuel is spoken of, but so far no suffering is reported. Coal prices are steady at usual quotations, other prices are steady and are as follows:—

Anvils.—Per pound, 10 to 12½c.; Buckworth anvils, 80 lbs., and up, 10½c.; anvil and vice combined, each, \$5.50.

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

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, \$24.50; 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.—\$11, \$12, \$13 per M, three grades.

Building Paper.—¼ 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; canal 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.—Coppered 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.

Cement.—\$2.40 to \$2.75 per barrel in cotton bags.

Chain.—Coil, proof, ¾-inch, \$7; 5-16-inch, \$5.50; ¾-inch, \$4.00; 7-16-inch, \$4.75; ¾-inch, \$4.40; ¾-inch, \$4.20; ¾-inch, \$4.05; logging chain, 5-16-inch, \$6.50; ¾-inch, \$6; ¾-inch, \$8.50; jack iron, single, per dozen yards, 15c. to 75c.; double, 25c. to \$1; trace-chains, per dozen, \$5.25 to \$6.

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

Dynamite.—\$11 to \$13 per case.

Hair.—Plasterers', 90c. to \$1.15 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.

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Iron.—Swedish iron, 100 lbs., \$4.75 base; sheet, black, 14 to 22 gauge, \$3.75; 24-gauge, \$3.90; 26-gauge, \$4; 28-gauge, \$4.10. Galvanized—American, 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.

Lumber.—No. 1 pine, spruce, tamarac, 2 x 4, 2 x 6, 2 x 8, 8 to 16 feet, except 10 feet, \$29; British Columbia fir and cedar, 2 x 4, 2 x 6, and 2 x 8, 12 to 16 feet, \$32; 2 x 20, 4 x 20, up to 32 feet, \$42.

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; clevises, 7c. per lb. (132.)

Pipe.—Iron, black, per 100 feet, ¼-inch, \$2.50; ¾-inch, \$2.80; 1-inch, \$3.40; 1½-inch, \$4.60; 2-inch, \$6.60; 2½-inch, \$9; 3-inch, \$10.75; 4-inch, \$14.40; galvanized, ½-inch, \$4.25; ¾-inch \$5.75; 1-inch, \$8.35; 1½-inch, \$11.35; 2-inch, \$13.60; 2½-inch, \$18.10. Lead, 6½c. per lb.; roofing pitch, \$1 per cwt.

Pitch.—Pine, \$6.50 per barrel; in less than barrel lots, 4c. per lb.; plaster, \$3.25.

Plaster.—Per barrel, \$3.25.

Roofing Paper.—60 to 67½cc. per roll.

Rope.—Cotton, ¼ to ½-in., and larger 23c. lb.; deep sea, 16½c.; lath yarn, 9½ to 9¼c.; pure Manila, per lb., 13¼c.; British Manila, 11¼c.; sisal, 10½c.

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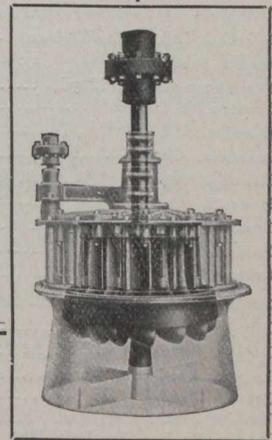
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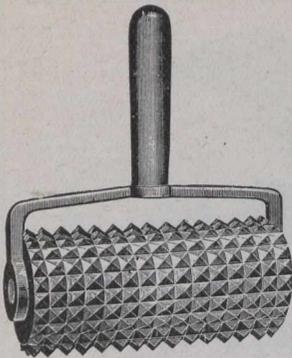
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Tenders will be received up to March 2nd, 1911, at 5 o'clock p.m. by the undersigned, for the construction of about 56 miles of the above railway, from Cap Tourmente to Murray Bay Wharf, divided up into sections of ten miles.

A certified check amounting to \$2,000, for each ten mile section tendered for must accompany each tender.

Forms of tender may be obtained and specifications and plans examined at the office of J. F. Guay, Civil Engineer, Morin Building, Quebec.

The right is reserved by the company to reject any or all tenders.

(Sgd.) J. F. GUAY.

TENDERS FOR ELECTRIC LIGHT POLES.

Tenders addressed to the clerk and marked **Tenders for Poles**, will be received up to and including Thursday, February 16th, 1911, for the supplying of, approximately, 1,000 30-ft.; 100 35-ft.; and 50 40-ft. cedar poles for an electric light line in the town of North Toronto.

Specifications and agreements may be seen at the office of The Canadian Engineer, 62 Church Street, Toronto, or at the office of the Town Clerk at Eglinton, Ont. Lowest or any tender not necessarily accepted.

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Eglinton, Ont.

ST. CATHARINES WATER WORKS.

TENDERS.

Sealed tenders addressed to "The Chairman, Water Works Commission," endorsed "Tender for Pipe and Specials," gate valves, pig-lead, will be received up to noon on Tuesday, February 28th, 1911, for the cast iron pipe and special castings, 12-in. to 36-in.; gate valves, 4-in. to 36-in., and pig-lead required.

Specifications, forms of tender and full particulars may be obtained at the office of the Commission, City Building.

The Commission does not bind itself to accept the lowest or any tender.

ALEX. MILNE,
Superintendent.

St. Catharines, Ont., February 2nd, 1911.

CITY OF WINNIPEG ELECTRICAL DISTRIBUTION SYSTEM.

TENDERS FOR CONDUIT.

Sealed tenders on prescribed forms addressed to the Chairman of the Board of Control, Winnipeg, Canada, and marked on the envelope, "Tender for Conduit System, 1911," will be received at the office of the undersigned up to 11 a.m., on Wednesday, February 22nd, 1911, for the following items:—

Specification No. 63, Conduit, 1911.

Specification No. 64, Construction of Conduit Runs, 1911.

Copies of the specifications, of certain plans, and of the Form of Tender may be obtained from the Power Engineers, Smith, Kerry & Chace, Carnegie Library, Winnipeg, where the plans of the routes may be examined.

Each tender must be accompanied by certified cheque for five per cent. (5 per cent.) of the amount of the tender.

The city reserves the right to reject any or all tenders, or to accept any tender which shall appear advantageous to its interests.

M. PETERSON, Secretary.

Board of Control Office, Winnipeg, February 2nd, 1911.



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A. J. McLEAN,
City Engineer.

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Tenders will be received by the undersigned up to March 1st, 1911, at the offices of the company, for the erection of a gas plant to serve the requirements of Monterrey, Mexico, a modern city of 85,000 inhabitants, with first-class railroad facilities. Plans and specifications may be seen at the company's offices. Copies of plans and specifications, form of tender, and other necessary information will be furnished responsible bidders on request.

Separate or supplemental tenders will also be received at the same time for the laying of gas mains and curb connections.

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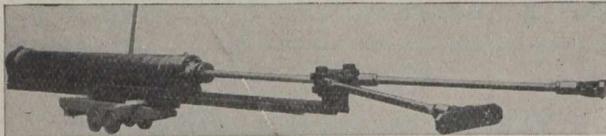
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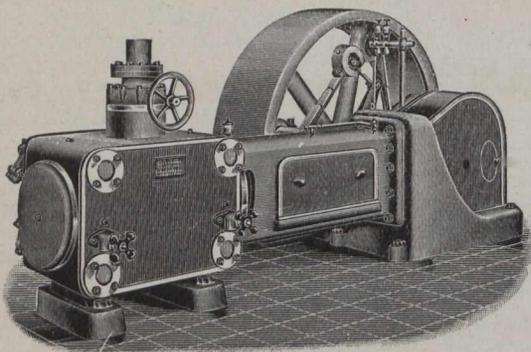
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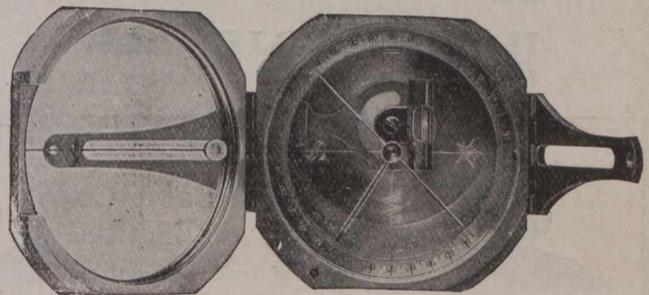
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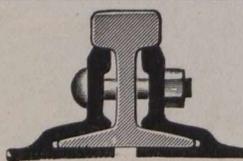
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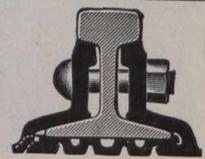
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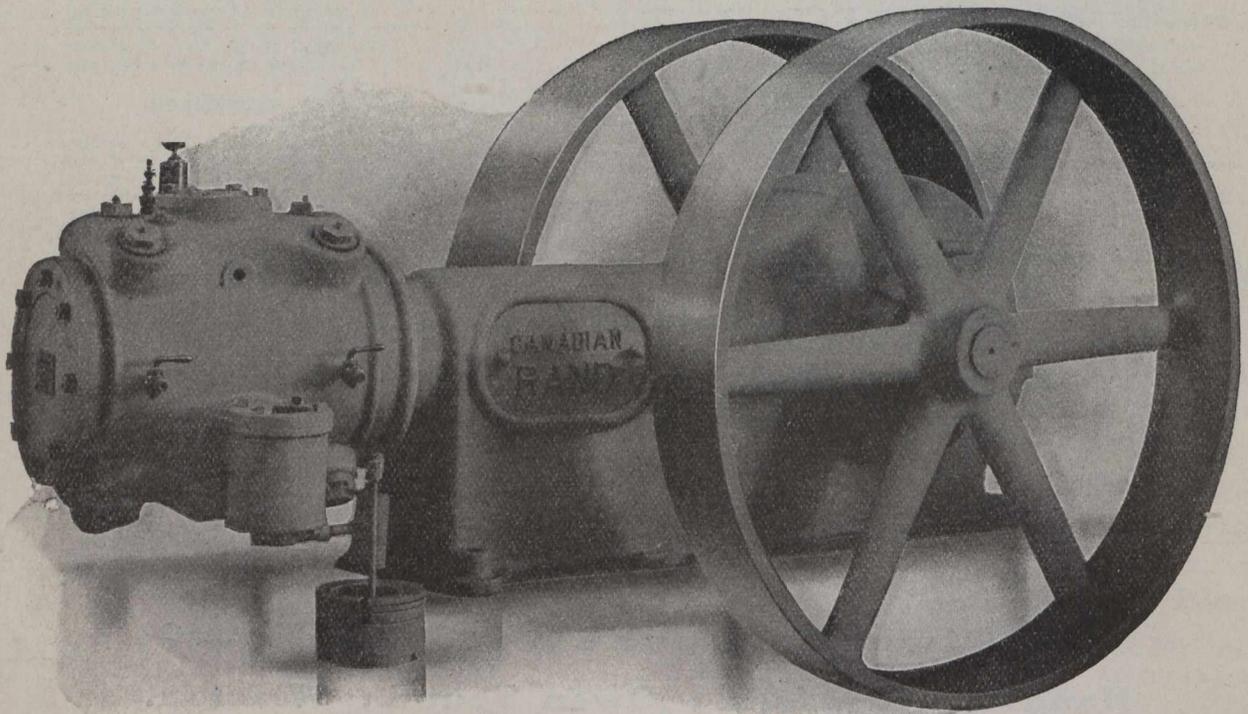
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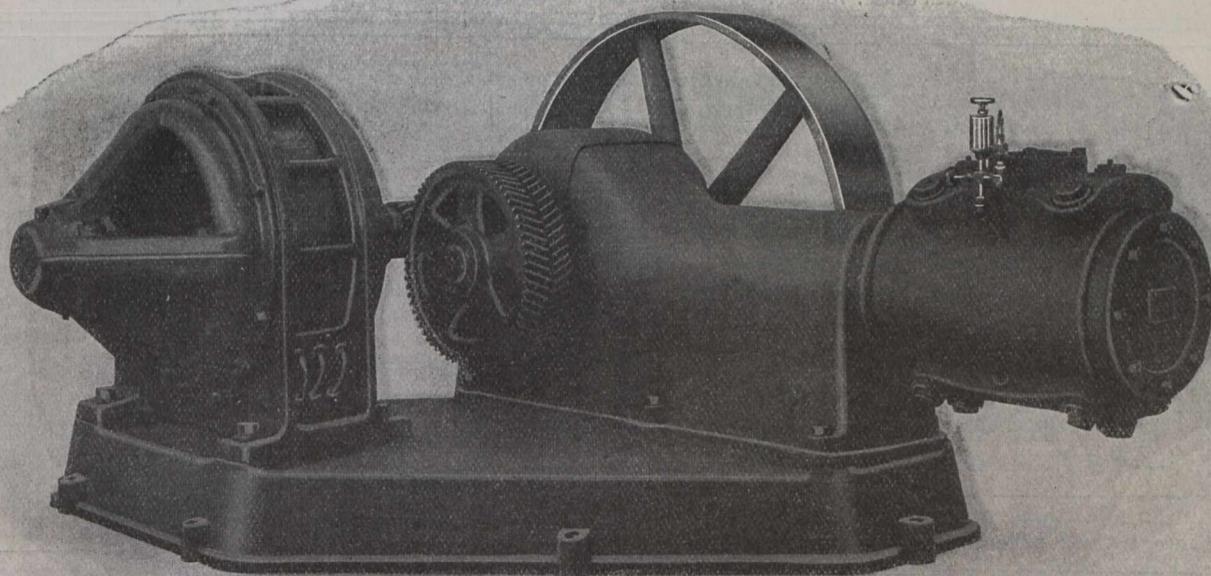
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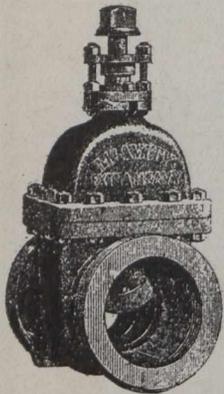
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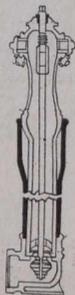
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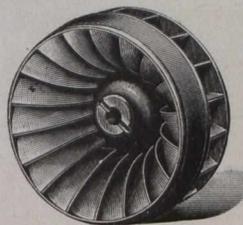
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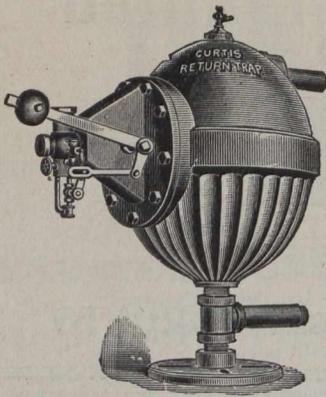
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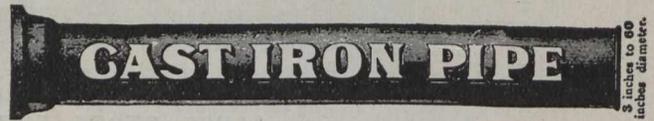
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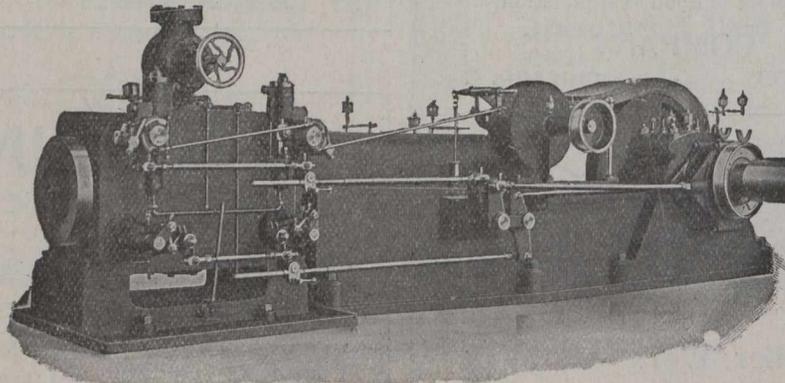
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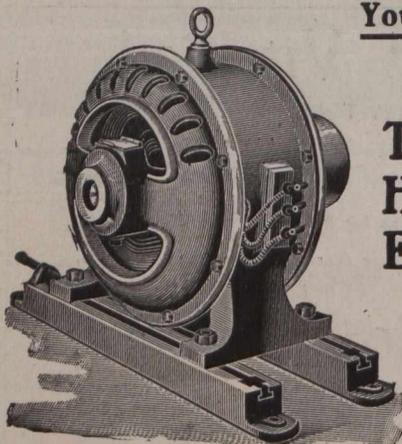
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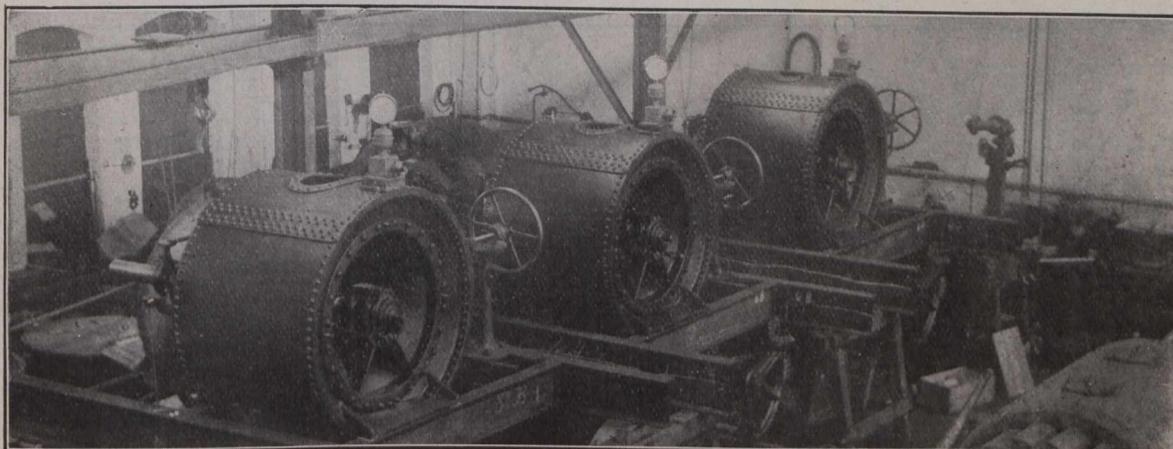


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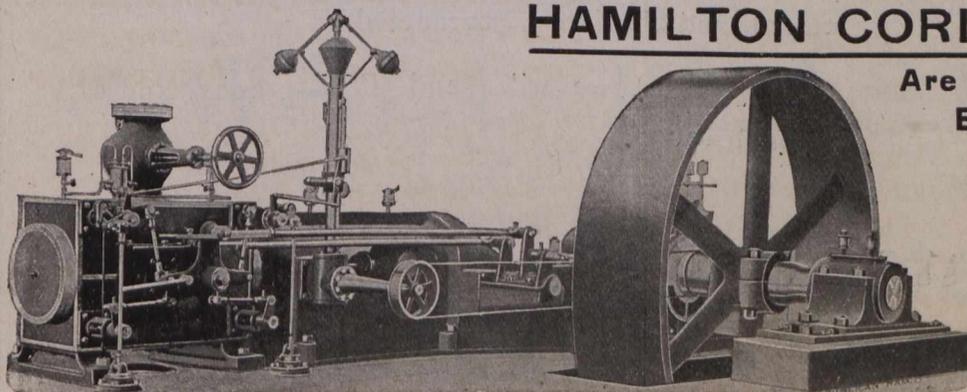
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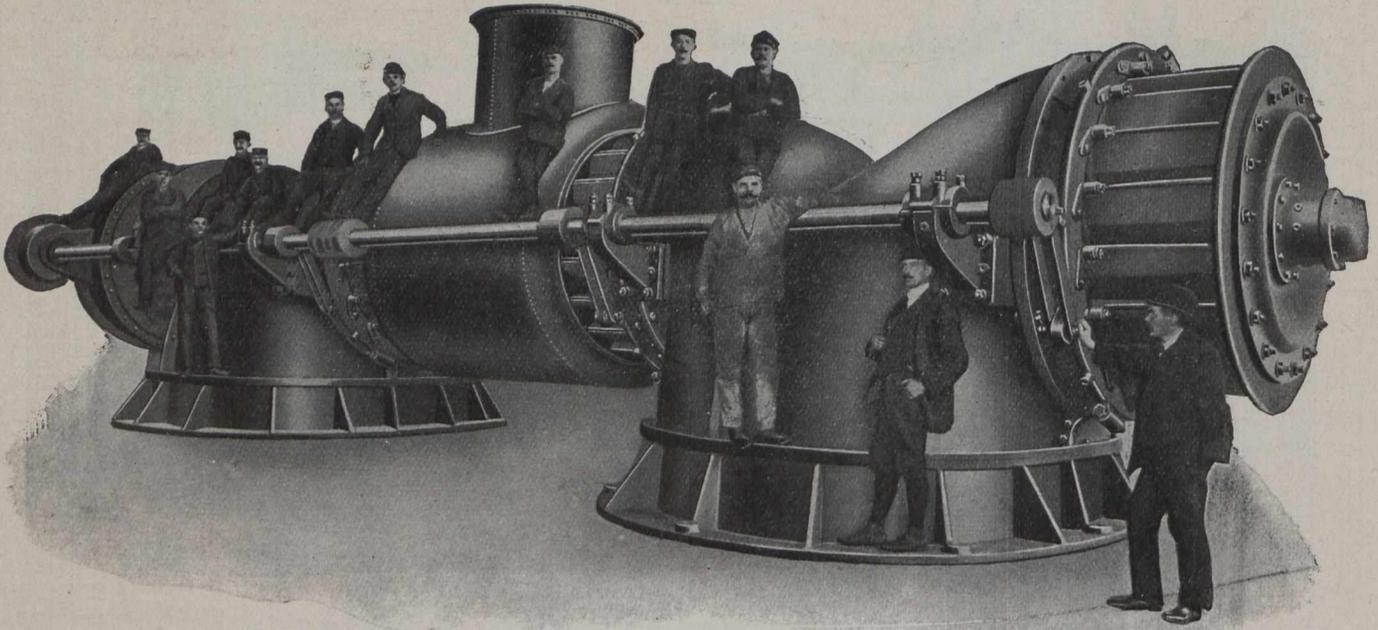
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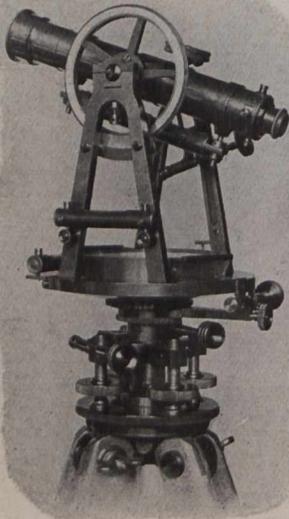
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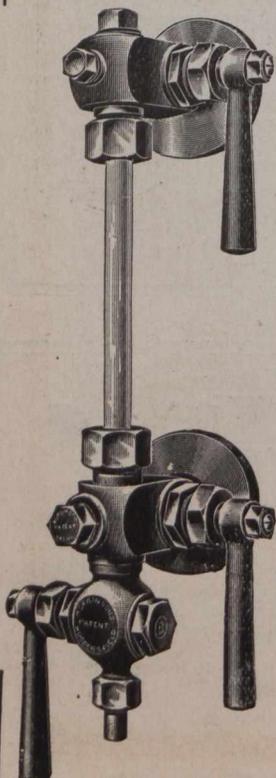
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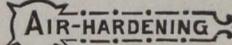
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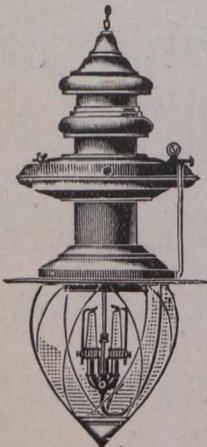
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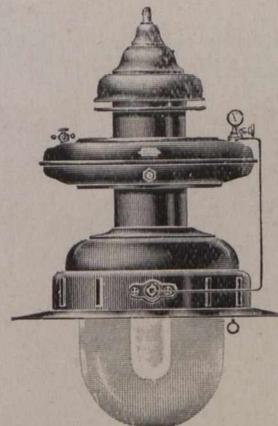
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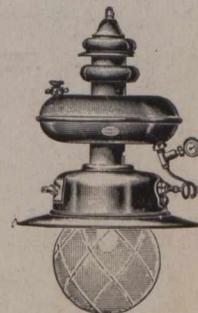
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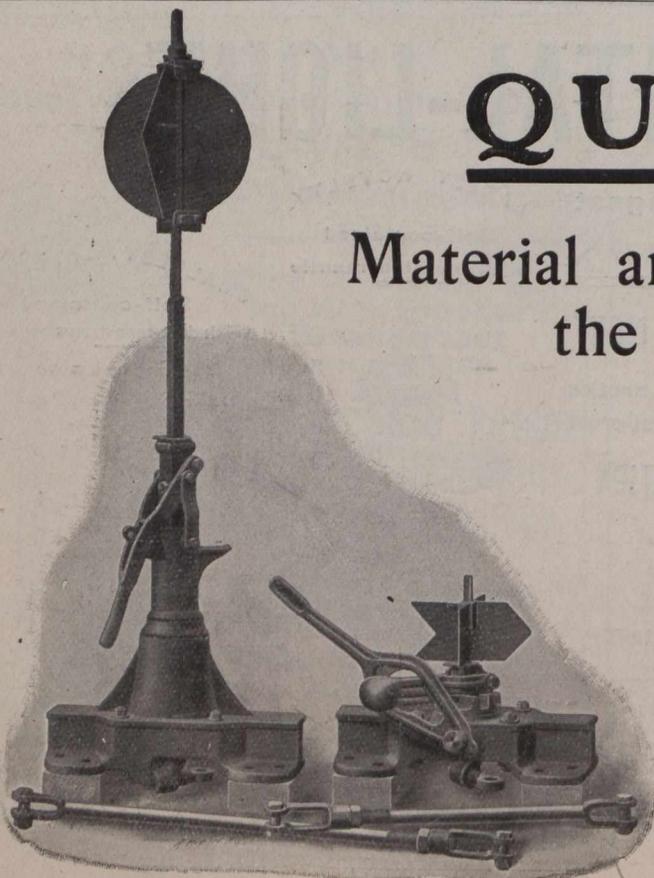
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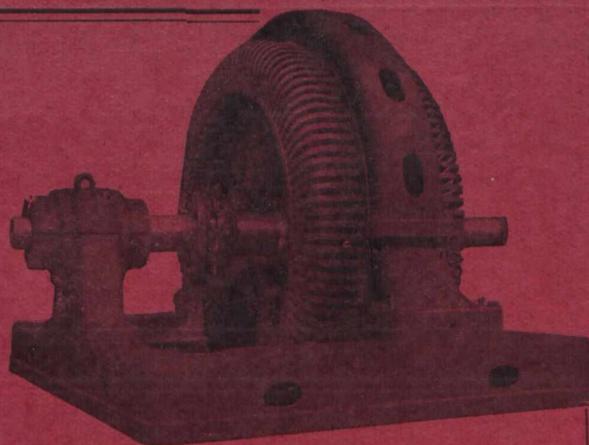


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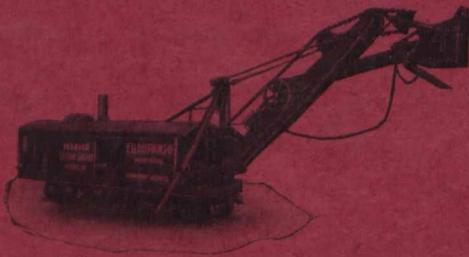
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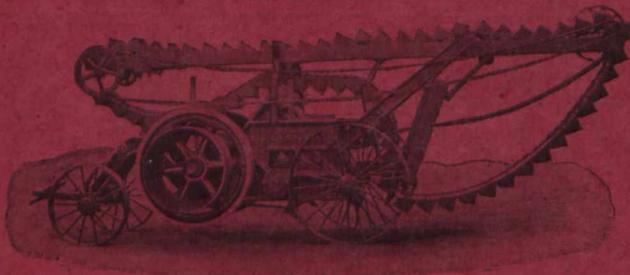
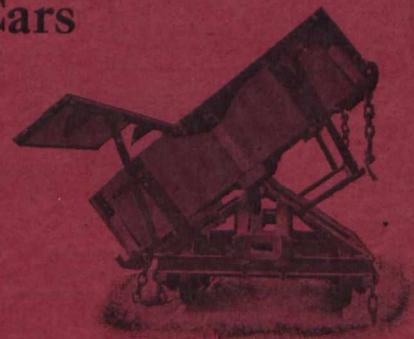
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