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# The Canadian Engineer

WEEKLY

ESTABLISHED 1893

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## The Canadian Engineer

ESTABLISHED 1893

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CIVIL, MECHANICAL, STRUCTURAL, ELECTRICAL, MARINE AND MINING ENGINEER, THE SURVEYOR, THE MANUFACTURER AND THE CONTRACTOR.

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### NOTICE TO ADVERTISERS:

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TORONTO, CANADA.

A reader is anxious to secure copies of the Canadian Engineer for December 6, 1907 and January 3, 1908. Perhaps some of our subscribers can accommodate him. There is three months' extension of subscription in it.

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### CONTRACTS, CONTRACTORS AND ENGINEERS.

The ideal conditions that should accompany tenders on large works have not yet been reached. For so long the engineer has held undisputed the position of judge, jury and prosecuting council, that the contractor has accepted without protest the engineers' forms of tender, methods of calling for tenders and decisions.

Now and then an engineer more courageous than his fellows, less afraid of work and deeply interested in his clients welfare recommends that his clients deal with the contractor

on sound business methods unhampered by the red tape, so much used by many. Not only do specifications frequently contain unreasonable conditions but they often leave to the contractor the cost of correcting the engineers' mistakes in the field, such as improper alignment or incorrect level. This is a piece of imposition the contractor should not have to stand for, but unfortunately sometimes he does.

But to our mind one of the most serious difficulties contractors are called upon to face to-day is in connection with tendering. By far too large a deposit is required, as a guarantee of good faith, and too frequently the deposit is converted into coin of the realm and held for an unnecessarily long time. Sometimes held for weeks after the successful tenderer has been named. Then, too, some individuals and a few companies call for tenders without ever intending to construct, thinking it clever, in this way, to secure correct estimates of cost. This is a piece of sharp practice that no Canadian engineer should encourage.

In another column reference is made to a specific case where the conditions attached to the tenders appear onerous. On the last occasion when the Transcontinental Railway Commission accepted tenders very few tenders were submitted, and the Grand Trunk Pacific Railway secured large sections. It is just probable that this will occur again with the result that they will sub-let the work in small sections at a lower figure, with the result that a large railway company will secure good profits, while the working contractor will do the work at a price he was willing to submit to the commission, if the conditions of tendering had been less burdensome. The country loses, the contractor gains nothing, the railway company secures a splendid profit.

### A CHAOTIC CORPORATION.

We have often mused upon the results obtained from aldermanic control of public streets and works, and, for the life of us, were unable to solve the various problems. Witnessing exhibitions of masterly inactivity in snow-removal, of bad grading in streets, of depressed paving, of rotten roadways and naked wires with drunken supports, we have wondered who was the municipal controlling engineer.

It is said that wonders never cease, and we are prepared to admit this axiom right now: for we were stricken to dumbness by reading the momentous announcement made through our esteemed contemporary, the Montreal Star, to the effect that the new aldermen where proposing to establish a Board of Consultation, consisting of the engineers of the corporation.

The Board's duties would be to—as our readers would never guess, we will enlighten them—we repeat, whose duties would be to—(permit us to take a deep breath)—to advise the alderman as to suitable materials for pavements.

Having recovered from the shock of this announcement, we experienced a relapse on reading the following, under date 14th February.

"This Board of Engineers must be given far more important duties than merely reporting as to the feasibility of public works." (We would ask whether this Board have already reported as to the feasibility of the specifications of the proposed water conduit at Lachine?)

"After it is decided to pave a street, lay sewers, build stations, etc., the Board will be expected to see that the works are carried out in a satisfactory manner by contractors.

"Unless this is done, the new Board, in my opinion, will amount to very little."



The above remarks are reported as emanating from one of the chairmen. "Very little." Truly, O Daniel, this terse expression fits the situation, for it would be impossible to further "be-little" your engineers in the eyes of municipal engineers, if the above duties are not already entrusted to them.

We admit having thought the woful exhibition of municipal engineering in Montreal was partly due to the presence of the Society of Civil Engineers and the Engineering Department of the McGill University—to say nothing of the engineering departments of the great railways of Canada—on the principle that "Poverty sits at the doors of palaces." We beg to apologize for the baseless surmise. We see now that the Montreal municipal engineers have been tethered: and that the aldermen, admittedly, must have been the judges of contractors' work.

We have desired enlightenment as to why there has been so much quarrelling over the selection of committees. We desire no further information, for we fear we are told too much.

It is considered sound finance to expend considerable sums in sending committees abroad in order that they may assimilate new ideas (we do not add "and have a good time").

We would go further, and recommend that certain committees be sent abroad—and marooned.

#### MATRICULATION STANDARDS.

Applied Science, a new monthly journal, published by the Engineering Society of the Faculty of Applied Science, Toronto University, in a recent number discussed editorially the advisability of making senior matriculation the standard for entrance to the Faculty of Applied Science and incidentally refers to the present conditions in that Faculty.

In general, the Canadian Engineer does not purpose devoting its attention to educational matters, but in this particular instance we feel that the engineering profession is much interested in the educational standards of a college turning out annually from eighty to one hundred men who purpose entering the profession.

After having discussed the matter Applied Science concludes that a faulty curriculum is responsible for such a large percentage of failures in the yearly examination, and advocates senior matriculation for entrance as a means of overcoming these failures.

We are not so sure that a faulty curriculum is the cause and if it were that it would be in the interest of education and engineering to amend the curriculum as suggested. That many of the failures in the past have been as much the result of poor pedagogical methods as of low entrance requirements is obvious. Sometimes these poor methods were the work of incompetent lecturers, sometimes the result of an overworked staff and unfortunately at times the result of a combination of both weaknesses.

But for the moment let us leave the staff and turn to the student. A man with junior matriculation standing entering the University with a determination to study and improve will secure good standing at examinations, while the idler with senior matriculation will fail. His entrance standing will not save him. It is the manner in which a student approaches his subject that will test the man, not whether he has had a smattering knowledge of that subject before. Being spoon fed for one year more in a high school will not make a man of a school boy.

It may be that at the present time a large number of men are seeking to enter the profession of engineering by way of the Faculty of Applied Science. That is a result of the attractive positions engineering is said to have offered during recent years. The present pause in industrial progress will correct this. Sympathy for fathers who persist in sending unprepared immature sons to a university—we have none. A father who will start his son on a four-year course without being reasonably well informed of the conditions and requirements of such a course deserves disappointment. A young man, who, of his own volition, takes up such a task will make

good. He may stumble once or twice, but that will make him more careful.

The high schools, the arts courses of the university are at the disposal of the student. He may secure a thorough grounding in English, mathematics, physics, or any one of a dozen branches. If, however, he prefers a shorter road he must take his chances. It is the way of the world.

We are not yet convinced that the curriculum is at fault. Some of the weaknesses have been indicated. We would gladly receive more statistics. What is the percentage of failures by departments? Are the requirements of each department similar?

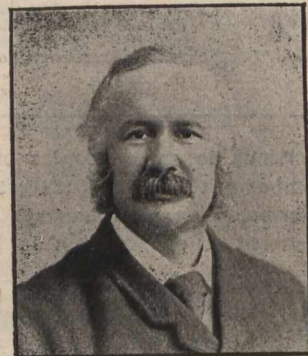
To educate the community to the true place of a university in a young life may be a slow process. Many "innocents" will be "slaughtered" in the process. To secure a satisfactory teaching staff will require more men and more money. Men of practical experience as engineers in charge of work. Men of liberal views and outstanding personality. Men of some literary ability and familiar, in a practical way, with the best pedagogical methods.

#### RECTOR OF THE IMPERIAL COLLEGE OF SCIENCE.

In the appointment of Dean Bovey of McGill as Rector of the new Imperial College of Science and Technology, Canadian engineers lose from their midst one of their most successful investigators and McGill University loses a capable professor and wise administrator.

Henry Taylor Bovey was born in Devonshire, England, March 7th, 1852, and was educated at Cambridge University and afterwards was appointed fellow in Queen's College.

In 1877 he was appointed professor in Civil Engineering and Applied Mechanics in McGill, and one year later, when



Henry Taylor Bovey, C.E., LL.D.

the Faculty of Applied Science of McGill University was established he was appointed Dean. Dean Bovey is as well-known as an author as a college professor. His three best known works being, Applied Mechanics, published in 1883, and Strength of Materials, and a Treatise on Hydraulics, published in 1895.

At this time when great changes are taking place in Technical Education in Canada we can ill spare him, yet we feel sure we will not entirely lose him, for undoubtedly the most important part of his new duties will be to organize a department for the exchange of scientific ideas and scientific methods between colonial and British specialists.

#### NEW LAND SURVEYORS.

The following gentlemen have completed the final examination for Ontario Land Surveyors, and after taking the oath will be permitted to practice in Ontario:—

Messrs. H. W. Sutcliffe, J. L. Lang, F. W. Paulin, G. F. Summers, W. J. Moore, A. G. Ardagh, C. E. Bush.

Those who were successful at the preliminary examination are: Messrs. T. A. Jackson, E. Fitzgerald, G. S. Flint, L. D. Barlin, K. L. Jardin.



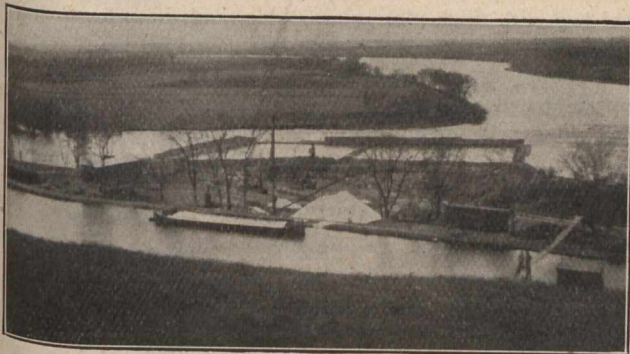
**RAPID COFFER-DAM EXCAVATION.**

By Charles M. Ripley, New York.

**The Contractors Plant and Methods for the Excavation. Showing Details of Cofferdam Construction.**

The Economy Light & Power Company are constructing the foundations for a 10,000 horse-power hydro-electric plant at the point where the Desplaines River empties into the Kankakee River, the two forming the Illinois River. After the completion of the dam, it is the opinion of the engineers that a full seventeen-foot drop will be gained which together with a flow of 10,000 cubic feet per second will be employed for the generation of electric power which will be marketed largely in Joliet, Illinois.

In the month of August, 1907, J. O. Heyworth, the general contractor, began to move his construction plant by fifty-ton barges down the Illinois and Michigan Canal, hauled by a 24 horse-power Barber Bros. gasoline launch. In a period of three months' time the following work was done:—A camp was built for the accommodation of about 200 men, a 7,000 yard U-shaped levee, which we will call coffer-dam No. 1, was thrown up, 5,000 yards of rock were also excavated from the power plant site and placed in the cribs of the coffer-dam No. 2 beyond the levee of the river as shown in the photographs, and the work pushed to the stage shown in the photograph taken November 10, 1907, or about three months' time. The contractor's plant is described as follows: A Lidgerwood 8 1/4 x 10 hoisting engine at the side of the canal with a guy derrick for the unloading of the heavy machinery from the barges. This engine and derrick were also used in connection with the unloading of the barges of crushed stone and one yard Hayward clam shell bucket

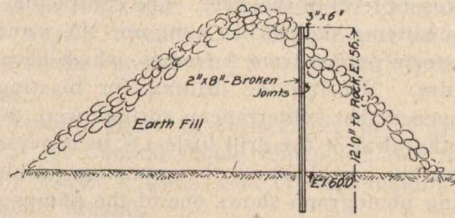


unloads three 180-ton barges in 14 hours; thus all trucking to the job was eliminated.

An industrial railway enters the site of the excavation at the north-east corner in the form of a single track. It is fanned out in eight tracks on which Western dump cars carry out the excavated material, which is silt, glacial drift and sandstone underlying about nine feet. At the top of a ten per cent. grade the single track runs level for about thirty feet, at which point an 8 1/4 x 10 inch Lidgerwood double-drum double-cylinder hoisting engine is located with the drums facing down the track. Two cables extend down into the excavation and thus one hoisting engine with one engineer attends to the removal of the material and is capable of moving two trains of six cars up or down the grade at the same time. After the cars get on the level track, teams of horses haul them to the spell bank.

One of the most interesting features of the work was the way the Page Drag scraper excavating bucket was used both to run the levee around coffer-dam No. 1 and also to assist in filling cribs in coffer-dam No. 2. In the earlier stages of the work, the two Page buckets with their accompanying engines and derricks, were the first pieces of apparatus to begin excavation. The machines travelled on a track laid just within the limits of the excavation. In one operation dirt was dug, lifted and after the machine made a quarter turn, earth was dumped just beyond the excavation limits, making levee on three sides. Later these machines were run nearer the centre of the excavation and, again in one operation, they dug, hoisted and dumped as follows:—The same one-yard special power scraper bucket strung from the

40-foot boom of the derrick dug out the silt and glacial drift, part dry and part wet, and dropped part into the industrial cars and part was upset in a pile where laborers with wheelbarrows conveyed the dirt to make the earth fill in coffer-dam No. 2, further out in the river. Seven thousand yards of dirt and 5,000 yards of rock were excavated in a little less than two months and placed either in the spoil bank or in the coffer-dam. Thus excavated material from coffer-dam No



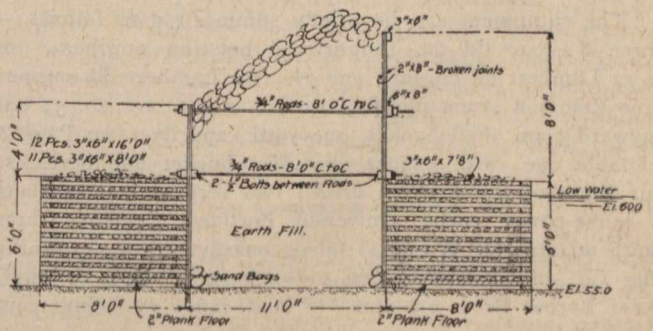
1 was used in construction of coffer-dam No. 2 as well as making levee around coffer-dam No. 1.

In the rock excavation, four Ingersoll-Rand inch-and-a-half steam drills were used, and decidedly heavy blasts were employed during the noon hour and after the end of the day. In that part of the excavation which was beyond the reach of the Page drag bucket, teams and scrapers were used and some pick and shovel work was done.

The accompanying illustrations show the different types of coffer-dam and levee construction. Type 1 was used running at approximately right angles to the Desplaines River for a distance of 120 feet back from the edge of the stream. As will be noted two by eight timbers were driven three feet into the ground, the joints broken and a top walling piece of three by six timber spiked to it, after which the earth fill was dumped on either side. Type 2 was used on the down stream side of the coffer-dam for a distance of 110 feet out from the edge of the stream where water is still. The construction is shown in the accompanying illustration. Types 3 and 4 were used on the up-stream face of the coffer-dam where the full force of the fifteen mile an hour current strikes it and also on the sides where the scouring effect of the stream is most dangerous. It is interesting to note that on the up-stream face of the coffer-dam, the level of the water is 3 1/2 or 4 feet higher than on the down stream face owing to the banking up of the water as it strikes at high velocity. The rock cribs are on both sides of this most critical point in the coffer-dam. They were constructed as shown in the accompanying detailed drawing and were 8 x 16 feet in dimension, 6 feet deep, and had a 2-inch plank bottom. These were built of heavy green maple, which almost sank as soon as launched in the stream above their final location. Three 1 1/4 inch manila ropes were used to gradually locate each coffer-dam in place as the heavy current carries them down stream, one by one, into place.

As a further precaution against the destruction by the combined static and velocity heads of the water a row of 1 1/2 inch holes were drilled just inside of the up-stream side of the coffer-dam. Iron rods were driven into these to further act as an anchor to the stone cribs and prevent their being slid out of place.

The accompanying photographs show the method of putting in the earth fill in a Type 4 coffer-dam—the most



difficult section of all. Wheelbarrows were run along the planks shown after the cribs had been filled with rock at either side.



It will be noted that the top of the coffer-dam is at about elevation 70 (Hennepin data) and that the excavation will be carried down to elevation 36, or 20 feet below the average bottom of the river and 24 feet below the low water level. It will thus be seen that the pumping problem is a very serious one. As yet coffer-dam No. 2 has not been drained since it is hardly completed. The U-shaped levee, however, which encloses coffer-dam No. 1, an area of about 50,000 square feet, is now at a level of about elevation 46, or 14 feet below the present level of the river. The contractor, as shown in the accompanying sketch, has hung one No. 3 and one No. 4 Emerson steam pumps from A frames, which have kept the excavation dry. During the drilling for blasting, it frequently happened that subterranean springs were tapped and upon the withdrawal of the drill little  $1\frac{1}{2}$  inch geysers would spurt out further complicating the pumping problem. The accompanying photograph shows one of the pumps operating with part of a strainer exposed above the surface of the water and taking air at every gulp.

The water power to be developed at this hydro-electric plant is supplied both by the regular flow of the Desplaines River and also by that of the Chicago drainage canal. This is made possible owing to the fact that the drainage canal discharges into the Desplaines River at a point above the location of the dam. In addition to this there is to be considerable storage of water above the power plant owing to the fact that the neck of land between the Desplaines and the Kankakee Rivers will be turned into a reservoir by means of continuing the concrete dam now under process of construction, or in the form of 500,000 cubic yards levee reaching over towards the Kankakee River.

In addition to the Page scraper bucket excavator the contractor's plant consisted of two 40 horse-power vertical boilers, one for supplying the steam drills and the other for supplying the two Emerson pumps.

The concrete work, totalling 26,000 yards, will be started in two months. The barge shown in the photograph has



already delivered considerable crushed stone from Joliet. Universal Portland cement made by the Illinois Steel Company, is certified in a one-three-six mixture for the foundations, and Smith & Ransome mixers are being shipped for the concrete work.

The equipment can be briefly summarized as follows:— Three  $8\frac{1}{4} \times 10$  dd dc. Lidgerwood hoisting engines; one  $9 \times 12$  Lambert dd engine; one  $7\frac{1}{2} \times 10$  Lambert dd engine; three Emerson steam pumps; two No. 4 and one No. 3; one Hayward clam shell bucket, one yard capacity; two Page & Schnable, one yard scraper excavator bucket and derricks; four Ingersoll-Rand steam drills; two vertical boilers about 40 horse-power each; Universal Portland Cement; three Smith mixers No. 3; one 15 ton locomotive crane, Browning Eng. Co., of Cleveland; two 50-ton barges. One 25 horse-power Barber Bros. gasoline tow-boat, made 77 round trips, 34 miles each, in 80 days, towing 50-ton barge, locking through four locks each trip.

The engine has three cylinders,  $6\frac{1}{4} \times 6\frac{1}{2}$  inch stroke, two cycle; storage battery, 6 volts.

## STRESSES IN DAMS.

At a regular meeting of the Institute of Civil Engineers, held recently, three interesting papers were discussed relating to stresses in dams of various kinds. The first paper, by Sir John W. Ottley, K.C.I.E., and A. W. Brightmore, D.Sc., M.M.Inst. C.E., dealt specifically with "Experimental Investigations of the Stresses in Masonry Dams Subjected to Water Pressure." The experiments described were carried out in the shops of the late Royal Indian Engineering College at Cooper Hill, and occupied, from first to last, a period of about fourteen months. They were restricted, for reasons given, to models of a dam of typical triangular section, under perfect conditions, and the results obtained are submitted as a contribution to existing knowledge on the important subject of the arrangement of stresses in masonry dams subjected to water pressure. The models were made of "plasticine," a kind of modelling clay, which appeared likely to reproduce, on a small scale, many of the conditions existing in a "full size" structure. The dam was first modelled of triangular section, with the vertical face exposed to the pressure of the water, the base being made equal to the height divided by the square root of the specific gravity of the "plasticine," so that the resultant of the pressure on the base (due to the weight of the model dam itself and the pressure of the water) would act at one-third of the width of the base from the outer toe. The height of the model was taken at 30 inches, which, therefore, gave a base of 26 inches. The length of the dam was 12 inches. In subsequent experiments the width of the base was reduced to 23 inches, 20 inches, and 17 inches, whilst in one case a sloping face was adopted. The model was molded in a frame furnished with thick plate-glass sides, and, in order to permit of accurate measurement of any displacement in the model, corresponding horizontal and vertical lines, 2 inches apart, were scratched on both the glass and the "plasticine." The glass sides were made adjustable, and, previous to the application of water pressure, care was taken to see that the lines on the glass coincided accurately with the corresponding lines on the "plasticine." A clearance was left between the glass sides and the model, to ensure that the latter should receive no support from friction between it and the glass.

Water pressure was applied to the face of the model by water contained in a thin rectangular indiarubber bag made to fit the frame. The weight of the model as first made (with a 26 inch base) was 230 lbs.; the water pressure on the vertical face being 195 lbs. This gave an average value for the intensity of normal pressure on the base of about 0.74 lbs. per square inch, and an average intensity of shearing stress over the horizontal base of about 0.62 lbs. per square inch, thus keeping keeping well within the elastic limit of the "plasticine." The displacements of the originally vertical and horizontal lines are shown in the various diagrams submitted. The first of these represents the condition of affairs after the water pressure has been left on for one day. After these measurements had been taken, the water was siphoned off, and it is worthy of notice that in the course of a few days the model entirely recovered its original form, thus showing that the material was elastic under the pressure to which it had been subjected for the comparatively short period of one day. More important results were obtained when the water pressure was left on for a longer time so as to allow the model to become permanently deformed owing to its plasticity, as it thus became possible to show more definitely the distribution of the stresses in the structure. A diagram showed the state of the model after the water pressure had been left on for 33 days, the crack at the inner toe having commenced to appear after seven days. After detailing the method of calculation adopted, it is pointed out that both the recorded displacements of the lines on the model and the calculations based on these indications show that, although the old assumption that the shearing stress is proportional to the normal stress does not hold good at the base (because the dam is "fixed" at that level), yet at higher levels it is, approximately, correct, and that, therefore, the



shearing stresses to be provided against are not those at the base, but at rather higher levels near the outer profile. It is further pointed out that, although a dam may be designed so as to have no tension on the horizontal plane at the inner toe when subjected to water pressure, still there are tensions on other planes passing through that point, and it is suggested that the plane of maximum tension at the inner toe can be made more vertical by tying the front part of the dam into the foundation below the level of the base. The permissible values of compressive and shearing stresses in dams are then considered, and the following final conclusions are drawn:—(1) If a masonry dam be designed on the assumption that the stresses on the base are "uniformly varying," and that these stresses are parallel to the resulting force acting on the base, the actual normal and shearing stresses on both horizontal and vertical planes would (in the absence of stresses due to such factors as changes in temperature, unequal settlement, etc.) be less than those provided for; (2) There can be no tension on any plane at points near the outer toe; (3) There will be no tension on planes other than the horizontal plane near the inner toe; the maximum intensity of shearing stress on the base and the inclination of its plane of action being about 45 degrees.

## AS SEEN BY OTHERS

### Outside Tenders.

The Hamilton Herald: Whenever it is known that a strong feeling exists in favor of giving a certain contract to a local firm, it would be the fairest way to make the best possible terms with that firm and not invite outside tenders at all. To put outside firms to all the trouble and expense of submitting tenders and putting up their money as guarantee of their good faith when there is no intention of giving any of them the contract no matter how low they may tender, is both unjust and impolite.

### Test on Structural Steel.

The Engineering Times: The importance of the thorough testing of structural steel and the calculation of factors of safety cannot be overrated. It is from time to time impressed on the minds of engineers when a failure of some structure occurs unexpectedly, as for instance in the case of the recent fall of the Quebec Bridge. These points were treated of by Professor Arnold of the Metallurgical Department of the Sheffield University in a recent lecture before the Sheffield Society of Engineers and Metallurgists. Static tests of mild steel were discussed with reference to the stress strain curve, which consisted of four stages. First the range of proportionality, then the yield point range, next the range from this point to the maximum stress, and lastly to the breaking stress. The nomenclature used in test lists by both engineers and metallurgists is in many cases inaccurate. For instance, breaking strain means the total elongation, yet often it is expressed in tons per square inch. Obviously the maximum stress is here intended. The next point discussed was the bearing of kinetic testing on the problem. Comparison was drawn between the methods devised by Wohler in the seventies and the system inaugurated at Sheffield University. The results there obtained were not in agreement with those of Wohler as regards their application in actual practice. The abandonment of the maximum stress as the basis of the factor of safety was recommended, the yield point being preferred.

### Labour.

The Bystander in the Weekly Sun: That the workmen discharged from employment at a time like this should be

cast at once on public charity is the ordinary course of things which the employer cannot be blamed for following. But it is not ideal. It hardly appears just to the community. . . . If only the two interests could be brought into something like sympathetic connection, and the working man could be led to feel that his interest was identified with that of the capitalist, and the capitalist on his side to see not a mere tool but something like a partner in the working man, how vastly would the industrial world and the social world in general be improved! The subject, of course, has not failed to attract attention. Experiments in co-operation have been made, but hitherto, it seems, with little success.

### How True.

The Toronto Star: In recognizing the City Engineer's department the Council should remember, too, that the staff necessarily wastes a great deal of time making blue prints of aldermen's dreams.

### Engineering Progress.

The Practical Engineer: For progress in engineering, as in most other matters, there is required a judicious blending of enthusiastic enterprise with that type of prudence sometimes described as level-headedness. The first quality alone will drive a concern at a pace that will speedily bring it to the end of its resources, whilst the fact that a man has a level head will not suffice to prevent him from becoming stuck in the mud or left far behind on the progressive road.

### Who is to Finance New Quebec Bridge.

The Montreal Star: If ever there were a transaction into which Parliament should enquire vigorously, incisively and relentlessly, it is this business of the relations of the Federal Government with the Quebec Bridge Company. The committee ought to be appointed at once and get to work. We should have its full report before Parliament rises. There appears to be altogether too much likelihood that the country will have to bear the loss entailed by the tragic disaster of last summer, and must, moreover, go ahead with the completion of the structure. The bridge is now needed for our new transcontinental railway. This being true, we should know precisely what has been done in the past, what our obligations are, and what we may depend on for the future.

### Newspaper Engineering.

Power: Newspaper engineering, like newspaper science, would be a serious menace if it were more influential than it is. Fortunately the number of interested persons who give any credence to utterances by daily newspapers on technical subjects is relatively very small. There is, however, a small percentage who still classify their favourite dailies with the Bible, and many of these people have probably paid dearly for their confidence.

One of the latest examples of misguided and misleading newspaper statements appeared in a recent number of a Canadian daily as follows: ". . . producer gas power can be developed almost anywhere in Ontario at twenty dollars per horse-power per year, taking a 100-horse-power engine as a unit and running it at almost full load ten hours a day for three hundred days a year." This, we are further informed, "includes everything—fixed charges, labour, oil, water and fuel." The writer apparently meant to be fair, for he explained in detail how the annual rate was computed. . . . "It does not take a skilled engineer to operate a producer plant," this newspaper Solon explains, "but a man must use intelligence and quite often patience!"

It is exactly this class of information that has caused by far the largest number of "set-backs" that the gas-power industry has suffered, that has caused or encouraged the investment of hard-earned savings in schemes of dubious merit, that has educated thinking readers to look askance at any statement made by the daily press.

The quantity and value of pulp-wood exported to the United States during the undermentioned fiscal years have been as follows:

Fiscal Year.	Cords.	Value.
1905 . . . . .	593,624	\$2,600,814
1906 . . . . .	614,286	2,649,106
1907 . . . . .	628,744	2,748,909



# LEGAL NOTES.

[This department will appear in the third issue of every month. Should there be any particular case you wish reported we would be pleased to give it special attention, providing it is a case that will be of special interest to engineers or contractors.—Ed.]

## BRIDGES AND CULVERTS.

**County of Dufferin vs. County of Wellington.**—At first blush the distinction between bridges and culverts seems quite unimportant, and, according to the dictionaries, it is quite indefinite, but such are just the points that puzzle litigants and remain conundrums until the words have been judicially interpreted. The structure in question was a circular concrete pipe, with an inside diameter of three feet; the concrete is six inches thick, and there is about a foot of gravel on top of the pipe. It replaced an old bridge, about 8 or 10 feet in span, which had fallen into disrepair. It spans a stream crossing the boundary line between two townships, one in Dufferin and the other in Wellington, and, according to the Ontario Municipal Act, if a culvert, it must be maintained by the county of Dufferin, but, if a bridge, then by the two counties jointly. The county of Dufferin sued for a declaration that the structure is a bridge, and, therefore, the counties jointly liable, but failed to establish their contention, and the action was dismissed with costs.

**North Dorchester vs. Middlesex** is another instance where the same words were under judicial consideration, and the same question as to liability to maintenance was fought out. Here there were three streams crossing the boundary line, and called, respectively, "Doty's Creek," "Kettle Creek, and "Caddy's Creek." The first was crossed by a bridge, 67 feet in length between supports, and the top floor of the bridge was some 15 feet above water level. Kettle Creek was crossed by a bridge 31 ft. 9 in. in length between supports, and the top floor of the bridge was 9 ft. 4 in. over the ordinary water level. As to both of these streams a civil engineer called by the plaintiffs swore that, "though the volume of water was not great, a culvert would not suffice"; it must be some structure in the nature of a bridge, and having a span underneath. They were never-failing streams, but not of sufficient flow for boating or floating logs, and no attempt was made to use them for that purpose.

Caddy's Creek was a still smaller stream; the highway crossed by means of a bridge, with a span beneath, and nine feet in length between supports; the top floor of the bridge was some four feet above water level. The engineer deposed that "a culvert would be sufficient here; anything having a waterway of 15 feet would do" In fact, the same creek was crossed by a culvert about a mile below, though at the point in question the road had recently been flooded, together with a large area of flats surrounding. The Court remarked that, though the structure was a bridge in form, and nine feet seemed a large span for a culvert, still the line must be drawn some place. Held, that this structure is not "a bridge" within the meaning and intention of the statute, and that the duty of erecting and maintaining same must rest upon the plaintiffs. As to the former two, held that they are both bridges, and must be maintained by the defendant county. 16 O.R., 658.

**Township of Williamsburg vs. United Counties of Stormont, Dundas and Clengarry.**—Here the statute provided that the burden of maintaining bridges should rest upon the township wherein situated, but if the bridge were upwards of 300 feet in length and used as a general highway by the residents of several adjoining townships, then the burden might be shifted to the county. The bridge in question crosses Casselman's Creek, which is part of the Montreal Road, on the north bank of the St. Lawrence, and

within the township of Williamsburg. The township petitioned on these grounds, and obtained an order directing that the bridge be maintained and repaired by the United Counties. The Counties appealed, contending that the bridge was not over 300 feet in length, and that it was not habitually crossed by travellers from other municipalities. The case was heard before the Divisional Court at Toronto, and it was held that, inasmuch as the general law casts upon the local municipality the duty of maintaining all roads and bridges in its limits, and the township is seeking to avail itself of an exception; therefore, the onus of showing they are within that exception rests upon the township. This onus the Court considered had not been proven, consequently the appeal was allowed and the former order set aside.

This case, it may be observed, is but an example of the general rule that the burden of proof lies upon him who asserts the affirmative of the issue.

All persons are presumed to be governed by the general law until the contrary be shown. From this general law the plaintiff township was seeking to be relieved, and consequently must prove its right to such relief. In failing to establish such right by convincing evidence, it failed altogether.

## AGREEMENT GOVERNS.

**Magee vs. Gillespie, et al.**—The plaintiff is an engineer and the defendants owners of a mining claim. The plaintiff alleged he had been engaged by the defendants to make all necessary examinations of their discovery, and the consideration mentioned was \$500. On this agreement made with Gillespie he proceeded to do the work, and the benefit of his services was shared in by the other defendants.

The terms of the agreement appeared somewhat indefinite, but as to the fee of \$500 the plaintiff was substantially corroborated by a witness named Hogan, and also to some extent by the plaintiff's brother. The Court held that there had been a bargain, and that the plaintiff had in all respects fulfilled his part of the contract.

The defendants contended that the fee was entirely out of proportion to the services rendered, but the Court remarked that this is not open for them to question. There had been a bargain made, under which the plaintiff was bound to give all the time necessary to the work he was undertaking, and under which, if the time taken had been much greater than that actually consumed, he would not have been entitled to any more than the lump sum agreed upon. Judgment for the plaintiff, \$500. O. W. R., 1908, p. 212.

The question of sufficiency of consideration has nothing to do with the law where the parties have fixed an amount. The law does, indeed, require some consideration to be stated, and will not force an agreement against a party who gains nothing either in money or by way of relief from his fellow. But if the parties agree upon some amount, the law stops at that, and leaves the parties to abide by the bargain they have made. The Courts will not, in the face of an agreement, make any investigation as to whether the sum named is a fair equivalent or not. Thus, if the plaintiff above had agreed to do the work for \$1 instead of the sum named, he would still have been bound by his contract, and had it been \$1,000, the defendants would still have been debarred from questioning the fairness of a fee they had already agreed upon.

## CLAIMING LIEN.

**Dunn vs. McCallum.**—In this case the owners of three adjoining parcels made three separate contracts with Messrs. McCallum & Campbell, contractors, for erection of houses on their respective properties. The contractors



proceeded simultaneously with the erection of all three houses, and for the purposes of the work procured supplies from different persons, amongst whom was the plaintiff, Dunn, who supplied materials to the value of \$380.

Failing to receive payment in proper course, Mr. Dunn filed a lien for the total amount of his claim of \$380 against the three parcels **jointly**. He did not appear to have kept any detailed account of what materials had been furnished to each particular house, but made up his claim **in toto**, and registered for the full amount against all. Thus it would be necessary for each owner to pay the full \$380 in order to free his house from the lien, while a considerable portion of that amount was a debt for materials used on the houses of his two neighbors.

Obviously, each owner should be in a position at any moment to **remove the encumbrance from his own house on payment of the true amount due for materials used in that house**. The Court held that the lien was illegally registered. The rights of owners are also to be considered, and the **lien must be set aside**, even if the plaintiff, not having kept separate accounts as to the several properties, should lose his lien altogether. Here the plaintiff, Dunn, had it within his power to keep such separate accounts, and there arises also the further principle that where two innocent persons are involved, he who permitted the facts to arise must suffer. Had the three lots been held by the **one** owner there would have been no necessity for keeping separate accounts, or filing separate liens; and the plaintiff would have been quite within his rights, notwithstanding that there were three distinct contracts; but he must not confuse or commingle his accounts as against **several owners**. 14 O.L.R., 249.

#### UNAUTHORIZED USE OF CURRENT.

##### Pacquette vs. Montreal Light, Heat and Power Co.—

Joseph J. Pacquette was the owner of house No. 1580 St. Lawrence Street, Montreal, and also of the store next to it. He obtained electric lighting for his **dwelling only**, and signed a contract with the Company, agreeing to use the supply for that purpose only, and to make no new connections without permission. The Company installed appliances in the dwelling; their inspector came around and approved of the work as done, and the current was turned on, supplying the plaintiff's house and a number of others through the same meter.

Shortly afterwards Pacquette connected another wire to those in his house, fitted up a portable lamp, and used the same to light the shed at the back of his shop next door. This was done without notice to the Company, without their knowledge, and, therefore, in violation of the contract. The current thus supplied passed, of course, through the meter, and was paid for monthly in the same bill as the house supply. Later, the Company's transformer became defective, with the result that a higher voltage than necessary and than had been intended entered the dwelling house. No harm resulted in the house, but the current was too strong for the additional unauthorized wire, and Pacquette was killed while handling the lamp.

His widow brought this action for damages, and obtained judgment from the Superior Court of Quebec. This judgment the Supreme Court has reversed holding that the defendant Company was not concerned with the additional wire. Their contract bound them to install fixtures in the house, but the additional wire was not only unauthorized, but positively in **violation of the contract**; consequently no duty or obligation to maintain the same could rest on the Company. Action dismissed. 39 Can. S.C.R., 326.

#### CONTRACTOR'S LIABILITY FOR UNSAFE METHODS.

**Dufour vs. Pacquet.**—The defendant was a contractor engaged in railway construction work, and he engaged the plaintiff, a skilled miner, to use dynamite in blasting rock excavations. The work at the time of the accident being at a distance from the electric battery generally used for igniting the fuses, the method adopted was to ignite the

fuses with a red-hot poker supplied for that purpose. At the time when the accident occurred, the defendant's foreman permitted the plaintiff to light the fuses by means of torches made of birch bark without protesting against the danger of such a method. After lighting one of the fuses, the plaintiff threw the torch away as he ran off to take shelter, and by this means another fuse in close proximity became ignited without his knowledge. On his return to set off the charge to which the last fuse was attached he was injured by a premature explosion. The trial Court found that the accident was the result of **common fault: that of the defendant in failing to supply a safe means of carrying on a dangerous work, and that of the plaintiff by imprudence in negligently using the torch**. This verdict was sustained by the Superior Court of Quebec, and is again approved by the Supreme Court. The plaintiff having been guilty of contributory negligence, the damages are apportioned according to the practice in the Province of Quebec. Judgment for the plaintiff, \$2,000. 39 Can. S.C.R., 332.

#### SOCIETY NOTES.

##### Engineers' Club, Toronto.

Mr. Somerville's motion to make a change in the Constitution, whereby a new class of members would be established, namely, associates, was fully discussed. The members present, although favorable to the motion, thought now was not the best time to decide with regard to probable change of quarters. The matter will come up for discussion again on the second Thursday in March.

The committee on new quarters reported progress and were requested to continue their work. The project as it stands is a development of a move by the Engineers' Club toward securing new quarters, those at 96 King Street West being now too small. The original idea was that a private house centrally located could be remodelled into acceptable quarters and a committee was appointed to work the matter up. While doing so they received a communication from the Society of Chemical Industry, asking to be taken in, with a view to purchasing joint quarters, and shortly after the Institute of Mining Engineers also asked to be included. The committee, recognizing the feasibility of a modern club building if several of the scientific bodies of the city got together, brought the question back to the Engineers' Club in the form of a recommendation that they be given authority to go ahead with arrangements along this line. The club gave its hearty consent, and the committee now work along lines indicated in their report.

##### Ontario Land Surveyors.

The fifteenth annual meeting of the Ontario Land Surveyors will be held in Toronto, February 25th, 26th and 27th, and a programme of unusual interest has been arranged.

Thursday evening a lecture will be given by Commander R. E. Peary, United States Navy, in Massey Hall. No man has travelled the North Land so extensively as he; no living man has devoted such time, and study, nor endured such hardship in quest of the Pole. Commander Peary's lecture on "Nearest the Pole" will be intensely interesting.

Wednesday eight papers are promised.

"Concrete in Municipal Work," by James Hutcheon.

"Reinforced Concrete in Highway Bridges and Culverts," by O. McKay.

"Preliminary Location of Curves in the Bush," by R. Laird.

"Railway Right of Way in New Brunswick," by W. E. McMullen.

"Drainage and the Drainage Act," by C. A. Jones.

In the afternoon:

"City and Town Lots," by S. Bray.

"Our Timber Resources and Losses by Forest Fires in Ontario," by J. F. Whitson.

Thursday is devoted to unfinished business, new business and election of officers.

The meetings will be held at the Repository, Parliament Buildings, and will commence at 10 o'clock a.m., and 2 o'clock p.m.



# CORRESPONDENCE

[This department is a meeting-place for ideas. If you have any suggestions as to new methods or successful methods, let us hear from you. You may not be accustomed to write for publication, but do not hesitate. It is ideas we want. Your suggestion will help another. Ed.]

**Problem.**

To lengthen a curve so that the forward tangent will pass through a given point:—

ATB is a 5° curve, having an intersection angle of 45°, and whose tangent passes through C.

The BC (A) of curve to remain unchanged.  
The tangent distance IC = 960 ft.  
The perpendicular distance CG = 100 ft.

Find additional length of 5° curve to be added so that the tangent would pass through the point G.

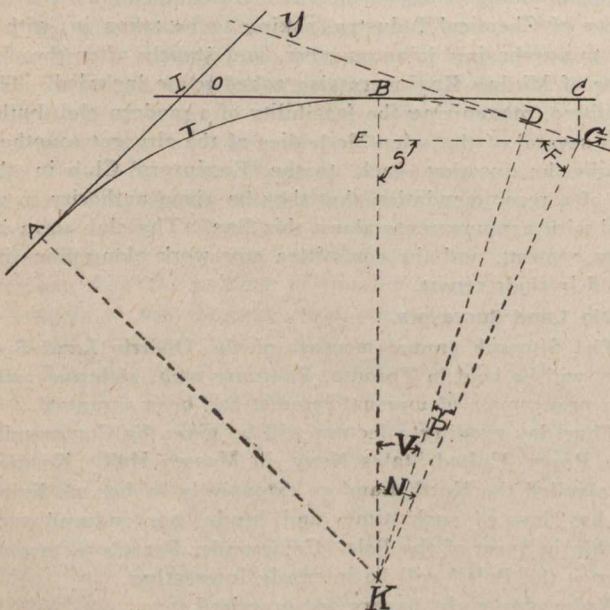
**Solution.**

Draw EG parallel to BC.  
Then EG = IC — IB,  
and EK = BK — BE.

$$R = \text{Radius} = BK \text{ or } DK = \frac{5^\circ}{\text{Sin of } 12\% \text{ of curve.}}$$

$$BI = R \tan \frac{1}{2} \text{ angle of intersection } O.$$

$$\text{Tangent of angle } N = \frac{EG}{EK}.$$



$$\text{Angle } F = 180^\circ - (N + S).$$

$$GK = \frac{EK}{\sin F}$$

$$DK = \frac{EK}{\cos P}$$

$$\text{Angle } N - \text{angle } P = \text{angle } V.$$

Then angles V + O = L. AKD = required angle Y;  
also, YD = R × tan ½ intersection angle Y.

**Example.**

$$R = \frac{5^\circ}{.04362} = 1146.28.$$

$$EG = 960 \text{ ft.} - 474.8 \text{ ft.} \dots\dots\dots = 485.2 \text{ ft.}$$

$$IB = R \times \tan \frac{1}{2} 45^\circ = 1146.28 \times .5205 \dots\dots\dots = 474.8 \text{ ft.}$$

$$\text{Tan } N = \frac{485.2}{1046.28} = .46373 \dots\dots\dots = 24^\circ 53'$$

$$\text{Angle } F = 180 - (24^\circ 53' + 90^\circ) = 180^\circ - 114^\circ 53' = 65^\circ 07'$$

$$GK = \frac{EK}{\sin F} = \frac{1046.28}{.90717} \dots\dots\dots = 1153.3 \text{ ft.}$$

$$EK = BK - BE = 1146.28 - 100 \dots\dots\dots = 1046.28 \text{ ft.}$$

$$\text{Cos } P = \frac{1153.30}{1046.28} = .99391 \dots\dots\dots = 6^\circ 20'$$

$$\text{Angle } V = 24^\circ 53' - 6^\circ 20' \dots\dots\dots = 18^\circ 33'$$

$$\text{Angles } V + O = Y = 18^\circ 33' + 45^\circ \dots\dots\dots = 63^\circ 33'$$

Toronto, Feb., 1908. Yours, John H. Devey.

**UNREASONABLE CONDITIONS ATTACHED TO G. T. P. TENDERS.**

Sir,—I have read with interest the notice in the Canadian Engineer of February 7th, inviting tenders by the Commissioners of the Transcontinental Railway for six sections. The accepted checks to accompany the tenders for three of the sections are to be for one hundred thousand dollars each, and for two of the sections seventy-five thousand dollars each, and for the other section one hundred and fifty thousand dollars.

Now, Mr. Editor, I would like to ask how many contractors or contracting firms there are in Canada that can tender on these different sections, and put up these large checks, and then give the additional security, which means another accepted check in case they are awarded any of the work, and carry it on without getting large accommodation or assistance from the banks, and any business man can tell you what help the banks are ready and willing to give during the present money stringency, and in case the bank furnishes the necessary funds it is the bank that is really the contractor.

In the opinion of many the Railway Commissioners, while no doubt meaning well, are making two serious mistakes, viz., the work is being let in too large sections, and the checks to accompany the tenders are out of reach of the ordinary contractors, the distance in miles of the six sections now advertised to be let being as follows: 39 miles, 67 miles, 31 miles, 52 miles, 100 miles, and 75 miles.

It would be much better in many ways if the contracts were let in ten or twenty mile sections, or, another way, divide the work up in money values to the amount of one hundred or two hundred thousand dollars, still keeping it in miles, etc. Then there would be a chance for the smaller but competent railway contractor. This would also to a large extent do away with the trouble experienced last year in procuring men or help to do the work, as almost every contractor, or contracting firm, has a number of men or a following that they can place on their contracts, and with these there could and would no doubt be distributed a large number of the unemployed, who have had no experience in railway construction work, but who would soon acquire it.

Some will say, why not let the ordinary or smaller contractor sub-contract from the party getting the large contract? Now, this is not desirable, for several reasons, one being the ever-present fear of loss, or failure, etc., on the part of the original contractor, which is avoided in case the contract is direct with the commission.

The C.P.R. in building their Toronto to Sudbury line, a distance of over two hundred miles, did not ask for any check to accompany the tenders received, nor did they require the



contractors to whom the different contracts were awarded to put up deposit or security checks, and no doubt they gained in doing this, but they no doubt assured themselves of the competency, financial and otherwise, of the contractors to whom the contracts were given before they awarded them the work.

There are hundreds of contractors in Canada to-day who could help build the Grand Trunk Pacific Railway if they were given the opportunity. What is to hinder the half dozen or so firms of contractors that will tender—owing to the large and out of reason security checks that are required—getting together, and the result being that each would get a section?

In discussing this matter with a member of Parliament he said he understood that one reason why the work was let in such large sections was that it was easier to deal with one firm than with several. This is nonsense. A division engineer has charge of, say, from 50 to 100 miles, while each ten or twelve miles of railway construction work has a resident engineer, and as regards official or office hands at Ottawa, there is no scarcity, and more can be got if required.

The net result of the present system will likely be that two or three, or, at the most, a half a dozen wealthy men or corporations will get the whole at higher prices than would otherwise prevail if the work was let in smaller portions, as it should be.

The above, Mr. Editor, is not written in an antagonistic spirit to the Dominion Government or the Transcontinental Commission, but with the idea and hope of an improvement.

February 8th.

Contractor.

#### RAILWAY CROSS-OVER.

Mr. J. M. W. Greig, of Glasgow, Scotland, also sends solution of this problem.

#### VENTILATION OF SEWERS.

Sir,—In your issue of February 7th, 1908, and on page 105 of that issue Messrs. Lea and Smith recommend a certain system of sewer ventilation. It may be all very well to suggest that traps be not inserted between the sewers and the houses and that each soil pipe be made a ventilation, but what will the Ontario Board of Health say? What will the City Board of Health say? "The fact that, as a rule, the house connections are more foul than the sewers" is not a good reason for all, owing to a current of foul air from the sewers to pass through each house, and where defective plumbing exists into the rooms of the houses. Possibly I do not understand the method suggested, but from the description given I am afraid the cure is worse than the disease.

Yours,  
Inspector.

February 11th, 1908.

#### CANADIAN SOCIETY OF CIVIL ENGINEERS.

At the last ballot the following student members were elected:—

**Students.**—L. Band, Engineer's Office, Town Hall, Westmount; G. W. Bayly, 243 College Street, Toronto; H. J. Becker, Midland, Ont.; H. McC. Belfour, Bath, Ont.; C. K. Brown, G.T.P. Railway, Saskatoon, Sask.; G. S. Browne, 622 Sherbrooke Street West, Montreal; E. V. Collier, C.G.S. Frontenac, Sorel, P.Q.; F. P. V. Cowley, St. James' Rectory, Winnipeg; J. Denovan, Dalkeith, Ont.; M. C. Edmunds, 486 Albert Street, Ottawa; B. O. Eriksen, Chief Engineer's Office, C.P.R., Montreal; S. D. Fawcett, G.T.P. Railway, Box 68, Winnipeg; G. Francis, 131 Mackay Street, Montreal; J. G. Gibson, Cowansville, P.Q.; J. F. Grenon, Chicoutimi, P.Q.; F. F. Griffin, 54 Smith Street, Winnipeg; F. O. Hodgins, care of Lieut.-Col. W. E. Hodgins, Ottawa; A. E. Humphrey, Palmyra, Ont.; H. S. Johnston, Strathcona Hall, Montreal; A. P. Landy, T.C. Railway Offices, St. John, N.B.; J. A. Laporte, T.C. Rail-

way Pty. No. 5, New Liskeard, Ont.; E. Lavoie, Baie St. Paul, P.Q.; J. T. E. Lavoie, St. Cyrille de L'Islet, P.Q.; A. M. Lindsay, McGill University, Montreal; C. T. Lount, Hanover, Ont.; A. Malchelossé, 51 Avenue Viger, Montreal; F. G. Malloch, 301 Bay Street, Hamilton, Ont.; P. Malouin, 25 St. Olivier Street, Quebec; B. E. Martin, T.C. Railway, St. Philippe de Neri, Kamouraska, P.Q.; J. E. A. McConville, 168 St. Denis Street, City; F. McKinnon, T.C. Railway, Quebec; K. R. McLennan, T.C. Railway, McDougall's Chute, Ont.; H. R. McQueen, Box 199, New Glasgow, N.S.; W. J. Moffat, Pembroke, Ont.; D. W. Munn, 262 Mance Street, Montreal; P. deL. D. Passy, Port Hope, Ont.; J. N. Pring, Manchester University, Manchester, England; G. L. Ridout, 77 York Street, Toronto; C. B. Russell, Pembroke, Ont.; R. G. Saunders, care of City Engineer, Toronto; M. A. Scott, care of Judge Scott, Edmonton, Alta.; W. R. V. Smith, Box 551, Fort William; R. A. Spencer, Dominion Coal Co., Glace Bay, N.S.; H. Stiles, 144 Metcalfe Street, Montreal; J. E. Thibault, St. Fite des Caps, P.Q.; T. L. Tremblay, 20 Durocher Street, Quebec; C. T. Trotter, St. Johns, P.Q.; R. deVigan, St. Stanislas, P.Q.; C. F. Whitton, 271 University Street, Montreal; H. B. Whyte, Kingston, Ont.; G. C. Wright, Kingston, Ont.; G. S. Young, C.P.R., Place Viger, Montreal; W. E. Young, 54 Vermont Avenue, Toronto.

#### TRADE INQUIRIES.

The High Commissioner for Canada, 17 Victoria Street, London, S.W.:—

A Sheffield firm desires to get into touch with Canadian importers of steel files, etc.

A Manchester firm at present buying in the United States asks for catalogues and prices of wrought iron pulleys from Canadian manufacturers.

A Manchester firm asks for samples and prices of mica from Canadian exporters.

From the City Trade Branch, 73 Basinghall Street, London, E.C.:—

A London manufacturer of a patented "turn-low" acetylene burner, and also of other incandescent goods, wishes to arrange for the sale of these specialties in Canada.

A Canadian company who are shippers of asbestos, cobalt, copper, mica, nickel, molybdenite and various other minerals would be pleased to hear from United Kingdom buyers. The company also deals in timber limits and oil lands, and invites correspondence from persons interested.

#### LIST OF RECENT CANADIAN PATENTS.

Below will be found the only complete weekly up-to-date list of patents recently granted to Canadian inventors in Canada and the United States, which is furnished by Messrs. Fetherstonhaugh & Co., Toronto, Ont.; Winnipeg, Vancouver, and Washington, D.C.:—

**Canadian Patents.**—S. E. Henderson, Toronto, end-thrust bearings; M. Daley, Ottawa, Ont.; automatically-operated station indicator; H. W. Price, Toronto, Ont., automatic train-controlling and signalling mechanism for block signal systems; H. W. Price, Toronto, Ont., automatic electro block signal systems; A. W. Crawford, Toronto, Ont., conveyors; H. Barnett, Hamilton, Ont., combination wrenches; T. Fox, Toronto, Ont., anti-friction bearings; A. E. Matheson, Goderich, Ont., formation of sprocket chains; W. H. Kahrs, Toronto, Ont., acetylene gas generators.

**United States Patents.**—A. E. Dion, Ottawa, Ont., electric current controller; J. C. Holm, Cape Scott, B.C., wrench; J. C. Locke, Westmount, Que., horseshoe dresser; J. A. McAvity, St. John, N.B., water closet; W. E. Scott, Montreal, Que., vessel hull scraper; T. J. Coe, Toronto, Ont., typewriting machine; W. N. Nicholls, Toronto, Ont., vibrator; R. N. Somorret, Manitoba, Man., grain car door; J. E. Baucier, Montreal, Que., trolley.



## BOOK REVIEWS.

Books reviewed in these columns may be secured from Vannevar & Co.,  
488 Yonge Street, Toronto, Ont.

**Economics of Railway Operation.**—By M. L. Byers, Chief Engineer Maintenance of Way, Missouri Pacific Railway. Engineering News Publishing Co., New York. Cloth, 6 x 9, pp. 672; \$5 net.

This book is divided into seven parts, as follows: (1) Organization; (2) Employment, Education and Discipline of Forces; (3) Accounts and Accounting; (4) Reports; (5) Economic Operation; (6) Analysis of Operations and Control of Expenses; (7) Betterments.

The section which appears to us most valuable is Part V., dealing with Economic Operation. Doubtless the author was most familiar with this department. At any rate it is these five chapters that make the book valuable. Chapter I., a general introduction, takes one page. Chapter II., Maintenance of Way and Structures, eighty-two pages; Chapter III., Machinery Department Operation, eighty-seven pages; Chapter IV., on Transportation, occupies sixty-nine pages, and Freight and Traffic Departments, in Chapter V., is included in seven pages. The last chapter, called Other Departments, covers passenger traffic, purchasing, tests, auditing, treasury, law, police and insurance.

This work will be considered as a valuable contribution to railway engineering and operating literature, not so much because of its analysis of railway problems, but because it is a valuable book of reference. The chapter on Organization is devoted largely to a reprint of the by-laws and organization of one of the model American roads. The chapter on Accounting is nothing more than a set of rules, but as such is instructive as a guide.

In Canada the civil engineer receives but little insight into railway management, and this book, written by a civil engineer, will be welcomed by engineers desirous of becoming more familiar with the operating side of rail-roading.

**Investigation of Centrifugal Pumps**, being Bulletin No. 173 of the University of Wisconsin. Published by the Secretary of the Board of Regents of the University. Price, 50 cents.

The University of Wisconsin, through the Department of Hydraulic Engineering, is endeavoring to supply to the engineer, manufacturer and user knowledge concerning centrifugal pumping machinery. The first bulletin on the subject, entitled "Investigation of Centrifugal Pumps. Part I. A Discussion of the Theory of the Centrifugal Pump and Tests of a Six-inch Vertical Centrifugal Pump," has just been issued by the University.

Referring to the theory of the centrifugal pump, the bulletin discusses the general theory as ordinarily given for deriving the theoretical head developed by the impeller of a centrifugal pump, and shows how the various conflicting formulæ ordinarily given are essentially the same in result.

The experiments with the six-inch vertical centrifugal pump were arranged specially to investigate the effect, on the discharge and efficiency, of the number and shape of the vanes of the impeller of the pump. For this purpose the impellers to be compared were made of the same general size so as to be easily placed in the same pump casing, while the number and shape of the vanes used was radial, and radial with curved entrance, while the number of vanes for each shape was varied, being six, twelve and twenty-four in number. The form of waterway between the vanes was also varied by increasing the thickness of the outer ends of the vanes. The comparison of the results of the experiments thus show the effect on discharge and efficiency of the pump of practically all possible modifications of the simple radial value. Additional experiments are now being made which will show the effect on discharge and efficiency of curving the vanes of the impeller both forward and backward, and also of varying the form of the pump casting.

The importance of the subject is such that the investigation has been laid out on broad lines, and will last several years. It is hoped that the results of the investigation, when completed, will be of material aid to a thorough understanding of the subject.

The general scope of the investigation has been laid out by Daniel W. Mead, Professor of Hydraulic and Sanitary Engineering, while the details of the investigation and writing of the bulletins have been performed by Mr. C. B. Stewart, C.E. Copies of the first bulletin, University Bulletin, No. 173, may be obtained by addressing the Secretary of the Board of Regents of the University of Wisconsin, Madison, Wisconsin. Price, 50 cents, postpaid, to non-residents of the State of Wisconsin.

## CATALOGUES.

**Testing Meters.**—A circular now being distributed by the Westinghouse Electric and Manufacturing Company is an interesting and instructive compilation of data on the various Westinghouse testing meters. The subject of proper selection and application of the various types is fully explained, so that the meter best suited for any particular condition may readily be selected. The method of testing service integrating meters by means of "Portable Integrating Watt Meters" is fully described, and should prove of assistance to those called upon to do this class of testing.

**Hoisting Drums.**—The Hayward Company, 97-103 Cedar Street, New York. Contractors especially will be interested in a new 14-page illustrated booklet on the "Two-in-One" Hoisting Drum. The booklet treats largely of the application of hoisting drums to the various types of machinery capable of operating automatic buckets, a number of which are shown. As the name implies, the "Two-in-One" drum consists of two drums mounted on the same bed-plate and acting as one drum. It is not connected to the engine by gears or sprocket chains, so the necessity of changing the engine with which it is to be used in any way is eliminated. A contractor who has several single drum hoisting engines wishes to use double-chain automatic buckets, or should he have double-drum engines, and in addition to operating the buckets, wishes to raise and lower the booms, the all-important question is an additional drum, which, in all probability, he will order from the engine manufacturer. To connect this drum, the engine should be mounted on wooden skids to receive the pedestals which carry the new drum-shaft. These pedestals have then to be bolted to the skids and the shaft lined up so that the gears mesh properly. The "Two-in-One" Hoisting Drum does away with these alterations, and requires no more intelligence to put in operation than the placing of a hoisting engine, and leading the lines to a derrick.

## PUBLICATIONS RECEIVED.

**Topographical Survey Report of Moose Mountain District, Southern Alberta**, being a report by D. D. Cairnes to H. P. Low, Director of Geological Survey of Canada. A topographical and an economic map accompany this report. Text illustrated. Size, 6 x 9, pp. 60.

**Seasoning and Preservative Treatment of Arborvitæ Poles**, being Circular No. 136 of the Forest Service of United States Department of Agriculture. Paper cover. Size, 6 x 9, pp. 30.

**Burning of Coal without Smoke**, being Bulletin No. 334, containing a preliminary report by D. T. Randall, of the United States Geological Survey. Paper cover. Size, 6 x 9, pp. 30.

**Report of Board of Railway Commissioners for Canada**, being the second report for 1907. This report contains the conditions and specifications for telephone crossings laid down by the Board. Sessional Paper, 20 cents. Paper cover. Size, 7 x 10, pp. 142.



# 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.

## RAILWAYS—STEAM AND ELECTRIC.

### Ontario.

**ST. MARY'S.**—Arrangements are being made to hold a meeting between the Town Council and Mr. A. E. Welch, manager of the proposed North Midland Electric Railway, regarding the entry of the electric line into the town.

### Quebec.

**MONTREAL.**—The Canadian Pacific Railway's new line from Toronto to Sudbury, which has been under construction for some time, it is announced will be completed by June. The company will then be able to reach Toronto from Western Canada over its own tracks.

### Manitoba.

**WINNIPEG.**—The Winnipeg Electric Street Railway is making preparation for the electrical operation of the line to Selkirk. It is expected that this line will be completed by March.

**WINNIPEG.**—The Canadian Northern have in contemplation several improvements on the line between Port Arthur and Winnipeg this year. The company also intend to replace some 30 miles of the present steel between Atikokan and Rainy River with 80 lb. steel. Roadmaster O'Donnell says that it is the intention of the company to make extensive improvements in this division including the spending of a lot of money in Fort Frances. The advent of the Duluth, Rainy Lake and Winnipeg line from Duluth to Fort Frances and the running of through trains from Duluth to Winnipeg will necessitate better tracks and facilities.

### British Columbia.

**VANCOUVER.**—Construction will be commenced early in the spring by the White-Parr railway on their line from Copper Camp to White Horse. Ore bunkers will be erected at Skagway. Six hundred tons of steel rails have been purchased for the enterprise.

**GRAND FORKS.**—Several reports are current as to C.P.R. expenditures here during the coming season. It is said that \$150,000 will be expended in terminal round houses and other divisional point requisites here. Local contractors are preparing to figure on the work.

## LIGHT, HEAT, AND POWER.

### Ontario.

**TORONTO.**—The special committee on electric power at a meeting held recently decided to recommend the appointment of an engineer to make an estimate on the cost of installing a plant. The Hydro-Electric Commission will be asked if it can supply power in seven months, and the Cataract Power Company will also be asked to explain its figures.

**DESERONTO.**—The Town Council have decided to put in a gas producer plant at the pumping station, and a committee was appointed to secure data in respect to the cost of installation. An engine of about 100 horse-power will be required.

**PETERBOROUGH.**—A deputation, composed of the municipal officers of eighteen municipalities in Central Ontario and many business men and manufacturers from eight ridings, will wait on the Dominion Government on behalf of the Northumberland-Durham Power Company to request that a lease be given the company of Upper Healey Falls, which is necessary to proceed with the development of water power at that place.

## CONTRACTS AWARDED.

### Ontario.

**TORONTO.**—The contract for the construction of the Rosedale section of the Trent Valley Canal has been awarded by the Department of Railways and Canals to the Randolph McDonald Company, of Toronto, the lowest tenderers. Work on the section will be actively commenced in the spring.

**HAMILTON.**—The following tenders for electric pumps have been recommended: Buffalo Pump Company, \$7,600; James McDougall Company, Worthington pump, \$7,720; Canadian General Electric Company, \$9,100. In his report Mr. Sothman stated that the Buffalo company had not complied with the specifications, and it is believed that the Worthington pump will be selected.

**ST. CATHARINES.**—The firm of W. P. Nott & Company, who were given the contract for section No. 1 of the Trent Canal have given notice that they cannot go ahead with the work, and the contract has therefore been cancelled. It has been given to Messrs. Larkin & Longster of St. Catharines, who had the next lowest tender.

**GUELPH.**—The tender for the work of lighting and wiring the City Hall here has been let to Stevenson & Malcolm.

### Quebec.

**MONTREAL.**—The Dominion Iron & Steel Company has been awarded the contract by the Canadian Pacific Railway for thirty thousand tons of steel rails to be delivered during the coming season. Smaller contracts with one or two other concerns are also reported.

### British Columbia.

**VICTORIA.**—The contract for a new steamer to ply on the Skeena River has been let by the G.T.P. to Alexander Watson, of this city. The work on the steamer is to be rushed. The contract entered into calls for its delivery May 1st. The machinery has been ordered in Toronto from Polson's works and will be shipped to the coast and installed as soon as the hull is ready to receive it. The cost of the hull will be about \$15,000, while the total cost will probably reach over \$30,000.

### Alberta.

**EDMONTON.**—The clearing of the first thirty miles west of Edmonton of the right of way of the G.T.P., has been let to J. McAllister, the next thirty miles, has not yet been let, or is let in small contracts, the third thirty miles is let to M. McKenzie, and the fourth and last thirty miles to Ben Baker.

## SEWERAGE AND WATERWORKS.

### Ontario.

**TORONTO.**—The Sewers Committee in considering tenders for pipes found that the figures of the Toronto and Hamilton Sewer Pipe Company and Sackville Hill were so close that the secretary should figure on them. The committee will ask for an appropriation of \$12,000.

**ORILLIA.**—The Provincial Board of Health has considered the matter of Orillia's water supply. Orillia wants to empty its sewage into Lake Simcoe. The Government institution there gets its water from the lake, which has long been looked upon also as a possible source of supply for Toronto.

### Manitoba.

**WINNIPEG.**—At the meeting of the fire, water and light committee, City Engineer Ruttan recommended that another



2,500,000 gallon pump be placed in well No. 5. There is already one pump in the well, but the indications are that with it in service only half the yield of the well is being secured. With the second pump in, the engineer expects to secure 5,000,000 gallons daily, from No. 5. The estimated cost of the pump is \$12,000.

**WINNIPEG.**—A three-days' test of the garbage destroying capacity of the city crematory has been arranged. A. B. Greig, the incinerator expert, who accompanied City Engineer Ruttan to the coast to inspect the test of an incinerator there, is in charge of the operations at the crematory.

**British Columbia.**

**VICTORIA.**—Mr. A. L. Adams has been instructed to draw up plans, and a scheme for a waterworks system on Smith's Hill, and a general distribution system.

**VANCOUVER.**—City Engineer Clement has presented his estimates of expenditure for the year. The total amount, covering the regular fields of work, is \$256,879 as against appropriations last year of \$213,250, an increase of over \$40,000. Owing to the availability of the new street improvement by-law, the amount asked for new work in each ward was cut from \$10,000 to \$5,000, though this reduction was about balanced by an estimate of \$80,000 for maintenance this year as against \$57,000 last year.

**TENDERS.**

**New Brunswick.**

**COVERDALE.**—Tenders will be received until March 23, 1908, for the Mill Creek Mouth Bridge, Albert County. These tenders were previously called for October 22nd, 1906. Plans may be seen at Public Works Department, Fredericton, N.B. C. H. LaBillois, Chief Commissioner.

**Ontario.**

**TORONTO.**—Tenders will be received until February 25 for dredging slips. Joseph Oliver (Mayor), Chairman Board of Control.

**Manitoba.**

**DUNREA.**—Tenders will be received until March 10 for the construction of a steel Highway Bridge, upon concrete and boulder foundations, over the Souris River, in the municipality of Riverside. J. H. Putnam, Treasurer of the municipality of Riverside.

**Saskatchewan.**

**MOOSOMIN.**—Tenders will be received until March 2nd for the erection of a Provincial Jail building about two miles from this town. F. J. Robinson, Department Public Works, Regina.

**British Columbia.**

**VANCOUVER.**—Tenders will be received at the office of the City Clerk of Vancouver up to March 2, 1908, for the construction of the sub-structures of the new bridges over False Creek, at Westminster Avenue and Granville Street; also for the wooden trestle approaches to the Granville Street structure, and the embankment approaches to the Westminster Avenue structure, and for the construction of a temporary bridge over False Creek at Westminster Avenue.

**BUILDINGS.**

**Ontario.**

**BARRIE.**—A carriage factory will be erected here on the corner of Queen Street and Gwynne Avenue by Mr. Broadway at a cost of \$4,000.

**BROCKVILLE.**—Plans are under consideration for the erection of a new wing in connection with the Collegiate Institute here. It is expected that work will be commenced in the spring.

**OWEN SOUND.**—A shoe factory and a factory for cutting granite will be erected here during the coming summer.

**Alberta.**

**CALGARY.**—There are at present under construction at Calgary the following public buildings:—Court House, to cost \$225,000; Register Office, \$120,000; C.P.R. Depot, \$225,000; City Hall, \$150,000; Y.M.C.A., \$90,000; Normal

School, \$70,000; High School, \$30,000; making a total of \$910,000.

**Saskatchewan.**

**PRINCE ALBERT.**—Among the new buildings to be erected here during the coming season are the Imperial Bank Building, High School, and St. Alban's School for girls.

**British Columbia.**

**PRINCETON.**—A new building block will shortly be erected here.

**VANCOUVER.**—The British Canadian Wood Pulp and Paper Company are proceeding with the erection of their plant, about twenty-five miles from this city.

**VANCOUVER.**—The Barber Mattress Company will make extensive additions to its plant shortly. Building permits aggregating \$350,000 were granted during January of this year.

**MISCELLANEOUS.**

**Ontario.**

**TORONTO.**—Contractors who lay concrete sidewalks for the city will now guarantee their work for only 18 months, instead of five years, as heretofore.

**TORONTO.**—City Engineer Rust in submitting his estimates to the Board of Works asked for a total of \$719,341.28. As compared with last year the totals are:—

	1908.	1907.
Works .....	\$490,763.28	\$242,975.62
Waterworks .....	228,578.00	194,499.00
	<u>\$719,341.28</u>	<u>\$437,474.62</u>

The appropriation asked for roadways was \$60,000, just twice the sum voted last year. For maintaining sand pumps \$31,365 was asked, as compared with \$15,000 a year ago. To widen Dundas Street Bridges Mr. Rust asked \$40,000. For a new bridge on Winchester Street \$25,000, and \$50,000 for Crawford Street Bridge.

**Manitoba.**

**WINNIPEG.**—The Board of Control have decided to get into communication with the National Transcontinental Railway Commission in regard to a railway and traffic bridge over the Red River at the foot of McDermott Avenue. The city and the town of St. Boniface have already had plans prepared for a bridge at that point on the river and a grant from the Provincial Government has been secured towards its erection.

**Saskatchewan.**

**ABERDEEN.**—At a meeting of the telephone holders of Aberdeen, held recently, it was decided to form a stock company to operate telephones in and around Aberdeen, under the name of "The Aberdeen and Rural Telephone Co."

**Alberta.**

**STRATHCONA.**—Two by-laws are under consideration by the Council. A by-law authorizing a grant of \$17,500 to assist in the construction of a high level traffic attachment upon a proposed bridge over the Saskatchewan River, and to provide for raising the said sum of money. A by-law to provide for raising \$9,682.45 to cover the cost of a fire alarm system, a steam roller and certain other machines and implements purchased by the City of Strathcona during the year 1907.

**British Columbia.**

**REVELSTOKE.**—A petition signed by a large number of the residents here has been sent to the Provincial Government for the construction of a general traffic bridge across the Columbia River here.

**VANCOUVER.**—It is expected that plans will shortly be prepared for the Westminster Avenue and Granville Street Bridge, as the bridge committee have again taken the matter up.

**VANCOUVER.**—According to Mr. A. L. Berdoe, general manager of the White Pass Road, five hundred men will be wanted by April 15 on that company's works at Skagway and in the vicinity of White Horse in connection with the building of ore bunkers at the former place and the extension of the White Pass & Yukon route through the White Horse copper camp.



## PERSONAL.

CECIL B. SMITH has been retained by the City of Nelson for the purpose of looking over the city power plant.

MR. T. B. SPEIGHT, O.L.S., has gone north to make a survey of the islands in Lake Abitibi. He will be gone six weeks.

MR. F. H. REYNOLDS, assistant city engineer, Winnipeg, has accepted the position of general manager of the South Wellington coal mines, with headquarters in Victoria.

MR. C. HOLDEN, assistant engineer of the power construction department of Winnipeg, has been appointed superintendent of the city power plant and light system at Moose Jaw, succeeding A. C. Read, who resigned.

MR. T. L. HARRISON, of Harrison & Company, opticians, Montreal, is on his way home from an extended tour through Mexico, California, and other Pacific Coast sections. He will pass northward to British Columbia, and return to Montreal by the C.P.R. about the end of March.

MR. WALTER J. FRANCIS, C.E., who for the past 15 years has been employed upon engineering work of various kinds in Canada, has opened an office in the Sovereign Bank Building, Montreal, as consulting engineer. Mr. Francis has an excellent record both in college and practical life. He won a diploma at the Chicago World's Fair, for the School of Practical Science, Toronto, for draughting work, and in 1893 received one of the first honor diplomas granted by that school. He has since been continuously in charge, both in design and construction, of municipal, railway, and canal work, power development, and in structural steel and building undertakings in different parts of Canada, and has made a specialty of concrete work in all its branches. He holds the degree of C.E. from Toronto University, and is a member of the C.S.C.E., by which society he was awarded the Gzowski Medal in 1906 for his paper on the Hydraulic Lift Locks of the Trent Valley Canal. He is also a member of the American Society of Civil Engineers, and enters private practice with every prospect of a successful future.

## NEW INCORPORATIONS.

**British Columbia.**—Chase Lumber Company, \$10,000; Columbia Valley Irrigated Fruit Lands, \$500,000; Golden Giant Mines, \$100,000; Lost Lake Timber Company, \$30,000.

**Toronto.**—American Drummer Cobalt Silver Mining Company, \$500,000; J. B. Bartram, F. Rielly, W. A. Gordon, Queen City Construction Company, \$50,000; C. B. Jackson, Petrolea; J. E. Denise, J. P. Holden, Toronto. Berg Brick Machinery Company, \$250,000; A. Berg, J. Berg, S. Berg. The George A. Just Company, builders and contractors, of New York, are permitted to use capital in Ontario to the amount of \$40,000.

**Ottawa, Ont.**—Watson Carriage Company, \$40,000; R. E. Watson, J. T. Moxley, R. C. Code.

**Montreal.**—Canadian Croker-Wheeler Company, \$25,000; R. A. Stinson, F. J. Bell, Westmount; H. Holden, Montreal. P. Lafrance & Company, \$49,000; A. Lafrance, H. Dion, L. Olivier. Lymans, Limited, \$1,000,000; H. H. Lyman, A. Lyman, W. E. Lyman.

**St. John's, Que.**—St. John's Temagami Gold and Silver Mining Company, \$795,000; M. Robert, A. Bouthillier, St. Blaise; J. B. Comeau.

## ENGINEERING SOCIETIES.

**CANADIAN RAILWAY CLUB.**—President, W. D. Robb, G.T.R.; secretary, James Powell, P.O. Box 7, St. Lambert, near Montreal, P.Q.

**CANADIAN STREET RAILWAY ASSOCIATION.**—President, E. A. Evans, Quebec; secretary, Acton Burrows, 137 Bay Street, Toronto.

**CANADIAN INDEPENDENT TELEPHONE ASSOCIATION.**—President, J. F. Demers, M.D., Levis, Que.; secretary, F. Page Wilson, Toronto.

**CANADIAN SOCIETY OF CIVIL ENGINEERS.**—413 Dorchester Street West, Montreal. President, J. Galbraith; Secretary, Prof. C. H. McLeod. Meetings will be held at Society Rooms each Thursday until May 1st, 1908. January 28th, 1908, annual meeting of the Society.

**TORONTO BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.**—96 King Street West, Toronto. Chairman, C. H. Mitchell; Secretary, T. C. Irving, Jr., Traders Bank Building. February 27th, the chairman, Inaugural Address.

**WINNIPEG BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Chairman, H. N. Ruttan; Secretary, E. Brydone Jack. Meets first and third Friday of each month, October to April, in University of Manitoba.

**ENGINEERS' CLUB OF TORONTO.**—96 King Street West. President, J. G. Sing; secretary, R. B. Wolsey. Meeting every Thursday evening during the fall and winter month.

**CANADIAN ELECTRICAL ASSOCIATION.**—President, R. S. Kelsch, Montreal; secretary, T. S. Young, Canadian Electrical News, Toronto.

**CANADIAN MINING INSTITUTE.**—413 Dorchester Street West, Montreal. President, Frederick Keffer, Greenwood, B.C.; secretary, H. Mortimer-Lamb.

**NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.**—President, R. McColl; Secretary, S. Fenn, Bedford Row, Halifax, N.S.

**AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, TORONTO BRANCH.**—Louis W. Pratt, secretary, 123 Bay Street, Toronto.

**AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—29 West 39th Street, New York. President, H. L. Holman; secretary, Calvin W. Rice.

## MARKET CONDITIONS.

Toronto, February 20th, 1908.

Among architects and contractors in the city the usual reply to inquiry is that nothing new or striking in construction is at present available. The prominent jobs which were begun last year are awaiting completion when the weather is fit. Brick and cement people say that the weather and the roads are against any present activity. Hardware and metal dealers have had a dull fortnight. During the week of heavy snow they fared no worse but rather better than dealers in other lines, such as tea and tobacco, of which articles none came into the city for a week.

In heavy metals there is little movement; shelf hardware is more active since the snow blockade is removed. In the United States the effects of the late panic upon business in various directions is marked. January industrial failures were double those of January 1907; railroad earnings were 8 per cent. less; bank clearings 25 per cent. less. As to transportation, where in January last year railways were 100,000 cars short, there were, on 10th February, 360,000 cars idle.

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

**American Bessemer.**—Fourteen-gauge, \$2.45; 17, 18, and 20-gauge, \$2.60; 22 and 24-gauge, \$2.65; 26-gauge, \$2.80; 28-gauge, \$3.

**Antimony.**—Quiet, but inquiries are coming in more freely; we quote 11½ to 13c.

**Bar Iron.**—\$2.20 base, from stock to the wholesale dealer. Unaffected by last week's action in the United States which advanced prices \$2 per ton.

**Beams and channels,** \$2.75 to \$3, according to size and quantity; angles, 1¼ by 3-16 and larger, \$2.65; tees, \$2.90 to \$3 per 100 pounds. Extras for smaller sizes.

**Boiler Heads.**—25c. per 100 pounds advance on boiler plate.

**Boiler Plates.**—¼-inch and heavier, \$2.50. Supply probably adequate and quotations still firm.



**Boiler Tubes.**—Lap-welded steel, 1¼-in., 10c.; 1½-in., 9c. per foot; 2-in., \$9.10; 2¼-in., \$10.85; 2½-in., \$12; 3-in., \$13.50; 3½-in., \$16.75; 4-in., \$21 per 100 ft.

**Building Paper.**—Plain, 32c. per roll; tarred, 40c. per roll, and the market decidedly strong at these prices.

**Bricks.**—Common structural \$10 per thousand, wholesale; small lots \$12 to \$13, and the demand fairly brisk. Red and buff pressed are worth \$18 at Don Valley Works.

**Cement.**—Star brand, Toronto, 1,000 barrel lots, \$2.25 per barrel, 350 pounds net, including bags, or \$1.85 ex-package, small lots cost \$2.10 warehouse, \$2.15 delivered. National and Lakefield prices are identical; English, Anchor, \$3 per barrel in wood. Demand continues moderate.

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

**Dynamite,** per pound, 21 to 25c., as to quantity.

**Felt Paper—Roofing Tarred.**—Market steady at \$2 per 100 pounds. Orders are fairly regular, and the spring prospects good.

**Fire Bricks.**—In steady request; English, \$32 to \$35; Scotch, \$30 to \$35; American, \$25 to \$35 per 1,000.

**Fuses—Electric Blasting.**—Double strength, per 100, 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. Bennett's double tape fuse, \$6 per 1,000 feet.

**Galvanized Sheets—Apollo Gauge.**—Sheets 6 or 8 feet long, 30 or 36 inches wide; 10-gauge, \$3.25; 12-14-gauge, \$3.35; 16, 18, 20, \$3.50; 22-24, \$3.70; 26, \$3.95; 28, \$4.40; 29 or 10¼, \$4.70 per 100 pounds. Stocks very low.

**Ingot Copper.**—Market still irregular and inclined to weaken. We now quote 14½ to 16c., as to quantity.

**Lead.**—Holding its own at 4½c.

**Nails.**—Wire, \$2.55 base; cut, \$2.70; spikes, \$3.15. Supply moderate.

**Pitch.**—Quiet at 75c. per 100 lbs.

**Pig Iron.**—Summerlee No. 1, always in demand, generally for small lots, quotes now, nominally, \$27; Gleggarnock, \$26.50; No. 2, \$26; Cleveland, No. 1, \$23.50, \$24; Clarence, No. 3, procurable in Montreal, price here \$23 to \$24.00. But a small business doing; buyers cautious.

**Steel Rails.**—80-lb., \$35 to \$38 per ton.

**Sheet Steel.**—In moderate supply; 10-gauge, \$2.65; 12-gauge, \$2.70.

**Tar.**—Market unsettled, \$3.50 per barrel the ruling price.

**Tank Plate.**—3-16-in., \$2.65.

**Tin.**—Irregular, but active, fluctuating in Singapore and London. Quotation in Toronto, 31½ to 32½c.

**Tool Steel.**—Jowitt's special pink label, or octagon drill steel, 10½c. per pound; Capital, 12c.; Conqueror, highspeed, 70c. base.

**Zinc.**—Dull, 5½c.

\* \* \* \*

Montreal, February 20th, 1908.

The pig iron situation in the United States has not shown any decided change. Finished material seems to be a little better and operations are being resumed in numerous small factories and steel corporation plants.

In England prices are not only being held firm but are showing slight advances. Heavy foundries are meeting with a good demand and consumption of pig iron is going on at a rapid rate, the result being that, notwithstanding the cessation of export, prices on everything, save hematite, are being maintained. Owing to the lack of business, especially in shipbuilding, steel makers are very quiet, the result being that hematite pig iron is in poor demand and prices are tend-

ing downwards. Finished and partly finished material is in exceedingly poor demand, and even the material reduction in prices does not appear to produce any particular improvement.

The local market shows continued slight improvement. Demand is by no means heavy, but fair quantities of metal are being purchased for prompt delivery, and also for delivery at the opening of navigation. One or two large concerns, more particularly those engaged in the manufacture of agricultural implements, are about to close their works indefinitely, owing to the absence of orders.

Cut and wire nails have declined, but otherwise prices of finished material continue practically unchanged and, for the most part, demand is very light. It is expected that business will shortly begin to pick up again in several lines, but, in the meantime, the feeling is not very firm and purchasers of large quantities of almost anything would probably get considerable concessions from quoted prices.

**Antimony.**—The market is steady at 11½ to 12c. per pound.

**Bar Iron and Steel.**—The market is unchanged. Bar iron, \$2.00 per one hundred pounds; best refined horseshoe iron, \$2.25, and forged iron, \$2.15; mild steel, \$2.10; sleigh shoe steel, \$2.10 for 1 x ¾-base; tire steel, \$2.10 for 1 x ¾-base; toe calk steel, \$2.60; machine steel, iron finish, \$2.15.

**Boiler Tubes.**—The market holds steady, demand being fair. Prices are as follows: Two-inch tubes, 8 to 8¼c.; 2½-inch, 11c.; 3-inch, 12 to 12¼c.; 3½-inch, 15 to 15¼c.; 4-inch, 19¼ to 19½c.

**Building Paper.**—Tar paper, 7, 10, or 16 ounce, \$2 per 100 pounds; felt paper, \$2.75 per 100 pounds; tar sheathing, No. 1, 60c. per roll of 400 square feet No. 2, 40c.; dry sheathing, No. 1, 50c. per roll of 400 square feet, No. 2, 32c.

**Cement—Canadian and American.**—Canadian cement is generally quoted at \$1.80 to \$1.90 per barrel, in cotton bags, and \$2.10 to \$2.20 in wood, weights in both cases 350 pounds. There are four bags of 87½ pounds each, net, to a barrel, and 10 cents must be added to the above prices for each bag. Bags in good condition are purchased at 10 cents each. Where paper bags are wanted instead of cotton, the charge is 2½ cents for each, or 10 cents per barrel weight. American cement is steady at \$1.15 per 350 pounds, basis Glens Falls, cotton or paper bags. When the cotton bags are returned in good condition, only 7½ cents is allowed for them. American cement sold at \$2 on track.

**Cement—English and European.**—English cement is unchanged at \$1.90 to \$2.20 per barrel in jute sacks of 82½ pounds each (including price of sacks) and \$2.10 to \$2.20 in wood, per 350 pounds, gross. Belgian cement is quoted at \$1.90 to \$2.10 per barrel, in wood.

**Copper.**—The market for copper is steady. Prices are 15½ to 16c. per pound.

**Lead.**—The market is steady and unchanged, this week, at \$4 to \$4.10 per 100 pounds.

**Nails.**—Demand for nails has improved, but prices have declined, being \$2.30 per keg for cut, and \$2.25 for wire, base prices.

**Pipe—Cast Iron.**—The market is next thing to dead, as nothing is used during the winter. Prices are steady at \$36 for 8-inch pipe and larger; \$37 for 6-inch pipe, \$38 for 5-inch, and \$39 for 4-inch at the foundry. Gas pipe is quoted at about \$1 more than the above.

**Pipe, Wrought.**—The market is firm but duller. Quotations and discounts for small lots, screwed and coupled, are as follows: ¼-inch to ¾-inch, \$5.50, with 54 per cent. off for black and 38 per cent. off for galvanized. The discount on the following is 66 per cent. off for black and 56 per cent. off for galvanized: ½-inch, \$8.50; 1-inch, \$16.50; 1¼-inch, \$22.50; 1½-inch, \$27; 2-inch, \$36; and 3-inch, \$75.50; 3½-inch, \$95; 4-inch, \$108.

**Spikes.**—Railway spikes are not in very good demand. \$2.60 per 100 pounds, base of 5½ x 9-16 Ship spikes are steady at \$3.15 per 100 pounds, base of ¾ x 10 inch and ¾ x 12 inch.

## SECOND HAND EQUIPMENT FOR CONTRACTORS, MINES, STONE- WORKERS.

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**THE HARTLAND COMPANY**  
32B Board of Trade Build'ng. MONTREAL.



**Steel Shafting.**—At the present time prices are steady at the list, less 25 per cent. Demand is very dull and lower figures would hardly be refused.

**Steel Plates.**—Demand is quite dull and a firm bid at lower figures than quotations would be considered. Quotations are: \$2.75 for 3-16, and \$2.50 for  $\frac{1}{4}$  and thicker, in small lots.

**Tar and Pitch.**—Coal tar, \$4 per barrel of 40 gallons, weighing 575 to 600 pounds; coal tar pitch, No. 1, 75c. per 100 pounds, No. 2, 65c. per 100 pounds; pine tar, \$4.35 to \$4.50 per barrel of about 280 pounds; pine pitch, \$4.25 per barrel of 180 to 200 pounds.

**Tin.**—Tin is unchanged, at 31½ to 32c. per pound.

**Tool Steel.**—Demand is light but the market is firm. Base prices are as follows: Jessop's best unannealed, 14½c. per pound, annealed being 15½c.; second grade, 8½c., and high-speed, "Ark," 60c., and "Novo," 65c.; "Conquerer," 55 to 60c.; Sanderson Bros. and Newbould's "Sabon," high-speed, 60c.; extra cast tool steel, 14c., and "Colorado" cast tool steel, 8c., base prices. Sanderson's "Rex A" is quoted at 75c. and upward; Self-Hardening, 45c.; Extra, 15c.; Superior, 12c.; and Crucible, 8c.; "Edgar Allan's Air-Hardening," 55 to 65c. per pound.

**Zinc.**—Zinc is steady at \$5.25 to \$5.50 per 100 pounds.

#### ORDERS OF RAILWAY COMMISSION OF CANADA.

(Continued from Page 7.)

4320—Feb. 12—Approving revised location of Esquimalt & Nanaimo Railway Company north of Wellington, B.C.

4321—Feb. 12—Authorizing Bell Telephone Company to erect its aerial wires across the Canadian Pacific Railway at Beachville Station, Ontario.

4322—Feb. 8—Authorizing Woodstock Electric Railway, Light & Power Company, Limited, to erect its wires across the roadbed and track of the Canadian Pacific Railway at King Street, Woodstock, N.B.

4323—Feb. 8—Approving location of Atlantic, Quebec & Western Railway in the Township of Perce, Mal Baie, and Douglas, County of Gaspé, Quebec, mileage, 60 to 90.

4324—Feb. 8—Approving By-law No. 8 of Ottawa Electric Railway Company, authorizing the secretary-treasurer of the company to prepare and issue tariff of tolls to be charged for the carriage of passengers upon its railway.

4325—Feb. 6—Authorizing Canadian Pacific Railway to construct bridge at highway crossing at Bala, Ontario.

4326—Feb. 8—Authorizing Canadian Pacific Railway to open for the carriage of traffic that portion of its Pheasant Hills branch, between Lanigan, at mileage 254.5, from Kirkella and Saskatoon at mileage 328.4, a distance of 73.9 miles in Province of Saskatchewan.

4327—Feb. 8—Approving agreement between the Great North-Western Telegraph Company of Canada and the Cen-

## The Latest Book on the Electric Furnace

Electric Smelting is a subject of increasing importance to Canadian Engineers and this work contains a clear and connected account of the principle on which electric furnaces are constructed, the uses to which they can be put and the more important details of their construction. The articles upon which the book is based appeared in the Canadian Engineer during 1906.

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#### ITS EVOLUTION THEORY AND PRACTICE

BY ALFRED STANSFIELD, D. Sc., A. R. S. M.  
Professor of Metallurgy, McGill University

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ALL ORDERS FOR COPIES SHOULD BE ADDRESSED TO

**The Book Department, Canadian Engineer**

62 Church Street

TORONTO



# TENDERS CALLED FOR



Sealed Tenders addressed to the undersigned, and endorsed "Tender for Steel Tugs," will be received at this office until **Monday, March 2, 1908**, inclusively, for the construction of Three Steel Tugs, according to a plan and specification to be seen at the offices of E. T. P. Shewen, Esq., Resident Engineer, St. John, N.B.; C. E. W. Dodwell, Esq., Resident Engineer, Halifax, N.S.; J. G. Sing, Esq., Resident Engineer, Confederation Life Building, Toronto, Ont.; Chas. Desjardins, Esq., Clerk of Works, Post Office Building, Montreal, and at the Department of Public Works, Ottawa.

Tenders will not be considered unless made on the printed form supplied, and signed with the actual signatures of tenderers.

Accepted cheques on a chartered bank, payable to the order of the Honorable the Minister of Public Works, for three thousand five hundred dollars (\$3,500.00), for one Steel Tug; six thousand dollars (\$6,000.00), for two Steel Tugs, and eight thousand dollars (\$8,000.00), for three Steel Tugs, must accompany each tender. The cheques will be forfeited if the person tendering decline the contract or fail to complete the work contracted for, and will be returned in case of non-acceptance of tender.

The Department does not bind itself to accept the lowest or any tender.

By order,  
FRED. GELINAS,  
Secretary.

Department of Public Works,  
Ottawa, February 1, 1908.

Newspapers will not be paid for this advertisement if they insert it without authority from the Department.

## MONTREAL WATERWORKS.

Sealed Proposals, endorsed "Tender for 12 Million Gallon Steam Pump," will be received up to noon, on **Tuesday, the 24th March, 1908**, at the Office of the City Clerk, City Hall, Montreal, for the furnishing and erecting at the Low Level Pumping Station, of one twelve million Imperial gallons steam pump.

Certificate of deposit of certified cheque with the City Treasurer, for the sum of \$6,000.00 must accompany each tender.

General specifications and all information to be obtained from the undersigned.

The Water Committee will consider the proposals offered, at its next meeting after their reception.

The Water Committee does not bind itself to accept the lowest or any tender offered.

GEO. JANIN,  
Superintendent of Waterworks.

Montreal, February 18th, 1908.

tral Vermont Railway Company, respecting carriage of poles and other material of the Telegraph Company.

4328—Oct. 29, 1907—Authorizing the Chatham, Wallaceburg & Lake Erie Railway to carry its line of railway and its power lines and telegraph and telephone lines across and along the track of the Pere Marquette Railway Company on the town line, between the Townships of Harwich and Raleigh, in the County of Kent, Ontario, also granting leave to Chatham, Wallaceburg & Lake Erie Railway to operate the said crossing until May 31st, 1908.

4329—Feb. 6—Approving location of Atlantic, Quebec & Western Railway, section 3, mileage 20 to 30.8, and section 10, mileage 90 to 102.4 through the Townships of Douglas and York, County of Gaspé.

4330—Feb. 10—Authorizing Thessalon Lumber Company to operate its cars across the track of the Canadian Pacific Railway Sault St. Marie branch, at a point between Dayton and Dean Lake Stations, about two and one half miles east of Dayton, Ontario.

4331—Feb. 12—Authorizing Winnipeg Electric Railway Company to carry and maintain its wires for the transmission of electrical energy across the Canadian Pacific Railway tracks at the Town of St. Boniface for a period of two months from February 12th, 1908.



Department of

Public Works.

Tenders for the Construction of a Reinforced Concrete Bridge and Dam over Wascana Creek, Albert Street, Regina.

Tenders addressed to the Deputy Commissioner of Public Works, Regina, Saskatchewan, and endorsed, "Tenders for the Construction of Bridge and Dam, Albert Street, Regina," will be received up to 4.30 p.m., **Monday, February, 24th, 1908**, for the construction of a reinforced concrete bridge and dam over the Wascana Creek on Albert Street, Regina. A certified cheque for the sum of \$2,000 must accompany each tender. Cheque will be retained until the contract and bonds for the work have been executed and the work commenced. Cheques of unsuccessful bidders will be returned after the contract is signed. The right to reject any or all bids or waive any defects is reserved. Plans, specifications and all information may be obtained on application to the undersigned.

F. J. ROBINSON,  
Deputy Commissioner of Public Works.

Dated at Regina, Sask.,  
February 8th, 1908.

Plans and specifications are on file at the office of the "Canadian Engineer," Toronto.

4332—Feb. 12—Authorizing Winnipeg Electric Railway Company to carry and maintain across the tracks of the Canadian Pacific Railway its wires for transmission of electrical energy, in Section 25, Township 12, Range 8, East, of the first Meridian, for a period of two months, from February 12th, 1908.

4333—Feb. 12—Authorizing Winnipeg Electric Railway Company to carry and maintain its wires across the tracks of the Canadian Pacific Railway, Section 35, Township 13, Range 9, east of the first Meridian, Manitoba. These wires to be for transmission of electrical energy, for a period of two months, from February 12th, 1908.

4335—Feb. 5—Authorizing Grand Trunk Railway to Ontario, to lay a water pipe under the track of the Grand Trunk Railway in the Town of Tillsonburg, Ontario.

4334—Feb. 5—Authorizing Grand Trunk Railway to operate, construct and maintain a branch line or spur to premises of People's Specialty Company, Grand Ligne, Quebec, rescinding Order No. 4013 of November 15th, 1907.

4336—Feb. 7—Authorizing Canadian Pacific Railway to construct a spur to the premises of Standard Paint Company, Limited, near Highland, P.Q.

4337—Feb. 12—Authorizing Bell Telephone Company to carry its aerial wires over the Canadian Northern Railway at eight and a quarter miles west of Winnipeg, Manitoba.

4338—Feb. 6—Authorizing Grand Trunk Pacific Railway to carry its railway across public highway crossing at mileage 85.2, between Sections 13 and 14, Township 51, Range 20, west of the 4th Meridian.

4339—Feb. 12—Authorizing the municipality of Ratter and Dunnet to construct a public crossing over the tracks of the Canadian Pacific Railway at 9th line, between Lots 8 and 9, Sixth Concession, Township of Dunnet.

4340—Feb. 12—Extending until May 1st, 1908, time within which the Canadian Northern Ontario Railway shall install interlocking and derailing appliances at crossing of Canadian Pacific Railway, Township of Cleland, District of Nipissing, Ontario.

4341—Jan. 31—Authorizing Canadian Northern Railway to use for construction purposes only the crossing of its track with the Canadian Pacific Railway, near Lachevrotiere, Quebec, until May 1st, 1908.