

PAGES

MISSING

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The Canadian Engineer

ESTABLISHED 1893

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CONTENTS OF THIS ISSUE.

	Page.
Editorial:	
School of Mines, Kingston.....	893
Bonds and Surety	893
Leading Articles:	
Grounded Transmission Mediums.—II.....	895
Depreciation of Machinery	902
Correspondence:	
Safe Floor Loads	898
Medical Attendance in Camps.....	899
Flow of Well	899
Legal Notes:	
Fair Wage Clause	900
Municipal Boundary	900
Negligence	900
Non-navigable Stream	900
Society Notes	901
Construction News	903
Market Conditions	906

THE CANADIAN SOCIETY OF CIVIL ENGINEERS.

The Society meets in Toronto, January 28th, 29th and 30th, 1909, and Mr. M. J. Butler, Deputy Minister of Railways and Canals, says: "One good reason, to my mind, why the Canadian Society of Civil Engineers should hold their annual meeting in Toronto this year is on account of the fact that the home of the retiring president is in that city. Aside from this, I am of the opinion that it will be the means of increasing the interest of those gentlemen who belong to the Society residing in Toronto, and in this way bring about a better feeling among the members."

Watch next week for Mr. Henry Holgate's reasons why engineers should attend.

SCHOOL OF MINES, KINGSTON.

The part our colleges of applied science play in the development of our country is so great that their position should be thoroughly understood, for on the training they give, the ideals they establish, and the frame of mind in which their students approach new subjects will largely depend the development and expansion of this young country.

The School of Mines, Kingston, last week held open house, and many engineers availed themselves of the opportunity of studying on the ground the college situation and equipment. They had an opportunity to do more. They met the staff and students, and realized that in addition to a thorough scientific education, both theoretical and practical, the young engineers were receiving impression in loyalty, in honest work, and of leadership such as augur well for the profession of engineering.

The college buildings as to situation are ideal, but as to equipment and space it must be admitted they are crowded. This will surely be soon remedied, for the work of the School is recognized, and development must follow. A better location or a Mining School it would be hard to find. The geological formations near Kingston show great variety. The region to the north is rich in mineral specimens, and the distance to prospective and developed mines is not great. Splendid opportunities exist in which the prospective mining engineers' education may be given a practical turn.

Although called the School of Mines, their courses are not prepared for mining men alone. Students in civil, electrical and mechanical engineering are offered carefully prepared courses in each department. In every case the framers of the curriculum have had in mind the requirements of the practising engineer; the academic man is not so well provided for. The School is affiliated with Queen's University, and their combined B.A., B.Sc. courses make it possible for men to satisfy almost every fancy in combined courses.

The School of Mines is to be congratulated on the fine spirit displayed by staff and students, and Queen's University is to be congratulated on having a Department of Applied Science which has furnished so many men of prominence to the engineering profession, and which is a leader in presenting engineering educational ideas.

PERSONAL vs. SURETY COMPANY BONDS.

One of the greatest hardships and one of the most abused requirements under which contractors work is the deposit which accompanies tenders and the guarantee bonds which they must furnish. This should not be so, for they are perfectly legitimate and necessary parts of all contracts. Deposits have been held for months while councils considered and reconsidered, private individuals going surety for contractors have been harrassed, until at last in sheer desperation many contractors are driven to the surety companies.

In some places the municipalities have taken the stand that the only bonds they should accept are those of surety companies. We give here with two clauses of the tender form which contractors bidding on contract work in Vancouver, B.C., must sign:—

“If this tender is accepted, the undersigned agree to furnish a bond in an approved corporate guarantee company for the proper fulfilment of the contract as required under the terms of the specifications, and to execute the agreement and bond in triplicate within six days after being notified so to do by the city solicitor. And in the event of default or failure on our part so to do agree that the Corporation of the City of Vancouver shall be at liberty to retain the money deposited by to the use of the corporation, and to accept the next lowest or any tenders, or to advertise for new tenders, or to carry out the works in any other way they may deem best; and also agree to pay to the said corporation the difference between this tender and any greater sum which the said corporation may expend or incur by reason of such default or failure, or by reason of such action, as aforesaid, on their part, including the cost of any advertisement for new tenders; and to indemnify and save harmless the said corporation and their officers from all loss, damage, cost, charges, and expense which they may suffer or be put to by reason of any such default or failure on part.

7. And propose the Company as surety, which is willing to become bound with the undersigned for the due performance of the contract for which this is a tender.

.....
Contractor's signature.

.....
Witness.

The undersigned hereby offer to become bound for the above-named contractor in the usual bond for the fulfilment of the above-mentioned contract if awarded to

.....
Signature of Surety.

This seems to be going to an extreme. It may at times be advantageous for a municipality to be freed of the trouble of investigating the standing of each bondsman, but, on the other hand, it is the corporation in the end, not the contractor, who pays dearly for the monopoly that has been created. Surety companies fill a very necessary field, but we cannot see the necessity nor yet the wisdom of placing all contracts under their control.

Many of the largest contracts in Canada are carried on without any bond requirements. In these cases the work is well and faithfully done at the very lowest prices. A large contractor working under a strong, fair engineer cannot afford to be dishonest. An engineer working free of municipal or party politics can very easily secure good work without the expense and delay on guarantee company red tape.

EDITORIAL NOTES.

The decision of the Attorney-General to refuse to permit argument in the courts of Ontario against the Government's right to enter, through the Hydro-Electric Commission, the field of electric generation and distribution should help clear up the cheap power situation in Ontario. Of course, no one supposes that this will end litigation, but it will be taken as an indication of the stand the Government intends taking, and should encourage the municipalities to proceed with their schemes.

CURRENT NEWS

New Brunswick

ST. JOHN.—The Intercolonial water tank at the island and yard, with a capacity of one hundred thousand gallons, burst on December 13th. Its collapse broke the bridge across Marsh Creek, broke the windows of the dynamo-room and storeroom, and the flood swept two men from their feet and slightly injured them. The tank was of wood, with steel bands, and it is supposed these bands were corroded. The loss is ten thousand dollars.

Ontario.

OTTAWA, ONT.—The Railway Commission has ordered a daily inspection of the electric bells at all railway crossings. Another order is that where freight cars are used on main line trains they must be equipped with air-brakes, steel tyres, and metal trucks as designed for passenger service. Where these requirements are not complied with on account of exceptional circumstances trains must not be run at more than thirty-five miles an hour.

OTTAWA, ONT.—A deputation headed by C. L. Owen, M.P. for Northumberland; Mr. Mulholland, Liberal candidate in that constituency; Mayor Doxsee, of Campbellford, saw Hon. G. P. Graham, Minister of Railways, and M. J. Butler, Deputy Minister, Dec. 14, and laid before them their views in respect to the route which should be followed by the Trent Valley Canal through Campbellford. The council, board of trade and manufacturing interests of Campbellford were represented. Somewhat divergent views were expressed by the delegation.

Alberta.

LETHBRIDGE.—This city will buy and operate coal mines for the benefit of the city's needs. Forty acres will be purchased from the Alberta Railway and Irrigation Co.

As announced in The Canadian Engineer some time ago, the Canadian Pacific are building at the Angus shops, Lachine, ten consolidation engines. The following are the main dimensions and equipment:—

Weight on drivers.....	168,150 lbs.
Weight, total	192,350 lbs.
Cylinders	22½ in. x 28 in.
Diameter of drivers	58 in.
Boiler, type	Wagon top
Boiler, working steam pressure.....	180 lbs.
Heating surface, total	2,797 sq. ft.
Tubes, number	240 (2-in.), and 24 (5-in.)
Tubes, length	14 ft. 1¾ in.
Firebox	8 ft. 5/8 in. x 5 ft. 5/4 in.
Grate area	43 sq. ft.
Water capacity	5,000 Imp. gals.
Coal capacity	10 tons
Axles	Mild steel
Bell ringers	Little Giant
Brake-beams	Simplex truss
Brake-shoes	C.P.R. standard
Couplers	Tower
Headlights	C.P.R. standard electric
Injectors	Hancock inspirator
Journal bearings	C.P.R. standard
Superheater	Vaughan-Horsey

GROUNDING TRANSMISSION MEDIUMS.—II.

By J. Stanley Richmond, Consulting Engineer,
Toronto, Ont.

Earth Voltage and Potential Measurements.

It is necessary for convenience to sometimes use in the consideration of electrical phenomena, besides absolute and arbitrary zeros, two others designated self-zero and medial zero; self-zero being that of the voltage of the point having the lowest voltage and medial zero, that of the voltage of the middle point electrically in a generating and transmission medium.

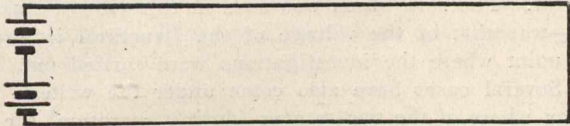


Fig. 1.

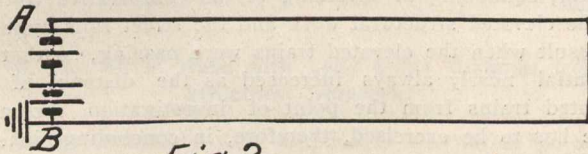


Fig. 2.

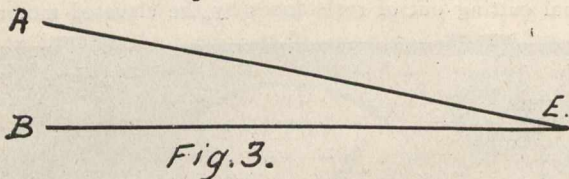


Fig. 3.

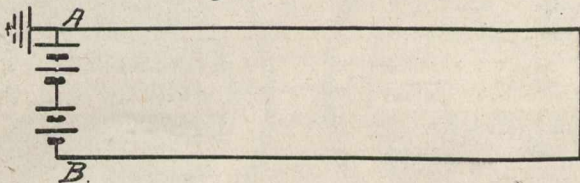


Fig. 4.

Fig. 1 is a diagrammatic representation of a so-called insulated transmission medium. In practice, however, such insulation is not obtainable; for, at some point or other of the circuit a lesser or greater ground exists. And it is due to the fact that such ground with direct-current transmission is one day at one point and another day at another point that the expression arose that "one day our system is positive and another day it is negative." It must be understood, of course, whether the system is running "negative" or "positive," that the direction of transmission remains the same.

Fig. 2 similarly represents a generating and transmission medium, but with the low voltage side of the generating medium grounded. As a result, the voltage conditions can be illustrated as shown in Fig. 3, in which BE being the zero line, E is the voltage of the pole B, A is the voltage of the pole A, and AE is the varying voltage of the transmission medium. The arbitrary zero and the self-zero of this circuit will be that of the voltage of the pole B.

Fig. 4 illustrates, diagrammatically, similar apparatus; A being grounded instead, of B, when the voltage conditions will have to be represented as in Fig. 5; in which AE being the zero line, E is the voltage of the pole A, B is the voltage of the pole B, and BE the varying voltage of the transmission medium. The arbitrary zero of this circuit will be that of the voltage of A; while the self-zero will be that of the voltage of B.

Fig. 6 also diagrammatically illustrates similar apparatus, but with C (the medial point electrically between the two poles) earthed, when the voltage conditions will have to be represented as in Fig. 7; in which CE being the zero line, A is the voltage of the pole A; B is the voltage of the pole B; AE is the varying voltage of one-half of the transmission medium and BE the varying voltage of the other

half of it. The arbitrary zero and the medial zero, in this case, will be that of the voltage of C; while the self-zero will be that of the voltage of B.

The writer has defined electrical conditions as the abnormal position of the molecules of which matter is composed. Voltage, therefore, may be described as the degree of such abnormal position, and must not be confused with potential, which is the ability to do work due to the difference between two voltages. Potential and not voltage, therefore, is the "cause" producing any "effect" designated an electrical phenomenon.

Incidentally, it may be stated that a so-called voltmeter is incorrectly termed. Correctly speaking, it should be termed a potential meter. For it does not measure voltage in respect to a standard zero, but only the difference in voltage between (or potential of) two points, the one on one body and the other on another body, or between two different points of one body.

To illustrate, in a minor way, the practical application of the zero question, take the case of special potential meters designed by the writer for the measurement of earth potentials.

Fig. 8 is a sketch showing the arrangement of the scale for a single centre-zero potential meter having two ranges of five and fifty volts, respectively. As will be noticed, the words "Above" and "Below" are used instead of the usual signs + and -, and that the centre of the scale is marked "Zero." The binding-post, usually marked + on a centre-zero instrument, is, in this case, marked "Zero." To take, with such meters, the potentials between the rails of a surface street railway and the hydrants with a view to tabulating the voltages of the hydrants, the modus operandi is as follows:—

Each instrument, with two insulated cords, one long and the other short, is accompanied by two boys, the elder of which handles the meter and hydrant connection, while the younger one takes charge of the rail connection. The elder one is also provided with printed forms, a facsimile of which is marked Fig. 9, and is instructed to be very careful to keep his end of the longer cord always attached to the "Zero" post of the meter throughout the whole set of readings, while the younger boy holds the other end of it on to the near-by rail, which he has previously cleaned.

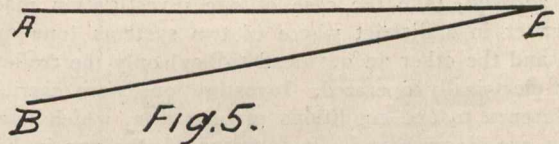


Fig. 5.

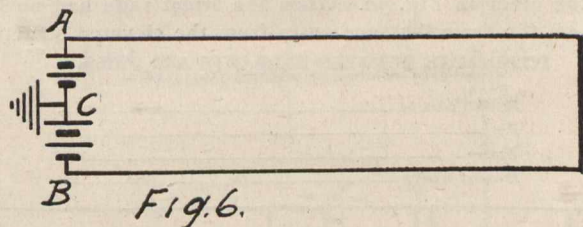


Fig. 6.

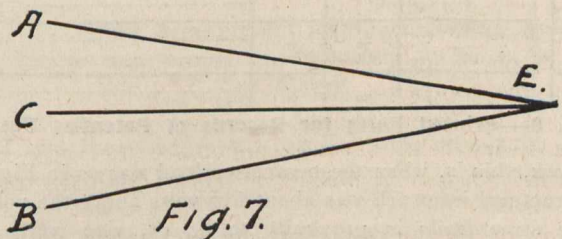


Fig. 7.

The shorter cord, which is attached to one of the two other binding-posts (according to which of the two ranges is being used), is connected to the hydrant by the elder boy, who is instructed to read the deflections just the same as he would the variations of temperature indicated by a thermometer; that is, if the deflection of the needle is above the zero the

reading is entered on his form without any sign; and, if the deflection of the needle is below the zero, the reading is entered with the sign — before it. If the deflections of the needle are both below and above the zero at the same place they are entered (to use arbitrary figures) as — 2.50 to 3.25. To assist in the prevention of mistakes, it should be impressed on the reader that he should always read and enter from a lower reading to a higher reading.

Fig. 10 is a reproduction of a photograph of a duplex potential meter (two instruments like that before described, but with the scales graduated for millivolt readings), also designed by the writer. The lid was removed while the photograph was being taken so that the special arrange-

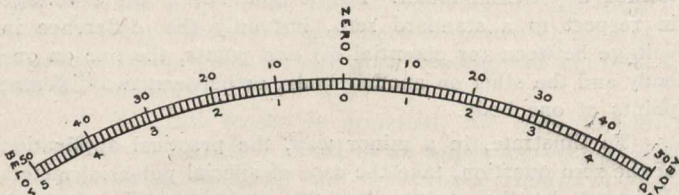


Fig. 8.—Arrangement of Scale for Single Centre-Zero Potential Meter.

ments would show up better. Duplex potential meters, similar to the voltages of two bodies with that of the voltage of a third one used as the zero. Take the case when investigations are taking place in regard to a surface road, an elevated road and cable sheaths (all earthed). First:—The surface road rails can be connected to the two zero posts, while the other post of each side of the instrument is connected, respectively, to the elevated structure and the cable sheaths. Second:—A set of readings can then be taken with the zero posts attached to the elevated structural work, while one of the posts on each side of the instrument is connected, respectively, to the rails and sheaths. The wiring of these duplex instruments is such that the needles move in similar directions and equally under similar influencing conditions. The comparative results are very interesting and instructive.

Such explanations are rather long; but in practice it is remarkable with what rapidity and accuracy boys can take these readings, even if they have no electrical knowledge.

As a practical illustration of the foregoing method of taking potential readings and the method of analysis afterward adopted, take the case of one investigation made by the writer in a district where of two systems (one an elevated and the other an overhead trolley) only the trolley was being electrically operated. Investigations were carried out in reference to two conditions of operation, which two conditions are diagrammatically represented, the one in Fig. 11 and the other in Fig. 12. When the street rails had no load on them for some distance away from the elevated structural

POTENTIALS BETWEEN HYDRANTS AND RAILS.
(FIGURES GIVEN ARE VOLTAGES OF THE HYDRANTS TO THE RAILS.)

Readings taken by _____
 Date _____
 Weather _____
 Preceding Weather _____ for _____ Days

READING No.	LOCALITY.	TIME.	VOLTS.	REMARKS.
		TO	TO	
		TO	TO	
		TO	TO	

Fig. 9.—Printed Form for Records of Potential Tests.

ironwork, this is, when the nearest carload was as in Fig. 11, the structural ironwork was about five volts above the voltage of the street rails in proximity to it; or, vice versa, the street rails were about five volts below the voltage of the adjacent structural ironwork. The grounded portions of the two systems at this point had, therefore, a potential of five volts. When the carload was on the street rails close by the structural ironwork, however, as shown in Fig. 12, the structural ironwork was only about one volt above the voltage of the contiguous street rails; or, vice versa, the street rails

were then about one volt below the voltage of the structural ironwork. The grounded portions of the two systems, therefore, had, under this changed condition of carload, a potential of only one volt. The lesser potential at this point indicated, therefore, the transmission of a much greater amount of energy by the grounded return of the street railway system than was indicated by the higher potential, which is explainable. For the voltage of the trolley wire of the street railway system was several hundred volts above the voltage of the street rails; and when a considerable amount of energy was being transmitted from the trolley wire through the cars to the street rails, the latter, as a result, were raised in voltage; that is, the voltage of the street rails near the structural ironwork were raised from — 5 to — 1. The zero which was used in this case—an assumed one—was that of the voltage of the structural ironwork at the point where the investigations were carried out.

Several cases have also come under the writer's observation where of the two returns (during operation) the street rails had the higher voltage. As a result, the partial balancing, equalizing or reversing of the comparative voltages of the elevated structural work and the street rails appeared to result when the elevated trains were passing, so that the potential nearly always increased as the distance of the elevated trains from the point of investigation increased. Care has to be exercised, therefore, in concluding, in such a case, that a gradually increasing potential is due to the gradual cutting out of resistances by the elevated motorman

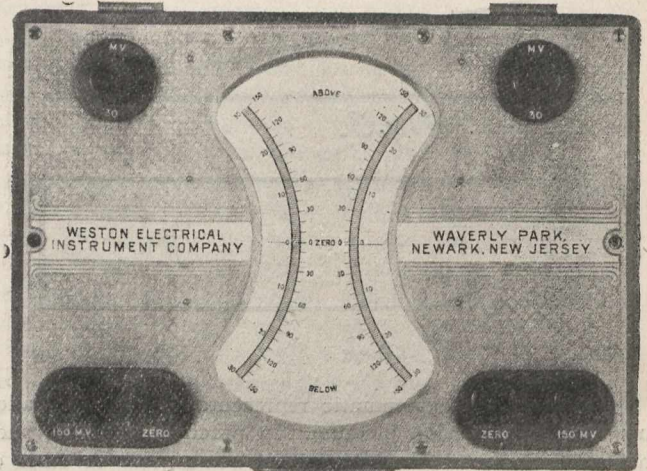


Fig. 10.—Duplex Potential Meter Used in Making Electrolytic Surveys.

at the controller; that is, an increasing potential between elevated structural work and street rails is due, in such case, to a decreasing elevated load at the point of measurement.

Earth Potential Readings.

When potential readings are taken, care should be used that the deflections of the needle of the potential meter (voltmeter) do not mislead one, due either to imperfect connections at the terminal leads or through the failure to fully

$$C = \frac{I}{R}$$
 consider the C = — law analytically.

As an example of imperfect connections, take the case of a poor conductor or insulating material, such as a cement pavement. Naturally enough, if the terminal leads are simply laid on the cement at two different points, the contacts made are bad ones. To make good connections in a case like this, a liberal amount of water should be poured on the cement at the points between which the readings are to be taken. Then two tin pails, weighted with water and with the terminal leads attached to them, should be placed on these watered points, one pail on one point and the other pail on the other point.

As explanatory of an analytical consideration of the C = — law, take the case of the complaint made to the writer by a railway company that the men handling the installation of its bare cables, intended as auxiliaries to its

third rail, which was in service at the time, were receiving severe shocks.

Fig. 13 is a sketch illustrating in cross-section the arrangement of the bare auxiliaries and third and traction rails.

On examination, it was found that the inconvenience to the men only resulted when these bare cables were insulated (not grounded). A thorough investigation gave the following results:—

Contact, by means of the hands to these bare cables and the traction rails, did, at times, cause unpleasant sensations of such magnitude as to be conclusive to one experienced to such that a considerable potential, much greater than that shown by a potential meter, existed.

The sensations were only experienced by making and breaking contact. They were, therefore, not due to alternating potential.

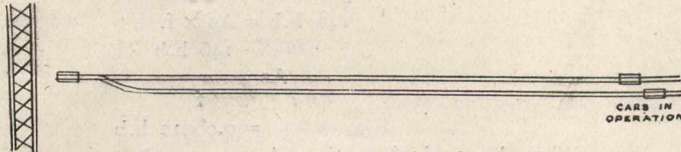


Fig. 11.—Street Rails with Load Some Distance from Structural Ironwork.

As the sensations were not due to alternating potential, they were not the result of induction caused by the few volt variations of the voltage of the third rail.

As the shocks were rapidly experienced if making and breaking were carried out rapidly, such could not be due to the discharge of inductance (induced static charge), as in the case of a so-called static condenser.

When readings were taken with a potential meter, the lineal deflections of the needle were the same whether the low or high range terminals of the instrument were used. Such unexpected action of the meter, however, is explainable. For voltage is only one of the factors necessary to produce a deflection of the needle, as it simply forces the

amperage through the resistance. So that $C = \frac{I}{R}$ is only

true when the amount of C is sufficient. In Fig. 14, consider the meter as having two ranges: the resistance coil of the lower one having with the resistance coil of the movable coil a resistance of 2,000 ohms; and the higher range having, similarly, a resistance of 10,000 ohms. That the voltage of the third rail is 555. That the traction rails have a voltage of five, due to a return drop of five volts. That the insulation resistance between the third rail and the bare auxiliaries is four-tenths of a megohm. That the insulation resistance

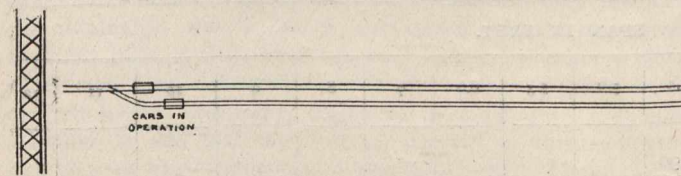


Fig. 12.—Street Rails with Load near to the Structural Ironwork.

between the bare auxiliaries and the traction rails is a little over one megohm. That, of course, the third and traction rails are connected to a generating medium. The voltage of the bare auxiliaries will then be 400.

Now, by $C = \frac{I}{R}$, the 2,000-ohm resistance requires for

a true deflection $\frac{400}{2,000} = \frac{200}{1,000}$ amperes, or 200 milliamperes.

But, when the meter is connected to the bare cables and the traction rails, the total resistance controlling the C is

2,000 + 400,000 ohms; which, by $C = \frac{I}{R}$, permits of the

transmission of only $\frac{400}{402,000} = \frac{1}{1,005}$ amperes, or, roughly,

one milliampere. But it has been shown that 200 milliamperes are needed for a true deflection under the condition of potential existing. As a result, only one-two-hundredth of a true deflection will be obtained. This is, the meter, instead of showing a potential of 400 on the lower range of the scale will only show one of 2.

Similarly, the 10,000-ohm resistance requires for a true deflection $\frac{400}{10,000} = \frac{40}{1,000}$ amperes, or 40 milliamperes. But

the total resistance governing the amount of C transmitted is 10,000 + 400,000 ohms; which amount of C, therefore, is

$\frac{400}{410,000} = \frac{1}{1,025}$ amperes, or, roughly, one milliampere. But,

in this case, it was shown that forty milliamperes are required to produce a true deflection. As a result, only one-

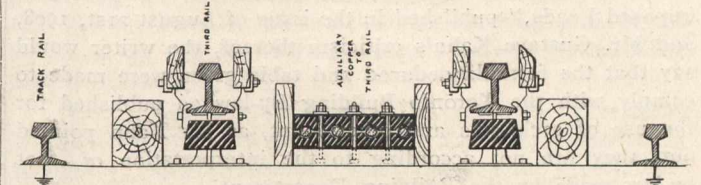


Fig. 13.—Arrangement of Bare Auxiliaries, Third Rails and Traction Rails.

fortieth of a true deflection will be obtained. That is, instead of a high range showing a potential of 400, it will only show one of 10.

Now, two volts potential by the lower range and ten volts potential by the higher range are read by a deflection of the needle to the same point on the scale. This is, the lineal deflection of the needle of a potential meter, in cases similar to that under consideration, will always be the same whether the low or high range terminals are used. And in somewhat similar cases, where very small potentials are dealt with, as in many instances occur when taking the potential of earthed conductors, the deflections, owing to the small amount of C available, will be so slight as to be unreadable. Many cases have come under the writer's observation where, having obtained a potential of, say, one-quarter of a volt between one earthed conductor and an earthed return and two volts between another earthed con-

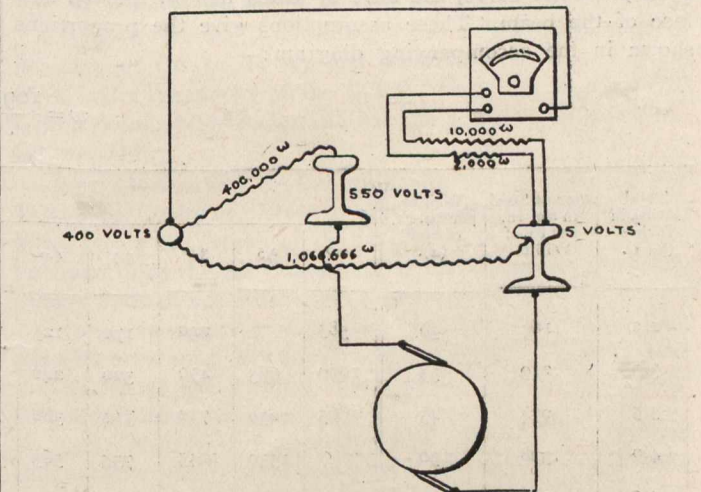


Fig. 14.—Testing Arrangement giving Misleading Readings due to High Insulation Resistance in Series in Test Circuit.

ductor and the same return, he has been unable to obtain readings showing a potential between the two earthed conductors; though, as will be understood, there must have been a potential of one and three-quarters volts.

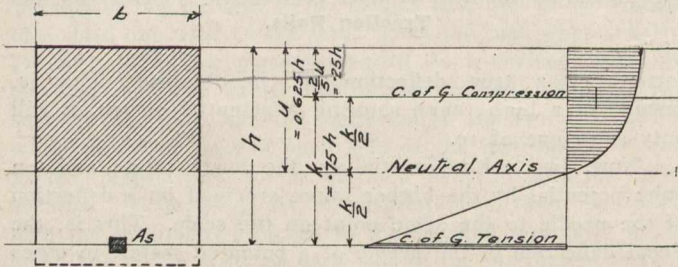
A Canadian patent has been granted to Walter P. Chapman, C.E., of Toronto, for an instrument to record stresses in members of a bridge or building, either under dead or moving loads, and should prove of great value in design and construction of structures.

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.]

SAFE FLOOR LOADS.

Sir,—Referring again to the article on "Safe Superimposed Loads," published in the issue of August 21st, 1908, and Mr. Gustave Kahn's criticism thereof, the writer would say that the formula deduced and table given were made to comply with the Toronto Building By-law as published for the use of architects and others, but, as Mr Kahn pointed out, they are not according to the interpretation of that by-law made by the Building Department.



To make the matter clear it might be well to describe the method of design used by the Building Department, and give a table showing how the results of this method compare with those formerly given.

All symbols used will be the same as in the preceding article. It is assumed that the neutral axis of the beam is half-way between the centre of gravity of tensile forces and the centre of gravity of compressive forces, and that the intensity of compression in the concrete may be represented by a parabolic curve, the base of which lies on the top surface of the beam. These assumptions give the proportions shown in the accompanying diagram:—

From this we find that the economical area of steel is 0.00912 of the area of concrete, as follows (the average intensity of stress in the concrete, if considered about the c. of g. of steel, will be found to be 356. This is taken at 350, and the area inclosed in the parabola is two-thirds of the rectangle):—

$$\begin{aligned} \text{Total compression} &= \text{total tension;} \\ \text{i.e., } 0.625 \text{ h.b} \times \frac{2}{3} \times 350 &= A_s \times f. \\ 146 \text{ h.b} &= A_s \times f. \\ A_s &= \frac{146 \text{ h.b}}{f} \\ &= 0.00912 \text{ h.b} \end{aligned}$$

When $b = 12$ inches, then $A_s = 0.1095 \text{ h}$.
For a beam proportioned with this area of steel we will have a resisting moment of $146 \text{ h.b} \times 0.75 \text{ h} = 109.5 \text{ h.b}$

$$\text{When } b = 12, \text{ R.M.} = 1314 \text{ h}^2.$$

In a continuous floor slab maximum bending moment is $w.l (12 l)$

considered as —

$$\text{Resisting moment} = \text{maximum bending moment.}$$

$$\begin{aligned} 1314 \text{ h}^2 &= \frac{10}{12} w l^2 \\ w &= \frac{1314 \text{ h}^2 \times 10}{12 l^2} \\ &= \frac{1095 \text{ h}^2}{l^2} \end{aligned}$$

Loads given in the table equal this, less the weight of one square foot of slab. It will be noticed that this gives a much higher safe load than the formula presented before, but it is hardly necessary to point out that, although perhaps this will not result in a dangerously high load, yet the method of obtaining it does not agree with that used by any

$$w = \frac{1095h^2}{l^2} - a$$

Total Depth in Inches (h+1).	Area of Steel in Sq. In. per Ft. of Width.	Weight per Sq. Ft. of Slab (a).	SPAN IN FEET.															
			2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7	8	9	10	11	12	
2.5	.164	30	585		240	170	125	90										
3.0	.219	35	1060	665	450	320	240	180	140	110	90							
3.5	.274	45	1665	1050	710	510	380	290	230	180	145	95						
4.0	.328	50		1530	1045	755	565	435	345	275	225	150	105	70				
4.5	.383	55			1430	1040	785	610	480	390	320	220	155	110	80			
5.0	.438	65			1880	1365	1030	800	665	515	425	300	210	150	110	80		
5.5	.493	70	Span in Feet.			1740	1315	1025	815	665	550	380	275	205	150	115	90	
6.0	.547		13	14	15		1635	1275	1020	830	685	480	350	275	200	150	115	115
6.5	.602	80	115	90				1580	1250	1015	840	595	435	330	250	195	150	150
7.0	.657	90	145	110	85				1490	1215	1005	715	525	400	305	235	185	185
7.5	.710	95	180	140	110				1750	1435	1190	850	630	475	365	290	215	215
8	.766	100	220	175	140					1670	1390	995	740	560	435	345	275	275
9	.875	110	305	250	200						1840	1320	985	755	590	470	375	375
10	1.095	125	400	325	270							1675	1260	970	760	605	475	475

of the generally known authorities on reinforced concrete design. In fact, it does not agree with the by-law as issued in two of its chief provisions, namely, that "The modulus of elasticity of concrete remains constant within the limits of the working stresses," and "The strain in any fibre is directly proportionate to the distance of that fibre from the neutral axis." Compliance with these would give a straight line to represent the intensity of stress in the concrete instead of a parabola. It might also be pointed out that with the neutral axis, as low as it is here considered, it is not possible that "a section plane before bending shall remain plane after bending."

This table of safe loads is given solely as a guide and convenience to workers in reinforced concrete, and it is not implied that it is correct according to the most approved methods of design, but simply that it fulfills the requirements of the Building Department's present method of design.

Yours,

J. Morrow Oxley,
Asso. M. Can. Soc. C.E.

MEDICAL ATTENDANCE IN CAMPS.

Sir,—With regard to an editorial on "Medical Attendance in Camps," which recently appeared in the "Canadian Engineer," I beg leave to submit the following:—

For the benefit of those whose destiny it may be to live in railroad, mining, and lumber camps, and, indeed, all habitations supported by corporations or responsible companies conducting work beyond the precincts of civilization, I believe it is an urgent requirement that the Government of this country should investigate the conditions which exist in connection with the medical efficiency of such outfits. I have lived at various times in some fifty or sixty of these camps in different parts of Canada, and this matter has invariably appealed to me as being worthy of considerable improvement.

However, there recently came under my notice a most striking example of rank inefficiency in this respect. A large corporation, while conducting construction operations not far from Alaska, employed about 2,000 men, distributed among camps of fifty or a hundred men, all of whom paid a monthly medical fee of \$2.50 per month each. The working season was about four months. Hence, the total revenue for medical purposes was approximately \$20,000 for one season.

In one of these camps I suffered from a slight illness, and upon enquiring could not find a man who had ever heard of a doctor visiting the camp, and the only medical aid obtainable was a parcel containing castor oil, some cathartic pills, a little court-plaster, and a few other trifles, which had been delivered early in the spring, and had been coveted by an ex-convict, employed as a laborer. I should also like to add that the "official doctor" of this company was one of the "people's representatives." These facts explain themselves, and may prove interesting as supplementing your editorial.

I am, yours very faithfully,

R. E. W. Hagarty.

Nov. 26th, 1908.

Seaforth, Ont., Dec. 7th, 1908.

The Canadian Engineer,

Toronto, Ont.:

Dear Sirs:—

"A flowing well discharges through an 8 1-4 inch pipe, the top of which is belled over so as to make the lip 11 inches in diameter. The water rises to a height of 1 3-4 inches over the centre and 3-4 inch at the rim. What is the discharge?" Some of your readers who are familiar with hydraulic problems of this nature may be able to offer a solution.

Signed:—Subscriber.

The Carter Halls-Adlings Company, builders and contractors, have been incorporated to do business in Ontario.

ORDERS OF THE RAILWAY COMMISSIONERS OF CANADA.

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

5569—November 3—Authorizing the C.N.O. Ry. to cross the tracks of the G.T.R. spur line to Edward's Mill, Rockland, Ont., between mileage 36 and 37, west from Hawkesbury, Ont.

5570—November 4—Approving of the interlocking plant installed by the C.P.R. at the drawbridge across the Red River at Whittier Junction, Man., and authorizing the C.P.R. to operate its trains over the drawbridge and through the Junction without being brought to a stop.

5571—November 5—Amending Order of the Railway Commission of the Privy Council dated October 24th, 1906, by permitting the Sherbrooke Street Railway Company to move the derail ordered to be installed on the west side of the tracks of the G.T.R. where applicant's railway crosses King Street, Sherbrooke, P.Q.

5572—November 5—Approving by-law of the Brockville, Westport and North-Western Railway Company, authorizing William J. Curle, Brockville, Ont., the general superintendent of the B. W. & N.W. to prepare and issue tariffs of the tolls to be charged for all traffic carried by the applicants upon its line of railway.

5573—November 5—Allowing the G.T.P.R. to use temporarily, for construction purposes, the crossing of the C.P.R. tracks (Pembina Branch), at Oak Point Junction, near Winnipeg, Man., authorized by Order No. 5417, dated the 14th September, 1908.

5574-75—November 5—Granting leave to the Manitoba Government Telephones to erect, place, and maintain its wires over the tracks of the C.N.R. at Dufresne Siding, and one mile east of Somerset, Man.

5576—November 5—Authorizing the C.P.R. to construct, maintain, and operate a branch line or spur, in the village of Blairmore, Alta., to the premises of the Rocky Mountain Cement Company.

5577—November 5—5578—November 5—Granting leave to the Manitoba Government Telephones to erect, place, and maintain its wires across the tracks of the C.P.R. at two miles west of Minnedosa, and ¾ miles west of Minnedosa, Man.

5579—November 5—Granting leave to the corporation of the City of Ottawa to lay and thereafter maintain a water main under the tracks of the G.T.R. where the same crosses Laurel Street, between Loretta Avenue and Champagne Ave., Ottawa, Ont.

5580—November 7—Granting leave to the Caledon Telephone Company, Ltd., to erect, place, and maintain its wires across the tracks of the G.T.R. at a point on Twenty Sideroad, near the 4th Concession of the Township of Albion, County of Peel, 2½ miles from Caledon, Ont.

5581—November 7—Granting the Bell Telephone Company leave to erect, place and maintain its aerial wires across the tracks of the Central Vermont Railway Company, at Richelieu Street, St. John's, P.Q.

5582—November 10—Authorizing the G.T.P. Railway Company to cross road allowances in the Province of Saskatchewan, from mileage 60 to 109.52.

5583—November 12—Authorizing the Manitoba Government Telephones to erect, place, and maintain its wires across the tracks of the G.T.P. Ry. one mile west of Rivers, Man.

5584—November 12—Authorizing the C.N.O. Ry. to construct bridge over Greene's Creek, at mileage 52, west from Hawkesbury, Ont.

5585—November 12—Authorizing the Bell Telephone Company to erect, place, and maintain its wires across the tracks of the G.T.R. at the foot of Peter Street, Toronto, Ont.

5586—November 12—Authorizing the Manitoba Government Telephones to erect, place, and maintain its wires across the tracks of the C.N.R. at Loretta, Man.

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.]

FAIR WAGE CLAUSE PROVED INEFFECTIVE—PARTIES TO CONTRACT.

Kelly vs. City of Winnipeg.—The plaintiffs contracted with the city to reconstruct the concrete piers of the Redwood Bridge, and the contract contained what is commonly called a "fair wage scale" as to what wages should be paid to workmen. The work was in progress and certificates as to the amount performed had already been issued when the city discovered that the wages being paid were not as specified.

The city calculated the difference between wages that should have been paid and what were actually paid to be \$1,043, and held back this sum in paying the contractors to make up the wages of the men employed on the contract. The contractors then sued for this difference.

The following is an extract from the judgment of Mr. Justice Macdonald:—

"However commendable the action of the civic authorities may be in their efforts to protect the working classes, I cannot see how the city can successfully resist the plaintiff's demand. If the city supplied the workmen it could no doubt compel adherence to this provision of the agreement, but I do not think that, under the agreement entered into there is anything to prevent the contractors making such a bargain as they can for the performance of the work so long as the work is done to the satisfaction of the defendant corporation.

"The city might have been justified in withholding the progress estimate, in which event it might have been difficult for the plaintiffs to recover without first settling for wages on basis of fair wage schedule, but after progress estimate had issued, and after deposit of pay rolls showing workmen paid in full, the contractor at once became entitled to the amount certified due him.

"The workmen have no claim upon the defendant corporation, they are not parties to this issue, nor before the court; and it is not established that the corporation has sustained any damage."

The court notes that if, in making their tender, the defendants figured on wages as per the fair wage schedule, their expenses have been \$1,043 less, and they have imposed upon their workmen to that extent. If, on the other hand, they did not figure on this basis, but upon that of the wages actually paid by them, they were indifferent to the interests of the workmen, as they might have secured to the latter an additional \$1,043, which the city was quite willing to pay.

Now, in any case the workmen are not parties to the present contract, and, therefore, cannot maintain any action for the breach of it. On the other hand, the city being a party to the agreement, is entitled to sue for the breach, but can only recover to whatever extent it can prove itself to have suffered damage; but it cannot show itself to have suffered any damage, and, therefore, is powerless. Judgment for the plaintiffs for the amount withheld and costs.

MUNICIPAL BOUNDARY.

The limits of the city of London, Ont., were defined by a proclamation setting the municipality apart as "all the lands comprised within the old and the new surveys of the town of London, together with the lands adjoining thereto, lying between the said surveys and the River Thames, the

northern boundary of the new survey to be produced until it intersects the north branch, and the eastern boundary to be produced until it intersects the east branch of the river."

It was held that where two properties are divided by a river or highway, the limit of each is prima facie the centre line of such river or roadway; and that in the present case the limits of the city extended to the centre of the River Thames.—Re McDonough, 30 U.C.R., 288.

NEGLIGENCE—IMMEDIATE CAUSE—PLAINTIFF MUST PROVE INJURY.

Thomas vs. Ontario Sewer Pipe Co.—The plaintiff, an engineer, was employed by the defendants to run a stationary engine, and while thus engaged the front of a valve was blown out by the pressure on it, resulting in serious scalding to the engineer, who brought this action for damages, alleging that the accident occurred from negligence of the defendants. He adduced evidence upon which the jury found that the defendant company allowed "the engine to run on an improper bed; also, that they did not supply proper appliances for the work to be done by the plaintiff, and that the engine and engine-room were in bad condition," but they also found that "the valve itself was not defective."

A verdict was given for the plaintiff, but upon appeal it was set aside, and the Supreme Court upheld the Court of Appeal. The court points out that the negligences or shortcomings of the defendants, however numerous, will not make them liable for injuries the plaintiff may have sustained unless there is direct connection between such negligences and the injury which resulted. The facts that the engine-room was in bad condition, that the bed of the engine was also defective, and even the engine in bad condition, all combined go for nothing unless it can be shown that these negligences, or some one of them, was the immediate cause of the injury complained of. The jury in this case decided that the company were remiss in many regards, but they also expressed their opinion that the valve itself was not defective. Now, the immediate cause of the accident must have been within the valve which gave out, and, as the plaintiff has not been able to show any direct connection between the negligences proved and the bursting of that particular valve, he has failed to prove the liability of the defendants.—42 S.C.R., 396.

NON-NAVIGABLE STREAM—OWNERSHIP OF BANKS AND BED.

Canadian Electric Light Co. vs. Tanguay.—The plaintiff had for some time been the owner of certain lands on the Chaudiere River, Province of Quebec, and it was omitted that at this point the river was not navigable for vessels and rafts, but could be used for floating loose logs.

The plaintiff dammed the stream and made other improvements for the purpose of generating power. The defendant owned timber limits further up stream, and, as he desired to avail himself of the Chaudiere for floating his logs, he undertook to place certain piers and other improvements in the river to facilitate his purposes, and the plaintiff brought this action, endeavoring to compel him to remove the same. Held, that in the Province of Quebec, where a watercourse is capable merely of floating loose logs, it is not a dependency of the Crown within the meaning of the Civil Code, and consequently the plaintiff who owned the banks owned also the bed of the stream, and could compel the defendant to remove any permanent work which he had placed thereupon.

The defendant was within his rights in attempting to float his logs down stream; he had a right to use such watercourse for all advantages which the stream and its banks

in their natural condition could afford the public. He might, if feasible, pass upon the stream in the same manner as if it were a navigable river, but he must refrain from placing any works which, though an improvement from his standpoint, might be an obstruction as regards the adjoining owner, to whom the bed of the stream belongs.—40 S.C.R.I.

The above is French law, but very similar to that pertaining in the British Provinces.

LEASE OF OIL RIGHTS—WELL TO BE "COMMENCED"—PREPARATIONS FOR DRILLING.

Lang vs. Provincial Natural Gas and Fuel Co.—On the 22nd February, 1908, one David Utz leased to plaintiff Lang certain lands in Welland County, Ont., by a written lease containing the proviso "that if within six months from date a well has not been commenced on said premises this lease shall be null and void."

The time expired on 22nd August, 1908, and at that time Lang, the lessee, had done no work on the ground, but had put upon the place where the well was to be drilled certain of the necessary plant, consisting of a derrick, an engine and belt house, and driving-pipe and casing, at an expense of \$200.

On August 27th, 1908, the plaintiff was notified by the lessor to remove his plant, but objected, contending that the work he had done amounted to a commencement of a well, and, therefore, he was still within the terms of his lease.

The court held that the terms of the lease imported that some work upon and in the ground ("breaking the ground") was contemplated, and that the preparations made did not constitute a commencement of the well. The lessee has, therefore, forfeited his rights under the lease and cannot succeed in the present action.

This is following English and other authorities, in one of which cases "the excavation" is said to be the "commencement of a building."—17 O.L.R., 254.

CONTRACTORS' RIGHTS—PROGRESS ESTIMATES—ENGINEER'S CERTIFICATE.

The plaintiffs were contractors for the building of locks for the Government on the Galops Canal, and the contract provided for monthly payments to the contractors of 90 per cent. of the value of the work done. A schedule was attached to the contract specifying what value was to be set upon certain kinds of work, and stipulating that such payments were to be based upon the Government engineer's certificate as to the amount of work done, such certificate to be also approved by the Minister of Railways and Canals. Thus, the Engineer's certificate and the Minister's approval were necessary precedents to the monthly payments, and the remaining 10 per cent. of the amounts earned were to be held over until final completion of the work. The engineer was to be the sole judge of the work and materials, and his decision upon all points relative thereto was to be final, and he was to be at liberty to make whatever alterations and changes in the work he deemed expedient.

Some difference arose as to prices and changes in the work, and the Government refused to make the full monthly advance, and the contractors brought action.

Held, that the contractors could proceed by action as soon as any payment on a monthly certificate was withheld and without waiting until final completion of the contract.

The engineer, exercising his discretion, ordered that a dam be made deeper than originally contemplated, and in other regards changed the character of particular classes of work, and when completed classified such work and fixed its value. The engineer in charge then died, and his successor objected to the valuations thus fixed and attempted to lower them and cut down the amount of monthly payments to be made thereunder.

Held, that though the monthly certificates were only approximate, the valuations fixed by the one engineer could not be reopened or revised by a succeeding engineer.—*Murray vs. The Queen*, 26 S.C.R., 203.

SOCIETY NOTES.

Engineering Society, Queen's University.

The Engineering Society, Queen's University, Kingston, Ont., held their annual dinner on December 9th, 1908, in Grant Hall, Kingston. It was a most successful function, in table spread, in numbers, in good speeches and enthusiasm nothing more could be desired. The various toasts, usual at such gatherings, were honoured, but space will not permit a verbatim report.

In proposing the toast, "Our Country," Mr. W. F. Nickle, M.P.P. emphasized the idea that we should not be so particular about Canada for Canadians as Canadians for Canada. We should all be willing to do something for our country, should be willing to make some sacrifice for the good of Canada, socially, politically and commercially. Professor Adam Shortt, in his reply, lamented that the past development of Canada was brought about by taking off so much of the cream. Development should take place without wasteful destruction, and the engineer must plan to build up without paralyzing.

"The Profession," the most interesting toast for such a gathering brought out several good addresses. In proposing the toast Professor H. E. T. Haultain, of Toronto, drew a happy contrast between the profession of engineering and the professions long called the learned profession. The engineer worked as an individual, and as such must uphold the honor of his fellows, in the other profession there are the class traditions, which are such a guide and compelling force. The engineer deals with conditions—not with the individual; a working force a—therefore not a custom, he must be clear-sighted, self reliant and resourceful. Dr. Wilton Hersey, of Montreal, the first to reply dwelt upon the fact that a very large field was opening up for the engineer familiar with chemistry. We are on the threshold of industrial development, a field in which the chemical engineer will far outweigh the engineering chemist. Mr. Henry Holgate, C.E., of Montreal, also responded, and the interested attention and frequent applause from the audience was their tribute to the views of a man who had done things. Mr. Holgate pressed home the point that the engineer must develop our country by preserving our national resources. The great question of the past has been development, the future engineering problems will be problems of transportation and sanitation. The engineer must be an adviser as well as a builder, a saver as well as a spender. The engineer's life is a continual mental struggle to keep abreast of the times. He must broaden himself and be a citizen and a leader. Specialization is all right, but one must not neglect the dependent work. To the students Mr. Holgate suggested that business methods and English were two working tools they should not neglect.

Mr. E. Coste, M.E., of Toronto, congratulated Queen's on her splendid mining equipment, and the opportunities their colleges offered to the mining student.

The "University" was proposed by D. M. McIntyre, K.C., and replied to by Principal D. Gordon and Dr. Clark.

The "Faculty" was proposed by M. Y. Williams, '09, and replied to by Professor William L. Goodwin and Professor J. C. Gwillim. The faculty song which followed this toast was a feature of the evening. It was well sung by Mr. George Thompson, and reminded members of the staff of their peculiarities.

"Sister Institutions," proposed by Mr. S. King, '09, was responded to by Dr. Adams, McGill, and Dean Galbraith, Toronto, and also by the student representatives from the various colleges.

Engineers' Club, Toronto.

The annual meeting of the Engineers' Club was held on December 10th, and the election of officers resulted as follows:—President, Mr. A. B. Barry; first vice-president, Mr. A. M. Canniff; second vice-president, Mr. R. G. Black. The directors, who are also chairmen of the committees, rooms, library and papers, are Messrs. R. A. Baldwin and Stanislas Gagne.

Mr. C. R. Young read an interesting paper on "Artistic Bridges for Populous Districts." The lecture was illustrated by about fifty lantern slides, showing many famous bridges of the Old World and the New. The speaker deplored the fact that the lowest tender for bridge construction was almost always the one accepted, as it usually meant that the finished bridge was not as artistic a structure as the people who voted for the outlay intended it should be.

ENGINEERING SOCIETIES.

ARCHITECTURAL INSTITUTE OF CANADA.—

President, A. F. Dunlop, R.C.A., Montreal, Que.; Secretary, Alcide Chaussé, P.O. Box 259, Montreal, Que.

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

CANADIAN STREET RAILWAY ASSOCIATION.—President, J. E. Hutcheson, Ottawa; Secretary, Acton Burrows, 157 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. Annual meeting at Toronto Jan. 28, 29 and 30, 1909.

QUEBEC BRANCH OF THE CANADIAN SOCIETY OF CIVIL ENGINEERS.—Chairman, E. A. Hoare; Secretary, P. E. Parent, P.O. Box 115, Quebec. Meetings held twice a month at Room 40, City Hall.

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.

MANITOBA 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 months.

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

CANADIAN MINING INSTITUTE.—413 Dorchester Street West, Montreal. President, W. G. Miller, Toronto; Secretary, H. Mortimer-Lamb, Montreal.

CANADIAN CEMENT AND CONCRETE ASSOCIATION.—President, Peter Gillespie, Toronto, Ont.; Vice-President, C. T. Pulfer, London, Ont.; Secretary-Treasurer, Alfred E. Uren, 62 Church Street, Toronto.

NOVA SCOTIA SOCIETY OF ENGINEERS, HALIFAX.—President, J. H. Winfield; Secretary, S. Fenn, Bedford Row, Halifax, N.S.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS (TORONTO BRANCH).—W. H. Eisenbeis, Secretary, 1207 Traders Bank Building.

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

DEPRECIATION IN MACHINERY.

No hard and fast rules can be established for marking off the value of machinery. The percentage of depreciation depends only in part upon the age of the machine; to a far greater degree it is affected by contemporaneous progress in the line of manufacture which it was designed to promote. The effect of these and other factors is clearly presented in the following extract from a paper by

the well-known mill engineer and architect, Mr. Chas. T. Main, of Boston:

The two most important things which determine the market value of machinery are:

First. Its comparative ability to turn out a product in quantity and quality equal to that of the most improved machines.

Second. Is actual condition with respect to wear and tear.

Although a machine may not be worn out, or even may have been run but very little, it may be unprofitable to run, because other machines have been introduced which do so much more or much better work. These machines may be used to advantage in some other concern, and may on this account have more value than scrap. Parts of machines have been improved so that these portions may be changed while leaving a portion of the machine as before; as for example, cotton spinning spindles, so that depreciation might be applied to a portion of a machine instead of to a machine as a whole.

The depreciation for actual wear and tear will vary with the severity of the work done, speed of the moving parts, the care taken in the running, and the amount laid out in repairs.

It seems to me impossible to separate the depreciation from wear and tear altogether from that due to improvements, in arriving at its present value, and it is customary to treat them in a general way, allowing a definite depreciation to cover both.

Any concern which does not lay aside, at least, five per cent. of the total value of its plant if new, and apply the same at intervals towards the renewal and improvements, will find itself at the end of twenty years in a position not able to compete with success with modern equipped concerns, and it will be necessary to make radical changes at great expense calling for new capital.

It is often stated that there is no depreciation during the first year of running; that the machinery will do better work after it is limbered up and adjusted than when it is set to work. As a matter of fact, depreciation does begin immediately, although not perceptible. After the first year, depreciation is charged sometimes at a uniform rate of five per cent. over all the machinery, due allowance being made for any renewal of parts outside of ordinary repairs. I have used in several cases a depreciation of five per cent. up to the dressing room, and four per cent. for the dressing room and beyond. This view has been presented to me by a member of the Society of Mechanical Engineers, that after the first year the depreciation should be marked off five per cent. to ten per cent. a year until the value is brought down to one-half the original cost; then to maintain its value about level for a while, until it becomes apparent that it would soon be profitable to replace the machinery, when the depreciation goes on at a more rapid rate. This method may be profitable for a mill to pursue in its own bookkeeping, but it is not quite definite enough in making up a valuation for purchase, etc. It is sometimes the case that some of the machinery is older than those rates would allow them to be in existence, but they may be still there, perhaps for the same reason that the bridge remained which the engineer had figured could not hold up its load. When asked how he explained the fact that it did stand up, he said that the only reason that he could give was that it stood from force of habit. Some machines remain and do work long after it would be profitable to replace them. The value of such machinery to a purchaser is practically nothing, except that it may complete the organization of the mill and allow it to run until it can be replaced by new machinery.

If a sinking fund is created for replacing the machinery, three per cent. of the cost would replace it in twenty-four years. There is usually some value to machinery in a mill, even if the property were to be dismantled; but old machinery has no value except for scrap, which is very small, as the cost of taking down is about as much as the value of the scrap.

CONSTRUCTION NEWS SECTION

Readers will confer a great favor by sending in news items from time to time. We are particularly eager to get notes regarding engineering work in hand and projected, contracts awarded, changes in staffs, etc.

Printed forms for the purpose will be furnished upon application.

TENDERS.

Nova Scotia.

TENNYCAPE.—Tenders for Tennycape breakwater extension will be received at this office until 4 p.m. on Monday, January 4, 1909, for the construction of an extension to the breakwater at Tennycape, Hants County, N.S., according to a plan and specification to be seen at the offices of C. E. W. Dodwell, Esq., resident engineer, Halifax, N.S.; E. G. Millidge, Esq., resident engineer, Antigonish, N.S. Napoleon Tessier, Secretary, Department of Public Works.

Ontario.

KINGSTON.—Tender for masonry, concrete pile work, etc., at Kingston Military College will be received at this office until 4 p.m. on Thursday, January 7, 1909, for the construction of block and mass concrete, dry masonry walls, renewal of old foundation timbers of pile pier and widening of pile pier in front of Royal Military College at Kingston, County of Frontenac, Ont., according to a plan and specification to be seen at the offices of J. G. Sing, Esq., resident engineer, Confederation Life Building, Toronto, on application to the postmaster at Kingston, Ont. An accepted cheque for twelve hundred dollars (\$1,200) must accompany each tender. Napoleon Tessier, Secretary, Department of Public Works.

KINGSTON.—Tenders for quarters for stable establishment, Kingston, Ont., will be received at this office until 4 p.m. on Monday, December 28, 1908, for the construction of quarters for stable establishment R.M.C., Kingston, Ont. Plans and specifications can be seen and forms of tender obtained at this Department and on application to H. P. Smith, Esq., architect, Kingston, Ont. Napoleon Tessier, Secretary, Department of Public Works.

MARKDALE.—Tenders will be received by A. Macpherson, clerk, Markdale, Ont., until December 28, 1908, for the construction of the several portions of a municipal waterworks system as follows: 15,600 feet of cast-iron pipe and hauling and laying the foregoing complete. Plans and specifications may be seen at the office of C. H. Mitchell, Traders Bank Building, Toronto, or the clerk's office, Markdale. (Advertised in The Canadian Engineer.)

OAKVILLE.—Sealed tenders will be received by A. S. Chisholm, Esq., chairman Board of Water and Light Commissioners, Oakville, Ont., for the laying of approximately one thousand lineal feet of eight-inch cast-iron intake pipe in Lake Ontario at Oakville for the waterworks system. Pipe and necessary flexible joints will be furnished by the Commission; lead, etc., by the contractor. Plans and profile may be seen and form of tender obtained at the office of Willis Chipman, Esq., 103 Bay Street, Toronto, or at Oakville. (Signed), A. S. Chisholm, Chairman.

TORONTO.—Tenders will be received until December 22, 1908, by the Board of Control for twelve sewers, varying in size from 12 to 18 inches. Joseph Oliver, Mayor. C. H. Rust, City Engineer.

Manitoba.

WINNIPEG.—Sealed tenders, addressed to the chairman of the Board of Control, Winnipeg, for supply and erection of turbine pump, with electric motor, for the city waterworks, will be received at the office of the undersigned up to 11 a.m. on Monday, February 22, 1909. Specifications and forms of tender, together with conditions governing tender as prescribed by the city by-laws, may be obtained at the office of H. H. Ruttan, city engineer, Winnipeg. M. Peterson, Secretary, Board of Control office.

Saskatchewan.

REGINA.—Tender for Land Titles Building, Saskatoon, will be received up to 1 p.m. Saturday, December 26, 1908, for the erection of a Land Titles Building at Saskatoon, Saskatchewan. F. J. Robinson, Deputy Commissioner, Department of Public Works.

British Columbia.

NORTH VANCOUVER.—Tenders will be received for road machinery, a fuller description of which will be found on the Tenders Called For page of The Canadian Engineer. Alex. Philip, Clerk, North Vancouver, B.C.

VICTORIA.—The Department of Lands and Works, Victoria, are calling for tenders for the construction of a one-room frame schoolhouse at Fruitvale. Plans, specifications, etc., may be seen at the offices of the Government agent, Nelson, or of John A. Muir, secretary of the School Board, Fruitvale.

CONTRACTS AWARDED.

Quebec.

MONTREAL.—Mr. T. A. Morrison, representing a Canadian firm, secured the contract for twelve snowploughs for the municipality.

THREE RIVERS.—The lowest tender for the new wharf to be built shortly was \$142,000, and this tenderer will likely get the job. He is said to be a resident of Ottawa.

Ontario.

BRANTFORD.—Mr. T. J. Minnes & Co. have the contract for supplying and installing the heating, lighting and plumbing arrangements in the newly-constructed wing of the O.I.B.

TORONTO.—Of the four tenders received for paving blocks by the City Engineer, the Conneaut block proved to be the best, the price per thousand being \$26.68. f.o.b. cars. The lowest tender was \$25, f.o.b. cars, put in by the Ontario Brick Co. The Conneaut block, being adjudged superior, the tender of \$26.63 was accepted.

WELLAND.—The Ontario Iron and Steel Co. has received a splendid order in the shape of the steel work for twenty-five Grand Trunk Pacific locomotives from the Canada Locomotive Works, Kingston. Business at the steel works is picking up, and the rolling mills will commence again soon after the New Year.

Foreign.

BOSTON, MASS.—The Parsons Pulp and Paper Co., of Parsons, West Virginia, have closed a contract with the Aberthaw Construction Co., Boston, Mass., for constructing a reinforced concrete digester house. The building will be one hundred feet high, and will carry a chip-bin, at the top of which two digesters will be directly fed. This contract is evidence of the consistent policy of this company in replacing much of the wooden construction of its plant with concrete.

CHICAGO, ILL.—The contract for building Chicago's new city hall was awarded by the city council Dec. 8th to the Noel Construction Co., of Baltimore, whose bid was \$3,295,000.

RAILWAYS—STEAM AND ELECTRIC.

New Brunswick.

MONCTON.—Engineering parties have just completed the preliminary surveys for a low grade line between Amherst and Truro. A low grade line to the Transcontinental standard, it is found, can be secured for the entire distance.

MONCTON.—Three parties, numbering in all forty men, have been engaged since August in surveying the route for the proposed extension of the I.C.R. from Moncton to Truro by way of Parrsboro, and the entire route has now been laid out.

Ontario.

BROCKVILLE.—Application will be made to the Provincial Government for a charter for an electric railway to run from Ottawa to Morrisburg and westward to Brockville. C. S. Cossitt of Brockville to be president of the company and F. Iveson, Metcalfe, secretary. The proposed line, omitting the branch from Morrisburg East, will cover 143 miles, 50 from Ottawa to Morrisburg; 33 from Morrisburg to Brockville, and 60 from Brockville to Darling. The cost, as estimated by James Bell of Arnprior, president of the North Lanark railway, would be \$14,000 per mile or \$2,000,000 for the line. Operation would cost \$1,500 per mile or \$24,500 per year, and the earnings are estimated at \$2,500 per mile or \$357,500 per year.

GUELPH.—The Niagara power scheme, with its cheap electric energy, is opening up a new field for the construction of radial railway lines, and one of the first schemes is a line projected to run from Woodstock to Guelph through New Dundee, Plattsville and other towns, connecting at Galt with the T. H. & B. line. The promoters of the scheme are Messrs. Baird and McKee and other prominent business men of Plattsville, who have placed the project with the Central Securities Company of Toronto.

OTTAWA.—The Board of Control has decided in favor of the Canadian Northern Railway entering Ottawa by way of Hurdman's Bridge and over a common esplanade with the other railways. The C.P.R. wants to enter by a separate way, but the city will oppose that now.

OTTAWA.—Notice is given that the Huron & Ontario Railway Company will apply at the next session of Parliament for legislation extending the time for the commencement and completion of the lines of railway authorized and to increase the bonding powers of the company. This is the company which are reported to have sold \$324,000 worth of bonds. They have a charter covering the following routes:— (a) Port Perry to Kincardine, through Uxbridge and touching at or within half a mile of Mount Albert, Newmarket, Bradford, Beeton, Shelburne, Flesherton, Priceville, Durham and Walkerton. (b) From Priceville, through Meaford, Owen Sound, Southampton, Port Elgin and Tiverton to Kincardine; (c) from Walkerton, through Mildmay, Teeswater and Lucknow to Goderich, touching at Dungannon, with connection between Lucknow and Kincardine through Ripley. T. M. Sanders is engineer in charge of construction and equipment. H. Middlemist, Toronto, consulting engineer.

Manitoba.

BRANDON.—The railways are preparing for heavy expenditures in building next year. The C.P.R. has renewed its appropriation to be spent on the Brandon depot and the yards generally. The work in connection with their depot was to join by a handsome structure, the old portion of the depot with the new part in which are situated the express and dispatchers' offices. This building will be a lofty one, and the plans show that the two structures on each side will appear as wings to this the main part of the building.

BRANDON.—The Canadian Northern intend to open up work directly it is possible, upon this new depot and freight sheds. The depot when completed will cost in the neighborhood of \$45,000. The freight sheds are planned to be up to date in every respect as well. They will take in a full block of 500 feet and will occupy a site where the old ones stand at present. Considerable work is also planned in connection with the extension of their yards in the south portion of the city.

British Columbia.

NELSON.—Nelson street cars will be running again early next month. A local syndicate offered Maylor Taylor to operate the line if given free power from the city's power plant at Bonnington Falls. The details will be settled and the new proposition will be voted on at the municipal elections

in January. It is practically certain that the deal will go through.

VANCOUVER.—G.T.P. engineers have secured a good grade north from North Vancouver through the Seymour Creek Valley to Pemberton Meadows. It is probable that this route will be used for a branch to Fort George, in preference to that by way of the rock-bound shores of Howe Sound and the Squamish.

VANCOUVER.—The grading of the new line of the E. and N. Railway from the east coast to the point up to which contracts have been let by the C.P.R. is making satisfactory headway. Where the route traverses comparatively level and open country, the road work is being speedily accomplished. However, there are quite a few places where it is necessary either that rock be excavated or ravines filled. It was affirmed unofficially that it was intended, at an early date, to call for tenders for the grading of the road from French Creek to the western terminus—Alberni.

LIGHT, HEAT, AND POWER.

Quebec.

COATICOOK.—The electric light question is the greatest problem the aldermen of this place have to deal with. It is a question of going on to the meter system or not. It is thought that at the present time there are 1,000 lights being burnt here, for which no remuneration is received, and that some of the controllers do not work well, and if meters were installed, this would be rectified and pay would be received for all lights burnt.

MONTREAL.—The Montreal City Council has decided to accept the offer of the Montreal Light, Heat and Power Company to submit the price to be paid for electric lighting to arbitration, for the period beginning the first of 1909 till May 1st, 1910.

MONTREAL.—The St. Paul Electric Power Company has bought the lighting plant of the town of Emard for \$149,000 from J. L. Marchand. The plant was built only two years ago, and holds a franchise of thirty years for lighting the town.

SHERBROOKE.—The water situation at Sherbrooke, as in nearly all parts of the Eastern Townships, is becoming more serious every day. Lake Memphremagog, from which Sherbrooke gets her supply for light and power purposes, is very low, and despite rains during the past few weeks shows no improvement. The light company are still able to supply the whole city with lights, but of very poor quality. Should the drought continue the power situation will also become serious, as several large industrial concerns are dependent on the Magog River water supply for power.

Ontario.

GALT.—The Cataract Power Company have come before the Town Council with an offer to supply power at ten per cent. less than the figures estimated by the Hydro-Electric Commission. It does not seem probable that more than the ordinary courtesy would be extended to the Cataract Company's proposition. The view expressed by leading citizens is that the men who want to see the Cataract Power Company ensconced in Galt want to see the Hydro-Electric Commission's plans smashed, and that they are playing the game of opponents of publicly owned power plants and transmission lines.

NIAGARA FALLS.—The Ontario Power Company is preparing plans for the construction of a new pipe line to increase its capacity of electrical power by 65,000 horse-power. Work will be commenced early in the spring. The work is made necessary to handle the contract with the Hydro-Electric Commission. The tunnel will be of steel, lined with concrete and be 30 feet in diameter and three-quarters of a mile in length. The work will cost over three-quarters of a million dollars. With the new line the company will be able to develop 180,000 horse-power.

ORILLIA.—Since the completion of the Ragged Rapids Dam the town has reduced their charges for electric light. For stores, from 28 to 18c. per lamp a month. For houses, from 20 to 18c. a month. This is for 24-hour power every day. Last year there was a profit of \$10,000 after meeting all charges, which was applied to the reduction of taxes. Even with the reduced cost of light to consumers this year, it is expected that there will be the same surplus, as 1,000 new lights have been installed in the past three months.

SEWERAGE AND WATERWORKS.

Quebec.

MONTREAL.—Mr. Janin, superintendent of the Water Department, reports that Mr. McGovern had failed to complete his contract within the time limit, and that the work of connecting the conduit with the open portion of the aqueduct could not be carried out till the leak in the latter had been stopped. It appears that no penalty was provided in the contract. In any case, it would seem that the delay was due to accidents and circumstances which were unavoidable.

MONTREAL.—The Water Committee of the city council have decided to take over the Worthington pump at the wheel-house. A report was made showing that tests had been made of the pump, and that it was satisfactory in every way. The company now demands \$82,104.22, which includes the balance due under the contract, with a further \$42,600 over and above the contract cost, made up as follows: For the period from 1st November, 1907, to 22nd September, 1908, \$31,200; from 23rd September, 1908, to 26th November, 1908, \$6,400; bonus, \$5,000. Excluding the bonus this makes a sum of \$37,600 claimed from the city for the fourteen months' delay. On the other hand, the city is suing the company for \$30,000 for non-delivery and breach of contract.

Ontario

LONDON.—The net profits of the Water Commission this year were \$61,809. Of this amount \$30,997 was applied to sinking fund, leaving \$31,409 to be turned over to the city. This is \$17,000 in excess of the estimated net receipts. There will be no overdraft this year for the city council.

RICHMOND HILL.—An agitation is on foot to obtain a water supply for the village from the nearby elevation of the Ridges.

TORONTO.—The City Engineer has received authority from the Board of Control to purchase 281 meters at a cost of \$10,995.

TORONTO.—A delegation representing the brick manufacturers of Toronto waited upon the Board of Control and persuaded them to call for new tenders for the trunk sewer, which tenders are to include prices for brick sewers. Those who have tendered on the old specifications, which called for concrete sewers, are to be allowed to tender again if they so wish.

TORONTO.—The Sewers Branch of the City Engineer's Department has constructed 45,656 lineal feet, or 8.65 miles of sewers this year, besides having dredged 19,325 cubic yards of sewage deposits out of slips, and repaired 74 private drains, flushed 53 and lowered 14. Besides, during the year 67,094 lineal feet, or 12.71 miles of private drains were constructed, as follows: Six-inch drains, 62,013 lineal feet; 9-inch drains, 4,985 lineal feet, and 12-inch drains, 96 feet.

TELEPHONY.

Ontario.

BROCKVILLE.—The Bell Telephone Co. and the council have entered into agreement covering a five-year period by which the company pays the corporation \$500 per year rental for the use of its streets, and fixes the rate for business telephones at \$30 and residence telephones at \$25 per year.

FINANCING PUBLIC WORKS.

Ontario.

OTTAWA.—The City of Ottawa are offering \$966,940.90 of bonds for sale by tender on January 28th, 1909. Money to be used, in part, on public works. Napoleon Chaupayne, mayor.

British Columbia.

VANCOUVER.—The City Council endorsed for submission to the electorate the money by-laws totalling a sum of \$1,326,000. This includes \$500,000 for sewers, \$250,000 for the park block, and \$200,000 for road improvements. Several other large by-laws are yet to be considered. Eight in all are filed.

PERSONAL.

MR. E. P. COLLEY, C.E., of Victoria, B.C., has left on an extended trip to Europe.

MR. J. F. B. VANDELEUR left for Europe on Wednesday of this week, and will be absent about two months. While abroad Mr. Vandeleur will visit the various firms for whom he acts as Canadian agent.

MR. GEO. C. BURNHAM, formerly associated with the Allis-Chalmers-Bullock, Limited, has left that concern and entered into partnership with Kilmer & Pullen, the new firm being Kilmer, Pullen & Burnham, McKinnon Building, Toronto, electrical engineers and contractors, representing the General Electric Co., of Sweden.

MARKET CONDITIONS.

Toronto, December 17th, 1908.

In roofing materials and building papers December is an off-month, and this December is no exception to the rule. The volume of trade in tar, pitch and papers is quite limited. Such goods as lime, sewer pipes, and fire brick, on the other hand, are moving actively, indicating that winter repairs have begun. Cement is universally dull; bricks moderately active. Lumber is in plentiful supply, with a weak market and very fair consumptive demand.

In metals and hardware, rather more heavy goods are moving out of warehouse, but orders are mostly small, although country stocks must be low. Abroad, the makers are talking about an advance in price. Tool makers in the Eastern States are buoyant on this subject.

"New orders," says C. S. Trench, of New York, "from smaller consumers, and the railroads have been disappointing." The metals trades are being injured by Wall Street's persistent anticipating of great activity, which has not developed, and attempting to force up prices by manipulation before the normal forces bring about a rise. Most manufacturers are pursuing their way steadily under a much reduced demand compared with recent years.

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

- Antimony.**—Price unchanged at 8½c., with less enquiry.
- Axes.**—Standard makes, double bitted, \$8 to \$10; single bitted, per dozen, \$7 to \$9.
- Boiler Plates.**—1-4 inch and heavier, \$2.40. Boiler heads 25c. per 100 pounds advance on plate.
- Boiler Tubes.**—Orders are active. Lap-welded, steel, 1 1-4-inch, 10c.; 1 1-2-inch, 9c. per foot; 2-inch, \$8.75; 2 1-4-inch, \$10; 2 1-2-inch, \$10.60; 3-inch, \$12.10; 3 1-2-inch, \$15.30; 4-inch, \$19.45 per 100 feet.
- Building Paper.**—Plain, 30c per roll; tarred, 40c. per roll. Business decidedly quiet.
- Bricks.**—Common structural, \$9 per thousand, wholesale, and the demand moderately active. Red and buff pressed are worth, delivered, \$18; at works, \$17.
- Cement.**—Market still weak; cement can be had in 1,000 barrel lots at \$1.70 per bbl, including the bags, which is equal to \$1.30 without bags. At this time of year building operations are closing down, demand is therefore naturally limited. This week even the small dealers in Toronto find demand shut entirely off.
- Coal Tar.**—Season about over, price still \$3.50 per barrel.
- Copper Ingot.**—There is more activity in the States, rather quiet demand here. Prices are higher, at 15 to 15½c. with a prospect of their maintenance for a while.
- Detonator Caps.**—75c. to \$1 per 100; case lots, 75c. per 100; broken quantities, \$1.
- Dynamite.** per pound, 21 to 22c., as to quantity.
- Roofing Felt.** Very limited request. Price \$1.80 per 100 pounds.
- Fire Bricks.**—English and Scotch, \$22.50 to \$24; American, \$28.50 to \$35 per 1,000. A growing demand this month, with fair stock.
- Fuses—Electric Blasting.**—Double strength, per 100, 4 feet, \$4.50; 6 feet, \$6; 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 Brand.**—Sheets 6 or 8 feet long, 30 or 36 inches wide: 10-gauge, \$3.05; 12-14-gauge, \$2.15; 16, 18, 20, \$3.35; 22-24, \$2.50; 26, \$3.75; 28, \$4.20; 30, \$4.30; 30½, \$4.50 per 100 pounds. Fleur de Lis—28-gauge, \$4.30; 26-gauge, \$4.05; 22-24-gauge, \$3.50. Queen's Head—28-gauge, \$4.50; 26-gauge, \$4.25. Sheets are in very active request.
- Iron Chain.**—¼-inch, \$5.75; 5-16-inch, \$5.15; ¼-inch, \$4.15; 7-16-inch, \$3.95; ½-inch, \$3.75; 9-16-inch, \$3.70; ¾-inch, \$3.55; ¾-inch, \$3.45; ¾-inch, \$3.40; 1-inch, \$2.40.
- Bar Iron.**—\$1.95 to \$2, base, from stock to wholesale dealer.
- Iron Pipe.**—Black, ¼-inch, \$2.03; ¾-inch, \$2.25; ¾-inch, \$2.63; ¾-inch, \$3.56; 1-inch, \$4.11; 1½-inch, \$6.07; 1½-inch, \$8.27; 2-inch, \$11.16; 2½-inch, \$17.82; 3-inch, \$22.40; 3½-inch, \$20.45; 4-inch, \$22.28; 4½-inch, \$28.5-inch, \$43.50; 6-inch, \$56. Galvanized, ¼-inch, \$2.86; ¾-inch, \$3.08; ¾-inch, \$3.48;

¾-inch, \$4.71; 1-inch, \$6.76; 1¼-inch, \$9.22; 1½-inch, \$11.07; 2-inch, \$14.76. Makers are holding prices stiff and anticipate a rise.

Lead.—Quiet and unchanged at \$3.90 to \$4.00. Old Country market quiet but steady.

Lead Wool.—\$200 per ton f.o.b. factory.

Lime.—In adequate supply and brisk movement. Price for large lots at kilns outside city 22c. per 100 lbs. f.o.b., cars; Toronto retail price 35c. per 100 lbs. f.o.b. car

Lumber.—We quote dressing pine \$32 to \$35 per thousand; common stock boards as to grade \$24 to \$28; cull stocks \$20; sidings, \$17.50. Norway pine is neglected in favor of Southern, which is much stronger in fibre and the price well maintained. Hemlock continues to sell pretty freely. Some blocks have changed hands lately. Spruce flooring is quoted at \$25.00 and plenty moving. The season being practically over for shingles, there is but little movement in them, and prices are weak though unchanged at \$3.20 for British Columbia. White pine lath are scarcer, No. 1 especially, we quote \$4 for No. 1 and \$3.50 for No. 2 firm. A good deal of varied stuff is moving, not so much good pine as cheaper goods, such as hemlock and spruce. But all kinds of Canadian lumber are likely to continue firm.

Nails.—Wire, \$2.55 base; cut, \$2.70; spikes, \$3. There is a fair supply and no especial activity.

Pitch.—Very quiet; price, 70c. per 100 lbs.

Pig Iron.—Business continues quiet; prices are decidedly maintained. Clarence quotes at \$20.50 for No. 3; Cleveland, \$20.50 to \$21.00; in Canadian pig. Hamilton quotes \$20.00 to \$20.50.

Plaster of Paris.—Calcined, wholesale, \$2; retail, \$2.15. Trade quiet.

Putty.—In bladders, strictly pure, per 100 lbs., \$2.25; in barrel lots, \$2.05.

Rope.—Sisal, 9½c. per lb.; pure Manila, 12½c., Base

Sewer Pipe.—

	4-in.	6-in.	9-in.	10-in.	12-in.	24-in.
Straight pipe per foot	\$0.20	\$0.30	\$0.60	\$0.75	\$1.00	\$3.25
Single junction, 1 or 2 feet long	.90	1.35	2.70	3.40	4.50	14.63
Double junctions	1.50	2.50	5.00	....	8.50	....
Increases and reducers	....	1.50	2.50	....	4.00	....
P. traps	2.00	3.50	7.50	....	15.00	....
H. H. traps	2.50	4.00	8.00	....	15.00	....

In steady demand; price 70 per cent. off list at factory for car-load lots; 60 per cent. off list retail.

Steel Beams and Channels.—Quiet. We quote:—\$2.50 to \$2.75, according to size and quantity; if cut, \$2.75 to \$3; angles, 1¼ by 3-16 and larger, \$2.50; tees, \$2.80 to \$3 per 100 pounds. Extra for smaller sizes of angles and tees.

Steel Rails.—80-lb., \$35 to \$38 per ton. The following are prices per gross ton, for 500 tons or over: Montreal, 12-lb. \$45, 16-lb. \$44, 25 and 30-lb. \$43.

Sheet Steel.—Market steady, with fairly good demand; 10-gauge, \$2.50; 12-gauge, \$2.55; American Bessemer, 14-gauge, \$2.35; 17, 18, and 20-gauge, \$2.45; 22 and 24-gauge, \$2.50; 26-gauge, \$2.65; 28-gauge, \$2.85.

Tool Steel.—Jowett's special pink label, 10½c. Cyclops, 18c.

Tank Plate.—3-16-inch, \$2.50.

Tin.—Fluctuations continue abroad; unchanged locally as to price but quiet meanwhile.

Wheelbarrows.—Navy, steel wheel, Jewel pattern, knocked down, \$21.35 per dozen; set up, \$22.35. Pan Canadian, navy, steel tray, steel wheel, per dozen, \$3.30 each; Pan American, steel tray, steel wheel, \$4.25 each.

Zinc Spelter.—Business less active at same prices, \$5.25 to \$5.50. The London market stronger.

Montreal, December 18th, 1908.

Chicago advices state that consumers have practically withdrawn from the market, being covered for the immediate future and in many cases well into the new year. What further buying may be done, will probably be held over till the new year. Makers, however, appear indifferent, and are quoting former prices. Business in Philadelphia is quiet, and no revival is looked for till the new year. Tariff questions are exerting an unsettling influence and will do so until they are settled. There are larger enquiries in New York, and furnaces have received tenders for delivery of some large lots in eastern territory. Generally speaking, however, the market is quiet, pending the new year and more definite indications as to the seriousness of the tariff proposals.

London advices are to the effect that German buying has fallen off, and the situation is easy in view of the fact that stocks continue to increase and some makers, at least, are anxious sellers. The result is that prices have about touched the lowest point of the year. Steel mills are running about half time, and even on this basis stocks seem to be accumulating. Makers of foundry iron continue to experience good enquiry for local consumption, and some people are becoming desirous of covering requirements for the first half of next year, although it would seem that makers are not anxious sellers at present prices. Glasgow has developed weakness and prices are at a low point under less buoyant advices.

There has been a better enquiry in Canada during the past week, and several fair-sized lots have changed hands at advancing prices. A number of consumers have been in the market for carload lots, recently, for prompt delivery, thus indicating a scarcity of metal in the hands of consumers and a promising increase in demand during the next three or four months. It is stated on good authority that some of the local dealers have sold more goods during the past ten days than the previous three months.

Prices of various lines on the local market are again unchanged, and demand is quite dull.

Antimony.—The market is steady at 9 to 9½.

Bar Iron and Steel.—Prices are steady all round, and trade is quiet. Bar iron, \$11.00 per 100 pounds; best refined horseshoe, \$2.15; forged iron, \$2.05; mild steel, \$2.00; sleigh shoe steel, \$1.90 for 1 x ¾-base; tire steel, \$1.95 for 1 x ¾-base; toe calk steel, \$2.40; machine steel, iron finish, \$2.10; smooth finish, \$2.75.

Boiler Tubes.—The market is steady, quotations being as follows:—2-inch tubes, 8½c.; 2½-inch, 10c.; 3-inch, 11½c.; 3½-inch, 14½c.; 4-inch, 19c.

Building Paper.—Tar paper, 7, 10, or 16 ounce, \$1.60 per 100 pounds; felt paper, \$2.40 per 100 pounds; tar sheathing, No. 1, 55c. per roll of 400 square feet; No. 2, 35c.; dry sheathing, No. 1, 45c. per roll of 400 square feet, No. 2, 28c. (See Roofing; also Tar and Pitch).

Cement.—Quotations are for car lots, f.o.b., Montreal. Canadian cement is \$1.55 to \$1.65 per 350-lb. bbl., in 4 cotton bags, adding 10c. for each bag. Good bags re-purchased at 10c. each. Paper bags cost 2½c. extra, or 10c. per bbl. weight. English cement is \$1.65 to \$1.85 per 350-lb. bbl. in 4 jute sacks (for which add 8c. each) and \$2.20 to \$2.40 in wood. Belgian cement is \$1.60 to \$1.65 in bags—bags extra—and \$2.10 in wood.

Chain.—The market is steady as follows:—¼-inch, \$5.30; 5-16-inch, \$4.05; ¾-inch, \$3.65; 7-16-inch, \$3.45; ½-inch, \$3.20; 9-16-inch, \$3.15; ¾-inch, \$3.05; ¼-inch, \$3; ¾-inch, \$2.95; 1 inch, \$2.95.

Copper.—The market is steady at 15 to 15½c. per lb. Demand continues limited.

Explosives and Accessories.—Dynamite, 50-lb. cases, 40 per cent. profit, 18c. in single case lots, Montreal. Blasting powder, 25-lb. kegs, \$2.25 per keg. Special quotations on large lots of dynamite and powder. Detonator caps, case lots, containing 10,000, 75c. per 100; broken lots, \$1. Electric blasting apparatus:—Batteries, 1 to 10 holes, \$15; 1 to 20 holes, \$25; 1 to 30 holes, \$35; 1 to 40 holes, \$50. Wire, leading, 1c. per foot; connecting, 50c. per lb. Fuses, platinum, single strength, per 100 fuses:—4-ft. wires, \$3.50; 6-ft. wires, \$4; 8-ft. wires, \$4.50; 10-ft. wires, \$5. Double strength fuses, 15¢ extra, per 100 fuses. Fuses, time, double-tape, \$6 per 1,000 feet.

Galvanized Iron.—The market is steady. Prices, basis, 28-gauge, are:—Queen's Head, \$4.40; Comet, \$4.25; Gorbals Best, \$4.25; Apollo, 10½ oz., \$4.35. Add 25c. to above figures for less than case lots; 26-gauge is 25c. less than 28-gauge. American 28-gauge and English 26 are equivalents, as are American 10½ oz., and English 28-gauge.

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

Iron.—Prices are higher, owing to the iron having been put in store. Values, however remain about the same, the tendency being firm. The following prices are ex-store: Canadian pig, \$18 to \$19 per ton; No. 1 Summerlee, \$21 to \$21.50; No. 2 selected Summerlee, \$20.50 to \$20.75; Carron soft \$20.25 to \$20.75; No. 3 Clarence, \$18.75 to \$19 per ton.

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As showing the calibre of the men the Canadian Engineer is appealing to, it is interesting to note that during the past few days new subscriptions have been received from the following:

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