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The

CANADIAN MANUFACTURER

AND INDUSTRIAL WORLD.
DEVOTED TO THE MANUFACTURING INTERESTS OF CANADA.

VOL. 55. No. 1.

TORONTO

JULY 5, 1907



See the Classified "Ads" on Page 46

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Rock and Ore Crushers
Cyclone Pulverizers
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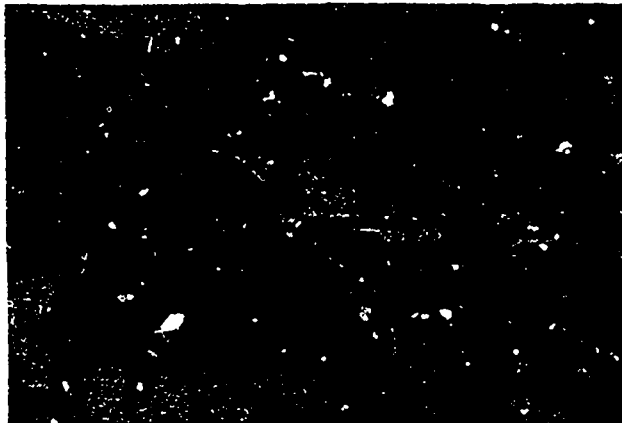
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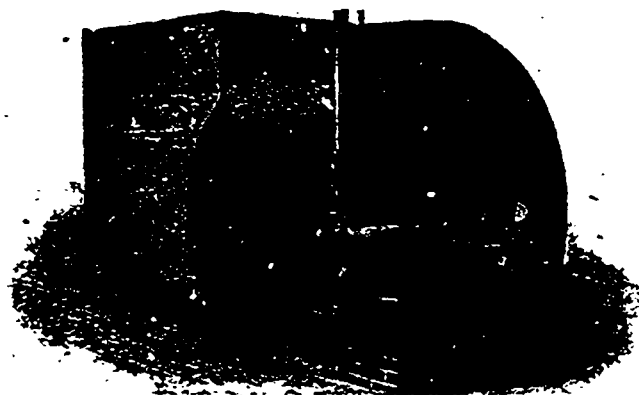
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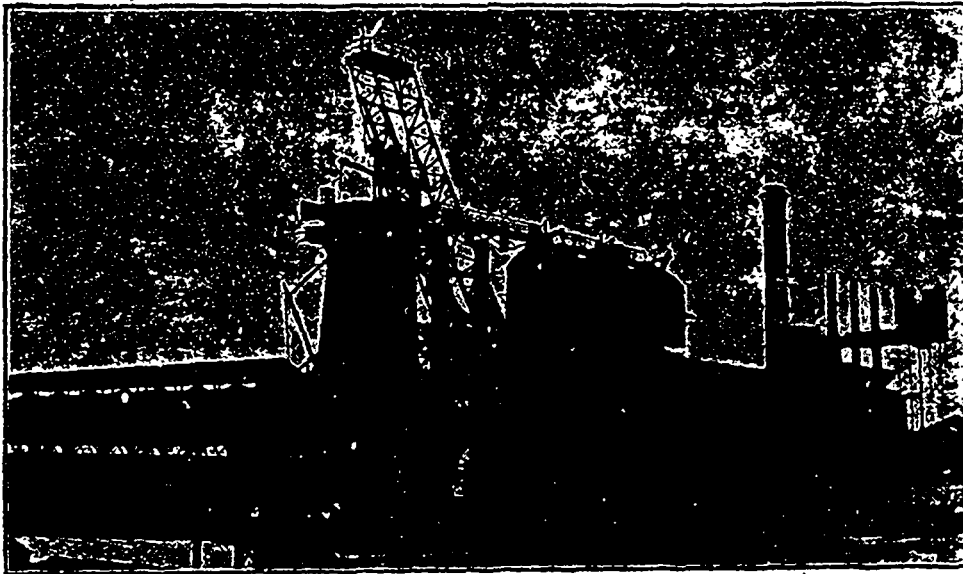
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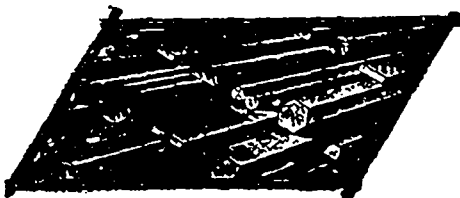
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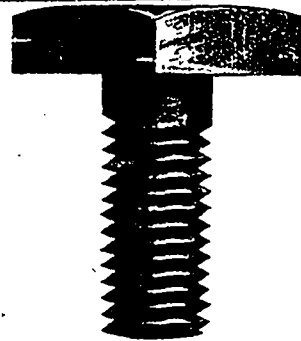
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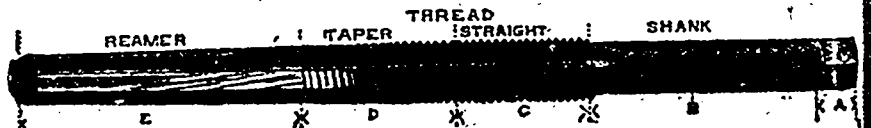
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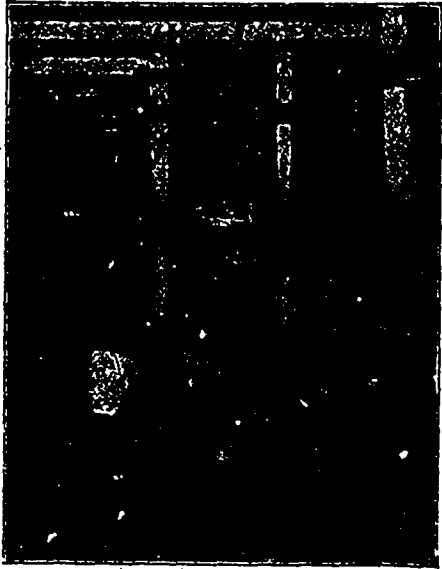
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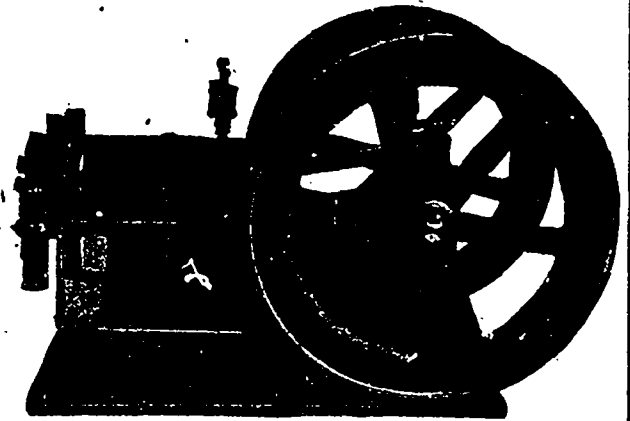
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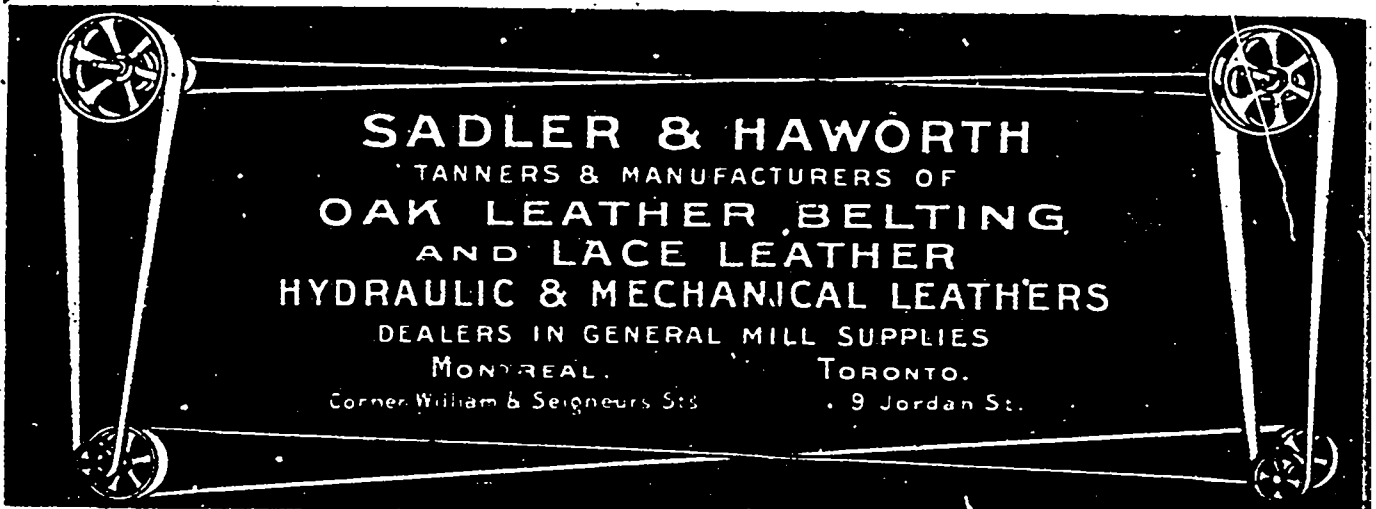
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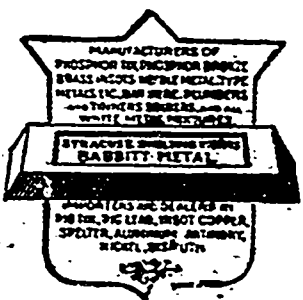
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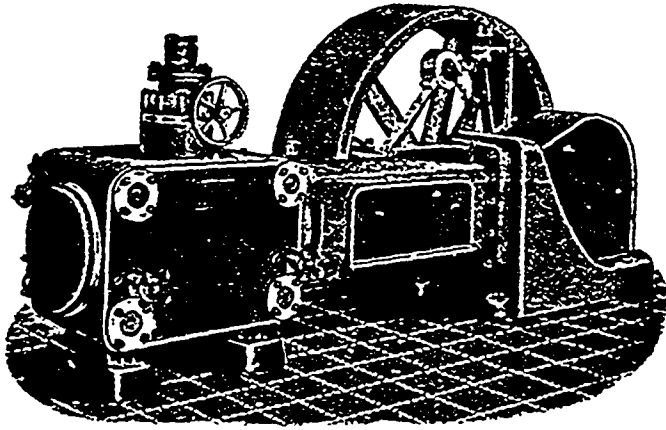
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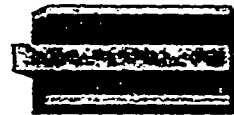
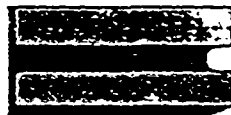


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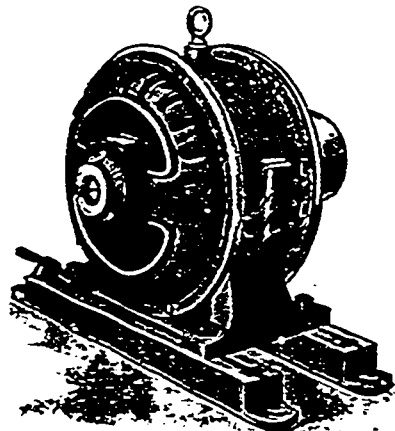
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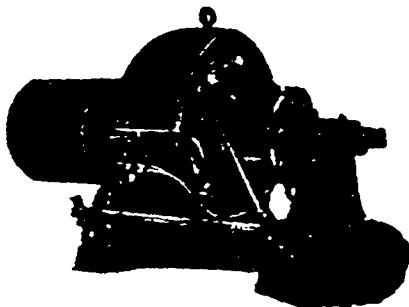
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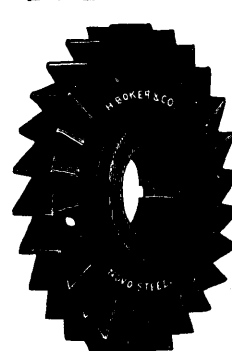
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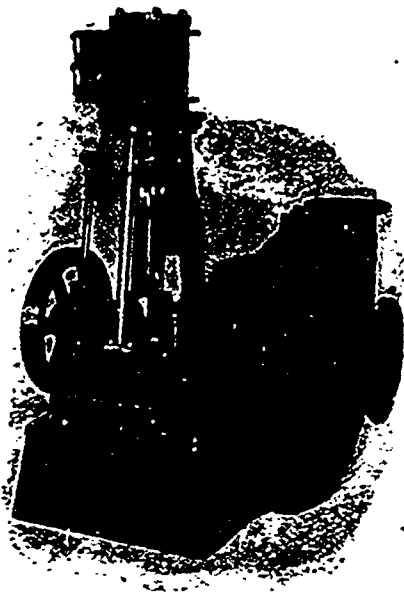
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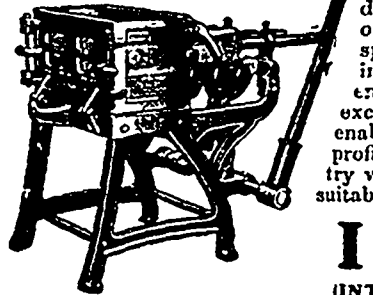
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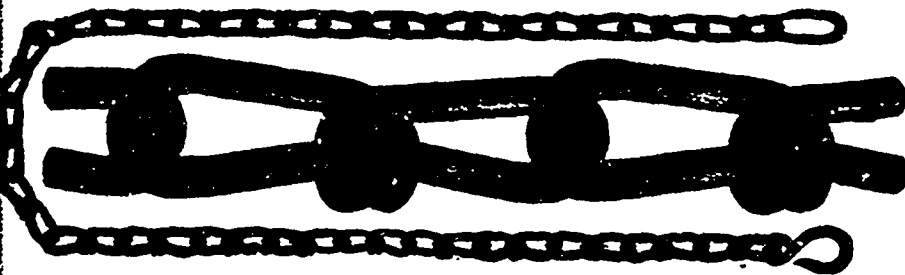
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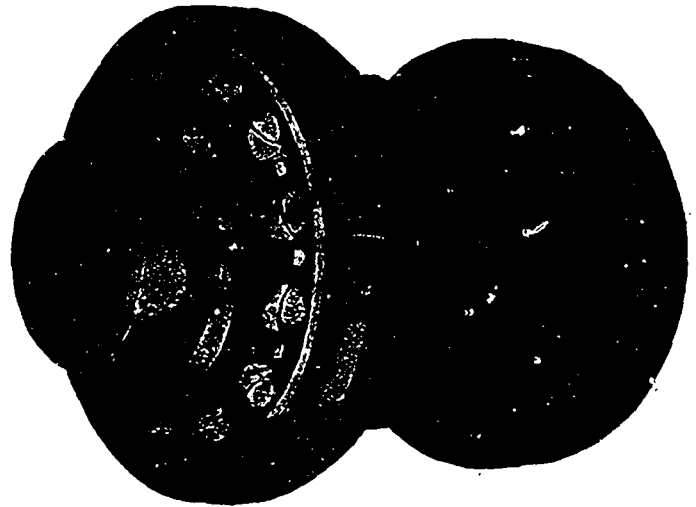
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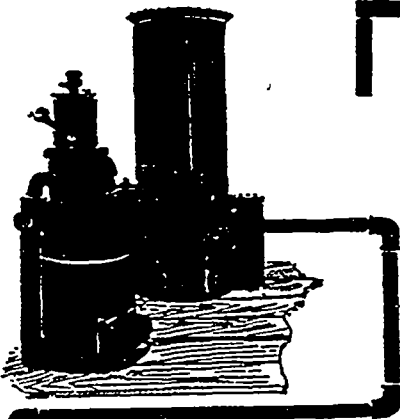
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OUR BIRTHDAY.

THE CANADIAN MANUFACTURER was established in 1880, the first issue appearing on the first day of July of that year. Therefore it has now entered upon the twenty-eighth year of its existence. During the twenty-seven years that have now passed, it has never missed appearing on its regular publication day. As its name indicates, the purpose of its coming into existence was to advocate the interests of Canadian manufacturing industries, and how well it has succeeded in doing so, its friends can testify. Its cardinal political aim has always been the advocacy of adequate tariff protection to all Canadian manufacturing industries—the shibboleth by which it has always been known. The present issue is Number 1 of volume 55.

LAVISHING TREASURE ON TRADE.

(An editorial which appeared in THE CANADIAN MANUFACTURER of July 1, 1887—twenty years ago, at which time the Toronto Globe was a strong advocate of Canada's commercial union with the United States.)

The British have been lavishing treasure and fighting all over the world since Queen Elizabeth's time, largely for the purpose of obtaining new buying and selling markets. Russia has overrun Asia at high cost of blood and treasure for the same purpose. There is not a nation in Europe but would cheerfully undertake war to gain a new market including two millions of people. Canada has the opportunity to include sixty millions within her commercial boundaries, and there are actually people who gravely assert that she ought to refuse!—Toronto Globe.

Greater nonsense was never written. England, during Queen Elizabeth's time, never lavished treasure and went fighting all over the world for the purpose of obtaining new buying and selling markets. Whatever she did in

those days was for the acquisition of territory and through love of conquest. She was not then a commercial and manufacturing nation in any sense of the word, such as she has been within the last century. Since the invention of the cotton gin and the perfection of machinery for the rapid and cheap production of textile fabrics, and the development of the thousand processes for supplying the wants of mankind by the manipulation of natural and crude products and the manufacture of them into the necessities of life, she gives employment to her teeming and rapidly growing population, who produce more manufactured goods than can be consumed at home. England has been and is constantly seeking new markets for whatever she may have to sell. But she would never have had occasion to seek such markets if it were not that her soil was dotted with almost unnumbered thousands of factories, work shops, furnaces and foundries, the bowels of her earth honeycombed by delvers for coal and ores, and the very atmosphere above her murky with the smoke from her industrial establishments.

Canada does not seek to acquire territory to add to her domain as England did in Queen Elizabeth's time. She already has as many broad acres as she cares to own, and every school boy in the land knows that no such industrial conditions prevail with her. Canada does not desire to undertake any war to gain a market of any sort. Under an economic system of government that English statesmen do not think can be successfully and profitably applied in their country, the United States have sprung forward in the race for greatness, and now equals the mother country in nearly all, and actually surpasses her in some of the most important industries which elevate nations.

And this is the country that the nonsensical Toronto Globe suggests that Canada has the opportunity of capturing and including within her commercial boundaries.

CANADA'S NICKEL OPPORTUNITY.

According to some very competent authorities, the coming rail for railroad use will be made of harveyized steel—that is, steel in which nickel is an important ingredient. The armour plates of the war vessels of all the world are now made of harveyized or nickel steel. In armour plates it is a matter of "must"—there is no choice about it, and if it is found that harveyized steel is the best for the manufacture of railroad rails, in the future the heavy traffic of the railroads throughout the world will be carried over harveyized rails.

Canada contains the most extensive and valuable deposits of nickel ore known to the world, the second in extent being in the French penal island of New Caledonia, in the South Pacific ocean: and nickel ore in insignificant quantities is found in some other countries. The known deposits of the Sudbury regions of Ontario are owned chiefly by British and American capitalists, about one-fourth of the output of which is sent to Great Britain to be refined, the balance going to refining works in the United States.

According to Canadian statistics the quantities and values of nickel contained in ore and matte, exported from Canada in the following years were as follows :

Pounds.	Value.
1902— 3,883,264.....	\$834,513
1903— 9,032,554.....	878,159
1904—14,229,973.....	1,337,485
1905—11,970,557.....	1,185,056
1906—23,959,841.....	2,166,936

The United States statistics show the quantities and values of Canadian nickel ore and matte imported into that country the same years to be as follows :

Ton of 2,000 pounds.	Value.
1902—13,288.....	\$1,205,157
1903—10,465.....	1,107,530
1904—12,101.....	1,196,136
1905—10,560.....	1,205,873
1906—13,626.....	1,673,879

The total quantity of nickel ore and matte imported from Canada into the United States in the five years amounted to 60,040 tons, or 120,080,000 pounds, valued at \$6,388,575. The only other imports of nickel ore into the United States in the same year which was from New Caledonia, were as follows :

Tons.	Value.
1902—15,271.....	\$220,926
1903— 5,171.....	75,389
1904—None	
1905—None	
1906— 50.....	544

The aggregate quantity of French nickel ore imported into the United States in the five years was 20,492 tons—say 40,984,000 pounds, value at \$296,859 the total quantities imported from all countries—meaning Canada and New Caledonia—being 100,532 tons valued at \$6,685,374.

Being a raw material, and imported into that country to be refined, where it gives employment to much highly skilled labor, no duty is imposed upon it by the United States; but when nickel oxide is imported it pays a specific duty of 6 cents per pound, and all other manufactures of nickel n.o.p., are dutiable at 45 per cent. ad valorem. In 1906 the imports of manufactures of nickel into the United States were valued at only \$7,181, upon which \$3,231.45 duty was paid. These facts show how completely the refining and manufacture of nickel and nickel goods consumed in the United States is confined to that country.

The United States, after supplying the local demand for nickel, is a large exporter of the refined article. The quantities and values exported to all countries in the years under consideration were as follows :

Pound.	Value.
1902— 4,418,491.....	\$1,190,606
1903— 2,997,400.....	864,221
1904— 3,461,371.....	940,558
1905—10,875,018.....	3,196,622
1906— 9,929,982.....	3,240,544

The values of manufactures of nickel exported from the United States in the same years were as follows :

1902—\$12,523
1903— 97,787
1904— 54,205
1905— 97,083
1906—184,455

Notwithstanding the fact that about one fourth of all the nickel ore and matte produced in Canada is exported to Great Britain, the United States is a large exporter of refined nickel to Great Britain. The quantities and values of such exports in the years under discussion were as follows :

Pounds.	Values.
1902—2,288,640.....	\$563,071
1903—1,602,099.....	451,840
1904—1,634,698.....	460,029
1905—4,752,779.....	1,437,209
1906—5,072,828.....	1,665,136

The conditions as here shown, as they relate to Canada, are remarkable and not to the credit of this country. Although Canada is the largest producer of any country of the world—much larger than all other nations combined—although nickel enters so largely into so many of the most important arts, not one pound of commercial refined nickel has ever been produced in Canada. About every other metal—gold, silver, copper, lead, zinc and iron produced in Canada is refined here, and enters so extensively into our manufacturing industries, nickel is an exception. THE CANADIAN MANUFACTURER has always urged that an export duty should be imposed upon all nickel contained in the ores and matte exported, and the duty should be as high as the import duty on refined nickel imposed by any country. Last year Canada exported nearly 24 million pounds of nickel matte, valued at more than \$2,000,000, chiefly to the United States. That country does not produce a pound of nickel ore, and Canada last year supplied to it matte valued at \$1,673,000. It was admitted duty free, of course, for it was a raw material the refining of which gave occupation to large capital and much skilled labor. Yet if Canada were a producer of refined nickel it would be debarred entry to that country except upon the payment of 6 cents per pound duty.

The demand for refined nickel is increasing constantly, and the only way that Canada can participate in the trade is by forcing the production at home by the imposition of an export duty.

A NEW USE FOR CANADA'S NICKEL.

The large loss of human life and the extensive destruction of property arising from the use of defective rails have brought the railroads of the United States to the realization that better and more reliable rails must be used; and the question now uppermost with both the railroads and the manufacturers of rails is as to how better rails are to be made. Of course better rails must be made, and the question involves not only the materials but the cost. Mr. Charles M. Schwab, former president

of the United States Steel Corporation agreeing with the charge of the railroad companies that many of the accidents are due to the poor qualities of the rails now in use, believes that the use of a better quality is imperative. Most of the rails now in use are made by the Bessemer process and it is claimed that these are the ones that are proving so defective. Rails made by the open hearth process are of better quality, but cost more to produce, and they are the ones the use of which Mr. Schwab recommends, unless a still better process be adopted. "But I would go still further," says Mr. Schwab, "and make rails of a nickel alloy, by which I mean a harveyized rail. The railroads should use a rail that can be depended upon at all times. The mills will make them—they will make anything for which there is a demand."

Mr. A. J. Cassatt, president of the Pennsylvania Railroad Co., has, so it is said, "invented" a rail with which he would like to equip his road, known as the "Cassatt" rail. The Carnegie Steel Co., which is the rail making end of the United States Steel Corporation, with which Mr. Schwab is connected, has had the production of the Cassatt type of rail under consideration for some months, and the objection to the adoption by and equipment of the Pennsylvania Railroad with the Cassatt rail is the higher cost than of the existing type. The Carnegie Steel Co. say that the Cassatt rail will cost \$5 a ton more than the rails now made, or \$33 a ton. It is believed that Mr. Schwab's idea of the harveyized rail steel and the Cassatt rail are one and the same. Mr. Schwab is already engaged largely in making one sort of harveyized steel—that is, warship armor plates for the United States government.

The business of rail making in the United States and also in Canada is becoming one of the biggest problems in iron and steel—if it is not already the biggest. There have been already placed orders in American mills for almost 1,000,000 tons of steel rails for next year. More than one third of these orders are for open hearth rails, and all orders would be for the open hearth were it not shown that most of the big mills of the country are unable to make them. The fight over quality in rails has certainly held back the orders. It is safe to predict that the rail requirements of the country for 1908 will be not less than 3,250,000 tons.

It is not a matter of choice with the railroads whether the use of the present type of rails shall be continued if it is satisfactorily proven that they are not fully adapted to present day requirements, and that a harveyized rail can be produced. The matter of higher cost cannot be considered.

The matter of supply of nickel for the harveyized, or Cassatt rail, however, does concern Canada. If American railroads are forced by circumstances to discard the use of rails as now made, and adopt those in which nickel is an important element, all the important railroads throughout the world will be forced to do the same thing. There are hundreds of thousands of miles of such roads, and the re-equipment with harveyized rails means the consumption of thousands of tons of nickel, of which Canada is the chief producer.

NOT POVERTY STRICKEN.

It having been announced that the next annual convention of the Canadian Manufacturers' Association would be held in Toronto on September 24, 25 and 26 next, a committee representing the Association waited on the Toronto City Council a few days ago to see what the council would do in the matter of entertaining the visiting members of the Association attending the convention. We are not informed whether the begging committee were promised a contribution or not, but we deprecate this matter of going hat in hand to solicit contributions from the city to assist in entertaining members of the Association who may be in Toronto on that occasion. Of course Toronto would be pleased to welcome the visitors and make it pleasant for them, but it would be more or less mortifying to them to know that with an abundance of money in the hands of their treasurer, their entertainment was at the expense of the city. The Association is not yet pauperized. At the February meeting of the executive council, in making his usual report, treasurer Booth showed that the balance of money then in his hands was \$19,318, being, as he stated, "the largest balance in the history of the Association." Of course these large balances were after the salaries and other expenses of the Association were paid, amounting to \$2,000 or \$3,000 monthly. The report of the finance committee at the April meeting, showing the finances of the Association, recommended that authority be given them to invest some of the surplus funds in some trust company—this after the showing of treasurer Booth that the transactions of the previous months showed a credit of over \$19,000 after the expenses of the month had been paid, say \$2,921; and at the May meeting the finance committee reported that they had invested \$5,000 with a trust company at 4 per cent.

It is quite certain then, that the Association is not poverty stricken, and that it has plenty of money to pay the expenses of its approaching convention.

CHILD SLAVERY AND A REMEDY.

Onward, one of the publications issued by the Methodist Book and Publishing House, Toronto, has an abridged article, with illustrations, from the *Cosmopolitan* magazine, written by Edward Markham, on Child Slavery. Special reference is made to the demoralizing and disastrous effects of the labor involved in the manufacture of glass by children, also the "Little Slaves of the Coal Mines," the employment of small children in cotton mills, and in other industries in which the little ones toil away their lives. The story is a woeful one, and unfortunately but too true, we believe. Very naturally Onward wants to know what is being done about it, and what can be done to alleviate the evil.

In the opinion of *THE CANADIAN MANUFACTURER*, a great deal can be and ought to be done, and we appeal to the editor of our valued contemporary and to its large and influential clientele throughout Canada to assist in the work.

We deny that it is necessary to employ child labor in any gainful occupation that may be injurious to the

moral or physical health. If a child can perform the task it is certain that an older person can also perform it, and should. Why, then, is child labor employed? Only for gain, of course. If it is wrong, then, to employ child labor in gainful occupations, it should be prevented. But how? As far as Canada is concerned it can be done by making it unlawful. It will be urged that while it may be prevented in Canada, no Canadian authority can prevent it in other countries: and that it would be unjust to forbid the use of child labor in Canada in the manufacturing industries while the products of child labor produced in other countries can be imported into Canada and brought into competition with the products of manufacturers here who are forbidden to employ such labor. The answer to this is obvious. All countries, Canada included, forbid the importation from other countries of the products of prison labor. The object of this is to prevent the products of prison labor performed in other countries, to be brought into competition with free labor. If it is right to prevent the introduction into Canada of the products of prison labor, it would also be right to prevent the introduction of things made by child labor, and therefore the manufacturer would not be handicapped. It is possible that the cost of the manufactured article might be increased by the prohibition of child labor in its production, but the benefit to the community at large would much more than compensate for the difference, and the welfare of the little ones would be conserved.

Canada cannot forbid or control the use of child labor in other countries, but she certainly could prevent the introduction into the country of the products of child labor performed in any other country.

UNFAIR PARTISANSHIP.

Fair play is a jewel which not only individuals should practice, but governments also: but the practice of fair play is not indulged in to any great extent, particularly by governments, who can use partisan political machinery to better purpose to effect their ends. The recent report of the Ontario Bureau of Labor is an exemplification of this. If the report indicates the views of the Ontario government, of course subsequent reports will be of similar character, as many previous ones have been, and the government lies open to the criticism of unfairness. No doubt Hon. Mr. Reaume, the commissioner of public works, which includes the Bureau of Labor, of which Mr. Armstrong is secretary, selected the most available man whose duty it is to compile the reports, but it is quite remarkable that when Mr. Armstrong had prepared his reports, Hon. Mr. Reaume should not at least read them before they are sent to the printer, and when reading them, with a big blue pencil in hand, strike out such matter that is of such a partisan character as to give just cause of offence to other classes of citizens and taxpayers than those for whose interests and views Mr. Armstrong caters. It seems as though Mr. Studholme, not Dr. Reaume, in the matter of the reports, dictates the policy of the department.

It is timely, therefore, to direct attention to the following letter addressed by the Employer's Association to a Toronto paper which explains itself:

Has the government of Ontario thought it advisable, and has it gone to the expense and trouble of forming a bureau for organized labor, and of appointing an official to look after the interests of the unions?

One is forcibly struck with such a thought on reading the latest report of the bureau of labor, produced under the patronage of Hon. J. O. Reaume, commissioner of public works, by the secretary of the bureau, John Armstrong. From the whole report, it is impossible to come to any other conclusion, and unless matters are changed, the name of the report should be altered from that of the "Bureau of Labor" to that of "Organized Labor of the Province of Ontario."

At the very commencement of the report is a statement which shows in what way the sympathies of the labor bureau tend. On page 7 is the following: "It will be one of the paramount duties of the bureau to undertake the task of securing the good-will of employers and the hearty assistance and co-operation of wage-earners and labor organizations of the province."

Evidently a free citizen is of no use to Mr. John Armstrong. Why should he take into consideration the workman who does not belong to "organized labor?" Ninety-five per cent. of the workmen of Canada are free citizens, but such a number is not to be taken into consideration when the remaining 5 per cent. belong to unionism. One would think that every sane man in Ontario belonged to a labor organization, and that everyone who does not sign away his liberty to paid agitators is of so little consequence as to be a negligible quantity. It is the Socialist, under the guise of the union man, who is causing all the economic unrest in Canada to-day. As one of them was heard to say lately, glorifying in the fact that about 2,000 people are on strike in Toronto, "we are responsible for all this; we are preaching the doctrine of social unrest."

Is this the policy to which the Ontario Government wishes to have itself committed? Or have the labor unions got so much the upper hand in Ontario that Mr. John Armstrong feels justified in making himself their official mouthpiece? Things have come, indeed, to a sorry pass when the paid agitators, many from across the line, who are doing more injury to the industrial development of Canada than any other force, have so won over the government as to have a bureau appointed to look after their interest.

Again, on page 19, is given a list of questions, 18 in all, which were sent to "labor organizations" for answer, "that the bureau's directory of labor organizations may be complete." One would imagine from the number of questions submitted that the list is a very comprehensive one, whereas, in reality, it is anything but so.

The following list might be added with effect, and were answers truthfully given, the results might even surprise John Armstrong:

What is the amount of initiation fee?

What are the annual dues? How paid? Quarterly? Half-yearly?

Who are the salaried officers, and what is their pay?

What special assessments are made during the year? For what cause?

What proportion of money received is used for sick benefits? For officers' wages? For strike funds?

Where are funds deposited, and what security is there for their safety?

How much is sent annually to the United States?

When a strike is declared, are the votes cast counted by those whose duty it is to cause strikes to hold their positions?

How much is received annually from the United States to foment trouble in Canada?

These are questions of interest to every union man, for not ten men in any union can give answers to them, and those that can, deem it advisable to keep the information to themselves.

It would be better for Canada and for each individual in it were the government to take up these questions and insist on answers thereto, even by means of a royal commission, if necessary. Labor unions, as at present conducted, are the cause of immense losses in Canada, and while it should be the duty of the government to see that they are properly conducted, and that every dollar paid in by members can be rightly accounted for, it appears that the government thinks otherwise, and is giving a free hand to John Armstrong to spread the doctrines of "unrest" which some day will reap the whirlwind.

PRICKING THE "LABOR-VOTE" BUBBLE.

As all the business world knows, President Parry of the National Association of Manufacturers only a few years ago brought down upon his official head the adverse criticism, and in some instances the condemnation, of many members of the organization by reason of the pronounced and seemingly radical stand that he took against the encroachments of organized labor on the rights of its employers and more especially against its opposition to the "open-shop" principle. But he never wavered from his purpose throughout his several terms of office, and in the end it has been proved that there was nothing erratic in his radicalism, that it was really a wise conservatism—the only sane, logical and practicable position to have been assumed by him and the Association under the circumstances.

All the business world knows this, too, quite as well as the facts just stated: That the absolute failure of organized labor in its more recent sally into the field of politics, as one time proclaimed by President Gompers of the American Federation of Labor, can be ascribed in the very largest measure to the light let in upon that movement by the organized manufacturers through the association's officers. Referring to the mass of "labor bills," so called in recent evidence before Congress and numerous state legislatures, Secretary Cushing of the association makes this significant statement in his annual report rendered at the twelfth annual meeting of the organization in New York:

"The labor question as manufacturers and employers throughout the country understand it, inevitably must have grown into politics. From the very first, five winters ago, there had never been a doubt in the minds of public men (who were thoughtful, sincere and candid) that these labor bills were wrong morally and incorrect and impossible economically and in good business. Nor did it devolve upon them alone—and perhaps it was natural that they did not think that it devolved upon them at all—to find that it was safe to do, by vote and voice, the right thing.

"Through the course of time it was made more and more evident that they need not be afraid of the so-called labor vote; I mean the organized labor vote, which the agitators and politicians of so-called labor could control

wholly or partially. The other labor vote, the real vote of all the workers, the vote of the masses, is another thing."

There never was a flatter failure, a more humiliating defeat to its promoters, than that of the organized labor leaders at marking for defeat those members of Congress and United States senators who had refused to bend the knee to them in Washington.

The "labor vote" had been a political bugaboo through a quarter of a century, says the New York Commercial. It had made many a public official an abject coward, a fool. It remained for the National Association of Manufacturers to take up the thing systematically and to prick the bubble and let the wind out of it—to "unteach" the vicious doctrines of the closed shop contingent and to let in the light on the lie involved in its claim to numerical voting strength. Men marvel to-day that they ever got frightened by the scarecrow. But somebody had to expose it—and the organized manufacturers had not only the sense but also the courage to do this.

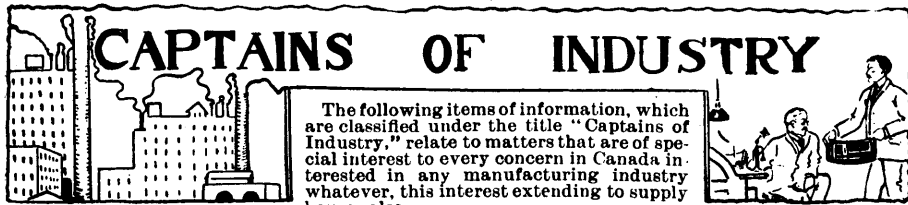
EDITORIAL NOTES.

At the recent thirty-ninth annual co-operative congress at Preston, England, at which there were delegates from all parts of the British Isles, and also from Germany, France, Austria, Denmark and Switzerland, it was urged that the Government should introduce a bill into parliament establishing Wages Boards in the sweated trades with power to fix minimum rates of payment. One delegate spoke of shirts made in Manchester at 1s. 9d a dozen. A member of the National Anti-Sweating League said that in London shirts were made for 1s a dozen, and in one case they were sublet by one woman to another at 8d. The League had in their possession a lady's blouse which would be sold for 35s to 40s. The worker who made it received the munificent sum of 6d.

The people of London absolutely without a home are said to be in the proportion of one to every 2,000 of the population.

The per capita circulation of money in the United States on June 1 was \$34.20, which is the highest point ever reached, and an increase of four cents during the month of May, 1907. This rate was based on an estimated population of 85,965,000 persons. On June 1 of last year it was \$32.45, and on January 1, 1907, it reached \$33.78.

The Canadian Electrical Association will this year hold its annual convention in Montreal, Sept. 11, 12 and 13. A very interesting programme is being arranged, and as an electrical exhibition will open in that city on Sept. 2 and continue for two weeks, it is expected that there will be a very large gathering of the electrical fraternity. The secretary of the Canadian Electrical Association is T. S. Young, Confederation Life Building, Toronto.



The Empress Transportation Co., Midland, Ont., have been incorporated with a capital of \$200,000, to carry on the business of a navigation and transportation company. The provisional directors include J. Playfair, D. L. White and D. S. Pratt, Midland, Ont.

The Cobalt Confederation Mines, Cobalt, Ont., have been incorporated with a capital of \$3,000,000, to carry on a mining, milling and reduction business. The provisional directors include M. McLeod, R. Herron, Cobalt, Ont., and F. C. Powell, Haileybury, Ont.

The Northern Reduction Co., Toronto, have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include W. C. Mackay, F. D. Byers, and A. N. Morine, Toronto.

The Hydro-Electrical Construction Co., Toronto, have been incorporated with a capital of \$50,000, to carry on a contracting and engineering business. The provisional directors include A. Keith, A. G. F. Lawrence and H. E. Ridout, Toronto.

The Canada Photo Supply & Mfg. Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture cameras, kodaks, printing machines, photographic supplies, etc. The provisional directors include T. H. Barton, J. H. Sinclair and M. Harvey, Toronto.

The Galetta Electric Power & Milling Co., Arnprior, Ont., have been incorporated with a capital of \$100,000, to develop electric power, etc. The provisional directors include T. Moran, D. J. McCuan, and M. Sullivan, Arnprior, Ont.

Cerre-Chamberland Fur Co., Toronto, have been incorporated with a capital of \$40,000, to manufacture furs, hides, etc. The provisional directors include R. W. Eyre, A. C. Chamberland and C. J. Cerre, Toronto.

Ontario Metal Novelty Mfg. Co., Toronto, have been incorporated with a capital of \$100,000, to manufacture metal novelties, dies, machinery, tools, etc. The provisional directors include E. Currie, M. Campbell and J. S. Woodhouse, Toronto.

Montreal Gold & Silver Mining Co., Cobalt, Ont., have been incorporated with a capital of \$10,000, to carry on a mining, milling and reduction business. The provisional directors include O. Baker, W. J. Sutherland and J. C. Armstrong, Cobalt, Ont.

The Electric Smelters, Limited, Ottawa, have been incorporated with a capital of \$18,000, to manufacture electric smelters, etc. The provisional directors include J. H. Reid, Cornwall, Ont.; G. P. Brophy and J. C. Scott, Ottawa.

The General Engineering & Construction Co., Toronto, have been incorporated with a capital of \$100,000, to carry on an engineering and contracting business. The provisional directors include F. B. Allen, F. D. Mackay and D. J. Johnston, Toronto.

A large portion of the village of Springfield, near St. Thomas, Ont., was destroyed by fire June 25. Loss about \$30,000.

The ratepayers of Clinton, Ont., voted favorably on a by-law to guarantee the bonds of the Clinton Thresher Co., whose plant was damaged by fire a short time ago. The town will guarantee bonds to the amount of \$20,000, repayable in 20 annual payments.

The furniture factory of Wm. Cyr, Ottawa East, Ont., was destroyed by fire June 20. Loss about \$8,000.

Toronto will expend \$710,000 in improving the waterworks system. A new pumping engine will be installed at a cost of about \$25,000.

The premises of the Belleville Gas Co., Belleville, Ont., were damaged by fire recently to the extent of about \$400.

The flour mills of Messrs. Lawson & Bros., Esquesing, near Georgetown, Ont., were destroyed by fire June 18. Loss about \$18,000.

The directors of the Superior mine, Sault Ste. Marie, Ont., will build a railway from the mine to the Algoma Central, a distance of about five miles. A new concentrating mill and smelting plant will also be erected.

Harbord Street, Toronto, is to be extended from Clinton Street to Ossington Avenue, at a cost of about \$125,000.

A new steel bridge may be erected across the Humber River at Scarlett's Road, Lambton, Ont., at a cost of about \$7,000.

An addition 60x50 feet, is being erected to the premises of Messrs. McGregor & McIntyre, Toronto.

The Board of Control, Toronto, invites tenders up to July 16 for supply and erecting steel railway bridges for the Lansdowne Avenue subway.

C. F. Bunnell, Clarendon Hotel, Winnipeg, Man., has awarded the contract to Messrs. Carter, Halls, Adlinger & Co., Winnipeg, for the erection of a large hotel at Kenora, Ont., at a cost of about \$225,000.

Additions will be erected to the electric light plant, Walkerton, Ont.

The Madison Williams Mfg. Co., Limited, Lindsay, Ont., have the equipment of their new plant practically completed. Since moving to Lindsay they have found an exceptionally heavy demand for sawmill machinery. A few days ago they shipped a complete sawmill plant to Montreal, whence it was transhipped to Hudson's Bay. On Friday last another sawmill outfit was sent forward to Englehart, Ont.

The National Spring & Wire Co., Albion, Mich., have secured premises at St. Catharines, Ont., and have installed machinery for the manufacture of steel wire springs for mattresses, carriage cushions, etc. Some further equipment, including saws to make crating and special machinery will be purchased in the near future.

The M. J. Burke Construction Co., Buffalo,

N.Y., are erecting a reinforced concrete factory at Niagara Falls, Ont., for the Canadian Nut Co., Toronto. One building, 124x43 feet, to be used as a machine shop, is now under construction, while plans for another building are being prepared.

The new factory of the Canadian Ramapo Iron Works, Niagara Falls, Ont., is almost completed.

R. P. Slater, mayor of Niagara Falls, Ont., is interested in the recently organized Ford Automatic Fire Shutter Co., who are putting up a new factory at Niagara Falls. Mayor Slater is also interested in the construction of a new factory in that town for the Carriage Mountings Co., of Toronto.

The Weber Gas Engine Co. have the contract for a complete power plant installation for the McClary Mfg. Co., London, Ont. This includes a 250 h.p. vertical gas engine with producer gas plant and generator.

The Freyseng Cork Co., Toronto, are erecting an addition to their factory at a cost of about \$7,000.

The Adams Wagon Co., Brantford, Ont., are erecting a brick warehouse at that place, costing about \$8,000.

Messrs. George Faster & Co., are building a \$25,000 warehouse at Brantford, Ont.

R. J. Smith & Co., Limited, Ottawa, have been incorporated with a capital of \$40,000, to manufacture clothing, etc. The provisional directors include R. J. Smith, R. J. Devlin and P. W. Ralph, Ottawa.

The Ottawa Prospecting & Development Co., Haileybury, Ont., have been incorporated with a capital of \$200,000, to carry on a mining, milling and reduction business. The provisional directors include A. J. Murphy, Haileybury; J. C. Ferguson, New Liskeard, Ont., and M. E. Weaver, Ottawa.

The H. Ditchburn Boat Mfg. Co., Gravenhurst, Ont., have been incorporated with a capital of \$40,000, to manufacture launches, canoes, sail boats, etc. The provisional directors include Herbert Ditchburn, A. W. Ditchburn and Thomas Greavett, Gravenhurst, Ont.

The Elgin Cobalt Mining & Development Co., St. Thomas, Ont., have been incorporated with a capital of \$200,000, to carry on a mining, milling and reduction business. The provisional directors include J. H. Courtenay, W. H. King and J. T. Utter, St. Thomas, Ont.

The Gold Mint Mining Co., of Larder Lake, Limited, Toronto, have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. E. Day, J. M. Ferguson, Toronto.

The Ridgetown Canning Co., Ridgetown, Ont., have been incorporated with a capital of \$100,000, to manufacture canned goods, catsups, etc. The provisional directors include C. B. Keenleyside, B. V. Hole and G. E. Coleman, London, Ont.

The Hamilton Steel & Iron Co., Hamilton, Ont., have commenced the manufacture of railroad spikes from basic steel bars. The new department is now in full running order.

The Standard Chain Co., Walkerville, Ont., have been incorporated with a capital of \$50,000, to manufacture iron and steel chain and forgings and attachments. The provisional directors include J. C. Schmidt, York,

Pa.; A. E. Crockett and H. P. Meckley, Pittsburg, Pa.

The Canada Pride Range Co., Toronto, will erect a warehouse on Dundas Street, to cost \$8,500.

Messrs. H. E. Bond & Co., Toronto, will erect a five story brick warehouse at a cost of \$80,000.

It is proposed to erect large ore works at St. Thomas, Ont., the plant costing \$96,000 and machinery, \$125,000. A by-law will be submitted to the ratepayers to grant the company a bonus of \$50,000. W. T. Cameron, A. E. Ponsford and ex-Ald. Saunders, St. Thomas, Ont., are among those interested.

The Tilbury-Romney Gas & Oil Fields, Limited, Toronto, have been incorporated with a capital of \$300,000, to manufacture crude or refined petroleum, oil, natural gas, etc. The provisional directors include J. F. Holliss, W. R. Bird and S. J. Marchallick, Toronto.

The Silver Circle Mining Co., Toronto, have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include Alexander Fasken, G. H. Sedgewick and A. T. Struthers, Toronto.

The Canada Construction & Dredging Co., Toronto, have been incorporated with a capital of \$60,000, to carry on the business of dredging, construction work, general contracting work, etc. The charter members include J. B. Bartram, C. M. Bartram and James Osborne, Toronto.

The Colonial Weaving Co., Peterboro, Ont., will erect a large addition to their plant.

The Laidlaw-Ainslee Lumber Co., Hamilton, Ont., have purchased a site and will erect a modern office furniture factory.

Good Hope Mines, Limited, Toronto, have been incorporated with a capital of \$3,000,000, to carry on a mining, milling and reduction business. The provisional directors include J. F. Holliss, W. R. Bird and S. J. Marchallick, Toronto.

The Jones Safety Device Co., Hamilton, Ont., have been incorporated with a capital of \$50,000, to manufacture and deal in all kinds of machinery. The provisional directors include W. R. Ward, V. W. Raven and C. W. Readman, Toronto.

The Wolverine Brass Goods Mfg. Co., Grand Rapids, Mich., have been granted a loan of \$20,000, by the ratepayers of Chatham, Ont. The company will establish a large plant at that place.

Messrs. Krug & Crosby, Hamilton, Ont., are manufacturing gasoline motor boats under the firm name of the Guarantee Motor Co. The engines they are making are 2½ and 5 h.p. single cylinder, and 5 and 10 h.p. double cylinder engine. The engines are reversible and have special guarantee. The company also make a specialty of engine cylinder castings.

The McGill Cobalt Mining Co., Cornwall, Ont., have been incorporated with a capital of \$1,000,000, to carry on mining. The provisional directors include Charles Pierce, A. H. Jackson and A. H. Vineberg, Montreal.

The St. Thomas Car Co., St. Thomas, Ont., have been incorporated with a capital of \$400,000, to manufacture railway, freight and passenger cars, etc. The provisional direc-

tors include W. K. Cameron, J. A. Moore and G. A. Ponsford, St. Thomas, Ont.

The Toronto Engraving Co., Toronto, intend erecting a five story office building at a cost of about \$30,000.

The American Machinery & Export Co., manufacturers of saw mill machinery, are considering the erection of a branch factory at Windsor, Ont.

The Horological Institute, Toronto, will erect a three story building costing about \$8,500.

The Imperial Glass Works, Toronto, have taken out a permit to erect a two story brick warehouse, to cost about \$14,000.

The Dominion Jewelry Mfg. Co., Toronto, have been incorporated with a capital of \$100,000 to manufacture jewelry of all kinds. The provisional directors include G. W. Bedell and Thomas Broadhurst, Toronto.

The Hamilton Carhartt Manufacturer, Limited, Toronto, have been incorporated with a capital of \$100,000, to manufacture clothing, etc., and to acquire business now carried on by Hamilton Carhartt Manufacturer. The provisional directors include Hamilton Carhartt, W. W. Carhartt, Detroit, Mich., and S. C. Smoke, Toronto.

The General Brass Co., Toronto, will erect a factory at a cost of about \$9,000.

The Canadian Locomotive Co., Kingston, Ont., will expend \$300,000 on extensions to their plant during the coming year.

Messrs. John Inglis Co., Toronto, will build a one-story galvanized iron blacksmith shop.

The Carriage Mountings Co., Toronto, are erecting new factory buildings at Niagara Falls, Ont.

The Cobalt Silver Wedge Mines, Limited, Cobalt, Ont., have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include D. A. Rose, G. E. Cherpaw and Edward Gillis, Toronto.

The Hamilton Tool Co., Hamilton, Ont., has been incorporated with a capital of \$40,000, to manufacture tools and machinery, and to take over the business now carried on by the Hamilton Tool & Optical Co. The provisional directors include H. O. Thompson, C. T. Raspberry and Amos Hutton, Hamilton.

Messrs. Hartley Bros., Brantford, Ont., are erecting a foundry at that place for the manufacture of tools and machinery fittings.

The Dominion Radiator Co., Toronto, will build a large chimney, 125 feet high, containing 25,000 bricks, and will cost about \$20,000.

The Grey, Hadley Spelter Co., Kingston, Ont., have been incorporated with a capital of \$500,000, to carry on a mining, milling and reduction business. The provisional directors include W. A. Wykesmith, F. G. Anderson and R. L. Torrance, Guelph, Ont.

The Ingersoll Packing Co., Ingersoll, Ont., have been incorporated with a capital of \$1,000,000, to carry on a business of a packing house. The provisional directors include W. D. Hook, R. I. Smith and W. E. Cragg, Ingersoll.

Automatic Agents, Limited, Toronto, have been incorporated with a capital of \$1,000,000 to manufacture machines wholly or partly automatic. The provisional directors include

E. B. Ryckman, C. W. Kerr and C. S. MacInnes, Toronto.

The Golden Empire Mines Co., of Larder Lake, Limited, Powassan, Ont., have been incorporated with a capital of \$1,000,000, to carry on a mining, milling and reduction business. The provisional directors include W. F. Shaw, T. S. Trenouth and W. C. Porter, Powassan.

The Hamilton Cataract Light & Power Co., Hamilton, Ont., have filed plans for a transmission line through Barton and Saltfleet township.

Messrs. Picard & Lalonde, Montreal, machinists, engineers, millwrights and general electrical contractors, are installing new equipment valued at about \$13,000.

Messrs. Laporte, Martin & Cie., Montreal, wholesale grocers, are erecting an office and warehouse building on St. Paul Street. The building will have a frontage on St. Paul, of 75 feet, and a depth of 120 feet. It will be seven stories high, built of brick and stone mill construction, fireproof, sprinklers throughout, and provided with water curtains. Electric elevators will be installed. There will be fifteen doors for shipping and receiving goods. Large sample rooms and offices will occupy the first floor. Jos. Sawyer, Montreal, is the architect, and Messrs. Hemlin & Lapointe, Montreal, are the contractors. The building is to be ready for occupation January 1 next.

The Chambly Electric Co., Montreal, electrical contractors and manufacturers of chandeliers and electroliers, have recently opened a wholesale department at 55 St. Antoine Street. They expect to build this fall.

Messrs. McComber & Cummings, Montreal, manufacturing furriers, have moved to larger premises at 373 St. Paul Street. The new building is about 135x25 feet, five stories, and gives nearly four times the former space. This business was commenced about eight years ago by Mr. J. E. McComber, who made a specialty of ladies' Persian lamb coats, and to this specialization he attributes a large share of their success. Two years ago the present style of McComber & Cummings was adopted.

Messrs. Rowan Bros. & Co., Montreal, have been incorporated with a capital of \$40,000, to manufacture beverages, alcohol, etc. The charter members include T. Carlin, J. E. Rowan and J. A. Mann, Montreal.

Messrs. J. Elkin & Co., Montreal, have been incorporated with a capital of \$45,000, to manufacture cloth, clothing, garments, etc. The charter members include J. Elkin, I. Elkin and S. Diamond, Montreal.

The Corinthia Mfg. Co., Montreal, have been incorporated with a capital of \$20,000, to manufacture drugs, chemicals, paints, lacquers, oils, perfumes, etc. The charter members include T. Robb, F. Hankin and R. Simpson, Montreal.

The ratepayers of Sherbrooke, Que., voted favorably on a by-law to raise \$200,000, to develop an electric light plant at Westbury.

Messrs. Babcock & Wilcox, Montreal, are supplying 2,000 h.p. additional B. & W. boilers, with superheaters and chain grate automatic stokers to the Canadian Pacific Railway Co.'s Angus shop.

Messrs. Darling Bros., Montreal, have received the following orders recently for their

Webster feed water, heater, purifier and filter: J. R. Booth, Ottawa, 2,500 h.p. machine; Dominion Coal Co., Glace Bay, N.S., 2,500 h.p. machine; T. Eaton Co., Toronto, 2,000 h.p. machine.

The Gazette Printing Co., Montreal, have been incorporated with a capital of \$500,000, to carry on the business of printing, publishing, lithographing, etc., and to acquire the business now carried on by the Gazette Printing Co. The incorporators include Richard White, S. L. Kydd and T. M. McCaw, Montreal.

The Canadian Spool Cotton Co., Maisonneuve, Que., are considering plans for the erection of extensive mills on the Riverside Park site.

Messrs. C. A. Paquette & Co., Quebec city, have applied for a site for a factory building.

The annual general meeting of the shareholders of the Dominion Bridge Co., Montreal, was held in the Windsor Hotel, June 20, Mr. McIntyre occupying the chair in the absence of Mr. Jas. Ross, the president. The report of the last year's operations was read and adopted, followed by the election of the following directors: Messrs. Jas. Ross, president; W. C. McIntyre, vice-president; Phelps Johnson, second vice-president and manager, succeeding Mr. W. C. McIntyre, R. B. Angus, Charles Cassils, F. Wanklyn and J. K. Ross.

The shipments of the Dominion Coal Co., Glace Bay, N.S., on June 12, were the largest the company have ever made. The total shipments amounted to 19,344 tons.

Messrs. Rhodes, Curry & Co., Amherst, N.S., have erected a rolling mill in connection with their works.

The Maritime Mfg. Co., clothing manufacturers, Pugwash, N.S., will erect a three story brick factory, 75x40 feet.

The Clark Foundry Co. will erect a new foundry at Sydney, N.S., the building to be of steel and concrete.

The finishing touches are being added to the Mark Fisher Building, Victoria Square, Montreal, and a number of the tenants are already in. The building is ten stories, 83x70 feet, of steel and stone, with concrete floors reinforced on the Roblin system, and sprinkler system throughout. There are two passenger elevators and a freight hoist. The first four floors will be occupied by Mark Fisher, Sons & Co., Perrin Freres & Cie., importers, and D. Morrice, Sons & Co., selling agents for the Canadian Colored Cotton Mills Co., will each occupy one floor. The Canadian Doloments Co., Limited, Montreal; the Laurentian Whitewear Co., Levis, Que., and the Riordon Paper Mills Co., Limited, will also have offices in the building.

The Riordon Paper Mills Co., Limited, have established head offices in the new Mark Fisher Building, Victoria Square, Montreal, and all business connected with their forest lands, sulphide pulp works at Hawkesbury, and pulp and paper mills, Merritton, is now being transacted entirely at the above address. The business of this company has expanded wonderfully during the past year or two, and it is now one of the most important industries of this character in the world, as not only a greater proportion of the paper mills in Canada obtain their sulphide pulp

from the Riordon's, but some 40 or 50 mills in the United States, Mexico, New Zealand, and Europe are also supplied. This company hold 600 square miles of spruce lands in the province of Quebec, from which they obtain spruce logs for the manufacture of pulp and paper.

F. Reddaway & Co., Montreal, recently shipped a consignment of "Camel Brand" belting valued at about \$3,000 to the new Portland Cement Works, at Exshaw, Alta. This order was partly due to the excellent results given by "Camel Brand" belting in the works of the International Portland Cement Co., at Ottawa.

The Clark Automatic Nut-Lock Co., Limited, 12 St. Peter Street, Montreal, are installing new machinery which will treble their capacity.

The Wells-Richardson Co., Limited, Montreal, are preparing plans for the enlargement of their butter color and dye departments.

Foundations are being laid for the Eastern Townships Bank Building, corner of St. James and McGill Streets, Montreal, opposite Victoria Square. The building will be ten stories above ground, and two below, steel construction, with concrete foundations to admit of subsequent addition of five stories. Work is being carried on day and night, and the building is expected to be complete in ten months. Peter Lyall & Sons are the contractors.

One of the best equipped kitchens in Canada will be that of the New Granby Hotel, Granby, Que., now nearing completion. The cooking equipment, recently installed by John Burns & Co., Montreal, includes a mammoth hotel range, with three fires and two ovens, complete with canopy, copper boiler and connections. The range presents an attractive appearance, with white tile back, and is equipped with thermometers. The proprietor, Mr. S. Page, intends to make the kitchen one of the show features of his hotel.

Lawson's grist mill at Stewarton, N.B., was destroyed by fire recently. Loss about \$15,000.

The premises of the Restigouche Wood-working Co., and the Dalhousie Lumber Co., Dalhousie, N.B., were destroyed by fire recently. The loss to the lumber company was about \$60,000.

The new acid plant in connection with the Miramichi Pulp Mill, near Chatham, N.B., was destroyed by fire June 18.

A large Allis-Chalmers-Bullock pump is being installed in the pumping station, Fredericton, N.B. This pump has a capacity of 3,000 gallons per minute.

The J. B. McManus Co., Memramcook, N.B., have been awarded the contract for double tracking on the Intercolonial Railway between Moncton and Painsec Junction, N.B.

The Royal Artificial Stone Co., Guelph, Ont., have been awarded the contract for the laying of cement walks and the building of a cement bridge at Brandon, Man.

A hospital will be erected at Souris, Man., at a cost of about \$12,000.

The Canadian Pacific Railway Co. will erect new section houses at Newdale and Strathclair, Man.

Cement sidewalks will be laid at Newdale, Man., this summer.

Messrs. Walter Woods & Co., Winnipeg, Man., are erecting a fireproof brick warehouse, four stories high, at a cost of \$55,000.

Morden, Limited, Brandon, Man., have been incorporated with a capital of \$50,000, to manufacture electric and gas fixtures, gas and gasoline engines, boilers, implements, etc. The provisional directors include M. W. C. Morden, J. Watson and J. B. Noble, Brandon, Man.

The ratepayers of the municipality of Brenda, Man., are negotiating for a rural telephone system.

The Great North Western Telegraph Co. have opened offices in Bannerman, Desford, Boissevain, Minto, Brandon, West Gretna, Bergman, Plum Coulee, Rowland and Portage la Prairie, Man.

Edmonton, Alta., is to have one of the largest brick manufacturing industries in the West, known as Pressed Bricks, Limited. This is to be a sand-lime brick industry of 40,000 capacity daily. The complete outfit is to be manufactured and installed by and under the supervision of A. Berg & Sons, Toronto.

Malcolm's Western Canneries are erecting a large abattoir at Medicine Hat, Alta. The building will be similar to the present one and will be 128x65 feet, three stories high with 12 feet basement. Orders have been placed for 600,000 brick, and machinery to the value of \$15,180 has been ordered and is largely on the ground here.

The ratepayers of Calgary, Alta., voted favorably on a by-law to raise \$125,000 by the sale of debentures for installation of a municipal telephone system.

The Saskatchewan Elevator Co. are erecting a 30,000 bushel elevator at Redvers, Sask.

The Brackman-Ker Milling Co., Victoria, B.C., have decided to erect 25 grain elevators in Alberta, to be completed this summer.

Lethbridge, Alta., has been made a divisional point of the Canadian Pacific Railway.

The Canadian Pacific Railway are making considerable improvements to the Crow's Nest Pass Railway.

The Strathcona Radial Tramway Co., Strathcona, Alta., are desirous of securing a franchise for the operation of a street railway system.

William Oliver, Lethbridge, Alta., will erect a wood-working factory there, at a cost of about \$30,000. It is his intention to also form a company for the manufacture of cement blocks, and erect a plant costing \$14,000.

The Rosthern Flour Mills Co., Rosthern, Sask., will erect a 100 barrel flour mill, costing about \$20,000.

The Regina Machine & Iron Works Co., Regina, Sask., have been incorporated with a capital of \$100,000. The company will erect a large foundry and machine works at a cost of about \$20,000. They will handle practically all classes of iron, steel or machine work.

The Bank of British North America will erect a bank building at Duck Lake, Sask., at a cost of about \$4,000.

The premises of the Vancouver Lumber Co., Vancouver, B.C., including about nine million feet of lumber, were destroyed by fire June 22. Loss about \$250,000.

J. A. Weart, Vancouver, B.C., will erect a fourteen story building at a cost of about \$450,000.

The Canadian Pacific Railway are considering the establishment of round-houses at Grand Forks, B.C.

P. D. McLaren, the Alberta representative of the Canadian Fairbanks Co., Montreal, has secured the contract for a Fairbanks-Morse gas producer electric light plant of 100 h.p. capacity for Lloydminster, B.C.

It is reported that a quantity of pure fire clay has been discovered at Perry Creek, near Cranbrook, B.C.

The Macdonald Co., Grand Forks, B.C., have two large contracts on hand for the Granby Co. One contract is for a large tank with a capacity of 100,000 gallons, and the other is for a mammoth flue dust chamber. The flue will be 15x13 feet inside measurement, and elevated 22 feet above the feed floor. 300 tons of steel will be required for the construction.

The Golden West Soap Co. will erect a factory at Burrard Inlet, Vancouver, B.C., at a cost of about \$150,000.

The offices of the Brunette Saw Mills Co., Sapperton, New Westminster, B.C., were destroyed by fire recently. Loss about \$500,000.

The Victoria Gas Co., Victoria, B.C., will make considerable extensions to their plant.

PUBLICATIONS.

HEATING FURNACES.—Rockwell Rod heating and bolt heating furnaces are described in two bulletins issued by the Rockwell Engineering Co., 26 Cortlandt St., New York, manufacturers of these. Illustration of complete furnaces are given together with diagrams and tables of sizes.

VENTILATING FAN.—A fourteen page booklet illustrating and describing the double Blackman reversible fan for ventilating purposes. A feature of this fan is that the time honored broad blades have been discarded in favor of a larger number of narrow blades of strip metal, each pair being in one piece. They are manufactured by James Keith & Blackman Co. Limited, and sold by Blackman Export Co., 70 Finsbury Pavement, London, E.C.

CONCRETE MACHINERY.—Bulletins have been issued by the London Concrete Machinery Co., London, Ont., manufacturers of cement machinery and cement brick, block and tile machines. The bulletins describe the various range of machines and give illustrations of some of the artistic and high class product.

ELECTRICAL INSTRUMENTS.—A catalogue describing the plant of the Evershed & Vignoles, Limited, Acton Lane Works, of England, represented in this country by J. F. B. Vandelaar, 3 Dineen Building, Toronto. The different lines of electrical instruments made by this firm are shown. These include standardizing instruments and testing apparatus as well as special electrical indicators of various styles for different purposes. Further information regarding these may be had from the Canadian representative.

CASSELLA COLORS.—Immedial Yellow Olive G is the subject of the March bulletin issued

by the Cassella Color Co., being a supplement to their book on Cotton Dyeing. A number of the shades produced by this dye stuff are shown, which include some of the very fastest made shades as well as the all important khaki shades.

ELECTRICAL EQUIPMENT.—A bulletin of 24 pages containing many illustrations gives a description of the electrical equipment at the Hornell shops of the Erie railroad. It is issued by the Westinghouse Electric and Manufacturing Co., being one of a series to be published showing what has been done in the way of improvement in methods of operating tools and handling work in railroad repair shop practice.

BILLING TYPEWRITERS.—The Remington Typewriter Co. are sending out a very complete catalogue of 40 pages describing the usefulness of the Remington billing typewriter, its wide application and universal use by firms in every line of business.

TRUSSED CONCRETE.—The Kahn system of reinforced concrete as applied to factories and mills is dealt with in a catalogue issued by the Trussed Concrete Steel Co., Toronto. According to it, the essentials in factory construction may be summed up as: Reasonable first cost, low maintenance cost, speed of erection, freedom from vibration, adaptability and above all fireproofness. The manner in which these conditions are met with in the Kahn system are pointed out and demonstrated by illustrations of numerous buildings erected in accordance with this system.

TIME CLOCK.—The Marks of Simplicity is the title of a new catalogue describing the advantage of "self-computing" system of keeping employee's time by graphic principle instead of print-hour figures. A copy will be mailed on request by Henri Viau, La Presse Building, Montreal.

WON FIRST PRIZE.

Mr. James Crombie, foreman boiler maker of the Sawyer & Massey Co., of this city, who recently attended the joint convention of the International Railway Boiler Makers' Association and the Master Steam Boiler Makers' Association, held in the city of Cleveland, has returned with honors, as well as having a most enjoyable time.

Among the many contestants Mr. Crombie won the first prize with his essay on "How to Heat and Drive Steel Rivets," for which he received \$50 in gold.

LEDOUX'S NEW CARRIAGE BUILDING.

Owing to the volume of business the above firm are now handling, they have found their present premises inadequate, and have acquired the property adjoining them on the west, upon which they will erect a modern building of some eight stories. This building will give them with the present building, some 138,800 square feet of flooring, making one of the largest carriage buildings of its kind in Canada. It is the intention of the firm to utilize the ground floor of the new building as a garage, and will fit same up with all the latest appliances for the proper overhauling of automobiles. The ground floor will be 100 feet square, and will be the largest and most modern of its kind in Canada. The next three floors will be utilized as showrooms, both for carriages and auto-

mobiles, and the remaining floors for the proper housing and storing of same. The building will be made as fire-proof as a building of this kind can be made, and everything that can be done, will be done to safeguard the interests of its patrons. The front will be of pressed brick, in keeping with their other buildings. The first three floors will be of steel construction, and the balance of mill construction.

GREATER THAN EVER.

Upwards of \$350,000 will be spent on new buildings and improvements at the Canadian National Exhibition this year, namely, Grand Stand, \$217,000; Horticultural Building, \$90,000; Railway Exhibits Building, \$40,000, making something like a million dollars spent upon new permanent buildings since the century opened. No other established annual exhibition can show a like record. The new grand stand will be a feature. It is the largest and most complete stand on the North American continent and will cost complete \$217,000. Its capacity and dimensions are as follows:—accommodation 15,000 people; length 693 feet; width 115 feet; height 60 feet; area covered, 77,940 square feet or 1.79 acres; weight of steel used 1,225 tons; seat stringers, 24,200 lineal feet. The steel used if applied to rails would reach from Toronto to Hamilton, a distance of 40 miles.

PRESTON FIRM EXPANDING.

Even in these days of industrial growth, the history of the Metal Shingle & Siding Co., of Preston, Ont., is remarkable. From a small beginning, about ten years ago, they have grown rapidly until their goods are now sold in every part of Canada, and in many foreign countries as well.

At the close of last year, their business in Eastern Canada having assumed large proportions, it was decided to open a branch factory in Montreal. The directors were fortunate in securing the large building at the corner of St. Catharine Street and DeLorimier Avenue, known as the old Canadian Pacific Railway shops, and work was immediately begun, to fit up the building for its new purpose. A large warehouse was erected with "Acorn Quality" corrugated sheets, and other extensive improvements made to the property.

The work of installing machinery has now been completed and the plant is in full running order. The Montreal factory has a large capacity, and, with the increased production, the company are now able to make prompt shipments to their customers everywhere. The manager of the Montreal branch, A. K. Cameron, whose successful experience on the road in Ontario, marked him out for the promotion.

Within the past couple of weeks, the Metal Shingle & Siding Co. have also opened a branch office and warehouse at 100 Esplanade Street East, Toronto, where a stock of all their principal lines will be carried. L. B. Beath, who formerly represented the company in New Ontario, has assumed management of the Toronto branch.

Mr. H. W. Bichell is in charge of the branch recently opened at 50 Adelaide Street West, Toronto, by the International Steel Co., Montreal.

YUKON ENTERPRISE.

An important work contemplated in the near future is the construction of a large power house of approximately 1,000 h.p. near the western boundary, on the Yukon River some 50 miles below Dawson, for the purpose of furnishing electrical power to dredges on the Forty-mile Creek and its tributaries in Alaska and the Forty-mile and Klondike Rivers in the Yukon Territory. The company has a power house in Dawson and furnishes this city and Grand Forks with electric light, and Dawson with water for household purposes and a hydrant system for fire purposes. On the completion of the power house at the boundary the company intends doing away with the works at Dawson, other than to hold it as a reserve in case of accident to the new plant. The fuel used in their present plant is coal taken from the company's mine on Coal Creek, at which place the proposed plant is to be situated, the idea being that it is cheaper to convey electricity than coal. The output of the mine last year amounted to some 3,000 tons, the entire output being used by the company in Dawson. This coal landed at Dawson by the company's steamer cost about \$12 per ton. With the plant at the mouth of the mine the coal costs about \$2 per ton.

PERPETUATING NEWSPAPER COMMENT OF THE PEACE CONFERENCE.

The binding of the enormous scrap book of newspaper clippings, relating to the recent International Peace Conference in New York, is now being completed. When finished, it will be the largest book of its kind in the world. It is to be boxed and crated and sent to the Hague within a few days, where it will be presented to the Hague Congress. The work of securing and compiling the 33,000 press notices from 4,500 newspapers contained in this remarkable volume, was engineered by Burrelle, the New York press-clipping expert, who for some time, has had a large corps of skilled workers busily engaged in this gigantic undertaking.

The bushels of clippings were carefully assorted, and divided into sections, according to states, in alphabetical order. These were then neatly trimmed and pasted upon sheets of finest parchment bristol board and subjected to pressure. There are nearly one thousand pages of ten columns each, which measure 28x22 inches,—the approximate length and width of the volume. With its heavy double boards and black seal leather binding, the monumental work will be more than a foot thick and weigh about 250 pounds. When open, it will extend five feet in width. As nearly as can be estimated, there are 146,000 running inches of printed matter, which if made into a ribbon one column wide, would be more than two and one-quarter miles in length. The comment upon the conference by New York City papers alone, is enough to fill the pages of seven regular editions of any standard daily.

When Burrelle made the famous Dewey scrap book, which was presented to the Admiral in 1898, the Chicago Tribune said:

"In the language of the street, the word scrap has two meanings, but there is no suspicion of a pun in presenting Admiral Dewey with a scrap book, celebrating his fighting powers. If it were a pun, it would be the heaviest on record, for the book weighs 350 pounds. It would also be decidedly

flat, being in book form. As it consists of over 10,000 clippings, it might take some time to find the point. But it is not a joke at all. It is only a novel and handsome way of letting the Admiral know what the 20,000 American newspapers have been saying about him, since his famous 'scrap' at Manila. He may congratulate himself, not only on being the subject of the largest book ever made, but also on being the first man who ever inspired so voluminous an utterance without any abuse in it."

That the punsters will get busy on the latest book turned out by Burrelle, is a foregone conclusion, for the reason that here is a scrap book going to the very persons who hope to prevent future "scrapping" among the nations. The new album is larger in every respect, than was the famous Dewey book. Some of these clippings are from the pages of THE CANADIAN MANUFACTURER.

INVENTOR'S WORK.

For the benefit of readers is published a list of Canadian patents recently secured through the agency of Messrs. Marion & Marion, patent attorneys, Montreal, Canada, and Washington, D.C. Any information on the subject will be supplied free of charge by applying to the above named firm. Edward Rennie, Halifax, N.S., shoe heel attachment; Louis A. Desy, Montreal, Que., excavator beam; Messrs. J. A. and C. O. Burlman, Whitewood, N.W.T., foot-power hammer; William Maloney, East Sherbrooke, Que., threshing means for harvesters; George T. Wilford, Galt, Ont., ratchet wrench; Hermann W. Dorken, Montreal, Que., ice skate; Omer Marchand, St. Paul l'Ermite, Que., paint; John S. Scott, Fredericton, N.B., saw set gauge; Thomas E. Davis, Crystal City, Man., carpet stretcher. "The Inventor's Adviser," a book on patents, will be sent to any address upon request.

DOLOMENT—A NEW FLOORING.

The Canadian Doloment Co., Limited, who have recently established offices in the new Mark Fisher Building, Victoria Square, Montreal, are introducing to the Canadian market a new flooring for factory, office, and general purposes, which has already met with much favor in Germany and England.

Doloment, as the new flooring is called, consists of two layers—viz. a thick under insulating layer, and an upper impervious finishing or decorative layer. This combination gives a smooth, sanitary, dustless and delightfully resilient flooring, free from cracks—even the corners of the walls are rounded—and affording considerable possibilities in color and design.

In the large factories of Siemens & Halske, Germany, Doloment has been used for some time, and three years' use in the workshops seems to have made no impression on it. In their chemical laboratories it is favored as being unaffected by acids, and in one shop where there were heavy machines from which oil was constantly dripping, it was found that oil had no deteriorating effect. In a new huge factory, seven stories high, which the same company are erecting, they are laying nearly the whole place with Doloment.

The Canadian Doloment Co., Limited, received their charter January 1 last. The capital is all British, and has been subscribed exclusively for the Canadian trade, showing the faith of the promoters in Doloment and in Canada. On April 10, the company opened

a factory on St. Antoine Street, Montreal, but already, after only two months, they are looking for larger premises. The new offices in the Mark Fisher Building are large and attractive, and are floored with Doloment in attractive coloring and design.

CANADIAN PATENTS.

N. C. Merrill, Vancouver, B.C., folding beds; F. W. Morris, Victoria, B.C., process for production of aluminum oxide; L. Rod Montreal, Que., non-refillable bottles; W. D. Smith, Montreal, smoke consumers; E. Ross, Woolwich Tp., Waterloo, Ont., heels for boots and shoes; H. Ditchburn, Rosseau Ont., stove pipe connectors for nesting pipes. T. H. Lake, Lindsay, Ont., manure loaders. L. H. Slaght, Toronto, Ont., mangles; W. Maloney, Smiths Falls, Ont., threshing means for harvesters; G. T. Wilford, Galt, Ont., ratchet wrenches; H. W. Dorken, Montreal, Que., ice skates; O. Marchand, St. Paul l'Ermite, Que., paints; M. Matthews-Barcondale, Ont., elastic fluid; A. M. Russell, Montreal, Can. openers; J. S. Scott, Fredericton, N.B., saw set gauges; E. D. Wilde, Winnipeg, Man., tables; E. K. Bell, St. George, Ont., hand trucks; H. A. Johnston Toronto, starting machines for internal combustion motors; O. W. Meissner, Westmount, Que., shaft rotating means; A. M. Munn, Wahnapiatae, Ont., saw setting and filing instruments; D. B. McRae, Gore Bay Ont., saw-fitters; L. N. Soper, Guelph, Ont., upright pianos action; L. H. Cortright, St. Johns, N.B., non-refillable bottles. The above Canadian patents were issued by Fetherstonhaugh & Co.

A NEW LUBRICANT.

The opening feature of the session of the convention of the American Institute of Electrical Engineers in Niagara Falls, N.Y. on the morning of Thursday, June 27, was the address by Mr. Edward G. Acheson whose subject was "Deflocculated Graphite." This is something quite new in the industrial world, and the invention for such it seems best to term it, is a result of what is destined to be known as the "Acheson Effect." It is interesting to tell of the interest the convention of members of the American Institute of Electrical Engineers displayed in the subject, the importance of which is just dawning. The various tests made by Mr. Acheson in the course of his demonstration commanded general attention. He displayed three bottles, in one of which was deflocculated graphite suspended in water; in the second was deflocculated graphite in kerosene oil, and the third a mixture of graphite and lubricating oil. Possibly the demonstration that excited most surprise was when Mr. Acheson dropped a piece of deflocculated graphite, containing not more than three grammes (which makes a chunk not larger than a small chestnut) into a quart bottle, saying that that quantity of graphite was sufficient to mix with a quart of lubricating oil and would give 33 per cent. The small piece of deflocculated graphite was hardly visible in the bottle, but it was related that the presence of that much deflocculated graphite in oil would make a wonderful difference in its efficiency, practically making a new lubricant. But as no part of Mr. Acheson's address lacked interest it is given in full elsewhere, it being evident that the industrial world is greatly interested

Chemical Society Convention.

Commencing on Thursday, June 27, the thirty-sixth general meeting of the American Chemical Society was held in Toronto with headquarters at the School of Practical Science. This gathering was composed of many notables in the chemical arena from all parts of Canada and the United States. A three days' program included the reading of several dozen papers, a trip to the Guelph Agricultural College, a visit to Cobalt, garden parties, receptions and dinners coming so closely one after the other, such as to be confusing to any but the analytical mind of the chemist. Those responsible for the successful carrying out of the elaborate programme of events were:

Programme committee—Marston T. Bogert, William A. Noyes, Wilder D. Bancroft, Charles L. Parsons, J. Bishop Tingle, Frank T. Shutt, W. H. Ellis. Local committee—Maurice Hutton, chairman; W. Lash Miller, secretary. Sub-committees—On accommodation for visitors, J. J. Graham, chairman; on local arrangements, W. H. Ellis, chairman; on excursions, A. Nieghorn, chairman; on Guelph meeting, R. Harcourt, chairman; Press committee, Alfred Burton, chairman.

At the opening meeting after addresses of welcome on behalf of the city of Toronto, by Mayor Coatsworth and Ald. Graham, the President, Prof. Marston T. Bogert replied on behalf of the Society, which is the third largest of its kind in the world. He eulogized the splendid work which had been and was being done by Canadian chemists.

IMPORTANCE TO MANUFACTURING.

He mentioned the importance of laboratory research in connection with manufacturing concerns. He declared that the manufacturer who despised the assistance of the chemist would be hopelessly outdistanced when brought into competition with one who employed a skilled graduate. He pointed to the growth of coal tar industries in Germany as a proof of this. There were mistakes on both sides he admitted. The manufacturer is too prone to look on the university man as a visionary and the latter is somewhat apt to make too light of the practical application of his knowledge. Prof. Bogert cited a number of instances of what chemistry has done for the world. The bessemer process had added two billion dollars to the annual worth of the world's products. Copper purified by chemical means had made electrical transmission to long distances possible. Explosives had revolutionized mining and engineering. Science applied to farming had made the farms of the United States worth \$28,000,000,000 to-day and their products, \$7,000,000,000 more.

The organization is divided into branches where the various subjects were read and discussed in sectional meetings. These include general and physical chemistry; organic chemistry; inorganic chemistry, agricultural sanitary and biological chemistry and industrial chemistry.

The papers under the head of Industrial Chemistry, of which Prof. W. H. Ellis was chairman, included:

The Volatile Oil of Pinus Serotina, C. H. Herty.

The Optical Rotation of Spirits of Turpentine, C. H. Herty.

The Constants and Variables of the Parr Calorimeter, S. W. Parr.

Pure Coal and the Deterioration of Coal Samples, W. F. Wheeler and S. W. Parr.

Determination of Benzene in Illuminating Gas, L. M. Dennis and Ellen S. McCarthy.

Deflocculated Graphite, E. G. Acheson.

Examination of Linoleum, Percy H. Walker.

An Experimental Gas Furnace for Ceramic Purposes, Frederic Bonnet, jr.

Note on the Fixation of Nitrogen in Moist Air by the Silent Electric Discharge, S. Avery and Mildred Parks.

The Ontario Cobalt Nickel Arsenides and Silver. Is the Silver Deposition by Replacement? Chas. E. Swett.

Some Experiments on the Amount of Volatile Matter in Coal, A. Bement.

Canadian Shales and Products, Charles Baskerville and W. A. Hamor. (Illustrated).

Ultramarine and Pyrophyllite, Charles Baskerville.

The Chemical Reactions During Water Treatment, Edward Bartow and J. M. Lindgren.

The Estimation of Carbon in Iron and Steel, E. P. Moore and J. W. Bain.

ABSTRACTS OF PAPERS.

Edward G. Acheson: Deflocculated Graphite. Experiments on clays, carried out in the year 1901, showed that by adding vegetable extracts—gallo-tannic acid, extract of straw—to moderately plastic weak clays, their plasticity was increased, the amount of water required to produce a given degree of fluidity was lessened, and the size of the particles in suspension was much reduced.

The effect on finely divided graphite is much the same; and by the use of a little gallo-tannic acid and a few drops of ammonia, suspensions may be prepared which last indefinitely. Extensive tests are now being made to determine the value of this "deflocculated graphite" as a lubricant, with most encouraging results.

S. Avery and Mildred Parks: Note on the Fixation of Nitrogen in Moist Air by the Silent Electric Discharge. The writers review the work of Berthelot, who concludes that the action is a catalytic one to be expressed as follows: $N_2 + H_2O - 5O = 2 HNO_2$.

He lays special emphasis on the fact that no nitrous acid is formed. Following in part the work of Berthelot, but working for shorter periods and using the Griess test for nitrous acid the writers found about one tenth of the fixed nitrogen present as nitrous acid. The longer the action the less was the proportion of nitrous acid present. Any agent capable of absorbing ozone, as a piece of rubber placed in the field of the discharge, enormously increased the proportions of nitrous acid; but the observation is inconclusive as nitric acid might be reduced as well as ozone absorbed. Conducted at a tempera-

ture high enough to destroy ozone, nitrous acid is found abundantly in the cooled products, but this is also inconclusive.

If a solution of nitrous acid as formed be treated for some time with air containing ozone, but no oxides of nitrogen, every trace of nitrous acid disappears.

While the results obtained are not entirely conclusive, the writers are strongly inclined to the opinion that the formation of nitric acid is due to the oxidation of lower oxides by ozone in the presence of water.

Edward Bartow and J. M. Lindgren: Some Reactions During Water Treatment. A laboratory attempt to soften the water from the University of Illinois water supply did not meet with theoretical expectations. Therefore, series of tests were made to determine the amount of calcium and magnesium removed by each addition of reagent. The mineral matter in the water consists almost entirely of the bi-carbonates of sodium, magnesium and calcium.

Two series of tests were made on the University of Illinois water supply, and one on a similar water from Bloomington, Ill., and three on a water of a different character containing alkaline earth bicarbonates and sulphates. It was found that after the neutralization of carbon dioxide the calcium is removed. A reaction then takes place between the reagent and sodium bicarbonate, when present, and finally, magnesium is removed. The reactions within the limits of solubility of the precipitates take place in order almost quantitatively, with but little over-lapping.

The experiments suggest the necessity for considering the presence of sodium bicarbonate in water treatment, and the possibility that in some cases only the partial removal of the alkaline earth carbonates may be most practical.

Six tables showing the analytical data obtained and six plates showing diagrammatic representations of the results accompany the paper.

A. Bement: Some Experiments to Determine the Amount of Volatile Matter in Coal. These experiments were undertaken for the purpose of determining whether it would be feasible to continue the volatilization of coal to a point within a reasonable length of time at which it could be considered to have been expelled. To ensure that no combustion would occur, an inert gas was continually passed through the crucible under slight pressure during the heating process. For convenience in preparation hydrogen was employed and the charge was heated by an ordinary Bunsen burner. The result was, that even after heating for periods of 100 and 120 hours, a loss still continued, and the indications were that it would have gone on for additional periods of equal lengths of time, at least.

E. P. Moore and J. W. Bain: The Estimation of Carbon in iron and steel. During the solution of iron and steel in acidified potassium cupric chloride, it has been suspected that there is an escape of volatile hydrocarbons. The evidence has been based upon indirect methods of analysis; and by arranging for the direct estimation of any evolved hydrocarbons, it has been found that there is a constant loss during the operation, of such slight magnitude, however, as to be negligible for ordinary analytical purposes.

The Manufacture of Forgings.

PLANT OF THE CANADA FORGE CO., WELLAND, ONT. ONLY ONE OF ITS KIND IN CANADA.

Previous to the nineteenth century nearly all iron work was forged. The period of cast iron followed when everything that could be cast was so made, on account of its cheapness. The last half of the century, however, saw an enormously increased use of both iron and steel forgings. Of these there are three kinds classified according to the method of their manufacture into hand forgings, drop forgings, and those machine hammered. The first are the product of the individual and his helper with the aid of a small air blast forge, anvil, and suitable tongs, hammers and shaping tools. The blacksmith, whose name in French, forgeron, is more indicative of his calling, is a feature of every country village, as well as a necessity in manufacturing establishments. His scope is limited, however, and machine operations now do a large

particularly so in various classes of machinery and power apparatus. Coupled with this the fact that no plant existed in Canada for the exclusive manufacture of heavy forgings led to the organization of the Canada Forge Co., the construction of whose plant was commenced on October 15 last, and on April 1, 1907, was completed fully equipped and in running order with a gang of about 40 men employed, turning out forgings for all parts of the Dominion. Great credit for the establishment of this model plant, the completeness of detail, the splendid arrangement of machinery and apparatus, the thoroughness of the work done, and the labor saving devices by which hand handling of material is almost nil, is due Mr. T. J. Dillon, president and general manager, who after making arrangements for the firm to locate

surplus heat and in purifying the atmosphere at all times of the year. This building is equipped with furnaces and steam hammer where the actual forging operations are done. The machine shop separated from the forge shop by an ample shop yard is 100x40 feet high, and lighted from all sides and the roof. Besides a motor generator set for supplying the lighting and power for the motors the shop contains an equipment of high grade machine tools for machining various forgings as ordered. In some instances orders call for forge only and again they may be sent out rough finished or finished to size as required by the consumer.

THE MAKING OF FORGINGS.

Coming to the plant by way of the siding from the two lines of railroad one finds him-



THE MANUFACTURE OF FORGINGS—MACHINE SHOP CANADA FORGE CO.

share of his former work. Drop forgings are machine made and confined to those of small size. It is worthy of passing note that the first plant for the exclusive manufacture of these in this country is at present under construction in the same Ontario town as the one about to be described. A press containing a top and bottom pattern, the die and counter, receives the roughly shaped heated metal and at a single blow brings it to the desired shape. The third kind of forging, including those of from five pounds to five tons or over, are related to both the others in that the forging is made by successive hammering or compression, as in the hydraulic system, and the power is supplied by mechanical apparatus instead of by hand.

Steel forgings are coming more and more into use on account of their greatly increased strength for equivalent weight. This is par-

in Welland has been in constant attendance, superintending operations and having every feature carried out under his personal supervision. Mr. F. C. Hirsch is secretary and treasurer.

THE PLANT.

The plant consists of two main buildings situated in the company's grounds facing the Grand Trunk and Wabush railways with which they are connected by a spur line. These buildings are the forge and machine shop, being situated at a distance of 100 feet apart, and connected by an industrial railway and overhead travelling crane. A notable feature of the forge shop which is 100x50 feet is the splendid ventilation and lighting arrangements, it being possible to open almost entire sides and ends of the building in the summer months, while roof ventilators placed over the furnaces aid in getting rid of the

self in the stock yard where from 400 to 500 tons of steel varying in size from 4x4 inches to 12x12 inches, with equivalent in slabs is piled. It consists of the highest grade basic hearth steel, ranging in carbon from 10 to 60 points, from Pittsburg and Buffalo. While the siding goes to both sides of the forge shop it is met at some distance by a spur of the company's industrial railway by means of which stock can be loaded directly from the railway cars to the industrial cars, or the operation reversed with the finished product. A derrick in the yard is used for handling the material, bars of which weighing up to ten tons may be seen. Hoisted from its pile in the yard to the industrial car or taken from a freight car on the siding the bar is conveyed by means of the industrial railway down the centre of the forge shop. Here it is lifted from the car by means of a Canada Foundry

Co.'s steel jib crane situated in a position to swing the material to and from the furnaces and steam hammer.

In the case of a large forging it is taken to the position in front of the larger swindell heating furnaces where six one inch jets of natural gas from the company's well, combined with an air blast from a Buffalo Forge Co. blower direct connected, supplies the heat at a uniform and controllable temperature for heating the bar. The furnace is provided with drop doors easily operated and when the material is swung into place in the furnace it is easily watched. Fires are started at 4 a.m. and the heat is ready at 7 to commence operations. One hundred thousand cubic feet of gas is consumed per day in the two furnaces employed, the large one using 60,000 and the smaller one 40,000.

After the steel has been changed from its original black color to a cherry red, then to a bright red, finally to a whiter heat, it is taken in hand by a special device controlled by the jib crane and with little manual effort is swung to the anvil of the steam hammer.

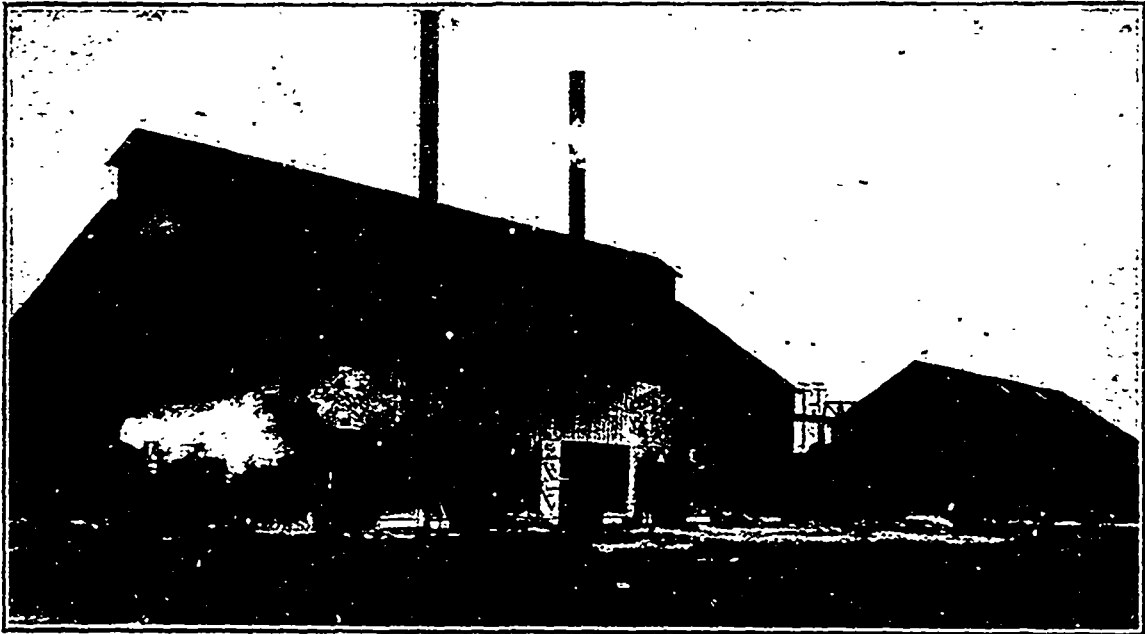
On reaching the machine shop it is first laid out and accurately measured to see that it conforms to specifications. The rough ends are then sawn off by means of cold saws. If "forge only" has been ordered it is ready for shipment. If rough finish specified it is planed down or machined to within one-eighth inch of working size, and if the finished article is required it is taken care of here and brought to within one-thousandth part of an inch of what the order calls for, if necessary.

IN THE MACHINE SHOP.

On entering the machine shop the splendid arrangement is at once noted, along each side of the main centre aisle are installed a row of machine tools, each row operated by a separate row of shafting running from a 20 h.p. Westinghouse induction motor. Overhead runs the travelling crane connected with the machine shop and by means of a switch at the door may be transferred to either one of two tracks which run directly overhead the two lines of machine tools. Starting at the

gears are contained in the head stock and change of speed or gear is made with facility by means of levers. At the lower end of the shop and crossing the aisle made by the two rows of machine tools is placed at 36x36 inch by 14 foot heavy forge planer built by the London Machine Tool Co., with two heads on the cross rail. It is capable of taking care of the largest forging made at this plant.

The most conspicuous machine in the shop, one end of which reaches to the planer on the opposite aisle to the machines already described, is a 36 inch triple gear Bertram lathe, 43 feet in length running parallel to the aisle. This machine was made specially for the Canada Forge Co., and will take shafting or forging 35 feet in length. It is equipped with extra wide cones and special gearing especially adapted for forge work. The last machine in the row is an extra heavy forge lathe 42 inches triple geared manufactured by Niles Bement Pond. It was equipped with a special crank shaft chucking device of the company's own design for turning pins of various sizes for crank shafts. By means of



THE MANUFACTURE OF FORGINGS VIEW OF CANADA FORGE CO.'S PLANT WITH FORGE SHOP IN FOREGROUND.

This hammer is a double frame, 3,500 pound Niles steam hammer. It is under perfect control of the operator and a heavy or light blow struck as desired. A special sheive is one of the features of the crane by means of which the work is turned, presenting any surface desired. In the case of larger forgings it is necessary to charge and re-charge them in the furnace as they cool rapidly to a point that makes forging impossible.

The steam hammers in this plant are both mounted on cubes of concrete, the larger one resting on a nine foot cube and the 2,000 pound steam hammer resting on a seven foot cube.

The steam hammer is also used for cutting off bars which is done with the greatest of facility even with the largest size. When the desired shape and size has been reached a five ton Niles overhead travelling crane takes the forging when it has been cooled directly to the machine shop.

In the case of a crank shaft or shaft of any kind after being laid out and sawn off it is centred and taken to the 14 inch Niles slotter for slotting out the throw of the crank shaft for the pins. Next in line is situated a four foot radial drill built by John Bertram & Sons. This is a high class automatic machine and is used for all drilling required. The special lathe for machining smaller classes of forgings is a 22 inch high speed London Machine Tool Co. lathe, of which the general manager spoke in highest terms. All

it a shaft may be inserted and pin turned up from five to fifteen minutes, depending on the size. This chuck weighs 1,200 pounds, and is so designed that it is impossible for the shaft to slip and any number of the same size may be turned up without extra adjustment.

POWER AND LIGHTING.

Power is supplied from the Ontario Power Co., at Niagara Falls, coming to their transformer house situated near the machine shop at 2,000 volts, and stepped down to 220. The machine shop is lighted by Westinghouse arc lamps and incandescent and in the forge shop by Jandus dust proof arc and incandescent, but at this time of the year there is little artificial required owing to the natural lighting of the building. Two 20 h.p. Westinghouse induction motors run the length of shafting in the machine shop.

A 20 h.p. induction motor is direct connected to a 30 k.w. general electric generator

for supplying power to the travelling cranes and for lighting. It is intended to use this motor later to run additional shafting and direct connect the generator to a 30 h.p. motor. In the transformer house are three transformers aggregating 90 k.w. high class marble paneled switch boards with instruments are installed both for light and power.

Additional equipment in the machine shops includes a tool room lathe for repairs and a tool room with a four barrel Bowser oil tank, valves, bolts, twist drills, pipe cutters, nut cutters, etc.

SOME DETAILS.

It is intended soon to run the plant both night and day as was the case when first started. About 40 men are now employed and it is planned soon to have about 55 employed.

The offices of the general manager and the staff are adjacent to the machine shop and are quite attractive.

The fire hydrant is situated within 50 feet

of each shop connected with a town water-works system. The company has its own reel and hose.

It has been the policy of this company since starting to give greater attention to quality than to tonnage. The result has been that the number of return forgings since commencing has been practically none at all, although the making of a forging requires great skill and piping may have been in a forging appearing only after sent to the customer, through no fault of the makers.

The Canada Forge Co. manufacture anything in the line of forgings, including shafting of all kinds, crank shafts, for steam and gas engines, connecting rods and special work of every description, in fact, forgings of every description in the rough or finished state varying in weight from 5 pounds to 10,000 pounds each.

It is the establishment of such plants in Canada to-day that gives a tone of confidence to Canada's future manufacturing possibilities.

Concrete Piles For Permanent Harbor Sheds at Montreal.

A new departure in foundation work for Canada has been made by the Harbor Commission in Montreal. In 1903 contracts for 14 permanent sheds for the port of Montreal were let to Messrs. Peter Lyall & Sons, of these seven are nearing completion, while the others are being started this summer. In connection with the foundations for these latter the use of concrete piles was discussed and finally adopted. The wharves on which the sheds are built consist of a timber crib filled in at the rear with material dredged from the harbor. For this material piling was of course necessary and in the sheds already erected wooden piles were used. As the tops of these wharves are about 25 feet above low water line, the greater part of these piles will be subject to alternate dryness and moisture, and consequently be subject to decay. For this reason the use of concrete piles recommended itself to Mr. Cowie, chief engineer of the Harbor Commission, as being more permanent. After going into this matter thoroughly it was decided to use the Raymond system of concrete piling, providing, of course, that this system should first pass tests satisfactory to Commission and their Engineer.

This system is the invention of Mr. A. A. Raymond, of Chicago. It was first demonstrated in the United States in April, 1901, and the first actual work was performed in June of the same year.

METHOD OF PILING.

The method may be briefly described as follows: A collapsible steel pile core, of the desired size and shape, is encased in a thin, closely fitting sheet steel shell. The core and shell are driven to the required depth by means of a pile driver fitted with a steam hammer. The core is so constructed that when the driving is finished, it is collapsed and loses contact with the shell, so that it is easily withdrawn, leaving the shell or casing in the ground to act as a mould for the concrete and to protect it from back pressure, which would distort the pile, and from the admixture of foreign matter which would

impair the strength of the concrete. When the core is withdrawn, the shell is filled with Portland cement concrete, which is tamped during the filling process.

The following are the points of superiority which recommend themselves to the user, of the Raymond pile over other concrete and wooden piles.

1. A shell or form is used for every pile. This form is such that it can be inspected before the concrete is placed, thus assuring perfection for every pile.

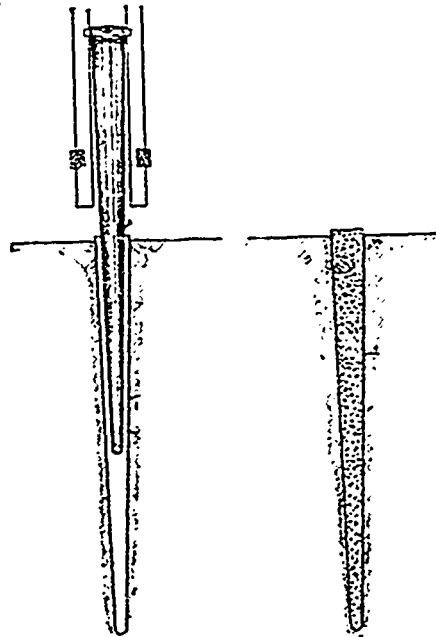


FIG. 1 SHOWING PILE CORE COLLAPSED AND PARTLY WITHDRAWN FROM THE SHELL. ALSO COMPLETE CONCRETE PILE WITHOUT REINFORCEMENT.

2. The size and shape of these piles is such as to develop the maximum amount of bearing value.

3. When necessary the piles can be easily reinforced.

4. These piles admit of being more rapidly placed than any other concrete pile.

5. With this system there is no driving on the concrete and therefore no possibility of fracturing the concrete.



FIG. 2—TEST PILE NEARLY DRIVEN.

6. As compared with wooden piles this pile is superior in its bearing capacity, and of course cannot be destroyed by the action of water.

The use of the shell is the distinctive feature of the Raymond System, and this feature makes the Raymond pile one that can be absolutely depended on to meet all requirements and produce a perfect pile. With this shell every pile can be inspected after being driven, a thing which can certainly not be said of any other pile, driven to date. Apart from this point the use of a shell recommends itself as a very necessary protection to the green concrete from quicksand, silt, soft mud or any porous or unstable material. The shell is strong enough to withstand the soil pressure when the core is withdrawn and, when filled with concrete, to withstand the additional pressure caused by driving adjacent piles. It is generally made of No. 20 gauge sheet steel, but in driving in very soft soil No. 18 gauge has to be used sometimes.

The tapering shape is another distinctive feature of the Raymond Pile. Cores for driving these piles are made in the following sizes:

20 feet long, 20 inches diameter at top, 6 inches diameter at point; 25 feet long, 20 inches diameter at top, 8 inches diameter at point; 30 feet long, 20 inches diameter at top, 8 inches diameter at point; 35 feet long, 18 inches diameter at top, 8 inches diameter at point; 40 feet long, 18 inches diameter at top, 8 inches diameter at point.

From the above dimensions it will be seen that all these piles have a considerable taper. This shape undoubtedly effects an economy in the number of feet of piling necessary.

producing at the same time a greater bearing capacity. When this pile is being driven, it is bound to drive harder with each blow since it has to increase the size of the hole with each blow for the entire distance of its penetration into the ground. In the case of a tapered pile the load is uniformly distributed throughout its entire length. Thus, where a pile penetrates the hard stratum lying near the surface and into softer underlying material, the bearing value of this upper stratum is fully developed by the large wedge-shaped pile, while it would be almost lost with a straight pile.

The placing of reinforcement, when necessary, is a simple matter with the Raymond pile. The reinforcing material is inserted when the concrete is being put in, and is simple and in plain sight.

The question of the time required to place these piles is another very important one. They can be placed more rapidly than any other concrete piles, as when the shell is driven the core can be quickly withdrawn, and the driver turned to drive another shall while the one already driven is being filled. As compared with wooden piles the economy of time is very considerable, as a much smaller number of piles is required, and the time required to do excavating, sheeting and pumping, as well as to put in additional masonry, is saved. The rapidity of the work is, of course, more or less governed by local conditions, and depending on these conditions, the number of piles that can be driven with one driver may vary from ten to forty a day.

The absence of driving on the concrete is

availability of material, the character of the soil, the number and spacing of the piles, and the general labor conditions.

While concrete piles necessarily cost more per lineal foot than wooden piling, the economy in the use of concrete piles as against wooden piles is very considerable. It is due first, to the much smaller number of concrete piles required to carry the necessary load, one concrete pile having, on account of its great

every blow of the same steam hammer or ten times as great as with the Raymond pile giving an ocular demonstration of the advantage of the wedge shape.

After the test pile had been allowed to set for ten days it was loaded with pig iron to 101,000 pounds, when a settlement of 5-16 inch was measured by the harbor engineer. The pile was then further loaded to 123,000 without any further settlement being

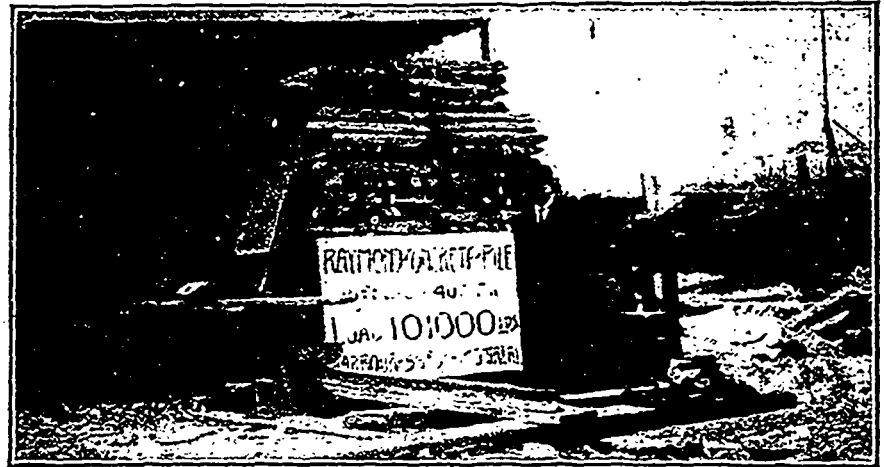


FIG. 3—TEST PILE LOADED WITH 101000 POUNDS. A. A. RAYMOND TO RIGHT.

size and taper, practically the carrying capacity of three wooden piles of the same length; and secondly, as concrete do not have to be put down below low water line, to great saving of excavation, sheeting, pumping and masonry generally required where wooden piles are used. For all ordinary foundation work, where it is not required to go to rock or hardpan, in which case an almost cylindrical core is used, the experience has been that it is preferable to use the 20 feet length, and if necessary to increase the number of piles, rather than to increase their length, the shorter pile with its greater taper having a greater bearing value per lineal foot of piling than the longer pile. In other words three 20 feet piles will have a greater bearing capacity than two 30 feet piles.

SHOWING THEIR CAPACITY.

It is manifestly impossible to say exactly what load these piles will carry, as the soil is not exactly the same in any two cases. All tests which have been made, indicate, however, that from two to three times as much can be placed upon a Raymond concrete pile as upon an ordinary wood pile of the same length under the same conditions.

In connection with the work for the Montreal Harbor Commission one Raymond pile was substituted for every two wooden piles and the contractors had to guarantee that one pile should stand a test load of 50 tons satisfactorily. On May 31 a test group of five piles was driven under the supervision of the Harbor Engineers. The test pile as well as the rest were driven to a penetration of 10 blows to the inch of a No. 2 Vulcan steam hammer. These piles averaged 18 feet in length, a 20 feet core being used. To actually demonstrate the difference in bearing capacity a wooden pile 12 inches in diameter was driven alongside the test group. This pile was 20 feet long, and similar to those used under the sheds already erected. The final penetration of this pile was one inch for

noticeable. As the compression under this load for concrete with a final set would be very nearly $\frac{1}{2}$ inch this was considered an eminently satisfactory test for concrete ten days old. The mixture used was 1:3:5. After this test Mr. Cowie expressed himself very much satisfied with the system and ordered the work to be immediately proceeded with. The contractors for this work are the Raymond Concrete Pile Co., of Canada, Coristine Bldg., Montreal. The total number of piles to be placed on this work will be 3,600, and the contractors hope to place the total number by the end of October, using two drivers, it being figured that each driver will average 20 piles a day.

IDEAL CONCRETE CO. ENLARGES.

The Ideal Concrete Machinery Co., of South Bend, Ind., have completed a deal for the purchase of the plant, business, patents, stock and good-will of the White Cement Machinery Co., of Jackson, Mich., thereby bringing into the "Ideal" family a number of machines that makes the line wonderfully complete, and will doubtless result in practical control of the concrete machine industry.

The former "White" machines will hereafter be manufactured with the Ideal machines, and will be known as the Ideal Sill, Side-walk, Step and Post Molds. The recently enlarged manufacturing capacity of the Ideal Concrete Machinery Co. places them in position to handle this increased volume of business without delay, and orders for the new Ideal machines will be filled as fast as received.

An elaborate catalogue has recently been issued by the Ideal Concrete Machinery Co., which to all intents and purposes is an encyclopedia on concrete block manufacture. It is sent free on application, and will prove interesting and valuable to builder and manufacturer alike.



FIG. 4—TEST PILE PARTIALLY DRIVEN SHOWING WOODEN PILE ALONGSIDE.

also to be commended, as, when driven, concrete piles cannot stand a hard blow of the hammer without fracture.

The cost of these piles varies, of course, with the locality, depending on the cost of transporting machinery to the site, the

When Business Tires.

LEARN TO LAUGH.

When troubles come both thick and fast,
Don't think your end has come at last,
But nail your colors to the mast,
And learn to laugh!

Discouragements may round you
You've forged through obstacles for long,
'Till life seems but a mournful song,
Then learn to laugh!

Your chance to rise may seem afar,
As distant as you twinkling star,
Don't let the thought your life work mar,
But learn to laugh!

Be confident, aggressive, bold,
Still forge ahead, and get a hold,
Warm to your work, be never cold,
And learn to laugh!

Put action into all your tasks,
Hard work is all that genius asks,
Success is hid 'neath many masks,
So learn to laugh!

A hearty laugh like merry chimes,
In arctic cold, or sultry climes,
Will cheer us all in troublous times,
So learn to laugh!

Frank Rutherford, in New York Commercial.

QUALITIES OF SUCCESSFUL MEN.

Brains, energy, forethought. Isn't that a splendid trinity of words? Wouldn't it be a veritable gold mine to you if in your make-up you had that trinity, and arranged in exactly that order? Lots of men in this world have brains. You find plenty of men who have graduated at the head of their classes in some first-class college working in the most humble positions in life. The best Latin scholar the writer ever knew could only make nine dollars a week on a "jack" in an upper leather factory away back in an old Massachusetts town. A Harvard valedictorian, years ago, drove mules on the old "Bay-miller line" in Cincinnati. These men had brains, and of good quality, too. They were like a man who is fairly well-known in Greater Pittsburgh at the present time, writes J. A. Jayne. This man reads Darwin, Spencer, Huxley and Fiske with the ease that a ten-year-old boy of average ability reads his primer. He will sit with James' psychology and devour it by the hour and rise refreshed ready for a dip into his Carlyle. If you want a good astronomical exposition, ask him and he can tell you all that the world has yet discovered relative to the movement of the heavenly bodies. He is a splendid, good fellow. Has never had a blot or blemish on his character. But he has never accomplished anything in this world. He lacks the second element in the trinity of words presented above—energy.

Couple energy to brains and you get a combination that is frequently found in a great manufacturing centre like New York. But energy unrestrained is practically worthless. Niagara was beautiful, but its energy

was wasted until it was controlled by art and brains of man. Here is a word picture of the energetic, brainy fellow, but who, however, fails to make good. He received a good education in the schools of our city. Graduated at one of the nearby colleges with honors. Entered the business of his father a business that was founded on industry, conservatism and truth. But this young fellow knew more than his father—or thought he did. Presently father died. The bulk of the estate came to the young man. That was some ten years ago. Immediately, when he took full control, orders poured in. Business boomed. New machines were ordered, then a new plant built. But after a while creditors began pressing. There was no money, and not enough to pay bills. The "bills payable" page of his ledger far overbalanced his "bills receivable" page. He has made absolutely no provision for payment of notes and outstanding accounts. Here were brains greatly in evidence. Energy too, well-nigh unparalleled. He lacks foresight. To-day he is working for \$20 a week, simply because he did not possess the third element of the success trinity—foresight.

Foresight is that element in a man's nature that enables him to foresee the evil as well as the good that is coming. To the sailor it is the ability to enable him to forecast the weather and bring the ship to her desired haven. To the business man it is that quality which, assimilated with brains and energy, makes him a power in his chosen line. Where most men fail in life is in their inability to exercise foresight. They are unable to read the shadows of coming events. Failure is the most polite personality that ever came into a man's office. It always sends its card in advance. It gives warning knocks, not once, but many times repeated, before it enters an office and pulls down the roll top desk and writes its name on the corrugated cover. Failure rarely strikes men unawares. But lack of foresight in the man prevents him from hearing the foot-fall or reading the letter that failure always sends on a man like an assassin in the midnight. It does not come with stealthy steps and rubbered. It sends couriers, cards, letters, announcements, and happy is the man who, seeing failure coming, exercises foresight and gets out of the way of failure. Brains, energy, foresight. Cultivate these, then add the fourth element that must be in every successful life—honesty—and success is sure to be yours.—N.Y. Com.

THE MAN WHO IS SURE.

The man who is sure of himself is safe in any company. Self-confidence is of inestimable service to man throughout life, for it gives him initiative and enterprise, which are at the bottom of all great successes. Timidity, distrust of one's own powers, the man who is bashful when walking into a parlor will appear more like a clown than a gentleman. The man whose knees knock together and whose voice shakes when he addresses a convention will be heard with some measure of contempt.—National Banker.

THE SUCCESSFUL MAN.

He's keen, and clear-headed,
To duty soon wedded,
Ambitious to rise.
At start, self-denying,
And keeping on trying,
To grow rich, or wise.

Then confident, daring,
And never despairing,
He's eager to do.
Upright, and God-fearing,
Thus still persevering,
Both earnest and true.

While toiling, and striving,
He's constantly thriving,
And helps all he can.
A good friend, and brother,
To many another,
A warm-hearted man.

With grit for a lever,
Success crowns endeavor;
He knows when to stop.
From right never swerving,
Till, thankful, deserving,
He reaches the top.
—The Gentlewoman.

GUIDE TO SUCCESS.

1. Be critical with your work, that others may judge it less harshly.
2. If a man misjudges you, forgive him. To err is human; to forgive divine.
3. You may have to pay the price for standing by right principles, but your work will show the result.
4. Do not have one set of morals in your home and another in business. Right is right and wrong is wrong.
5. The real worker loves his work, and to it will sacrifice any pleasure.
6. There may be plenty of clouds in your workaday life. Remember that the most beautiful sunsets come often after cloudy days.
7. Hesitate about giving explanations unless you are asked for them. Apologies are often mistaken for confessions of wrong.
8. Do more than you are paid for. Remember it takes some people a long time to pay their bills.
9. Allow people to criticize your work all they like, but resent any unfair attack on your character.
10. Know more than your work demands. Extra charge is a convenient thing.
11. When you get discouraged, try and begin anew.
12. There are those who achieve much when they are young; more learn their rewards with years.
13. Don't be a coward. The sun hates to shine on those who are afraid of their own shadows.
14. Recall some of the things your mother taught you when young—they are worth remembering.
15. You can beat a dray horse, but a race horse needs sympathy and encouragement.
16. To-day and to-day make the morrow.
17. Never lie. Honest work is built on true principles.
18. If your work is not appreciated, you have not failed. Experience counts for something.—Exchange.

Deflocculated Graphite.

BY EDWARD G. ACHESON.

The subject matter of this address is not in any sense electrical in character, but the effect described was discovered as the result of electrical work and the products obtainable by it may, with advantage, be used in electrical work and machinery. Such is my excuse for offering these remarks before this Institute.

In the year 1901, I was engaged in a series of experiments having as their object the production of crucibles from artificial graphite. In this work I was led into a study of clays. What I learned may be briefly stated as follows:

1. The American manufacturers of graphite crucibles imported from Germany the clay used by them as a binder of the graphite entering into the crucibles.

2. The Germany clays are much more plastic and have a greater tensile strength than American clays of similar chemical composition.

3. Residual clays—those found at or near the point at which the parent feldspathic rock was decomposed—are not in any sense as plastic or as strong as the same clays are when found as sedimentary clays at a distance from their place of origin.

4. Chemical analysis failed to account for those decided differences.

I reasoned that the greater plasticity and tensile strength were developed during the period of transportation from the place of their formation to their final bed, and I thought it might be due to the presence of extracts from vegetation being in the waters which carried them.

I made several experiments on clay with vegetable extracts, tannin being one of them, and I found that a moderately plastic, weak clay, when treated with a dilute solution of gallotannic acid or extract of straw, was increased in plasticity—made stronger in some cases as much as three hundred per cent.—required but 60 per cent. as much water to produce a given degree of fluidity, was caused to remain suspended in water, and made so fine in particles that it would pass through a fine filter-paper. Being acquainted with the record of how the Egyptians had the children of Israel use straw in the making of bricks, and believing it was used not for any benefits derivable from the weak fibres but for the extract, I called clay so treated Egyptianized clay.

Having in 1906 discovered a process of producing a fine pure unctuous graphite, I undertook to work out the details of its application as a lubricant. In the dry form, or mixed with grease or oil, it was easy to handle, but I wished it to enter the entire field of lubrication as occupied by oil. In my first efforts to suspend it in oil I met the same troubles encountered by my predecessors in this line of work; it would quickly settle out of the oil. My unctuous graphite was just plain simple graphite, and obeyed the same laws covering the natural product. So things stood until the latter part of 1906 when the thought occurred to me that tannin might have the same effect on graphite that it had on clay. I tried it with satisfactory results. I will now show you the effect and how it is produced.

I will take for the experiment two equal quantities of my unctuous graphite, as produced in the electrical furnace. When in this form, I call it disintegrated unctuous graphite. To one sample I will add plain water, and, after rubbing up in this mortar, I pour it into a test tube. To the other sample I will add water, a little gallotannic acid, and a few drops of ammonia. This last is not always necessary, but I find it improves the results with some waters. I will now rub the mixture in the mortar as in the first case, and then pour into a test tube. I will now shake up both tubes simultaneously and place them in a rack to settle.

Two minutes have now elapsed since the shaking and we find the graphite in the plain water has very completely separated from the water, not being miscible therewith, while the mixture of graphite, water, tannin, and ammonia remains as black as when shaken up. The graphite is miscible with the water in this mixture, it is suspended and would continue so indefinitely, at least I have found it to remain so for months, and I do not see why it should settle or separate the next day, week, month or year.

While this experiment, as you have seen it performed, shows the effect, the result is much improved by time. I have here a bottle in which is graphite, water, tannin, and ammonia which have been mixed for some weeks. The graphite is in what I call a deflocculated condition, a condition of fineness beyond that attainable by mechanical means, one approaching, if indeed not altogether, the molecular state. It is so fine as to pass with ease through the finest filter paper. Here I have a glass funnel containing one of the finest filter papers manufactured, and on this paper I will pour a little of the water and deflocculated graphite. See it run through the paper and collect in the tube, as black as ever and apparently unchanged. In fact it remains so black and has passed through so rapidly that a doubt exists in your minds as to its really being a mixture of water and solid matter—water and graphite. I can quickly convince you that such is the case.

Into the test tube containing the black liquid which has passed through the filter, I will now introduce a few drops of hydrochloric acid, and then slightly warm it over this spirit lamp flame. These acts have caused the suspended graphite to flocculate and when I now pour the liquid onto a second filter paper, you see the water run through clear, the graphite remaining on the paper. Removing a little of the graphite and smearing it on a piece of paper, drying the paper and rubbing the black spot, it is at once recognized as graphite.

This effect is obtainable with amorphous bodies generally; I have obtained it with alumina, lamp black, clay, graphite, and siloxicon.

I have successfully used deflocculated graphite in water instead of oil in sight drop-feed oilers and with chain feed oilers. I have a shaft in my laboratory measuring 2 5-16 inches in diameter, revolving at 3,000 revolutions per minute in a bearing 10 inches

long that had no oil on it for a month, deflocculated graphite being the only lubricant used, the feed being by chain, and it ran perfectly. On the same shaft is a similar bearing lubricated with oil; this runs much the warmer of the two.

A few days after this test was started a pessimistic friend remarked that just plain simple water would give the same results, that the presence of graphite was unnecessary. We are influenced by the opinions of others even when we know or think they are wrong. I emptied the oil out of the second bearing on the shaft and substituted plain water. The results during the first twelve hours seemed to support the contention of the friend. The next day after the machine had stood motionless over night things did not look so rosy for the water; it was a lame second on account of rust and was hurriedly removed. I think I shall not recommend clear water as a permanent lubricant.

Deflocculated graphite in water possesses the remarkable power of preventing rust or corrosion of iron or steel. This graphite, even after flocculation, is so fine in its particles that when dried *en masse* it forms a hard article. I have here a cake of dried deflocculated graphite. You can see it has the curvature of the watch glass in which it was dried. No pressure was used on it, but still you see it is comparatively hard, like a sun-dried clod of clay. It is self-bonding.

While, as I have stated, deflocculated graphite in water is an efficient lubricant, it has the drawback or disadvantage of losing water by evaporation. I also appreciated that much time would be consumed in converting the world to water lubrication from the present one of oil. Therefore I set before me the problem of replacing the water medium with oil. A very great deal of difficulty and many discouraging conditions were met with, but I am pleased to say success was arrived at, and I have here a bottle containing kerosene oil holding about one half per cent. of deflocculated graphite, that percentage being sufficient for most work. Here is another bottle containing spindle oil with a like percentage of graphite. The graphite has been in these oils for some weeks and shows no tendency to separate or settle.

BAIT FROM THE SILENT PARTNER.

Do things rather than people.

When things get perfect they perish.

Morals is largely a matter of geography.

Hell is not so pleasant as the road to it.

All some people lack is opportunity—to steal.

It takes half a life to learn how to live a life.

A concern that has nothing to advertise has nothing to sell.

Reforms wring hardships—the pains of the newborn are hard.

The greatest profit is interest—the borrower is the only real producer.

Athletics and esthetics are about as necessary to education as mistletoe to love.

"Truth crushed to earth shall rise again"—but the Lord alone knows when.

A loafer is one who casts his bread on the waters and waits—till it gets soaked.

There are not enough people travelling the straight and narrow path to justify widening it.

Standard Methods for the Analysis of Iron.

BY COMMITTEE OF AMERICAN FOUNDRYMEN'S ASSOCIATION.

At the annual convention of the Association in 1905, this committee reported a method for the determination of silicon in iron, and last year added methods for determining total carbon and sulphur. The committee now adds methods for determining graphite carbon, manganese and phosphorus, thus including all the determinations usually made on iron in which occasion for difference between the buyer and seller is apt to arise. This report will therefore include all the methods decided upon.

DETERMINATION OF SILICON.

"Weigh one gramme of sample, add 30 c. c. nitric acid (1.13 sp. gr.); then 5 c. c. sulphuric acid (conc.) Evaporate on hot plate until all fumes are driven off. Take up in water and boil until all ferrous sulphate is dissolved. Filter on an ashless filter, with or without suction pump, using a cone. Wash once with hot water, once with hydrochloric acid, and three or four times with hot water. Ignite, weigh, and evaporate with a few drops of sulphuric acid and 4 or 5 c. c. of hydrofluoric acid. Ignite slowly and weigh. Multiply the difference in weight by .4702, which equals the per cent. of silicon."

DETERMINATION OF SULPHUR.

Dissolve slowly a three gram sample of drillings in concentrated nitric acid in a platinum dish covered with an inverted watch glass. After the iron is completely dissolved, add two grams of potassium nitrate, evaporate to dryness and ignite over an alcohol lamp at red heat. Add 50 c. c. of a one per cent. solution of sodium carbonate, boil for a few minutes, filter, using a little paper pulp in the filter if desired, and wash with a hot one per cent. sodium carbonate solution. Acidify the filtrate with hydrochloric acid, evaporate to dryness, take up with 50 c. c. of water and two c. c. of concentrated hydrochloric acid, filter, wash and after diluting the filtrate to about 100 c. c. boil and precipitate with barium chloride. Filter, wash well with hot water, ignite and weigh as barium sulphate, which contains 13,733 per cent. of sulphur.

DETERMINATION OF PHOSPHOROUS.

Dissolve two grams sample in 50 c. c. nitric acid (sp. gr. 1.13), add 10 c. c. hydrochloric acid and evaporate to dryness. In case the sample contains a fairly high percentage of phosphorous it is better to use half the above quantities. Bake until free from acid, redissolving in 25 to 30 c. c. of concentrated hydrochloric acid, dilute to about 60 c. c., filter and wash. Evaporate to about 25 c. c., add 20 c. c. concentrated nitric acid, evaporate until a film begins to form, add 30 c. c. of nitric acid (sp. gr. 1.20) and again evaporate until a film begins to form. Dilute to about 150 c. c. with hot water and allow it to cool. When the solution is between 70 degrees and 80 degrees C. add 50 c. c. of molybdate solution. Agitate the solution a few minutes, then filter on a tarred Gulch crucible having a paper disc at the bottom. Wash three times with a three per cent. nitrate acid solution and twice with alcohol. Dry at 100 degrees to 105 degrees C. to constant weight. The

weight multiplied by 0.0163 equals the per cent. of phosphorous in a one gram sample.

To make the molybdate solution add 100 grams molybdate acid to 250 c. c. water, and to this add 150 c. c. ammonia, then stir until all is dissolved and add 65 c. c. nitric acid (1.42 sp. gr.). Make another solution by adding 400 c. c. concentrated nitric acid to 1,100 c. c. water, and when the solutions are cool, pour the first slowly into the second with constant stirring and add a couple of drops of ammonium phosphate.

DETERMINATION OF MANGANESE.

Dissolve one and one-tenth grams of drillings in 25 c. c. nitric acid (1.13 sp. gr.), filter into an Erlenmeyer flask and wash with 30 c. c. of the same acid. Then cool and add about one-half gram of bismuthate until a permanent pink color forms. Heat until the color has disappeared, with or without the precipitation of manganese dioxide, and then add either sulphurous acid or a solution of ferrous sulphate until the solution is clear. Heat until all nitrous oxide fumes have been driven off, cool to about 15 degrees C; add an excess of sodium-bismuthate—about one gram—and agitate for two or three minutes. Add 50 c. c. water containing 30 c. c. nitric acid to the liter, filter on an asbestos filter into an Erlenmeyer flask, and wash with 50 to 100 c. c. of the nitric acid solution. Run in an excess of ferrous sulphate and titrate back with potassium permanganate solution of equal strength. Each c. c. of N-10 ferrous sulphate used is equal to 0.10 per cent. of manganese.

DETERMINATION OF TOTAL CARBON.

This determination requires considerable apparatus; so in view of putting as many obstacles out of the way of its general adoption in cases of dispute your committee has left optional several points which were felt to bring no chance of error into the method.

The train shall consist of a pre-heating furnace, containing copper oxide (Option No. 1) followed by caustic potash (1.20 sp. gr.), then calcium chloride, following which shall be the combustion furnace in which either a porcelain or platinum tube may be used (Option No. 2). The tube shall contain four or five inches of copper oxide between plugs of platinum gauze, the plug to the rear of the tube to be at about the point where the tube extends from the furnace. A roll of silver foil about two inches long shall be placed in the tube after the last plug of platinum gauze. The train after the combustion tube shall be anhydrous cupric sulphate, anhydrous cuprous chloride, calcium chloride, and the absorption bulb of potassium hydrate (sp. gr. 1.27) with prolong filled with calcium chloride. A calcium chloride tube attached to the aspirator bottle shall be connected to the prolong.

In this method a single potash bulb shall be used. A second bulb as sometimes used for a counterpoise being more liable to introduce error than correct error in weight of the bulb in use, due to change of temperature or moisture in the atmosphere.

The operation shall be as follows: To one gram of well mixed drillings add 100 c. c. of potassium copper chloride solution and

7.5 c. c. of hydrochloric acid (conc.). As soon as dissolved as shown by the disappearance of all copper, filter on previously washed and ignited asbestos. Wash thoroughly the beaker in which the solution was made with 20 c. c. of dilute hydrochloric acid (1.1), pour this on the filter and wash the carbon out of the beaker by means of a wash bottle containing dilute hydrochloric acid (1.1) and then wash with warm water until all the acid is washed out of the filter. Dry the carbon at a temperature between 95 and 100 degrees C.

Before using the apparatus a blank shall be run and if the bulb does not gain in weight more than 0.5 milligram, put the dried filler into the ignition tube and heat the preheating furnace and the part of the combustion furnace containing the copper oxide. After this is heated start the aspiration of oxygen or air at the rate of three bubbles per second, to show in the potash bulb. Continue slowly heating the combustion tube by turning on two burners at a time, and continue the combustion for 30 minutes if air is used; 20 minutes if oxygen is used. (The Shimer crucible is to be heated with a blast lamp for the same length of time).

When the ignition is finished turn off the gas supply gradually so as to allow the combustion tube to cool off slowly and then shut off the oxygen supply and aspirate with air for ten minutes. Detach the potash bulb and prolong, close the ends with rubber caps and allow it to stand for five minutes, then weigh. The increase in weight multiplied by 0.27273, equals the percentage of carbon.

The potassium copper chloride shall be made by dissolving one pound of the salt in one liter of water and filtering through an asbestos filter.

Option No. 1.—While a pre-heater is greatly to be desired, as only a small percentage of laboratories at present use them, it was decided not to make the use of one essential to this method; subtraction of the weight of the blank to a great extent eliminating any error which might arise from not using a pre-heater.

Option No. 2.—The Shimer and similar crucibles are largely used as combustion furnaces and for this reason it was decided to make optional the use of either the tube furnace or one of the standard crucibles. In case the crucible is used it shall be followed by a copper tube 3-16 inch inside diameter and ten inches long, with its ends cooled by water jackets. In the center of the tube shall be placed a disc of platinum gauze, and for three or four inches in the side towards the crucible shall be silver foil and for the same distance on the other side shall be copper oxide. The ends shall be plugged with glass wool, and the tube heated with a fish-tail burner before the aspiration of air is started.

GRAPHITE.

Dissolve one gram sample in 35 c. c. nitric acid (1.13 sp. gr.) filter on asbestos, wash with hot water, then with potassium hydrate (1.1 sp. gr.) and finally with hot water. The graphite is then ignited as specified in the determination of total carbon.

The G. O. Hanford Mfg. Co., of Syracuse, N.Y., manufacturers of balsam and myrrh, are opening a branch factory on Youville Square, Montreal.

Effects of Sulphur on Cast Iron.

By HERBERT FIELD.

The effects of sulphur on iron are too well-known to be discussed here. It makes iron short, brittle, and hard. Excessive amounts make it very weak. These effects of sulphur are due to the fact that when cast iron solidifies, the sulphur is still in a gaseous state and each particle of iron is surrounded by a wall of gaseous sulphur. When the iron cools, the gas solidifies or unites with the surrounding crystals of iron as iron sulphide. In this latter condition, it occupies much less volume than when it was in the gaseous state. This leaves the crystals of iron surrounded by small spaces which, under the microscope, have the appearance of very minute cracks. These cracks give to the iron the brittle, short properly characteristic of high sulphur iron.

The point to be borne in mind in this connection is that the sulphur is in the form of a gas when the iron sets.

Let us go back for a moment and consider the effect when manganese was added to irons high in sulphur. The manganese united with the sulphur and the sulphide of manganese separated out at a temperature above the melting point of iron, or, in other words, while the iron was in a liquid condition, so that when the iron solidifies, there will be no sulphur left as a gas to form microscopic cracks, it having already united with the manganese to form sulphide of manganese. The bad properties due to high sulphur would, therefore, be removed. In place of the gaseous sulphur, we have present a sulphide of manganese which will rise to the top of the iron as a slag, provided sufficient time is given for it to do so. If, however, there is not sufficient time, the sulphide of manganese is held in the iron in suspension, in the form of infinitely small, solid particles. These are invisible to the naked eye and do more harm than so many particles of any solid substance.

There are times, however, when the casting remains liquid for a long time, that this sulphide of manganese will segregate together towards the top of the casting and form bad spots which are difficult to obviate and which are frequently blamed to very different causes.

In spite of the fact that the effects of sulphur have been known for a considerable time, it has only been within a comparatively short time that this knowledge has been applied in a practical way, or that the facts have been brought together and a lucid explanation given of the cause and effect of the additions of manganese to steels high in sulphur. The credit of bringing this subject again to the attention of metallurgists is due to J. O. Arnold.

While working on a sample of steel rail high in sulphur, furnished by Mr. Brinell and recorded as giving good results, he discovered that instead of the fine, microscopic cracks which would be expected from so high sulphur percentage, that the steel showed in place threads of what appeared to be slag running length-wise with the rail. This was manganese sulphide and proved to be no more harmful to the rail than the fine threads of slag contained in wrought iron are to that product.

If we apply this to cast iron, we find

the same conditions exist. The effect of manganese on cast iron, which has not previously been explained, under the light of this knowledge becomes clear. The statement that manganese softens iron is readily believed when we appreciate that it forms a compound with the sulphur, thus removing its hardening effect. The strengthening effect of manganese is easily explained when we consider that it removes the small, microscopic cracks caused by the sulphur.

It is very readily proved that manganese does unite with sulphur to form the sulphide of manganese in cast iron. It is not possible to separate it from iron by analysis, but its tendency to rise to the top of the casting gives us a desired opportunity to prove our question.

Charles H. Risdale gives the analysis of an ingot mold which showed in the top part 1.35 per cent. manganese and 0.75 per cent. sulphur, while the bottom part of the same mold showed 0.11 per cent. sulphur and but 0.54 per cent. manganese. An analysis recently sent me of a cylinder but 24 inches long and 9 inches in diameter give the following analysis for sulphur and manganese at the top and bottom of the cylinder:

2 inches from the bottom, sulphur 0.148 per cent.; manganese, 0.54 per cent.
 ½ inch from the top, sulphur, 0.204 per cent.; manganese, 0.66 per cent.

It will be noted that this cylinder was but 24 inches long, and that the time taken for it to solidify would be comparatively short, and hence the time allowed for the sulphide of manganese to rise would be of a very short duration.

The top of a water pipe cast on end gave sulphur 3.06 per cent., manganese, 1.136 per cent., while the bottom end showed but 0.076 per cent. sulphur and 1.136 per cent., while the bottom end another pipe gave 0.43 per cent. sulphur and 1.79 per cent. manganese, but, unfortunately, no piece from the lower part was saved. These show a simultaneous segregation of manganese and sulphur from molten iron. Inasmuch as manganese would not be expected to segregate by itself, it would appear that this compound must separate out and rise to the top of molten cast iron.

The writer considers that this explanation of the effects of manganese on cast iron reconciles the conflicting statements in regard to the same. It explains the segregation of sulphur and pig iron which has long been known but never explained. It shows why sulphur makes iron weak and that when united with manganese, it has practically no weakening effect on iron. It explains the remarkable effect of small amounts of manganese when added to a ladle of cast iron. It shows why high manganese may cause dirty iron.

WHEN NOT TO QUIT; WHEN TO GO ON.

Remember, says System, that in every business, in every career, there are valleys to cross, as well as hills to scale; that every mountain-range of hope is broken by chasms of discouragement through which ran torrents of despair!

To quit in the chasms is to fail. See always in your mind's eye, those sunny summits of success!

Don't quit in the chasm! Keep on!

IRON IN BRITISH COLUMBIA.

Recently the capital necessary for the complete reconstruction of the old Irondale plant, which years ago, was fed by the Texada ores, has been furnished. The remodelling of the smelter plant has now been completed and the ore supply is being arranged for. It is the intention to draw the principal ore supply from Texada Island, and the necessary fluxes will be secured from other points. It is understood that work is to be started at once on the erection of a deep-water wharf near Gillies Bay, Texada Island.

From the wharf the ores will be loaded into vessels for transportation to the Irondale smelter on Puget Sound. The present wharf near the mines, which was built by the Provincial government, will not be used, as its position is exposed to the full force of the Qualicum winds. The iron deposits were taken up by their present owners in 1878. The holdings consist of five square miles of ground within the area of which are embraced the iron deposits. The face of the iron showings, which have a width of several hundred feet and angle up a hillside for 800 feet, lie right on salt water. It has been estimated by a number of competent engineers at various times within the past twenty years that there is now in sight not less than 10,000,000 tons of iron ore. The ores are magnetite of a very high grade. The quality is such that when the ores were smelted at Irondale years ago, the commercial No. 2 pig could always be bent before it could be broken, so great was the tensile strength. As the market to be catered to lies altogether in the United States, it is preferable to export the raw ores and manufacture them in the United States. The government of British Columbia, at the session of the local parliament which adjourned recently, made an announcement that at the next session, which will convene early in 1908, it would bring in a bill requiring that all iron ore mined upon provincial lands should be smelted within the Province. The property upon Texada Island was Crown granted years ago, and the new law may not apply to exports from that property. There are many other large deposits of magnetic iron ore upon the west coast of the mainland of this Province. Upon Vancouver Island large deposits of "bog-iron" ore are reported, which will be useful in fluxing the magnetic ores. There are large quantities of hematite ore in the interior. Texada Island is very rich in lime rock, much of which approaches very nearly to good, serviceable marble. A mining company, operating on the northern end of Texada Island, in addition to shipping very large quantities of ore rich in gold and copper, also operates two lime kilns and supplies a large amount of lime to Vancouver, Victoria, Seattle, and the Hawaiian Islands. At the present time a very large quantity of pig iron is brought here from Scotland, which the experts pronounce an inferior grade to the pig iron manufactured from the ores of Texada Island.

Twenty-Five Years Ago.

EXTRACTS FROM THE FILES OF THE CANADIAN MANUFACTURER OF JUNE 23, 1882.

THE EXPECTED "BOOM."

The times change, and we change with them. It is permissible for us to do so, within limits. With regard to principles we should not change; our principles we should hold fast and firmly, if we have any. But we may change fashions without laying ourselves open to any serious charge. We may, for instance, indulge in a new fashion in words, if the popular ear seems to demand it. Of late there has arisen a popular demand for the use of the word "boom"; we bow to the popular will, and therefore use it, although the authority of great lexicographers cannot be pleaded in its favor.

Following the result of the general election, the present time is unquestionably a time of "great expectations." Be it right or wrong, be it wisdom or folly, on the part of the people, it has been voted that the National Policy is not only to be sustained, but also extended in Canada. Not even the most enthusiastic supporter of the Finance Minister has imagined that his tariff of 1879, with subsequent amendments, was perfect. Some other changes of great importance have been pressed upon the government, with very strong support of business and financial authority. But Ministers were not prepared to go farther without a renewal of the endorsement.

The expectation of a "boom" is founded on two things, one of which is a certainty, and the other a contingency. The certainty is that existing industries are to be safe and undisturbed for a term of years. This includes, further, the development of some new industries, which have been held back by the previous uncertainty, by this and nothing more. The contingency is the starting of some different and new industries, which require, not merely the confirmation of the policy of 1879, but its extension by letter of the statute. This is especially the case with regard to the production of iron. There is where the "boom" is expected principally to come in. The "boom" is looking that way most decidedly. But capitalists and business men generally, who may interest themselves in Canada's new venture in iron and steel, have a certain fair request to make. They are anxious to begin operations without delay, and they should not be compelled to wait until some day in March next, when the Budget Speech will be delivered, ere knowing whether they may go ahead or not. At the earliest date convenient the now sustained government should hold practical council, decide upon what is to be done, and then let the probabilities be known, for the general good. Time action of this sort will do millions for the country. In some particular lines a year's work ahead may be got in by utilizing at once the present summer season. It is to be hoped that some current rumor will prove true, and that capitalists, whose contemplated investments got up into the millions, will soon have assurances that they can go to work upon. Thus the great "boom" will come, most undoubtedly; the large expansion of old industries and the creation of new ones. The government would be well warranted in taking extra measures for hurrying things forward. Give us assurance,

give us confidence; the business community cannot have too much of it, nor can they have it any too soon either.

FROM THUNDER BAY TO WINNIPEG.

The last rail on the Thunder Bay and Winnipeg section of the Pacific Road has been laid, and traffic will be opened through on Dominion Day. For the Sault Ste. Marie connection we may yet have to wait some time, and still longer for the section north of Lake Superior, but with the road completed from Prince Arthur's Landing to Winnipeg, thence 250 miles beyond, and progressing towards the Rocky Mountains at a rapid rate, we are not badly off. It is now possible to carry freight from the heart of Manitoba to Halifax, or vice versa, all the way through on Canadian soil, or afloat in Canadian bottoms, and this for the greater part of the year. The lines of vessels sailing the long stretch from Sarnia and Collingwood to the head of the great lake, will do a larger business than ever before, while the Grand Trunk will certainly make "a big push" to develop traffic by the rising port of Midland City, on the Georgian Bay, which makes a short cut between Winnipeg and Montreal. The syndicate will not be behindhand in pushing things, either, and between the two the country ought to be well served.

A new foundry, for the manufacture of wood-working machinery, is now ready for operation in Galt, under the management of Messrs. Cant, Laidlaw & Co.

Messrs. J. M. Williams & Co., manufacturers of stamped tinware and japanned goods in Hamilton, have added a stove foundry to their already extensive premises. This addition to the stove foundries of Hamilton adds to the extent of that important industry at that point.

The machinery for Mr. Brodie's woolen mill is here and is being drawn up to the factory. Before long the hum will be heard on Dickson's race as it never was heard there before. The other factories are rapidly going ahead also, and in the course of a few weeks they will be in full blast, it is expected.—Peterborough Review.

A new company composed of J. S. Anthes, Joseph C. Bowers, Berlin; and Samuel Bricker, Listowel, has been formed to carry on extensively the manufacture of brooms. The new broom which they are going to make is one only recently patented, and does away entirely with the old fashioned wire binding, which is always first to give way in the present style of brooms.

A joint stock company, with a capital of \$60,000, has been formed at Montreal, for the manufacture of fire-proof paints, cement boiler covering, etc., to be known as "The Sparham Fire Proof Roofing Cement Co." Letters of incorporation have been applied for, the first directors to be Messrs. A. F. Gault, Thomas Craig, A. S. Hall, W. J. Whitehead, W. L. Maltby and Dr. T. Sparham.

The "hum" at the Moncton cotton factory

has commenced. Yesterday about thirty men were at work at the site of the factory and on the railway siding. The siding has been laid into the factory grounds, where there is to be a double track. The factory grounds are now being graded. A tool house is in course of erection, and Mr. Job McFarlane is expected up the river to-day with a scow-load of stone for the foundation of the main buildings. Some stone is also expected by rail from Albert. Altogether, things began to look brisk about the site.—Moncton Times.

We noticed last week at the warehouse of Geo. F. Haworth, Toronto, who is agent for H. L. Fairbrothers' American leather belting some mammoth belts, among which were two 24 inch double leather belts, 89 feet long; three 18 inch double belts, 85 feet long; one 16 inch double belt, 65 feet long; one 24 inch 8 ply rubber belt, 69 feet long; one 16 inch 8 ply rubber, 65 feet long, and one 14 inch 8 ply rubber, 100 feet long. Some of these belts are for Mr. H. H. Cook's large saw mill at Midland, and from the heavy and strong appearance of them, one would think they were made never to wear out.

In connection with the business outlook there are two or three circumstances worth remarking upon. First, the election agony is over; we have settled it who is to rule the country for the next five years, and business may now go ahead; next, the finishing of the Thunder Bay and Winnipeg road, and the great importance which the mixed land and water route by Lake Superior is likely soon to develop, will be a powerful factor in the extension of business both east and west. Thirdly, the recent favorable turn of the season, bringing warm rains and fine growing weather, is likely to have a very good effect.

A gentleman in Chicago has been in correspondence with Mr. R. Thompson, provision merchant, in reference to establishing a large refinery in this city after the style of that of Mr. N. K. Fairbanks, Chicago, so as to meet the requirements of the trade of the Dominion, and do away with American importations as much as possible. The establishment would include beef-canning, evaporating apples, packing-house, etc., and it is estimated that it would cost to build and to equip from \$30,000 to \$10,000. It would afford employment to a large number of boys and girls, who would be utilized in packing and labelling the boxes.—Toronto Mail.

THE POWERS OF WILL.

We sadly underrate the power of the will when we limit the sphere of its exercise to instant volitions. It finds its best and fullest authority in the slow and gradual formation of those habits of thought and feeling which we are likely to retain through life. For upon looking back, we shall find that we have deliberately trained ourselves by constant practice to think in one way, or upon one set of subjects, and now we are reaping the result. If selfish thoughts, bitter feelings, and cruel impulses arise within us, and refuse to be set aside, it is because we have nourished them in the past so exclusively that now they are strong enough to crush out the sweeter and finer parts of our nature that have had no such developments.

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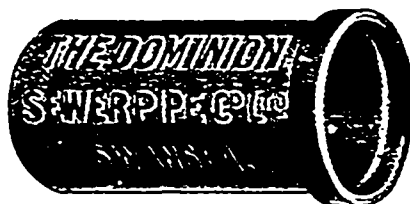
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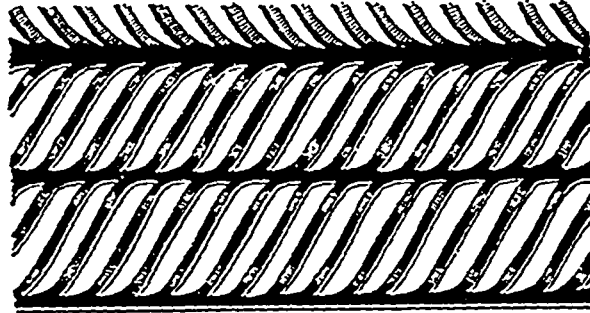
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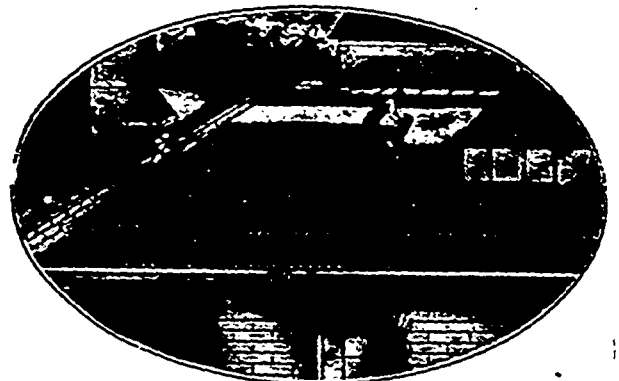
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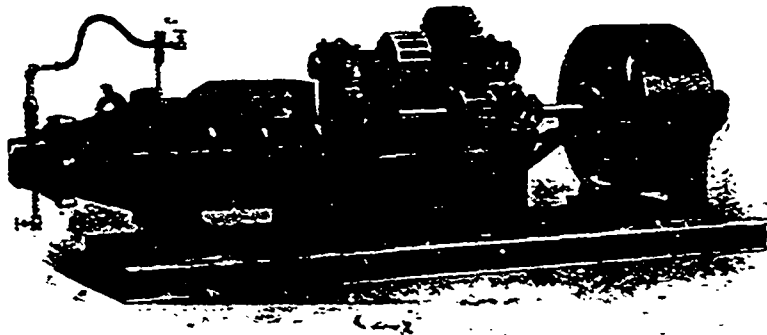
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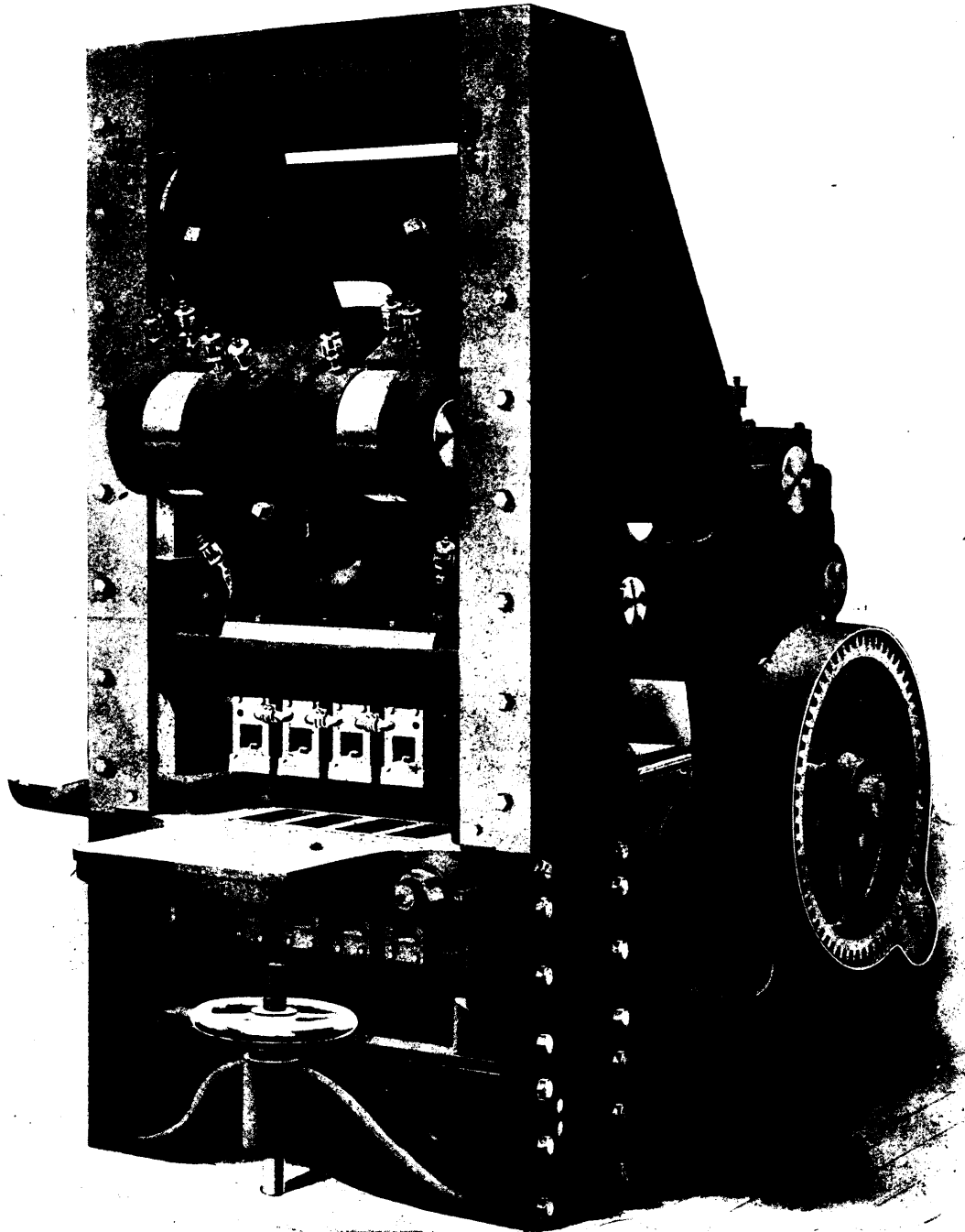
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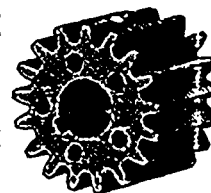
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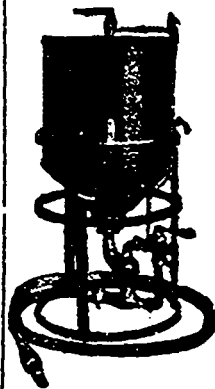
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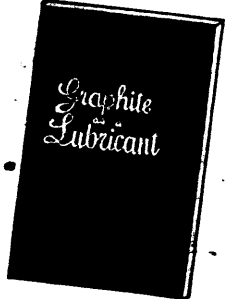
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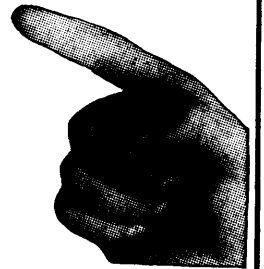
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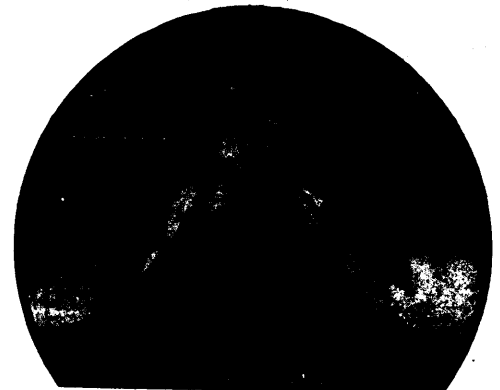
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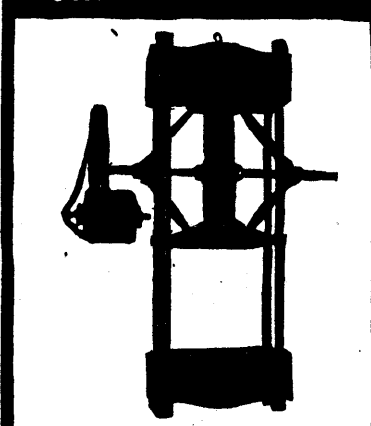
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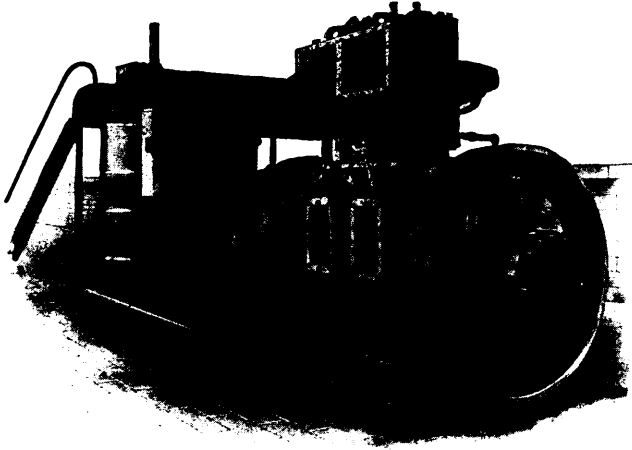
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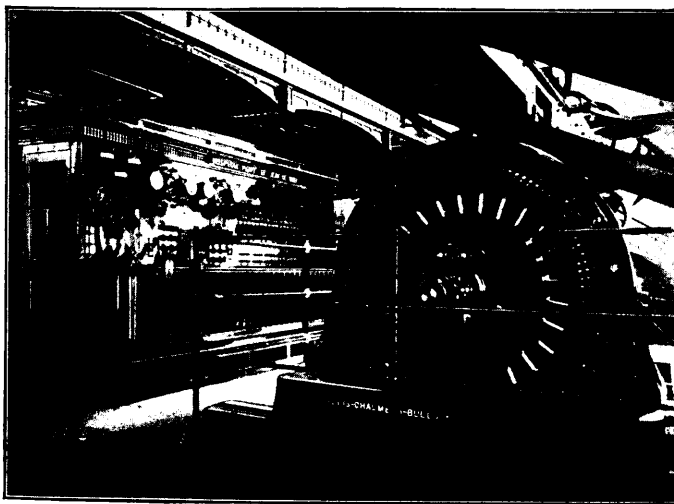
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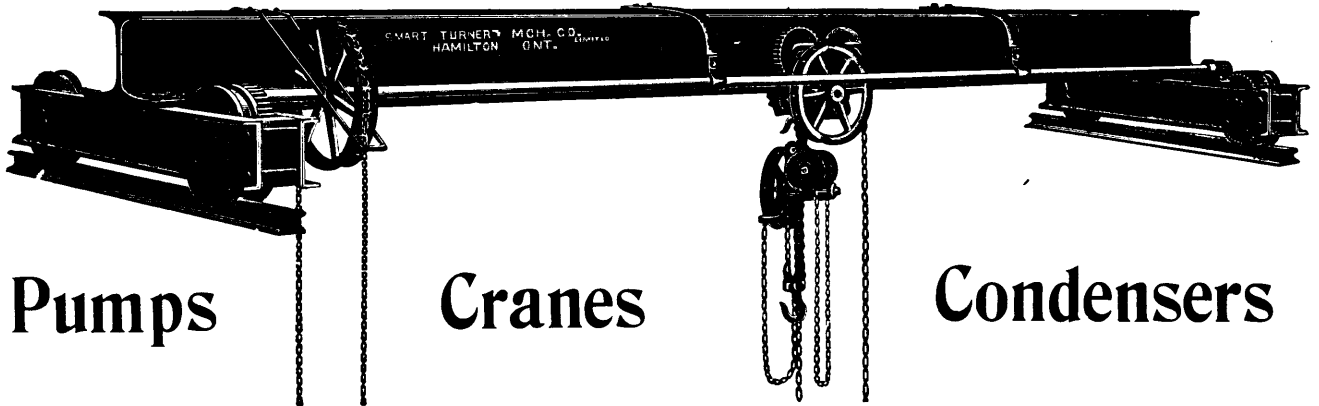
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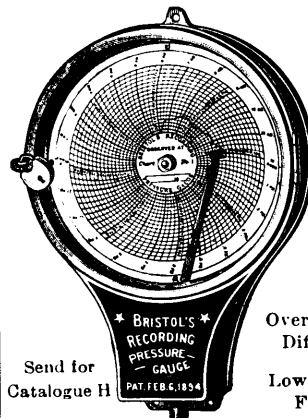
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