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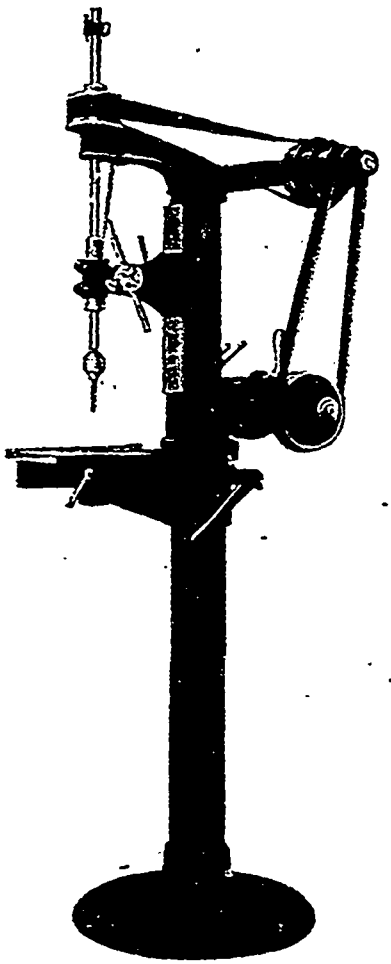
MISSING

FACTORY LOCATIONS.

The following Canadian municipalities are offering inducements to secure manufacturing establishments. Inquiries should be addressed to the Mayor, Town Clerk or Board of Trade of the respective cities

Barrie, Ont.
Hamilton, Ont.
Peterborough, Ont.
Regina, N.W.T.
Sherbrooke, Que.

Sensitive Drilling Machines

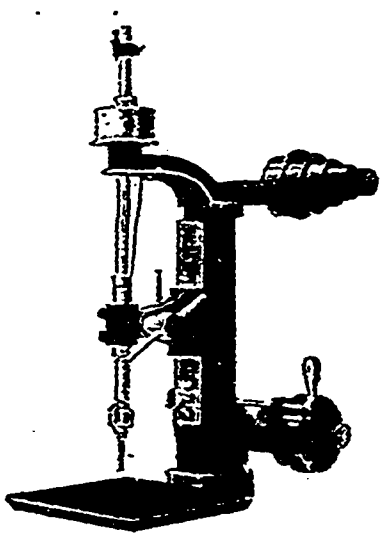


No. 1 Column Drill

To the Manufacturers of Canada: Why not buy sensitive drill presses made in Canada, which have time-saving features that no other similar machine on the market possesses.

These machines will take any drill with No. 1 taper shank, directly in the spindle, which is accurately bored to suit.

When used with chuck, any size from No. 0 to ½ inch straight shank drills may be used.



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THE ONLY DRILL PRESS ON THE MARKET ON WHICH THE TABLE TURNS COMPLETELY AROUND THE COLUMN AT ANY POINT

Write for Catalogue (just issued) and Discounts

THE HAMILTON TOOL CO., LIMITED

HAMILTON, CANADA

BUYERS' GUIDE AND DIRECTORY

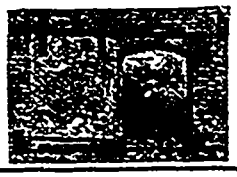
This Department has been started to bring together those who have to sell specialties for the factory, mill or foundry and these buyers who are "in the market" for such lines. Readers of this paper will find this department one of the most useful features of the paper. Mention the paper when you make enquiries of advertisers.

Buyers' Guide

TO INDEX and advertise Articles Made in Canada, in the 1909 to 1911 CANADIAN INDUSTRIAL BLUE BOOK BUYER'S GUIDE is wisdom on the part of the Canadian Manufacturer. For rates, address

THE MANUFACTURERS LIST CO.
Toronto, Canada

Fire Doors



STANDARD AUTOMATIC FIRE DOORS
Approved by Underwriters
Richards Mfg. Co.
446 St. Paul St.
Montreal

Paints and Varnishes

THE CANADA PAINT CO.,
Limited
OIL CRUSHERS, LEAD GRINDERS
Color Manufacturers, Varnish Makers
Montreal Toronto Winnipeg

Belt Transmitter

Write to-day for circulars describing the Lindsay Belt Transmitter.

It costs less and does away with the well known troubles of the loose pulley and clutch system.

A. J. LINDSAY
643 Yonge Street, Toronto

Galvanizing

WORK AND PRICES RIGHT
GALVANIZING
ONT. WIND ENGINE & PUMP CO.
TORONTO, ONT. LIMITED

Paper

WM. BARBER & BROS.
Georgetown, Ont.
Manufacturers of . . .
Book and Fine Papers

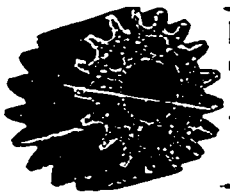
Textile Mill Crayons

ANY COLOR OF CRAYON

that you want can be obtained from us. We are specialists for Cotton, Woolen and Worsted Manufacturers. No trouble to send samples.

LOWELL CRAYON CO., - Lowell, Mass.
Original Manufacturers.

Gears



RAWHIDE GEARS
MANUFACTURED BY
THE HORSBURGH & SCOTT CO.
Cleveland, Ohio.

Paper

THE.....
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Cornwall, Ont.

Manufacturers of Engine Sized Superfine Papers, White and Tinted Book Papers, Blue and Cream Laid and Wove Foolscaps, Account, Envelope and Lithographic Papers, etc.

Engraving and Die-Sinking

TORONTO STAMP & STENCIL WORKS, Ltd.
(I. C. FELL & CO.)
Rubber and Steel Stamps
Seals and Brands. Memorial Brasses.
Door Plates.
137 Church Street, - TORONTO

Hack Saws

Cuts Bars 6 x 6 Inch Round or Square.
Needs no attention after work is flat in vise.
Automatic stop when piece is cut off.
Improved arm keeps saw perfectly in line at all times. Get Prices.
D. McKenzie, Guelph, Ont.

Bench Power Press

W. H. BANFIELD & SONS
Machinists and Die Makers
Makers of Power, Drop and Screw Presses
120 Adelaide Street West
TORONTO

Fire Brick

Fire Brick, Stove Linings, Locomotive Arch Blocks, Special Fire Bricks, Muffles, Boiler Blocks

Unusual and out-of-the-way orders a specialty.

Montreal FireBrick & Terra Cotta Co.
St. Elizabeth and St. Ambrose Sts., Montreal

Hardwood Flooring

Hardwood Flooring. — End Matched Bored, Polished and Bundled

SIEMON BROS., LIMITED
82 Confederation Life Bldg., TORONTO
Wiarton, Ont.

Writing Paper

The ROLLAND PAPER CO.
HIGH GRADE PAPER MAKERS
Makers of
"Superfine Linen Record"
"Karnscliffe Linen Bond"
"Empire Linen Bond"
"Colonial Bond"
Grand Prix, Paris, 1900.
QUEBEC MONTREAL TORONTO

Fire Brick

ONTARIO LIME ASSOCIATION
Builders' Supplies

Dealers in Scotch and American Fire Brick, Fire Clay, Fire Tile and Cupola Blocks. Always a full stock on hand.

118 Esplanade Street East, TOROKTO
Phone Main 5473

Lubricating Oils and Greases

WHALE OILS

Economic Oils and Greases will cut your Lubricating Account in two. Try them.

Canadian Economic Lubricant Co., Ltd.
Manufacturers of High-Grade Lubricating Oils and Greases.
25 to 29 Wellington Street, MONTREAL.
Refiners of Cold Test Neatsfoot and Whale Oils.

Rails

JOHN J. GARTSHORE
83 Front St. W., Toronto.

Rails and SUPPLIES,
New and Secondhand.

For RAILWAYS, TRAMWAYS, Etc.
Old material bought and sold.

Furnace Cement

STERNE'S ASBESTOS FURNACE CEMENT

Is the most efficient, economical and durable on the market.

Every pound guaranteed. Get our quotations

G F STERNE & SONS,
Brantford, Ont.

Office Furniture

Rivets and Steel Products.

The PARMENTER & BULLOCH CO., Ltd.
GANANOQUE, ONT.

Iron and Copper Rivets, Iron and Copper Burrs, Bifurcated and Tubular Rivets, Wire Nails, Copper and Steel Boat and Canoe Nails, Escutcheon Pins, Leather Shoe and Overshoe Buckles, Bit Braces, Felloe Plates.

Roofing Materials

LOCKERBY & McCOMB

Tarred Felt, Building Papers, Ready Roofing, Carpet Felt, Pitch and Coal Tar.

65 SHANNON ST., - Montreal

An Advertising Axiom

Talk to the buyer of the line you want to sell, when he wants to listen to you—when he is reading THE CANADIAN MANUFACTURER.

Wire Cloth

C. H. JOHNSON & SONS, LIMITED

St. Henry, Montreal

Makers of

Iron, Brass and Copper

WIRE CLOTH

Steel Concrete Engineers

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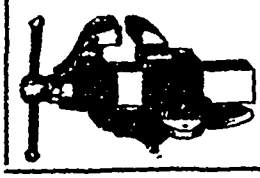
Manufacturers Reinforcing Steel Concrete Engineers

23 JORDAN ST., TORONTO

GUSTAVE KAHN, Canadian Manager.

Vises



VISES
Bench Vises
Drill Vises
Miller Vises
Pattern Makers Vises
Get Our Prices.
The Stevens Mfg. Co., Limited
GALT, ONT.

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Electro and Close Plating on all Metals
Brass Finishing and Spinning
Carriage Lamps Made and Repaired

P. KENT

37 Vitre St. W., MONTREAL

Testing of Materials

Chemical and Physical Testing of Iron, Steel, Alloys, Cement and Materials of all kinds.
THE TORONTO TESTING LABORATORY, Limited, 18 Saturday Night Building.
Associates: The Detroit Testing Laboratory
Prompt Service. Accurate Results.
Our prices are right. Write for quotations and get synopsis of our yearly contract plan.

Why Not Advertise
YOUR
Specialties Here?

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FYFE'S STANDARD

HAY, COAL AND WAGON **SCALES**

Warranted Superior Quality.

498 St. Paul St., MONTREAL

PROFESSIONAL DIRECTORY

Patent Attorneys, Mechanical and Electrical Engineers, Hydraulic and Constructing Engineers, Chemical and Mining Experts, Contractors and Builders, Architects, Auditors, Accountants, Etc.

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CHARTERED ACCOUNTANTS

18-20 King St. West, Toronto

Phone Main 1163

EDWARDS & RONALD, WINNIPEG

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To Provincial Government, Municipalities, etc.

Estimates, Plans and Supervision of Hydraulic and Steam, Electric Light, Power and Railroad Plants, Waterworks and Sewers.
Arbitrations, Reports and Specifications.
62-63 Guardian Building, - MONTREAL

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CHARTERED ACCOUNTANTS

26 Wellington St. East, TORONTO

Phone Main 1880.

Audits and Investigations a Specialty.

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Telephone Main 7396 Toronto

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Bureau of Inspection, Tests and Consultation.

66 Broadway, NEW YORK: 1121 The Rookery, CHICAGO: Monongahela Bank Bldg., PITTSBURGH. Norfolk House, Cannon St., E.C. LONDON.

Inspection of Rails and Fastenings, Cars, Locomotives, Pipe, etc.; Bridges, Buildings and other Structures. Chemical and Physical Laboratories. Reports and estimates on properties and processes.

Established 1849.

BRADSTREET'S

Capital and Surplus, $1,500,000

Offices Throughout the Civilized World.

EXECUTIVE OFFICES,

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CORRESPONDENCE INVITED.

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London, Ont. Montreal, Que.
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Vancouver, B.C. Winnipeg, Man.

THOMAS C. IRVING, Can'l Manager Western Canada
TORONTO.

C. J. FENSOM, M.E.

Consulting Engineer

ABERDEEN CHAMBERS. - TORONTO

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Residence. N. 2967

Machinery Designed, Supervised, Inspected and Contracted for. Tests, Reports, Electric Light Plants, Power Plants, Pumping Plants.

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Fireproof Mill Buildings in Steel and Concrete, Waterworks, Sewerage, Electric Plants, Bridges and Foundations.

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We solicit the business of Manufacturers, Engineers and others who realize the advisability of having their Patent business transacted by Experts. Preliminary advice free. Charges moderate. Our Inventor's Adviser sent upon request. Marion & Marion, Reg'd., New York Life Bldg., Montreal; and Washington, D.C., U.S.A.

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FOR MANUFACTURERS:—Design and Constructing Industrial Plants—Lighting—Power Transmission—Factory Power Distribution—Steam Plants—Hydraulic Powers.

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FREE Set of Sketching Instruments to each Inventor.

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CORRUGATED

WRITE FOR PRICES

METALLIC ROOFING Co. LIMITED.

TORONTO, CANADA.

IRON

. . . THE . . .

CANADIAN MANUFACTURER

and Industrial World

A Semi-Monthly Newspaper devoted to the Manufacturing Interests of Canada—A Newspaper, Not an Organ.

Established in 1880. Published 1st and 3rd. Fridays.

The Canadian Manufacturer Publishing Co., Limited

Office of Publication: 408 McKinnon Building, Toronto

D. O. McKINNON—Managing Director

Montreal Office—204 St. James Street,

ARTHUR B. FARMER—Representative

London, Eng., Office: 16 Devonshire Square, E.C.

WM. TUCKER & CO., Representatives

SUBSCRIPTIONS:

Canada $1.00. United States $1.50 per year. All other Countries in Postal Union six shillings sterling, including postage.

ADVERTISING RATES:

Made known on application to 408 McKinnon Bldg., Toronto

MORE CONFIDENCE THROUGHOUT CANADA.

Reports from every section of Canada indicate renewed confidence in business conditions.

A record wheat crop of a hundred million bushels is the promise of Western Canada. Reports from all parts of Ontario and nearly every portion of Quebec indicate a crop of more than usual magnitude while from the Maritime Provinces come reports equally encouraging.

Railway construction continues with unabated energy, while the demand for rails, bridges, rolling stock, etc., is sustaining activity in many important factories and mills. As money is now more easily obtained than was the case six or eight months ago municipal undertakings of considerable magnitude are in progress or under consideration.

All of these factors are basic in that they create demand for all classes of product. Already their immense influence on business conditions has been felt. Retailers are enjoying increasing demand for all lines and are in consequence meeting their bills more promptly and are buying for fall and winter trade with more courage and confidence. This in turn means greater activity for the manufacturer. Many factories and mills which a few months ago were shut down or were running on reduced time, are in full operation.

It is true that in many cases there has been a material reduction in the price of many materials as well as in many classes of labor. This will entail a readjustment of values which may take some weeks to effect and it may seem to curtail the consuming power of those classes whose wages are reduced. Yet this result was inevitable. The price of raw materials and of labor had for years mounted higher and higher until the danger point was reached, when it seemed as if only an industrial crisis could restore values to a normal level.

We have had the crisis. From one end of Canada to the other the pinch of money stringency has been felt. Yet to-day, in much less than a year since the curtailment of demand was first felt by manufacturers, we have almost recovered from its effects and we are looking to the fall and winter of 1908-09 with a confidence which amounts to relief, after the trying period of the last nine or ten months.

WHEN TO INFLUENCE A BUYER.

"If your tailor should call on you just when you had decided that your clothes looked shabby, he would have an extra good chance of an order; if a book agent should offer you a pocket dictionary, just at a moment when you were wondering how to spell embarrassment, he would probably land you.

The best time to put your claims before a consumer is when his mind is already interested in the subject."

The above argument, made by the publishers of The Ladies' Home Journal, illustrates a point that every advertiser should thoroughly grasp.

One of the great basic principles in advertising is that one should reach the buyer at the pyschological moment, —at a time when he is interested in the subject.

Apply this to the advertising of power equipment of any kind. It would be useless to advertise such lines through a publication of general circulation, such as a daily newspaper or a general weekly or monthly magazine. The value of these general publications for advertising the bargains of retail stores, for giving publicity to the merits of breakfast foods, toilet preparations, household novelties, etc., is supreme, for they reach such a wide circle of readers—all of them, especially the ladies, buyers of the lines suggested above. But to advertise power equipment in such mediums would not merely be waste: it would be futile.

In the first place probably 95 per cent. of the readers of such publications are of no value, as they are not now and never will be buyers of power equipment.

In the second place those who may be buyers of power equipment do not read a daily paper or a magazine for information about their business. They read it for the sporting news, for the information about stock markets, about politics, for the items of general interest, local, domestic and foreign.

So it is that in the last ten or fifteen years there has been a great development of trade journal advertising. One paper which gives its readers information above groceries and retail grocers read it for this information, and advertisers of lines which grocers sell use it to influence the grocer "when his mind is interested" in his business.

THE CANADIAN MANUFACTURER reaches the buyers of machinery, power equipment and all kinds of factory and mills supplies—and its advertisers reach these buyers when they are seeking for information about these lines.

THE CHANNEL OF CANADIAN TRADE.

In his address before the Toronto Board of Trade Sir Thomas Shaughnessy, President of the Canadian Pacific

Railway, gave utterance to a sentiment with which every manufacturer in Canada will agree.

"We must," said Sir Thomas, "establish such relations between the merchants and manufacturers of the east and the merchants and consumers of Western Canada as will make the trend of traffic and social intercourse in Canada east and west. If we succeed in doing that we shall not only make these strangers, these colonists who have come here to build up homes for themselves and their families, good Canadian citizens, but shall be able to make them strong advocates of every policy calculated to advance the material interests of the country and bring the various Provinces into closer connection and thus more firmly establish the original idea and intention of confederation."

The interests of Canada demand that there be such sympathy and understanding between the manufacturers of the Eastern Provinces and the consumers in the Western Provinces that there shall ever be a widening of the channel of trade between these two classes.

How can this best be done?

Sir Thomas admits the responsibility of the railways in this connection and argues that his road has done a great deal toward improving and lessening the cost of transportation between the East and the West by spending, since 1902, $36,000,000 for additions to its properties and $90,000,000 for additional operating facilities.

Then he argues that a wise, prudent and statesmanlike tariff policy is necessary, the end of which shall not be to enrich the manufacturer or of making the goods more expensive to the consumer.

To all this the manufacturer will give accord. He does not seek a tariff that will enrich him at the expense of the consumer. He wants to be safe-guarded against the unfair competition of the foreign manufacturer who pays starvation wages, or who is disposed to, once in a while, when business falls off at home, dump his goods in Canada at a loss to keep his factory in operation without slashing prices in his home market.

It is admitted by all classes in the community that the consumer would lose rather than gain if the dumping of foreign goods were to be allowed, with the consequent closing up of Canadian factories and the great advance in prices or shortage in supplies when the foreign manufacturer finds his product absorbed by his home market.

The average Canadian consumer, whether he live in the West or the East will readily grant to the Canadian manufacturer the right of protection against the product of factories in Europe where starvation wages are the rule, not the exception.

In return for this the manufacturer in Eastern Canada acknowledges an obligation and a responsibility. He is taking great pains to study the needs of the great Canadian West, to adapt his product to those needs. Moreover, as the West grows he must add to his plant and equipment in such degrees as will enable him to keep the market supplied. He must give credit, up to the limit of his resources, for product sold.

Then, when the crop falls short of the average and the demand for his product fades as the light dies out when the sun goes down; when he must dismiss half his employees or shut down his plant for lack of orders; when he must resort to every scheme and device to finance himself through a crisis he must with grim courage and calm patience use the utmost care to keep his business from going under the intricate mass of difficulties which beset it at such a time.

Truly the Western consumer owes as much to the Eastern manufacturer as the latter owes to him. May they always be good friends and may they both remember that Canada's destiny will be best served by causing the channel of trade from East to West to steadily widen and expand.

THE COST OF PRODUCTION.

It is well to devote every energy to building up business; to extend sales to every portion of the Dominion and to foreign lands; to the creation of a sales organization that will get an increased share, if not an increased volume of business when the demand is curtailed and will reach out "for everything in sight" when the demand is expanding. Such a selling organization is necessary to build up a large, wide-reaching business—but cannot be depended on for the profits of the concern.

Profits cannot come from growing sales unless care be constantly exercised to keep down the cost of manufacture.

The manufacturer who neglects his factory costs and pays attention only to increasing his sales is like the lady at the apple stand who was one day seized with the desire to make big sales. She was selling at a very low price and the newsboys responded to the inducement by buying very liberally. Said a passing merchant to her:

"How much do you pay for those apples?"

"Twenty cents a basket."

"How many are in a basket?"

"O, sometimes twenty; sometimes twenty-five."

"Then you must lose money if you sell them six for five cents as you have them marked."

"But see how many I'm selling," she replied, conclusively, as she turned to supply the wants of another youthful buyer.

Reasoning was useless. But when the day was done and the old lady counted up at the end of the day she had learned her lesson. She next day returned to her usual charge of three apples for five cents.

There is for the merchant a great deal of meaning in the truth in the adage that "Goods well bought are half sold." But the manufacturer's business is more complicated. He must buy his raw materials at rock bottom prices, but between the cost of raw material and his selling price is his best hope for profit.

His competitors will probably buy as cheaply as he and as a rule selling prices, of standard goods, find their level. So he must seek to find his profit in the curtailment of production costs.

This entails constant study of power costs, constant watch for new machinery which will increase production without increased cost of operation; constant systematizing of factory and warehouse methods so that all leakages may be stopped, and the maximum of efficiency, of men and machinery, developed throughout the plant.

To this end every factory should have a superintendent who is a natural leader of men and who is willing to give the necessary time and attention to mechanical matters, to be intimate with modern processes and the most up-to-date machinery. This superintendent should be encouraged to visit the other factories where new machinery, for which its makers are claiming great advantages is in operation. He should, too, be encouraged to read the foremost technical literature.

His assistants, the foremen in charge of various departments, should, too, be encouraged to keep in touch with all discoveries and inventions in their branch of mechanics.

Over all these should be a manager or managing director with a clear open mind and with the authority and courage to scrap or sell as second hand, a valuable machine if it can be replaced with one which will save more than its cost by increased production or decreased cost.

The Apprenticeship System of To-Day

W. R. Warner, of Warner & Swasey Co., Cleveland, O.

If we study men without an education, either trade or commercial, we realize that they are the men who are the laborers and we all know that the laborer is a good deal of a machine. In the words of a well-known manufacturer, "the man without an education is an automatic traveling crane." He has hands that can lift something, and by the aid of his feet and legs he can carry that something to another place. Without education that man will remain a travelling crane, but give him some education and if he has other qualities he becomes a more capable man, and can raise the price for which his service sells in the market. We pay the travelling crane $1.50 a day, and really it is a pretty high price. The uneducated man gets more than the educated man for what he does. The cheapest man the great manufacturing concern can hire is the $10,000 a year man; but the travelling crane gets $1.50 a day.

Some years ago the American Society of Mechanical Engineers met in Philadelphia and the Baldwin Locomotive Works invited us to inspect its plant. At that time it was making one locomotive a day. I did not care a snap for locomotives, after I had been there 5 minutes. I hung to the superintendent to ascertain wherein was his power over the men, for this power was apparent everywhere. Afterward I learned that he received a salary of $20,000 a year. A large salary, I thought, until I ascertained that that man had increased the output of that shop 50 locomotives a year, and it took but the sale of three to pay his salary. He was thus the cheapest man in the shop. In considering the apprenticeship system I cannot help going back to the time when I left the district school in New Hampshire and started in to learn the machinist's trade. The differences between the opportunity given the boy then and now are as wide as you can imagine. We had to take our turn in wheeling the castings, in oiling the shafting, and in sweeping the floor, and then we were given excellent work in putting in boiler fronts. No apprentice would be given such work to-day, and yet it served to give me ideas I have always remembered.

The apprenticeship system is not obsolete; it still exists. I think there are more apprentices to the iron and mechanical trades to-day than ever before in this country. For 40 years the Brown & Sharpe Mfg. Co. has had a system of apprenticeship and has turned out excellent workmen, foremen, superintendents and managers. The Pratt & Whitney Co., of Hartford, for over 45 years has taken apprentices and has turned out superintendents who are scattered all over the country. The New York Central Lines at this time have over 500 apprentices in their shops. Even the little concern with which I am associated has for over 25 years had many apprentices, and at the present time has some 35 or 40. It is plain, therefore, that the apprenticeship system is not obsolete.

A Business Proposition.

The aims of the manufacturer are purely commercial: this is to be admitted frankly. Our schools are founded on philanthropic principles to aid those who come to them, but the manufacturer takes an apprentice for only one purpose, to make money out of his services, certainly not to lose money. It is purely a business proposition.

The apprentice comes to the manufacturer for a purpose—for an education in mechanical lines. Can these two purposes be realized? Can I take an apprentice and so guide and manage his work that the result will be profitable to me and at the same time give him an education? I believe it can be done, indeed, it is being done by all the concerns I have mentioned, for the young men who are in the shops referred to do acquire a knowledge of the work. There are discouraging experiences at times; I could mention several, but you would not care to hear them. I will, on the other hand, refer to two or three encouraging ones. They are illustrative of the working of the apprentice system under favorable circumstances.

Apprentices who went to the Top.

A doctor in Cleveland came to our place and stated that he wanted to get a position for a young fellow who lived up in Maine and who wanted to learn the machinist's trade. I told the doctor that the boy ought not to come as far as Cleveland from Maine. I said: "Why doesn't he go to Portland or Boston? There are plenty of good jobs there. While we would like to have a good apprentice, it seems hardly worth while for him to come that distance." He replied: "Let me tell you about this boy. He lives 12 miles from a railroad. For years he fixed his mother's sewing machine, the clock in the house and everything of that sort, and finally he undertook to make a model of a locomotive. He had read about a locomotive and seen pictures of a locomotive, but there was one thing he couldn't understand, so he walked 12 miles to see one." When I heard all this I said: "Send the boy along. That is the kind of a boy we want." So that boy came from Maine clear to Cleveland to learn the machinist's trade. Before he had finished his apprenticeship he had won such a reputation that we took him in the drafting room and gave him six months there. In 1893 we sent this boy to the Chicago Exposition to study the exhibits there from all parts of the world. We wished him to bring home a lot of information, and he did. Very soon he was made superintendent and then manager of the works, and finally general manager. Now for several years his pay has been greater than the pay of any Government official in Washington, except the President.

Another of our apprentices came from a manual training school in Cleveland. He, too, got into the drafting room and became chief draftsman. One day he told us that he had decided to resign and start in business for himself. In a few years he was known all over the country, and now we buy his machines. He has made a splendid reputation, and is making a fortune because he knew how to think. That is the secret of success. Cases like these largely repay the care that a manufacturer must give to his employees, and they serve to counterbalance the other unsatisfactory experiences of which I spoke. In these instances, and in many others I might mention, the boys are taught much. One of the important things for them to learn is to look at the subjects from the right standpoint and to think all alone. That is one of the difficult things to teach them—to think alone.

Apprenticeship Debits and Credits.

One feature of the apprenticeship system we must not overlook is that it must pay for itself. The president of our college in Cleveland once remarked, when he had all the students together, "I see before me some charity students." The boys began to look all around to pick out the charity students; then he added, "you need not look; you are all charity students. For every dollar you pay the trustees have to provide $4 to put with it to furnish the facilities you have here." But the apprentices pay their own way, and I think they ought to feel that it is a square bargain. I am sure I felt when I left that old shop in New Hampshire that they did not owe me anything and I did not owe them anything. It was a square deal; I carried away all I could, and they had given me all they could. The students in our trade schools do not thus pay for their education, nor do the students in our colleges and universities. How much better, therefore, ought they to strive to make adequate return.

It is not possible to give full details in regard to the apprenticeship in individual factories. Each factory has its own system and code of rules and changes them occasionally as necessity arises. We take the boys for a four-year term, and the first year we pay them 80 cents a day; the second year $1 a day; the third year $1.20 a day; the fourth year $1.50. At the completion of the four years we make the boy a present of $100 in gold. These are the terms on which our boys enter. We make no distinction and no difference whatever.

There is, however, one reward of merit that we hold out to them that has served to supply our drafting room with draftsmen for many years. This reward is for the boy who will qualify himself during the earlier years of apprenticeship by studying drawing. This boy we take into the drafting-room for the last six months of his apprenticeship. It is a special reward, and I am sorry to say that not many go forward into the drafting room. The incentive, however, has served to develop those who have become our chief draftsmen, our foremen and our superintendents.

The progress of every boy in the apprenticeship system, as I presume it is in trade schools and in the colleges and universities, is wholly governed by the boy himself. One of the important things we try to impress upon the boy's mind is to think for himself and to think in practical lines. There are many illustrations of the success of the trade schools, of the technical institutes and the col-

From a paper read at the first annual meeting of the National Society for the Promotion of Industrial Education Chicago, Ill.

leges. We all know them, but we know also that there are many failures. One of the things wherein we are weak is that we do not teach the boys, whether in the apprenticeship system, the trade schools, the technical institutes or the colleges, along lines sufficiently practical.

I once visited one of our leading technical institutes and was shown about by the professor of mechanical engineering with much pride and satisfaction on his part. We went through the laboratory and machine shop and brought up in the drafting room. A senior there had a series of drawings of a machine which stood beside him. He had made the plans and detailed drawings of every piece so that the patternmakers could make the necessary patterns. I asked the student how long he had been on this work and he told me the number of weeks. The drawings looked well, and the professor I think, was not a little proud of that boy's work, yet all the threads on every piece were "left handed." "Not very important, you may say, but could that boy think alone? No. The mistake simply showed that the boy was not thinking of what he was doing.

British, American and German Standards for Electrical Apparatus.

J. S. Peck in the Electric Journal.

The Engineering Standards Committee of Great Britain has recently issued a "Report on British Standards for Electrical Machinery." This report appears very incomplete when compared with the standardization rules of the American Institute of Electrical Engineers and with those published by the German Technical Society, but it is really of a preliminary nature and will undoubtedly be made more complete in the near future: in fact, tests are now being carried on at the National Physical Laboratory in London for the purpose of obtaining information regarding the effect of long time application of high voltages to insulating materials, in order to guide the Committee in determining the proper insulation tests to be applied to electrical machinery.

A comparison of the standard rules issued in Great Britain, Germany and America is of considerable interest as showing the views of engineers in the different countries as to safe operating conditions. The temperatures, overloads and testing voltages called for in the standard specifications of the three different countries are given in Tables I, II and III. The indicated temperature instead of the rise in temperature is given, as this is really the value which determines the rate of deterioration of the machine. In America and Great Britain, the temperature rise is given above a room temperature of 25 degrees C., while in Germany, a room temperature of 35 degrees is permitted. This in itself adds ten degrees to the allowable working temperature under German conditions.

TABLE II.—OVERLOAD REQUIREMENTS.

	American	German
Generators	25 per cent. for 2 hrs.	25 per cent. for ½ hr.
Motors	25 per cent. for 2 hrs.	25 per cent. for ½ hr.
Motors	50 per cent for 1 min.	40 per cent. for 3 min.
Rotary Converters	25 per cent. for 2 hrs.	25 per cent. for 30 mins.
Rotary Converters	50 per cent. for 30 mins.	40 per cent. for 3 mins.
Transformers	25 per cent. for 2 hrs.	40 per cent. for 3 mins.

In the German rules, different temperature rises are permitted for different classes of insulation. Cotton insulation demands the lowest temperature, paper insulaton comes next, with about ten degrees higher rise, while mica, asbestos and similar insulating material is permitted a temperature about thirty degrees higher than is allowed for cotton insulation. In the British and American standards it is stated that where special heat resisting insulating material is used, higher temperatures may be allowed than with the ordinary insulating material, but no limits are given. This distinction in permissible temperature rise for machines insulated with different kinds of material seems a step in the right direction, for there is no reason why a machine insulated with asbestos and mica throughout should be operated at as low a temperature as a machine insulated with cotton and similar perishable material. The great danger in this classification appears to be in the opportunity it offers for fraud, on account of the inability of the customer to determine whether all of the insulation in a machine is really of a fire proof nature or not. Everyone familiar with the insulation of electrical apparatus knows that many of the so-called fireproof insulating materials are anything but fireproof, and while it is not likely that responsible manufacturing companies who have had wide experience with different classes of insulating materials will put out apparatus which will not give a reasonable life, there is the possibility that manufacturing companies with less experience may be tempted to operate at higher temperatures than the insulating materials will stand. It is not probable that any conservative British or American engineer would ever accept electrical apparatus operating at a temperature of 125 degrees regardless of the class of insulation employed, and it is doubtful whether many German engineers would accept such machines. Nevertheless, this temperature is permitted by the German rules with certain classes of insulating material.

In general it may be stated that the American standards are much more conservative than the German, while the British standards come somewhere between the two, but are nearer to the American than to the German. In Europe, the keenness of the competition in the sale of electrical machinery has made it necessary for manufacturers to take advantage of every possible means for reducing the cost of their apparatus. Increasing the temperature limit, which is equivalent to decreasing the cost per kilowat, is one of the easiest methods of increasing output. To secure safe working at higher temperature, the German manufacturers have been studying the use of non-combustible materials. This study has also been carried on extensively in America, but American manufacturers have shown a tendency to retain the low temperature limits, thus giving their customers the benefit of the improved insulation, in that they obtain machinery having longer life and greater immunity from breakdown.

British and American electrical manufacturing companies know how difficult it is to compete in price with the German manufacturers. Perhaps the more liberal standards under which the Germans work are in part responsible for this, in any event the tables here given will repay careful study on the part of the British and American engineers.

TABLE III.—INSULATION TESTS.

	American	German
Minimum testing voltage	1,000 for one min.	100 for 30 minutes
Apparatus for voltages between 5,000 and 10,000	Double for one min.	Normal + 5,000 for 30 mins.
Apparatus for voltages over 10,000	Double for one min.	Normal + 50 per cent for 30 minutes.

TABLE I.—MAXIMUM OPERATING TEMPERATURES OF ELECTRICAL APPARATUS.

AS SPECIFIED BY THE ENGINEERING STANDARDS COMMITTEE OF GREAT BRITAIN, THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS AND THE VERBAND DEUTSCHER ELECTROTECHNIKER.

Part of Machine	American		British		German. Cotton		Paper		Mica	
	T*	R†	T*	R†	T*	R†	T*	R†	T*	R†
Windings, stationary	75	75	..	85	..	95	..	105	..	125
Windings, moving	75	75	75	85	85	..	95	..	115	..
Commutators and brushes	80	..	..	..	..	..	..	..	95	..
Collector rings	90	..	..	..	85	..	95	..	115	..
Bearings	65	..	..	..	..	..	..	..	..	..
Squirrel cage rotors	80	..	..	..	85+	..	105+	..	125+	..
Transformers	75	75	75	75	95	..	105	..	125	..
Railway motors:										
Continuous rating	100	125	..	..	..	..	..	..	..	..
One hour rating	..	..	..	..	105	105	115	115	135	135

To obtain temperature rises, subtract 25 degrees from American and British temperature and 35 degrees from German temperature. T* stands for thermometer readings, R† for increase in resistance readings. All temperatures in degrees C.

Uniform Foundry Costs.

A Memorandum Prepared in Connection With the Chart Submitted by the Cost Committee of the American Foundrymen's Association.

By Ellsworth M. Taylor.

The chart submitted by the committee has been made as simple as possible, and is designed to illustrate merely the elementary principles of the burden or sur-charge distributions agreed upon as the standard units to be used by all foundrymen.

It is not intended to be a complete cost system in itself, nor should the arrangement of the items in the different sections necessarily be maintained, so long as the various kinds of labor and material are distributed to individual costs in accordance with the formula shown.

Briefly stated, it has been determined that, in order to correctly obtain the cost per pound of good castings, according to classes or individual patterns, after the cost of the metal and direct or applied labor has been ascertained, certain kinds of burden or sur-charge labor and materials must be distributed to each class into which the product may be divided in two general ways:

(1) According to weight of good castings.

(2) According to a percentage of the direct or applied labor used in producing each class.

And in order to get a clearer insight into the subject let us discuss the various sections of the chart in the order in which they occur. We will then take up in a general way the application of the principles to different kinds of foundries.

Metal.

This section of the chart requires little explanation. It is simply necessary for the foundryman to make up his report showing the cost of the metal actually consumed in the making of the good castings produced.

This means a fairly close check on what goes into the cupola, and what we ultimately get out of it.

Burden or Sur-Charges on Metal Distributed to Classes on Basis of Weight.

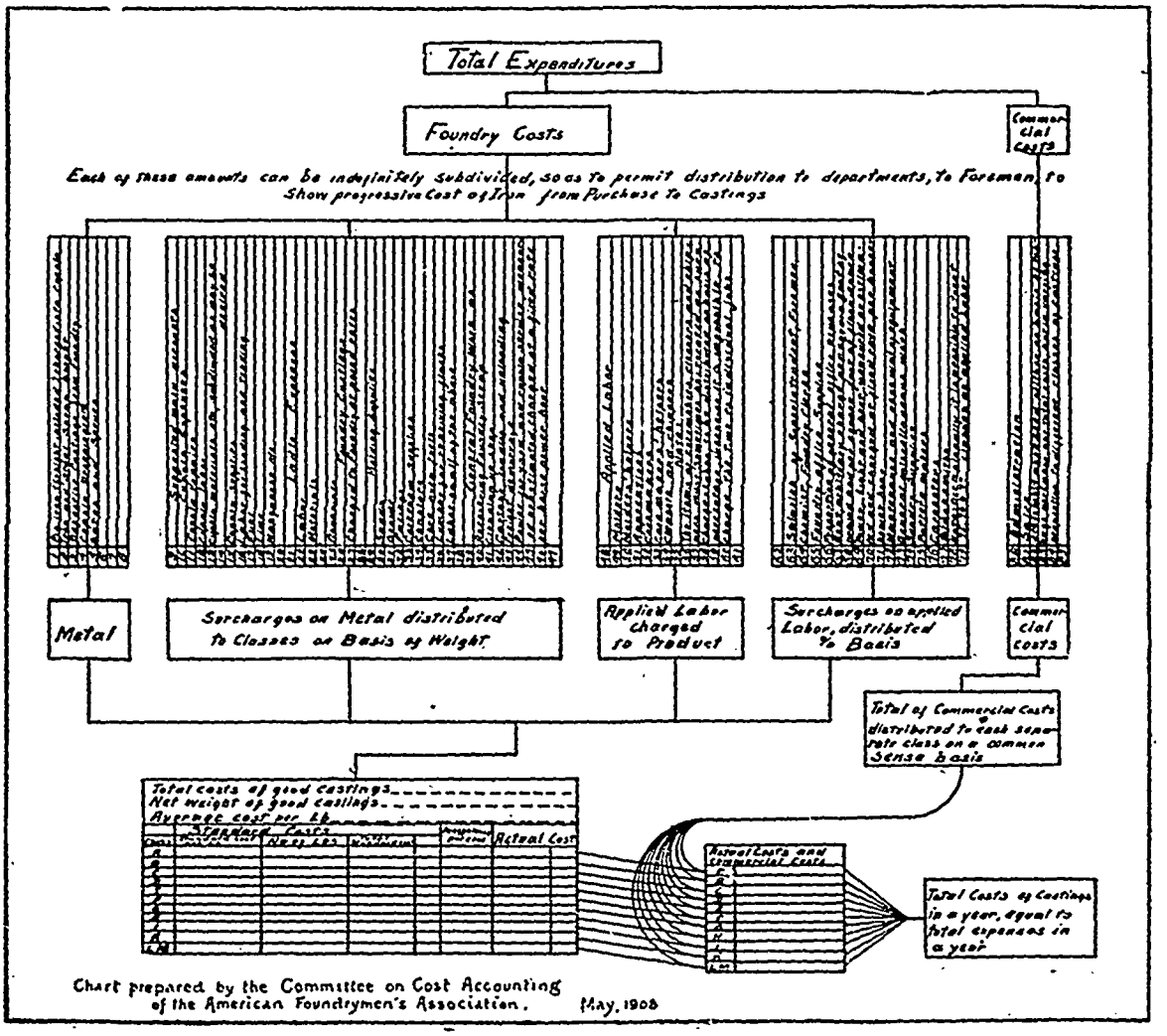
This section of the chart shows in a general way the kinds of labor and materials which will be distributed to classes or individual patterns in accordance with the weight of good castings into which the product may be divided.

In studying the items named in this section of the chart it should be remembered that the arrangement is perfectly elastic, and may be modified and enlarged upon according to the individual requirements and desires of each foundryman. The examples given are merely to illustrate the kinds of labor and materials which are to be included in this section.

It is suggested, however, that in arranging the items in this section the foundrymen group together those expenditures which relate to the successive steps through which the metal passes from the pig up to the finished castings.

For example:

1. Cost of metals delivered at yard.
2. Cost of materials and all expenditures to cupola.



3. Cost of materials and labor to cover molten iron in ladle.
4. Cost of moulding supplies and all items incidental to the same.
5. Cost of all general and miscellaneous items which must be distributed into the costs on a basis of weight of good castings.

The total cost of these items when divided by the weight of the good castings gives the number of cents per pound of burden or sur-charge cost to be apportioned to each class of castings or individual patterns into which the production may be divided.

The grouping of the items in this way is to enable the foundryman to analyze his costs logically and make comparisons for the purpose of detecting excessive expenditures.

It is sometimes the wish of the foundryman to group these and other items so as to put the responsibility for the economical handling of the iron in the various stages up to certain foremen or individuals.

All of these matters, however, must be decided according to individual desires and conditions.

Direct or Applied Labor.

The subdivisions in this section are merely suggestive. The list must be added to or decreased to meet conditions. As stated in the note, it is not always possible to class all *of the labor of these employees as direct or* applied labor, and likewise it is sometimes possible to class all or part of the labor of pattern makers, carpenters and blacksmiths as applied or direct labor.

The rule is that all labor is direct or applied when capable of direct distribution to any class of castings or individual patterns, and when it would be included as a direct labor charge in making up the cost of an individual job. Otherwise the labor items must be classed as burden or sur-charge cost.

The foundryman should be careful to observe this rule when figuring detail costs, as the percentage of burden or sur-charge apportioned to individual costs on a basis of direct or applied labor is obtained by dividing the total cost of the section—"Sur-charge on Applied Labor Distributed on Percent basis," by the total of the "Applied Labor" section.

Therefore, if we include in the applied labor section any considerable amount of labor which does not come within the above named definition of direct labor, we are apt to develop a percentage rate which will not cover our real burden or sur-charge.

Commercial Costs.

This section is intended to cover all costs beyond the shipping office door which have to do with the selling of the product.

Consequently item 80 of the chart—"Administration"—should be understood to mean only that portion of the executive cost which is used for the benefit of the selling department. The balance of the administrative cost should be included in item 66—"Proportion of General Office Expense"—or may be made a separate subdivision thereof.

Item 81 of the Chart—"Sales Costs"—may be sub-divided as each foundryman desires; for example, salesmen's salaries, salesmen's commissions, travelling expenses, etc.

In apportioning the commercial cost to the classes into which the product may be divided the unit of distribution should be made up on a basis of equity, taking into consideration the real conditions governing the sale of each class, such as the amount of sales, the costs up to the "Commercial Costs Section," the difficulty in making sales, the volume of advertising, etc.

Individual conditions must be carefully studied before the unit of distribution for this class of costs is adopted.

Summary of Costs.

After completing the arrangement of the sections described above we are in a position to secure a summary of costs which may be drawn up as submitted below, changing the arrangement to meet individual conditions.

The grand summary will be based on the following data:

(1) Total good castings produced.
(2) Cost of metals used.
(3) Cost of applied labor
(4) Cost of total sur-charge divided into:
(a) Cost of items to be distributed as "sur-charges or burden on metal distributed on basis of weight of good castings."
(b) Cost of items to be distributed as "sur-charges or burden on basis of per cent of applied or direct labor."
(5) Total cost of output.
(6) Commercial Costs.
(7) Gross cost of output.
(8) Net cost of metals used per pound of good castings (obtained by dividing item (2) by item (1).
(9) Burden or sur-charge to be distributed to individual costs on a basis of per pound of good castings (obtained by dividing item (4a) by item (1).
(10) Burden or sur-charge to be distributed to individual costs on a basis of per cent of direct or applied labor (obtained by dividing item (4b) by item (3).

The examples given in this schedule illustrate the classification of costs necessary for all kinds of foundries, and must be used to meet the conditions in the five general classes of foundries described below, and all others.

The Small Jobbing Foundry Selling its Entire Product to the Trade

This foundry wants to know:

(a) What is the gross cost of production? See items 5 and 7.

(b) How should we figure the cost of an individual casting? Multiply the weight of casting by item (8) Get the cost of the direct or applied labor used to produce the casting. Multiply the weight of casting by item (9). Multiply the direct labor by the percentage rate obtained by item (10). The total of these amounts is the cost of the casting up to the shipping office door. Add the proper proportion of item (6). The total is the gross cost of the casting.

(c) Suppose it is desired to divide the production into two or more classes, say for example "heavy work" and "light work" so that we may obtain the average cost of these classes without getting the detail cost of each casting? Separate item (1) into "heavy work" and "light work." Keep a record of amount of item (3) used for each class. Then proceed exactly as outlined for (b).

(d) Suppose it is desired to secure the cost of Smith's work, Jones' work, and Brown's work to find out which is the most profitable, and without getting the detail cost of each casting? Separate item (1) according to customers. Keep a record of amount of item (3) used for each customer. Then proceed exactly as outlined for (b).

The Jobbing Foundry Large Enough to be Divided into Two or More Distinctive Departments.

(e) Suppose one section of a plant is continually producing large loam castings, and another section produces machine made castings? Treat each department as a separate business proposition. This means

Separate item (1) according to departments. Separate item (3) according to departments. Separate item (4a) according to departments. Sub-divide 4a, First, according to those expenditures capable of direct charge to each department. Second, according to those expenditures incapable of direct charge to each department.

Examine carefully all of the items in the second sub-division of 4a, take into consideration all of the conditions prevailing in each department and apportion the amounts in accordance with the units of equity which the examination develops.

Separate item (4b) according to departments. First, according to those expenditures capable of direct charge to each department. Second, according to those expenditures incapable of direct charge to each department.

Examine carefully all of the items in the second subdivision of 4b, take into consideration all of the conditions prevailing in each department and apportion the amounts in accordance with the units of equity which the examination develops.

Separate item (6) according to departments. First, according to those expenditures capable of direct charge to the sale of castings from each department. Second,

Exhibit of the Goldschmidt Thermit Co. at American Foundrymen's Convention, Toronto

according to those expenditures incapable of direct charge to each department.

Examine carefully the items in the second subdivision of (6) and distribute the amounts in accordance with the general instructions given under the heading "Commercial Costs."

When the above distributions have been made we will find ourselves in possession of two sets of reports. Then proceed exactly as outlined for (b) in order to obtain any detail information.

The Foundry Selling Its Entire Product to its Own Machine Shop.

With this class of foundry the first step is to treat the two properties as separate institutions. Draw the line sharply between expenditures made for each property, and consider the foundry as an outside concern.

Fix the selling prices of the castings to the machine shop, taking into consideration general market conditions, and the fact that the foundry will be relieved of the usual commercial or selling expense. The foundry must then operate within these theoretical selling prices in order to be profitable.

The next thing to consider is whether the foundry is large enough to warrant subdividing it into departments.

If it is not necessary to make these departmental subdivisions we will obtain our costs and detail in the same general manner as outlined for (a) and (b).

If a departmental subdivision into departments is advisable for any reason proceed in the manner outlined for (c).

The Small Foundry Selling Part of Its Products to the Trade for Cash and the Balance to its own Machine Shop.

This class of foundry may be handled in several ways, the suggested division of the production being:

1st Cost and profits on castings sold to outside customers.

2nd. Cost and profits on castings sold to machine shop.

To get this information proceed as outlined for (d), being careful to apportion the commercial or selling costs as between the two divisions of the product.

If we wish to obtain detail costs proceed as outlined for (b) and-by posting these costs against sales we may get profits on individual jobs or by any class desired.

If we desire to divide our product first into perhaps "heavy work" and "light work" without going into the detail cost of each job, proceed as outlined for (c). And if it is still our wish to secure figures in the broad divisions of:

1st. Costs and Profits on castings to "Outside Customers,"

2nd. Costs and Profits on castings to machine shop,

We must divide (1) and (2) into the pounds of "heavy work" and "light work" in each class, and multiply the amounts by cost as developed by (c).

If we further wish to sub-divide costs of "work for outside customers," by customers, such as Brown's work, Jones' work, etc., we must know the pounds of "heavy work" and "light work" produced for each. Then multiply the amounts by the cost developed by (c.)

The Large Foundry Capable of Sub-Division into Departments and Selling Part of its Product to the Trade for Cash and Part to it's Own Machine Shop.

This class of foundry has the greatest complications and likewise the greatest possibilities for the application of the principles enumerated, and as its costs will be determined primarily by a combination of the illustrations given it does not seem necessary to go into much description.

A careful reading of the *outline for* (c) and for "The Small Foundry Selling Part of its Products to the Trade for Cash and the Balance to its own Machine Shop" should give a clear idea of points to be covered.

General Remarks.

In reading this paper it should be borne in mind that the intention is to illustrate correct principles of distribution and not to outline a complete cost system.

No attempt is being made to deal with the subject of handling of patterns, the handling of orders, the handling of metals, the record of stock, the books of account, statistics, etc.

All of these matters come under the heading of a cost system, and they were treated of in a general way by the writer in the paper prepared for the convention of the American Foundrymen's Association held in New York city in June, 1905.

(Note—The numbers and letters used in this paper do not refer to the numbers against the items on the chart except where specifically stated They are used here to permit of a logical arrangement and for the purpose of cross reference within the paper itself).

Driving Automobiles by Producer Gas.

From Kuhlow's German Trade Review.

For the past few years manufacturers of gas engines have been reaping rich harvests. This is largely due to the developments which have taken place in the use of producer gas. These developments have been hastened by the utilization of the waste gases from blast furnaces, which are, in fact, huge gas producers. But the greatest spurt has been given to the gas engine industry by the introduction of the suction producer plant, as a result of the experiments conducted by Benier in Paris about twelve years ago. Under these circumstances it is surprising that so little has been heard of attempts to apply producer gas to locomotion. The most likely explanation is that the makers preferred to stick to standard designs when there were plenty of orders for those, probably thinking that it would be time enough to tackle the problem of gas traction when the present boom was over. A little over a year ago, however, we published an article dealing with this subject, which raised very widespread interest. In that article we gave particulars of a patented method of driving automobiles by producer gas. A brief reference to the essential difference between the present machine and the ordinary producer may be necessary. The ordinary apparatus is of the suction type, that is to say, combustion is caused by the draught through the fuel from the suction of the piston. In this type of producer as applied to locomotion it has been found that the production of gas being dependent on the working of the engine there is no power of recuperation should the gas get low, while any sudden increase of load finds no response from the producer. In the producer fitted to the Glasgow vehicle, however, combustion is caused by a pressure draught, created by a hand blower to start the fire, then when the engine is working the blower is operated by mechanical means. The forced draught thus caused can be regulated in accordance with the requirements of the load and road.

An Experimental Car.

During the past year the proprietors of the patents have fitted a producer to a heavy chassis, and latterly have been conducting experiments to determine the running costs. The results are even better than what the patentee hoped for. The engine used is an ordinary petrol one with the compression increased. Between the inlet pipe and the carburettor a three-way cock is fitted, so that either gas or petrol can be used. In this way comparative results have been obtained which show that the running costs with producer gas are only one-fifth of those with petrol.

Further than this, the experiments have demonstrated that running cots equal to one-tenth of the cost of petrol should be obtained with a correctly designed high-speed gas engine and cheaper fuel. It was at first proposed to use a high-class coke, but later on Scotch anthracite peas were tried, and gave even better results than the coke. This, of course, was a great advantage, as the anthracite, besides being much cheaper than the coke, took up very much less space for a given distance, owing to its greater weight, and to the fact that about 1¼ lbs. of coke is needed per brake h.p., instead of only 1 pound of anthracite. The consumption on a recent non-stop run of 35¼ miles was about 1¼ pound of anthracite peas per ton-mile, or 173 ton-miles for 189 pounds of fuel. The same vehicle, under similar conditions, used four gallons of "Shell" spirit in 17 miles, or 21¼ ton-miles per gallon. The price paid for the spirit was 1s. 2d. per gallon, and for the anthracite peas, sifted and cleaned, 20s. per ton. At those rates we have 0.67d. per ton-mile with petrol, as compared with 0.12d. per ton-mile with producer gas, or a saving of 82 per cent., the other running expenses, of course, being equal for either form of power. Those results have been obtained under the very worst conditions.

Instead of having an engine specially constructed with separate mechanically-worked gas and air-valves, experiments have been made with an ordinary petrol engine, which has, of course, only about one-half the correct inlet area for the explosive mixture of gas and air.

Owing to this method of using the gas,

there requires to be an opening in the gas-pipe to allow the air and gas to mix before reaching the engine. Such an arrangement causes a twofold loss—on the one hand due to the escape of gas at certain engine needs, and on the other to an incorrect mixture. It being fairly well established now that a brake h.p. per hour can be obtained from one pound of anthracite, a simple calculation shows that producer-gas should show a saving of 90 per cent. over petrol, and that figure will no doubt be approached with a specially-designed engine and chassis. The exhaust is entirely free from smell, and is invisible.

The fuel is safe to store and handle, and the insurance premiums on premises where producer-gas vehicles are garaged will be very substantially less than for those using petrol. It will, therefore, be possible to cut down the fuel hopper to even less than what it is at present and still leave it large enough for a full day's run of a heavy lorry or an omnibus.

In the present car the hopper is placed immediately in front of the dashboard, the top side being level with the top of the dashboard, and the under side resting on the chassis frame. There are three lids on the top of the hopper, through which the fuel is fed in. These are made airtight by cone joints, and only require to be opened in the morning when the producer is being started to work.

The car can be under way five minutes from the time the fire is lit; and after that the producer requires no more attention, as the making of the gas is automatically controlled by the engine, and the fuel feeds automatically from the hopper to the producer. The producer is fixed to the bottom of the hopper immediately below one of the charging doors. It takes up very little space, being about 14½ inches diameter by 22 inches high.

New High Speed Twist Drills and Chucks.

The Whitman & Barnes Mfg. Co., St. Catharines, Ont., and Chicago, Ill., are introducing with much success two new styles of high speed drills and chucks, the "Norka" and "Economy."

The "Norka" high speed twist drill, (Fig. 2), and chuck, (Fig. 1), are the latest, having been but recently perfected. This drill, instead of being mill grooved in the usual way, is formed flat and twisted while hot. It is contended that by this process the grain of the steel is undisturbed, and that the steel is strengthened rather than impaired by this treatment. While it is not claimed that the extreme accuracy to be obtained by machine grooving is as yet attained by the twisting process, it is so closely approximated that for all ordinary uses the variation is imperceptible. The cost of manufacturing being somewhat lessened, the new drills can be sold at a moderate price.

The "Norka" drills are formed with correct clearance, are ground to size and are said to satisfactorily stand the rough usage incident to indiscriminate shop service. They are ground like other twist drills including the nicking of the center web. A flat shank beaded to fit corresponding grooves in the jaw of the chuck takes the place of the ordinary taper shank, and effectually prevents turning in the socket and breaking of tangs. The drill is centered at the top by a steel plug, and is securely locked in the grooved jaws with a clamping nut. Both the jaws and the centering plug are removable, and when taken out, the chuck can also be used for taper shank drills; but to protect the thread, the clamping nut should be replaced when using taper shank drills.

The "Economy" high speed flat drill, (Fig. 3), and chuck, (Fig. 4), are designed for extremely heavy feeds at rapid speeds in hard and tough high carbon steels, such as steel rails, arch bars, tool steel and steel castings. This drill is especially adapted to shallow drilling where the depth of hole runs from 1 to 3 inches. Being tempered so that almost the entire length of the drill may be used there is little waste of material. It is recommended that in grinding care be exercised to keep the centerpoint as thin or narrow as on twist drills. In the special "Economy" chuck provided for the flat drills, grooved jaws similar to those of the "Norka" chuck are used. The upper end of the drill is fitted in a recessed plug which is held in place by a retaining pin inserted through holes in the barrel of the chuck as shown. There are two sets of holes at right angles to each other and staggered, bringing them close enough for all adjustments. The pin when inserted is retained by a sliding sleeve fitting over the perforated barrel. With the adjustments provided the projecting length of drill may be made as short as the work allows, reducing the torsional strain on the drill and permitting a high rate of speed without danger of breaking.

The "Norka" twist drills are made in all the usual sizes, from ¾ to 2 inches diameter, with chucks of corresponding size; the "Economy" flat drills and chucks to accommodate them are furnished in sizes from ¾ to 3 inches diameter and in lengths up to 15 inches.

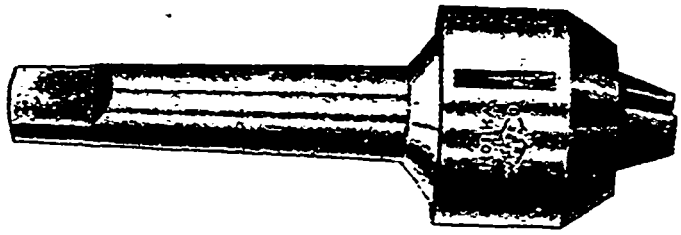


Fig. 1.—The Norka Drill Chuck.

Fig. 2.—The Norka Twist Drill.

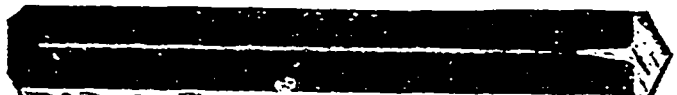


Fig. 3.—The Economy Flat Drill.

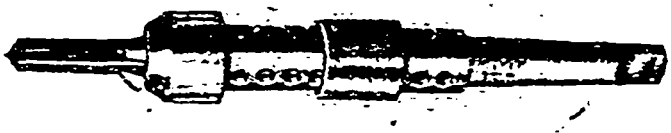


Fig. 4.—The Economy Drill Chuck.

New High Speed Drills and Chucks Made by the Whitman & Barnes Mfg. Company.

Several incendiary fires have occurred in Victoria, B.C., recently, among which are the following:—Hibben's box making machinery and surplus stock, $15,000; Morris' cigar store, ruined by water, $15,000.

Power Transmission in Wood Working Plants.

By W. L. C. in The Wood Worker.

Which is the cheapest and best method of transmitting power in a wood working plant?

In trying to answer this, as well as many other questions of like character, it is necessary to remember that hardly any two mills or manufactories are working under precisely the same conditions, and that a system which might be economical and satisfactory for one would perhaps be the worst another one could adopt. For example, in cases where only a small amount of power is needed, a gasoline engine may be better than anything else, but it would be absurd to say that it is the ideal for all users of power. To my mind the same argument holds good with respect to the use of electric motors. Where machines are scattered over a large area, and at a considerable distance from the source of power, it may well be that they offer the best solution of the problem. On the other hand, if your machinery is bunched, and your engine can be easily belted, requiring only a short line shaft, it would seem to be a case where belt or rope transmission is preferable.

The idea that there is any great economy in the use of motors has never appealed to me very strongly, but that there are many advantages in their use cannot be denied. It seems hardly necessary for me to enumerate them here, as they are familiar to all who read mechanical literature. As far as actual saving is concerned, it is still an open question whether the line and motor losses will not overbalance the losses due to shaft friction and slip of belts. The expense of installation is also a factor which must be taken into account, especially in considering a change from a system already in use.

After due consideration of the pros and cons in our own case, it was decided to replace our old generator which had been furnishing power for a department at some distance from the engine, with one large enough to supply sufficient current to run the whole plant. This was installed in July last, and new motors gradually put in, until in January of this year the old main belt was cut off and now all the machinery is motor driven. The change is so recent and the conditions so changed that it is as yet uncertain whether any saving will be effected in the cost of operation. At present, however, it seems probable that the steam consumption will be slightly greater than before, but the added efficiency and flexibility of our drive more than make up the small loss, if there is any.

Before this is published we expect to have the plant more effectively arranged than at present. The sander and resaw, which at present are belted from the line shaft, will have separate motors, enabling us to cut off the friction load when they are not in use. This is a distinct advantage where machines are used intermittently, as these are. On machines which are used continuously, like our cabinet planer and most of the circular saws it is very questionable if individual motors are desirable or economical. We have two four-sided inside molders which are fitted with 10 h.p. motors, and as these are frequently stopped for an hour or two at a time, the saving effected is probably considerable.

Our exhaust fan is a 60 inch double, requiring about 55 to 60 *h.p. to operate* it. This formerly required two large belts, one from the line to a heavy jack shaft, and another from that to the fan pulley. Now it is run by a direct connected motor with flexible coupling, which gives us a much more efficient drive, as constant voltage gives constant speed, which the belts would not do. We had no means of testing it when belt-driven, but the maker rates it at 53 h.p., making 1,250 r.p.m., the theoretical speed under the old conditions. Practically, it must have been considerably less. It is now fitted with roller bearings, which somewhat lessen the frictional load. Actual tests with a reliable instrument show that the motor, running at 1,260 r.p.m., is taking 75 amperes of current at 500 volts, or 50.3 h.p. That the fan is much more efficient than before no one can doubt, and it is very probable that it takes less power.

It is something of a difficult matter to estimate the power required for a line of shafting which carries several different machines, and select the proper sized motor to run it. Our main shaft, which was something over 350 feet long, we cut in three pieces, putting in one 20, one 30 and one 60 h.p. motor. At the time this was done we had no way of determining how much power each section would require, and guessed it off as nearly as possible. Since then we have procured a portable ammeter, which enables us to determine accurately just how much power each motor is consuming at any time. By starting different machines separately we can find out either the friction or working load of each, and for a plant of the size and character of this, which is run with motors, an instrument of this kind is almost indispensable. On testing these three motors we found that the 60 h.p. was fairly loaded, running from 40 to 55, according to the number and size of the machines in operation. The 20 horse was doing about 12 or 14 h.p., and the 30 horse little if any, more.

As any one at all familiar with electrical machinery knows, a motor should run at nearly or quite full load to attain its maximum efficiency. When we have installed the two motors on the resaw and sander, as mentioned above, we shall be able to substitute a 15 horse motor, and eliminate the 60, as we can now divide the shaft so as to load each motor to nearly its full capacity, and I have little doubt that the result will justify the judgment of our engineering force.

The advantages of the electric drive must be apparent to any one who has given the matter any consideration. Its flexibility and easy adaptation to different conditions; the elimination of so many large belts; the little care which good motors, properly installed, require, and the ease with which lines can be run to different departments of a large factory, are all points which appeal to the practical man. The subdivision of shafting into sections also renders it unnecessary to close down the whole factory, as sometimes happens when a belt gets caught or any accident happens. In short, it appeals to me as the best drive in this particular case.

As I said before, this does not mean that we have effected any particular saving in fuel. We use our exhaust for heating, and it is a difficult matter to determine whether the variation in the amount of coal burned from week to week is due to the difference in the temperature, or to some other cause, especially as the amount of waste from the factory is not at all uniform from day to day. A considerable amount of steam is also used direct from the boilers for other purposes. The only way we can get anything definite is from our engine cards, and these indicate a small increase since the change.

There is this to be said against electric machinery, that unless you have someone around the plant or within easy call who is familiar with its operation, you may get into trouble when you least expect it. It is "bad medicine" to monkey with for any one who doesn't know how to handle it, but almost every plant of any size nowadays has some one around who has some knowledge of it, and, as I said, good motors, properly installed give very little trouble.

Before finishing I want to say a word about a mode of power transmission which may not be familiar to all our readers, as it is only recently that it has come into practical use. I refer to what is known as the silent chain drive. For places where it is necessary to have a driving and a driven shaft with only a short distance between centers, I have never seen anything to equal it. I believe we have the largest one which has been installed in this vicinity (300 h.p.), and it is now working quite satisfactorily. With our limited room it would have been almost impossible to have installed a belt drive, whereas with two chains and a jackshaft between the engine and generator, it is only necessary to use 12 or 14 feet. Another advantage over the belt is the fact that it is perfectly positive. When the engine is running up to speed you can be sure that the generator is not lagging behind. With proper lubrication it would seem that it would last almost indefinitely, but that is a matter which time alone will determine.

To sum up, then, each one must determine for himself what methods are best adapted to his own circumstances. I do not think any competent and reliable engineer would undertake to say what was best for any particular plant until he had informed himself regarding all the conditions. There are certain general principles which can be laid down, and the rest must be left to the individual judgment. When our installation is completed, we expect to be well pleased with it, but others might prefer the old methods of transmission.

The Dominion Coal Co., of Glace Bay, C.B., have recently ordered a 16x16 inch Robb-Armstrong automatic engine for driving a mine ventilating fan at their No. 6 Colliery.

A Modern Shoe Factory.

From American Shoemaking.

In the new factory of P. J. Harney Shoe Co., Lynn, the ground floor is occupied by the office and the shipping and storage department. Two stairways, one at rear and the other at the front, prevent danger from fire. The elevators have independent power so that employees working on the higher floors can ascend or descend at any time.

The plant throughout is covered by modern fire protection system, and is heated by the vacuum system, which heats the whole building on the coldest day with two pounds of steam pressure.

The arrangement of offices on first and second floors are shown by the accompanying diagrams.

The key to first or office floor is as follows:

1. Front entrance and stairs for employees.
2. Rear entrance and stairs.
3. Main entrance and waiting room.
4. Buyer's office.
5. President's office.
6. Sample room.
7. Manager's office.
8. Salesmen's room.
9. Book-keeper's office.
10. Checking office.
11. Tag making.
12. Cost department.

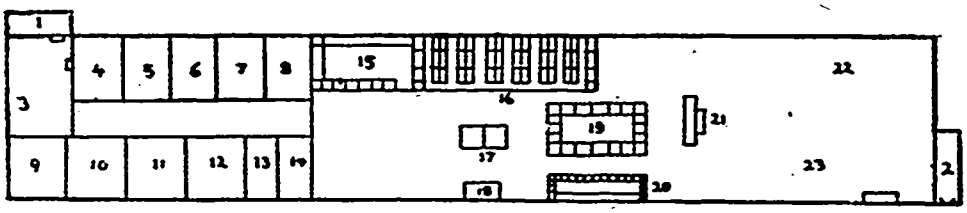


DIAGRAM OF FIRST OR OFFICE FLOOR—DRAWN TO SCALE, LENGTH, 250 FEET: WIDTH, 50 FEET. SCALE 50 FEET TO THE INCH.

No matter what the upper may be all shoes are cleaned on the tree and all shoes are jacked off to the last they were made on. All forms used in the department are modeled from the lasting lasts and this feature not only makes a shoe hold its shape better, but it does away with a good deal of ironing which is perhaps its strongest point. Another advantage to the shoes by having them done this way is that the bottoms are cleaner than they would be by any other system and there are no scraped edges. Only one shoe is handled at a time, which keeps the work better in all cases and makes it stand up because all of the moisture that is put in when cleaned on the tree stays in the upper until the dressing is put on.

The system calls for little ironing. On such leather as velours and gun meal there is hardly any ironing done except where there is a tendency to wrinkle. The ironing, too, is done by a new method which is not yet generally adopted, but which has been followed in a few factories where they are careful to get uppers smooth, and at the same time keep all of the goodness in the stock. The method is to take a damp cloth and put it on the shoe so that it comes between the iron and the upper. This might be called steaming as much as ironing and its great advantage is that it does not scorch an upper while it irons it and takes wrinkles out. The method is exactly the same as that followed by a tailor who places a damp cloth over the garment he is pressing. The upper thus has a chance to dry out gradually, as it is not forced, and all of the qualities of the natural skin are there. Because of this care in ironing it is impossible to tell where the operator put the iron on the stock.

The key to second floor, on which are the treeing and packing rooms, is as follows.

1. Elevator.
2. Desk.
3. Rack shelves.
4. Toilets and sink.
5. Dressing room.
6. Power stamper.
7. Singer sewing machines.
8. Sew on buckles.
9. Patent repairing.
10. Lacing.
11. Main entrance and stairs.
12. 8 Miller Twin Treeing machines.
13. Miller Brockton Shoe Vamp Creasing machine.
14. Dressing.
15. Brush waxing.
16. Marking cartons.
17. Packing.
18. Arlington & Curtis Double Blowers, size 80.
19. Inspecting.
20. Boxing.
21. Door to rear stairs.

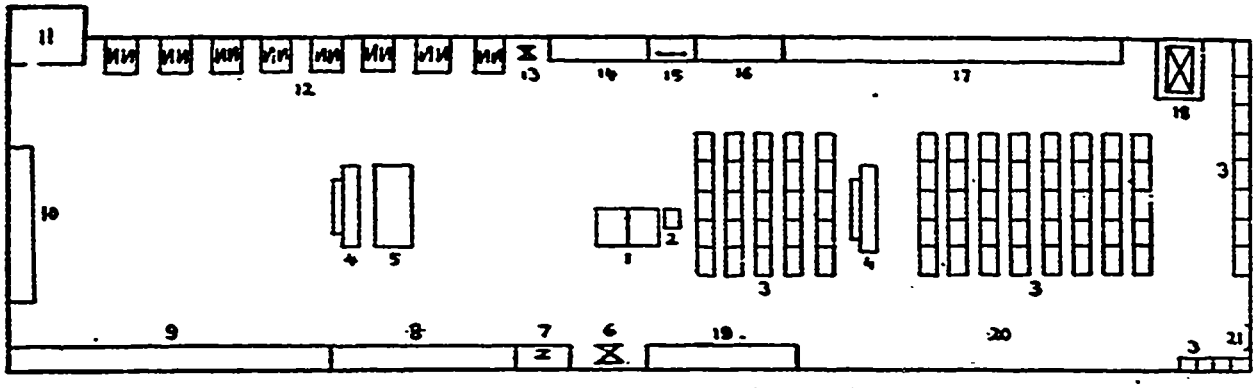


DIAGRAM OF TREEING AND PACKING ROOM, 2ND. FLOOR.

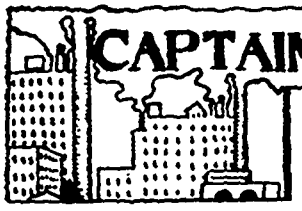
13. Ladies' Private Room.
14. Gents' private room.
15. Inspectors' room.
16. General supplies and findings.
17. Elevators.
18. Receiving and shipping door.
19. Sole storage.
20. Sole sorting room.
21. Toilets and sink.
22. Counter and heel storage.
23. Boxed and cased shoes in process of shipping.

Packing and Shipping.

The main work of this department is to inspect, monogram, lace, tree, fix tips if required, crease, dress, brush and pack. All shoes go through in the above order. The work begins at the elevator, same as in other rooms, and goes clear around until it comes back to the starting point.

In this department the shoes are looking good and each day's work is done as it comes and according to the sheet system followed. The sheet gives the number of cases each buyer has and his order. The bins in this room are arranged from A to Z so that each customer's orders are separate. Everything is for the retail trade and the system is most satisfactory, saving both time and labor.

The H. W. Johns-Manville Co., New York, recently opened a Canadian branch office and wareroom at 85-87 Wellington St. West, Toronto. A large stock of the various products of the company such as boiler compound, packing, electric, railway supplies, portland sectional conduit, and asbestos and magnesia products, will be kept on hand, enabling the company to guarantee prompt shipment of Canadian orders. The Canadian end of the business will be under the management of Geo. A. Schmidt.



CAPTAINS OF INDUSTRY

The following items of information, which are classified under the title "Captains of Industry," relate to matters that are of special interest to every concern in Canada interested in any manufacturing industry whatever, this interest extending to supply houses also.

The C. Wilson Scale Works, Toronto, were damaged by fire June 28 to the extent of about $16,000.

Stockwell-Henderson & Co., Toronto, dyers and cleaners, will erect a building to cost about $20,000.

The Queen City Oil Co., Toronto, have taken out a permit for a brick boiler house and smoke stack to cost about $3,300.

The Stratford Bridge Co. have been awarded the contract for the erection of an iron bridge at $1,050.

The Reid Foundry & Machine Co., Ingersoll, Ont., have been incorporated to manufacture the Reid and other moulding and foundry machines. David Reid and A. H. Marshall are interested.

The London Machinery Co., Guelph, Ont., will erect a new factory as their present premises are not large enough.

The Hall Foundry & Machine Co., Brantford, Ont., who are erecting a new plant there, have been granted a fixed assessment of $2,000 for ten years.

The Hamilton Tube Co., Hamilton, Ont., have been incorporated with a capital of $50,000, to manufacture steel tubes. The incorporators include J. L. Sharkey, New York City; G. A. Martin, Pittsburg, Pa.; and E. H. Ambrose, Hamilton, Ont.

The Separate School Board, Hamilton, Ont., will erect a school house at an estimated cost of $12,000.

The washer making department of the Hamilton Steel & Iron Co., Hamilton, Ont., was destroyed by fire. Loss about $4,000.

The planing mill of James Chalmers, Lindsay, Ont., was destroyed by fire recently. Loss about $5,000.

The lumber mill of Nichol Bros., Owen Sound, Ont., was destroyed by fire recently. Loss about $15,000.

J. F. Lewis, vice-president of the Philadelphia Lubricator & Mfg. Co., has been in Peterboro, Ont., recently in regard to a site for a factory for the manufacture of a greased cup, a new device for lubricating purposes. A suitable site has been purchased and further developments are expected shortly.

The ratepayers of London, Ont., will vote on a by-law of issuing bonds to the amount of $565,000 for the extension of the waterworks.

Plans have been submitted for the proposed new town hall at Meaford, Ont., to cost $17,500.

The city council of St. Catharines, Ont., have decided to erect a new school at a cost of $10,000.

The building of the Standard Chain Works, Sarnia, Ont., was wrecked by storm a few days ago. Loss about $10,000.

The Burks Falls Hardware Co., Burks Falls, Ont., have been incorporated with a capital of $40,000, to carry on a business of hardware merchants, etc. The provisional directors include Joseph Hilliar, A. P. Lowry and R. J. Bennett, Burks Falls.

The Berlin Sugar Refining Co., Berlin, Ont., have been incorporated with a capital of $100,000, to manufacture and refine sugar. The provisional directors include James Fowler, C. K. Hagedorn and S. J. Williams, Berlin.

The Lufkin Rule Co. of Canada, Windsor, Ont., have been incorporated with a capital of $100,000, to manufacture measuring tapes, rules, etc. The provisional directors include Theodore Huss, Saginaw, Mich., Edwin Russell and A. R. Bartlet, Windsor, Ont.

The Canadian Automatic Shoe Shine Co., Toronto, have been incorporated with a capital of $300,000, to manufacture shoe polishing machinery, etc. The provisional directors include F. H. Potts, T. A. Silverthorn and A. W. Holmested, Toronto.

A. Muirhead Co., Toronto, have been incorporated with a capital of $250,000, to manufacture paints, oils, varnishes, etc. The provisional directors include Andrew Muirhead, John Anthony and W. H. M. Bonnell, Toronto.

The Rainer Lumber Co., Rainer, Ont., will erect a saw and lath mill.

It is proposed to install a sewerage system at the Mimico Industrial School, Mimico, Ont., at a cost of $7,500.

The ratepayers of Galt, Ont., will vote on a by-law to issue $50,000, for the purpose of conducting a sewerage system.

The Parkdale Club, Toronto, will erect a club house to cost about $15,000.

The Wheatley Telephone Co., Wheatley, Ont., have been incorporated with a capital of $20,000, to carry on the business of a telephone company. The provisional directors include F. J. Fox, Nathaniel Coles and J. H. Allan, Wheatley, Ont.

The Canada Tool Co., Niagara Falls, Ont., have been incorporated with a capital of $200,000, to manufacture machinery, tools of metal, wood, etc. The provisional directors include P. J. Creedon, E. A. Nelson, and C. W. Davenport, Jr., Niagara Falls.

The Chambers-Ferland Mining Co., Toronto, have been incorporated with a capital of $2,500,000, to carry on a mining, milling and reduction business. The provisional directors include G. E. McCann, J. W. Heffernan and C. E. Stonehouse, Toronto.

The Church Book Room, Toronto, have been incorporated with a capital of $40,000, to carry on a publishing and stationery business. The provisional directors include E. A. Welch, R. Millichamp and W. J. Slater, Toronto.

The Toronto Power Co. have, by supplementary letters patent, increased their capital from $100,000 to $1,000,000.

The International Stock Food Co., Toronto, have been incorporated with a capital of $250,000, to manufacture cereals, health foods, etc. The provisional directors include E. B. Savage, M. W. Savage, Minneapolis, Minn., and Frederick Stokes, Toronto.

Quaker City Cobalt Mines, Haileybury, Ont., have been incorporated with a capital of $1,000,000, to carry on a mining, milling and reduction business. The provisional directors include H. D. Graham, E. A. Wright and T. H. Jessop, Haileybury, Ont.

Listowel, Ont., will raise $6,000 to complete the waterworks system.

The Concrete Engineering & Construction Co., Toronto, have been awarded the contract for Section C of the sewers, Preston, Ont.

The Canadian Pacific Railway are replacing the present rails of their line between London and Detroit with heavy 80-pound steel, the heavy traffic over the line making this compulsory. The work will be extended over two or three seasons, and each year a certain portion of the present line will be thus improved. This year the section between Hyde Park and Caradoc is being relaid.

Tolton Bros., Guelph, Ont., manufacturers agricultural implements, will erect an addition to their plant two stories high and to cost about $2,000.

The Pine Grove cheese factory, Arnprior, Ont., was destroyed by fire June 20. Loss about $1,400.

The Westermite Mfg. Co., Brantford, Ont., have been incorporated to manufacture Westermite, a new asphalt pavement. The company is composed of L. S. Van Westerum, Chicago, Ill., W. J. Aikens, Dunnville, W. T. Henderson and A. H. Elliot, Brantford. The advantages Westermite claims over the asphalt pavements already on the market is that it can be laid cold. In laying the different asphalts already in use, the asphalt must be laid hot and at a time when the temperature is at a certain standard, but Westermite can be laid cold and at any temperature. To lay other asphalts a temporary plant has to be laid on the street and moved along as the work progresses, but Westermite is taken to its place of use in barrels, fully prepared at the place of manufacture, and no heating is required.

The Alnwick Independent Rural Telephone Co., Alnwick Township, Ont., have been organized and will commence work on the installation of a telephone system at once. The president of the company is E. W. Hayden, Rosemeath, Ont.

The Percy & McPherson Brass Works are considering the erection of a factory at Forest, Ont., and are in negotiation with the town.

A new building will be erected at Guelph, Ont., at a cost of about $5,500, in connection with the General Hospital.

A new church will be erected in Hespeler this summer to cost about $20,000, by the congregation of the Presbyterian church.

The Canadian Locomotive Works, Kingston, Ont., will erect a new foundry.

The Kingston Milling Co., Kingston, Ont., will erect a power plant on a site about six miles east of the city. The mill will be enlarged.

Andrew Anderson and associates, Winnipeg, Man., are considering the establishment of an immense pulp and paper plant at Kenora, Ont., to cost about $3,800,000.

They propose to acquire the water power and property of the Keewatin Power Co. $1,000,000 will be spent the first year.

J. H. Hall & Sons, Brantford, Ont., are erecting a $3,500 machine shop.

The Canada Foundry Co., Toronto, are building a couple of bridges for the Temiskaming & Northern Ontario Railway in Northern Ontario.

The Muskoka Foundry Co., Parry Sound, Ont., have enlarged their premises.

George White & Sons, London, Ont., manufacturers engines, etc., will erect a new foundry. The wood working department will be commenced at once and will cost about $15,000.

The Toronto Electric Light Co., Toronto, will erect a sub-station at a cost of $20,000.

Merritton, Ont., will construct a municipal electric light plant to cost $5,550.

A. Todd, Walkerton, Ont., will erect a sawmill at Guelph, Ont.

The Louis A. Fisher Co. will build a large sawmill at Dryden, Ont.

A new mill to cost $150,000 will be erected at Fort Frances, Ont., by the Rainy River Lumber Co.

The Bracebridge Furniture Co.'s factory, Bracebridge, Ont., has been purchased by George Tennant, who will convert it into a sawmill and wood-working factory.

Robert Watt, Toronto, will erect a planing mill and factory there.

The Sydenham Glass Co., Wallaceburg, Ont., will build a new $60,000 factory.

The Canadian Canners, Limited, Ridgetown, Ont., will erect a large canning factory there.

A sash and door factory will be erected at Welland, Ont., by Brown, McMillan & Calder.

The Wallaceburg Sugar Co., Wallaceburg, Ont., are enlarging and improving their plant at a cost of $40,000.

A new German card factory will be erected in Peterboro, Ont., 85x32 feet, foundation of concrete, and the walls of cement brick. Turner Bros. are the proprietors.

The Presbyterians of East Hamilton, Ont., have established a new congregation to be known as St. Giles and will erect an edifice to cost about $15,000.

A. A. Barthelmes Co., Toronto, will build a concrete factory for manufacturing piano actions, etc.

The Dane Farm Implement Mfg. Co., of Iowa, are considering the erection of a $40,000 plant at Port Robinson, Ont.

A company capitalised at $200,000, will erect a factory at Fort Frances, Ont., for the manufacture of brick, tile, and sewer pipe. J. C. Sullivan is interested.

If the town of Forest, Ont., will grant exemption from taxation for ten years, the Percy & McPherson Brass Works will erect a factory there.

The Grand Trunk Railway Co.'s station at Berlin, Ont., was destroyed by fire, June 22. Loss about $15,000.

The worst fire in the history of Burk's Falls, Ont., occurred June 20, when property to the value of about $150,000 was destroyed. The heaviest losses are the Burke house, Clifton house, C. W. Coulter's general store, Burk's Falls Hardware Co., Canadian Express and G.N.W. offices, All Saints' Church of England, J. N. Dodds' harness shop, G. C. Church, general merchant; I. Davodovich, general merchant; S. T. Vanstone, jewelery store and residence· Stewart's livery, and Burk's Falls Transfer Co.

One of the mills of the Lincoln Paper Co., Merritton, Ont., was destroyed by fire, June 19. Loss about $50,000.

The grist mill of W. R. Pennick, Milltown, Ont., was destroyed by fire, June 17. Loss about $4,000.

Fire at Bancroft village, near Belleville, Ont., did damage to the extent of about $15,000, June 18.

The planing mill of James M. Chalmers was destroyed by fire, June 17. Loss about $3,000.

The Morlock Bros Co., Guelph, Ont., propose amalgamating with them the Jas. A. Cline Co., Stratford, Ont., and removing the latter concern to Guelph, Ont.

D. McKenzie, Guelph, Ont., has added a large 36 inch gap lathe, manufactured by the MacGregor-Gourlay Co., Galt, Ont.

An annex to the McKellar General Hospital, Fort William, Ont., will be erected to cost about $80,000.

The Consolidated Elevator Co., Fort William, Ont., will double the capacity of their elevator, which now holds 600,000 bushels

The Seventh Day Adventists, London, Ont., will erect a large church there.

The congregation of the North Parkdale Methodist church, Toronto, will erect a new edifice to cost $40,000.

London, Ont., will build a fire hall at a cost of $6,400.

McMahon, Granger & Co., London, Ont., will erect a new fireproof wholesale drygoods warehouse at a cost of $35,000.

The Canadian Locomotive Works, Kingston, Ont., are said to be planning considerable extensions, including the erection of a new foundry.

The Canadian Northern Railway have purchased the factory site of the Evans Co., Sudbury, Ont., for railway purposes.

Mr. McKilvey, Stratford, Ont., proposes to build a furniture factory in Galt, Ont.

W. J. Meyers, Toronto, will erect a building for the manufacture of brewers' casks.

The Campbell Lubricating Co., Hamilton, Ont., will erect a brick warehouse at a cost of about $3,000.

The Canada Piano Co., Montreal, have been incorporated with a capital of $20,000, to manufacture pianos, organs, gramophones, etc. The charter members include Victorien Lavoie, Ludger Hamelin and J. A. Hurteau, Montreal.

Hiram Johnson, Limited, Montreal, have been incorporated with a capital of $100,000, to manufacture furs, hats, caps, etc. The charter members include R. J. Williamson, St. Louis, Que., F. W. Hibbard and Louis Boyer, Montreal.

The Campbell Shoe Co., Quebec, Que., have been incorporated with a capital of $190,000, to carry on the business of manufacturers, traders and merchants. The charter members include Amos Campbell, Philippe Angers, Quebec City, and G. D. Anderson, St. Romauld d'Etchemin, Que.

A. Klipstein & Co., Montreal, have been incorporated with a capital of $20,000 to manufacture anilines, dyes, dyestuffs, etc. The charter members include G. C. Comstock, New York City, William Ferguson and J. W. Weldon, Montreal.

The Montreal Doloment Co., Montreal, have been incorporated with a capital of $40,000, to manufacture plaster, cement, concrete flooring and roofing materials. The charter members include Chas. Riordan, Toronto, C. C. Riordan and C. A. Pope, Montreal.

The Saguenay-Quebec Telephone Co., Montreal, have been incorporated with a capital of $140,000, to construct telephone lines in the county of Saguenay. The provisional directors include J. E. Dubuc, J. E. Cloutier and E. G. Gosselin, Chicoutimi, Que.

The council of St. Louis, Que., will submit a by-law to the ratepayers for the purpose of laying water pipe lines to cost $180,000.

La Compagnie des Constructions de Quebec, Quebec City, have been incorporated with a capital of $25,000, to construct railways, wharves, etc. The charter members include Edouard Paquet, J. J. Gravel, Quebec, and Philias Parent, Beauport, Que.

La Compagnie d'Imprimerie Paquin, Montreal, have been incorporated with a capital of $20,000, to carry on the business of printing, binding and stationery, and to acquire the business now carried on by Paquin & Fils. The charter members include Samuel Paquin, Jos. H. Lecavalier and C. W. Therrien, Montreal.

The Rolland Paper Co., Montreal, have been incorporated with a capital of $100,000 to acquire the business now carried on by the Rolland Paper Co., and to build dams, bridges, canals, etc., on their property, and to erect and maintain works, houses or tenements. The charter members include J. D. Rolland, Montreal, S. J. B. Rolland and Henri Rolland, St. Jerome, Que.

The L. E. Waterman Co., of Canada, Montreal, have increased their capital stock from $10,000 to $100,000, and have changed the name of the company to the L. E. Waterman Co.

The National Acetylene Gas Co., Sherbrooke, Que., have been incorporated with a capital of $60,000, to produce acetylene gas for illuminating as well as heating purposes, etc. The charter members include J. O. Brousseau, North Hatley, Que., Edouard Boudreau and Jacob Nicol, Sherbrooke.

The Ha! Ha! Lumber Co., St. Alexis, Que., have been incorporated with a capital of $45,000, to manufacture wood products of all kinds. The charter members include B. J. Kaine, Quebec City, T. D. Pontbriand, Sorel, Que., and F. L. Wells, Fulton, N.Y.

The Universal Printing & Publishing Co., Montreal, have been incorporated with a capital of $49,000, to manufacture stationery of all kinds, typewriting supplies, etc., and to carry on a general printing and publishing business. The charter members include Robert Gitters, David Paterson and Colin Paterson, Montreal.

The L. E. Waterman Co., Montreal, will erect a factory at St. Lambert, Que., to cost

about $50,000, for the manufacture of fountain pens.

The Improved Paper Machinery Co., Nashua, N.H., will establish a plant at Sherbrooke, Que., having been granted a bonus of $5,000, and exemption from taxation for ten years.

The Jenckes Machine Co., Sherbrooke, Que., have been awarded the contract for the water wheel and accessories in connection with the new pumping station at Sherbrooke.

The Robert Syndicate, Montreal, will build their power house at St. Timothee, where there is a head of 51 feet 7 inches. They will begin with 6,000 h.p. and increase it until they have 60,000 from the water coming through the Beauharnois canal from Lake St. Francis. This, with the 40,000 available h.p. at Cedar Island, where the Robert Co. have secured the rights, will make a total of 100,000 h.p.

The Danville Lumber Co.'s sawmill, Danville, Que., was destroyed by fire. Loss about $5,000.

Taylor & Jamieson will rebuild their sawmill at Scotstown, Que.

The steam shingle mill of Tilton & Raymond, Smith's Mills, Que., was destroyed by fire a short time ago.

Fire which broke out on June 22, at Three Rivers, Que., destroyed 100 buildings, including the post office, telegraph offices, Bell Telephone office, all the banks, all the drug stores, all the principal groceries, all the dry goods stores, the old parish church, several private residences, and all the principal hotels. The loss will be about $1,500,000.

It is stated that the proposed new Imperial Locomotive & Machine Works will be erected at Lachine, Que., without any unnecessary delay. The Trust & Loan Co., of Canada, have just received the engineers' plans for the construction of the series of buildings required for this great undertaking, and have handed them over to Mr. H. C. Stone, architect of Montreal, who has been commissioned to carry out the necessary preparations with a view to tenders being secured for the work during the month of July.

The Willis Piano Co., Montreal, are erecting a concrete factory at Ste. Therese, Que.

The sawmill of the Wm. Scott Lumber Co., near Fredericton, N.B., was recently destroyed by fire.

F. D. Sadlier's sawmill, Rowena, N.B., was recently destroyed by fire. Loss about $5,000.

The Stanley Railway & Mfg. Co. will erect a woodworking factory at Ryan's Brook, N.B.

J. B. Beveridge, Newcastle, N.B., will erect a large paper mill at Lower Derby, N.B., and will also build 25 dwellings.

The Westmoreland Power Co., Moncton, N.B., have applied for incorporation to construct a street railway and to carry on a light and power business.

Arthur Sewell is erecting a sawmill at Gibson, N.B.

Frank Reardon, J. A. Watt and G. R. Ramey have entered into negotiations with the city council of Halifax, N.S., with a view to establishing a glass works there.

Lunenburg, N.S., will improve the waterworks and sewerage systems, at a cost of about $25,000.

The National Rolling Mills will erect a new plant at Sydney, N.S. C. V. Wetmore and F. A. Crowell are interested.

It is proposed to erect a Y.M.C.A. building at Halifax, N.S., to cost $100,000.

The pipe shop of the Dominion Iron & Steel Co., Sydney, N.S., was destroyed by fire recently. Loss about $10,000.

The Silliker plant at Halifax, N.S., have commenced the building of railway cars.

Rhodes, Curry & Co., Amherst, N.S., have been awarded the contract for the Carnegie science building, by the Governors of Acadia College, Wolfville, N.S.

The ratepayers of Gilbert Plains, Man., will vote on a by-law to spend $15,000 for school improvements.

Dauphin, Man., will have a new post office, the estimated cost of which is $36,000.

The National Mfg. Co., incorporated under the laws of Ontario, have been granted a license to carry on business in Manitoba, with principal office at Brandon.

The packing plant of J. Y. Griffin & Co., Winnipeg, Man., was damaged by fire to the extent of about $75,000.

Gordon, Ironsides & Fares' abattoir, Winnipeg, Man., was destroyed by fire recently. Loss about $50,000.

The Goodwin Car Co., New York city, are considering locating in Winnipeg, Man.

The Williams Quarry Co., Winnipeg, Man., have been incorporated to develop a deposit of marble which has been discovered at Mount Williams, about twelve miles north of Winnipeg. The provisional directors include H. G. Middleton, A. J. Griffin and J. Williams, Winnipeg.

The Dominion Bridge Co., Winnipeg, Man., have secured the contract for all the structural steel work on the new Fort Garry Station at Winnipeg. This contract will amount to about $200,000, and will be one of the largest structural steel contracts ever let in Western Canada. The Winnipeg works of the company will shop considerable of the steel. The same company have also secured the contract for the structural steel work on Davon Court Apartments on Broadway, John D. Aitchison being the architect. All the steel work on this job will be shopped in the Winnipeg works.

A Catholic convent will be erected in Brandon, Man., at a cost of about $65,000. It will be solid brick, three stories, 76x56 feet.

The Great Northern Railway Co. are said to be considering the construction of a railroad from Winnipeg, Man., to Calgary, Alta., through Northern Saskatchewan and Alberta.

Burt & Andrich, Portage la Prairie, Man., will erect an office building and apartment block to cost about $10,000.

The Joint Stock Apartment Co., Winnipeg, Man., will erect a five story block 120x100 feet.

A. J. McArthur will build a tile works factory at Calgary, Alta.

The city council of Regina, Sask., will erect a market building to cost $25,000. The building will be 130x36 feet, solid brick.

The Edmonton Cement Works, Red Deer, Alta., purpose erecting a cement works.

The International Co., Coleman, Alta., are building forty new coke ovens.

Walker & Son have started a factory at Rosthern, Sask., for the manufacture of sashes and doors.

Humboldt, Sask., will have a new post office at a cost of about $25,000.

The Canadian Pacific Railway will erect a machine shop at Saskatoon, Sask., to cost about $20,000.

H. T. and H. P. Clarke will open a foundry and machine shop at Wetaskiwin, Alta.

Calgary, Alta., will spend $25,000 on electric light extensions.

The Northern Electric Co., Montreal, have been awarded the contract for the supply of 700 miles of long distance telephone material for the Province of Alberta.

The Canadian General Electric Co., Toronto, have been awarded the contract for the 500 kilowatt steam turbine generating unit for the town of Moose Jaw, Sask.

A. R. Fleming, Regina, Sask., is considering the establishment of a brick plant in Tantallon, Sask., at a cost of about $10,000.

The elevator building of the Smith Grain Co., Stockholm, Sask., was destroyed by fire Loss about $5,000.

A new collegiate institute will be erected at Regina, Sask., to cost about $150,000.

The finance committee of the city council of Calgary, Alta., have selected a site on which will be erected the new $50,000 drill hall.

The Presbyterian congregation of Asquith, Sask., will erect a new church building to cost $2,500.

The ratepayers of Arcola, Sask., will vote on a by-law to issue $60,000, for the purpose of providing a water supply and a waterworks system.

Whitewood, Sask., will have a new school building at a cost of $15,000.

The Dominion Government are calling for tenders for the installation of a waterworks plant at the new Prince Albert Penitentiary.

At a recent meeting of the General Hospital Board, Calgary, Alta., the contract for the new hospital was awarded to Woodward Bros., whose tender called for $103,370, exclusive of installing the electric wiring, etc. The contract for the latter was awarded to the North-West Electric Co. for $5,500. The amount does not include the installation of the heating apparatus, electric elevators, dumb waiters, laundry machinery, etc. Tenders will be called for these shortly.

The Burnvale Brick Pipe & Enamelling Co., Calgary, Alta., have been incorporated.

The International Lumber Co., Calgary, Alta., have been incorporated.

The Quigley Brick, Mfg. Co., Cochrane, Alta., have been incorporated.

The Canadian Oil Co., Edmonton, Alta., have been incorporated.

The G. & J. Safety Blasting Powder Co., Edmonton, Alta., have been incorporated.

The Nokomis Flour Mills Co., Nokomis, Sask., are erecting premises at that place.

The Canadian Northern Railway and Grand Trunk Pacific will erect a union depot at Saskatoon, Sask.

The Saltcoats Telephone Co., Saltcoats, Sask., have been incorporated with a capital of $25,000. W. H. Hallett is secretary-treasurer.

The Canadian Bank of Commerce, Strathcona, Alta., will erect a brick and stone building at a cost of about $30,000.

The British Canadian Pulp & Paper Co., Vancouver, B.C., will erect a new building.

E. K. Rogers, Vancouver, B.C., is preparing plans for the erection of a $40,000 power plant in connection with the Hidden Creek mines at Goose Bay, Observatory Inlet.

A Roman Catholic Church will be erected at Vernon, B.C., at a cost of about $10,000.

The Fernie-Fort Steele Brewing Co., Fernie, B.C., have awarded the contract for the erection of a modern brewing plant to cost $200,000.

The plant of the Victoria Machinery Depot, Victoria, B.C., was recently destroyed by fire. Loss about $180,000.

Johnson Bros., Vancouver, B.C., have been incorporated with a capital of $500,000, to manufacture dry goods, clothing, hats, caps, etc. The provisional directors include A. W. Johnston, Howard Johnston, Winnipeg, Man., and A. M. Johnston, Vancouver, B.C.

Willow River Timber Co., Vancouver, B.C., have incorporated with a capital of $250,000, to manufacture timber, lumber, etc. The charter members include J. H. Spence, T. B. McQuesten and Abraham Singer, Toronto, Ont.

Field Bros., Victoria, B.C., have purchased fifty sections of timber lands in the vicinity of Bella Coola, B.C., where they will erect a large sawmill this season.

The building of the Empress Mfg. Co., Vancouver, B.C., was damaged by fire. Loss about $70,000.

The council of Oak Bay, B.C., have passed a by-law to raise $10,000, for building a new school.

The V. Stanton Iron Co., London, England, have received an order for 300,000 tons of iron piping for water, gas and other public works from the council of Victoria, B.C.

Tenders will be received up to Monday, July 20, for the supplying and erecting of one horizontal cross-compound pumping engine, one steel tank and tower, one concrete and steel water tower. W. H. Northcott, purchasing agent, city hall, Victoria, B.C.

The F. H. Rice Lumber Co., St. Louis, Mo., contemplate erecting a plant in Victoria, B.C., to cost $100,000.

The Schaake Machine Works Co., New Westminster, B.C., have a $70,000 contract for supplying the machinery required for the Moresby Island Lumber Co.'s mill, Queen Charlotte, B.C.

The Bull River Power & Light Co., Fort Steele, B.C., will erect a 10,000 h.p. plant on Bull River, near that place.

The ratepayers of Ladysmith, B.C., have voted favorably on a by-law to borrow $25,000, for the installation of an electric light system.

The Phœnix Brewing Co., Phœnix, B.C., will enlarge their plant. The new building will be 40x20 feet, three stories high, and will be fitted throughout with new machinery.

The Cranbrook Electric Light Co., Cranbrook, B.C., propose building a hydro-electric plant on St. Mary's river to supply Cranbrook, Morgie and Marville with light and power.

The Cooke Lumber Co. will erect a sawmill at Nelson, B.C.

C. J. Moore, Victoria, B.C., will erect a sawmill at Prince Rupert, B.C.

The Eastern British Columbia Lumber Co., Fernie, B.C., are making extensions to their mill.

The Royal City Gas Improvement Co., New Westminster, B.C., are considering the erection of a $150,000 plant.

The Hydraulic Supply Mfg. Co., Seattle, Wash., will build a branch plant in Victoria, B.C., if they secure the contract for 18,000 feet of steel-riveted pipe required for the new waterworks system there.

The Western Fuel Co., at Nanaimo, B.C., have under way improvements that will cost in the neighborhood of $50,000. A new ventilating fan at the Northfield mine will cost $12,000, a high type fan another $25,000, and a Baldwin locomotive $12,000.

Grand Forks, B.C., is considering the erection of a $40,000 post office.

The School Board of Nelson, B.C., will erect a new school building to cost $60,000

The Massey-Harris Co. are erecting a large warehouse at Guernsey, B.C.

A new high school will be erected at Golden, B.C.

The school board of Nelson, B.C., have accepted plans for a new school building to cost $60,000.

Power Rates and Factors Which Influence Them.

ADDRESS BY W. N. RYERSON, BEFORE THE CANADIAN ELECTRICAL ASSOCIATION, AT TORONTO, JUNE 17-19, 1908.

In the study of power rates it must be evident that they will necessarily vary as the cost of supplying the various classes of load to the power company varies. All legitimate business concerns are entitled to a reasonable return on the investment necessary to carry on their affairs, and the legal right to vary their prices in the same locality, in accordance with the cost of the particular service, has been passed on several times by courts throughout the United States, and in the absence of legislation fixing rates or delegating this power to commissions or other bodies, it has been held that electric light and power companies, as well as gas companies, may require and collect minimum charges, even though the price of the power or gas consumed has not amounted to the minimum asked. The right has also been recognized to charge one customer one rate, who uses his power at other than peak periods, while another customer, under otherwise similar conditions, but who cannot or will not shut down or reduce the amount of his power during peaks, is charged more.

The factors which have the greatest influence upon the rates to be charged are: First, the distance of the customer from the source of supply; second, the amount of power the customer desires to use; third, the character of the customer's load—whether steady or intermittent, and, if the latter, the time, frequency and duration of peaks, or, in other words, the load factor; fourth, the average power factor; and, fifth, whether the load will be balanced or unbalanced.

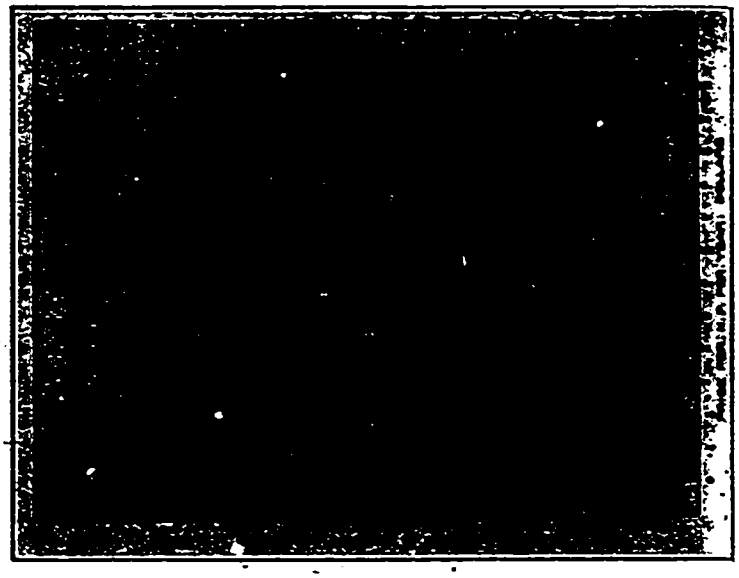
The first two factors are well understood and require little comment. It is evident that increased investment in circuits to reach the customer, as well as the size of conductor necessary to carry his load, must be taken into account in fixing the rates to be charged. It is also plain that, other things being equal, 10,000 h.p. can be sold at a lower price per h.p. than 500 h.p. The question of load factor, however, is by far the most important element entering into the cost of supplying power, and at the same time is usually the most difficult to explain to a non-technical man. More will be said about load factor further on in this paper. Power factor also is very important, but this may be taken account of very easily. One method is to allow the customer a power factor as low as, say, 90 per cent., but should it go below this figure, require from him a payment based upon 90 per cent. of the kilovolt amperes—periodical tests to be used for purposes of determination.

Unbalancing is not usually so serious, except in the case of large single-phase electrolytic or arc furnaces, and in these cases it is well to allow say 10 per cent. of unbalancing. In other words, should the difference between any two phases be greater than 10 per cent. of the lesser, then the power to be charged for shall be computed on the assumption that the current, and therefore the power taken from each of the phases is equal to the greatest amount actually taken from any one place.

The following are the principal methods at present used in charging for power: The flat rate; the meter rate—with or without a service charge. In addition to these there is a method not largely used, but which has a great deal to commend it, which is termed the "Sliding Scale." The fourth method, with only limited application, is what has been termed "Second Class Power."

THE FLAT RATE.

This method is undoubtedly in most cases the best for the power company, as under it should the customer's load factor be comparatively low, the installed capacity of the power plant may be oversold. Certain types of load lend themselves naturally to this method of charging, such, for instance, as electrolytic and other furnace loads running 24 hours per day and usually at a very steady rate. In this form of contract it is usual to require the customer to contract for a minimum amount of firm power for which he is obliged to pay whether he uses it or not. It is essential to meter the power by means of a curve drawing wattmeter, which will show every variation and determine whether the agreed minimum firm power has been exceeded, at what times, and by what amounts. The usual method of determining the bill is by averaging the daily peaks throughout the period for which charge is made, these peaks being of any pre-determined length. Another method sometimes used is to equip the circuit with an automatic overload circuit breaker, so adjusted as to open the circuit whenever the agreed amount of power is exceeded. In some forms of contract it is provided that the customer's load shall increase by regular increments at stated times, and, that furthermore, should his maximum peak exceed his firm minimum power by a certain percentage, varying from 10 per cent. to per cent., depending upon the amount of firm power, his minimum firm power will thereby automatically increase to the point of the maximum swing, and that this amount shall thereafter be taken and paid for. The usual objection to the Flat Rate method of charging is that it has a tendency to make the customer wasteful of his power. Another objection is that the curve drawing wattmeter, which is necessary for accurate determination under this form of contract, is not as simple and reliable as the integrating wattmeter and costs considerably more.



THE METER RATE.

This is the most universally used and best understood method of charging for power. By it book-keeping is simplified, and the meters required are more reliable, as well as cheaper, but, as generally employed, it has the distinct disadvantage of not distinguishing between a customer having a high load factor and one having a low load factor, and is, therefore, not equitable to both parties unless the rates are carefully chosen or combined with some method of service charge, or a penalty for excessive peaks, etc. So well is this recognised that the straight meter rate is rarely used at the present time, except in very small units, and it is more usually combined with a service charge (guaranteed minimum payments per h.p. installed), or by differential rates, the higher rate being charged during peak hours. This latter method leads to complication in the meters and is undesirable. Another method proposed for selling power under the meter rate is a scale of reduction in prices per kilowatt hour as the number of kilowatt hours during the period of charge increases and as the minimum payments, guaranteed by the prospective customer, also increase. This method may be so arranged as to take account of load factor, by guaranteeing a minimum payment per h.p. of connected load for the period of charge; the larger the guarantee the lower the price per kilowatt hour becomes. Maximum demand meters have been used to some extent, but they have not been de

veloped to such a point as to be considered commercial. The usual method with these maximum demand meters is to make a certain charge per kilowatt of maximum demand plus a small charge per kilowatt hour of consumption.

Various methods of determining service charges have been used, but the usual one is to base the charge upon the installed capacity of apparatus, varying the amount with the various types of installations and based upon previous experience. It is difficult to convince a customer of the justice of such a charge and the method of arriving at it. It is at times necessary to limit the hours run by a factory or other user during the winter months, in order that they shall not be run during times of peak load on the station. This point will be taken up later, in connection with "Second Class Power."

The Sliding Scale.

This form of contract is based upon the customer's load factor solely, but the power is sold on a maximum demand basis, the rate per h.p. per year varying between fixed limits in each particular case corresponding to the load factor. The load factor is based on a 24 hour day, and is taken over the period for which charge is made (usually one month). The average demand is the total kilowatt hours, or h.p. hours consumed during the month, divided by the number of hours in the month. The maximum demand for one day is the maximum peak lasting for a period of one minute or more, and as shown by a curve drawing wattmeter. The maximum demand for one month is taken as the average of the daily one minute peaks during the month.

A series of curves is drawn up for each particular locality based on a flat rate curve, "C," which, in this particular case reaches $15 per h.p. per year, at 1,000 h.p. This flat rate curve is arrived at by adding together all the various factors entering into the cost of delivering power to the locality in question, taking into account the decrease in cost per h.p. per year, as the amount consumed increases, and assuming that power sold on the flat rate basis would have a load factor of approximately 100 per cent. Should the customer's load factor be low the power company may oversell its plant capacity, as previously mentioned, to an extent which can only be arrived at by experience, but, in general, it will increase as the number of comparatively small installations connected to it increases.

The maximum rate curve "B" and the minimum rate curve "A" are arrived at from experience and by the "law of probability," the one being above and the other below the $15 base curve.

Thus assuming, referring to these curves, that the customer wishes to contract for 500 h.p. his flat rate will be $16 per h.p. per year, his minimum rate $10, and his maximum rate, $20. If during any one month his maximum demand (or the average of his daily one-minute peaks) has been 510 h.p. and his average demand 204 h.p., then his load factor for the month would be 204 divided by 510=.04, and the rate per h.p. per year would be $10 + $10 x .4=$14, and the monthly bill would be 510x$14÷12 =$595—or, in other words, the rate per h.p. per year is determined by adding to the minimum rate (or the rate at zero load factor) the load factor times the difference between the minimum and maximum rates. Supposing the month in question to have been one of 31 days, the average demand would correspond to a consumption of 151,776 h.p. hours, which would cost him 0.39 cents per h.p. hour or 0.52 cents per kilowatt hour.

Now, suppose that in another month the maximum demand remained 510 h.p. as before, while the average demand increased to 408 h.p., thus making his load factor .8 instead of .4, the rate per h.p. per year would then be $18 and the monthly bill $765. This is at the rate of 0.25 cents per h.p. hour, or 0.34 cents per kilowatt hour, thus showing conclusively that, under this method of charge, there is a strong inducement for the customer to increase his load factor.

"Second Class Power."

Certain manufacturing processes lend themselves readily to intermittent service, although having a high load factor while in operation. In this class are certain electrolytic and smelting processes. One method of handling this business is to contract with them for certain minimum amount of power to be used 24 hours per day (so-called First Class Power), and then during certain hours when the remainder of the power station load is light allow them to take a much larger amount, paying for both kinds of power on the flat rate basis. This latter excess has been called "Second Class Power," and it is evident that a very low rate per h.p. hour or per kilowatt hour can be made for it, where the conditions are otherwise favorable.

Although heretofore there has existed a wide diversity of opinion among the various companies in regard to the manner of charging for power, it is the writer's opinion that this is fast disappearing and that power customers are becoming divided naturally into certain definite classes, based upon experience with similar cases, and for each of which a definite method of charging can be arranged so that the income to the central station will be as nearly as possible proportional to the actual cost of supplying them with power. The writer holds no brief for any particular method of charging, but prefers what has been described as the "Sliding Scale" contract, especially where power is derived from waterfalls, on the ground that it offers greater inducements to raising the load factor.

Fortunately there has, so far, been no legislation in the Dominion of Canada regarding rates for electric light or power, and it would seem that the various members of the Canadian Electrical Association should be on the alert to forestall and prevent such legislation, by so adjusting their rates of charging that no inequality or unfairness can be claimed. Such a course will in a large measure forestall any legislation, which is almost certain to be detrimental to the power companies.

The Otis-Fensom Elevator Co., of Toronto and Hamilton, are moving a portion of their designing department to the head office in Toronto. The works are in the latter city, but owing to the delay and expense involved in sending drawings and estimates back and forth between the two offices the firm intend assembling one section of their designing staff at the head office.

INDEX TO ADVERTISEMENTS.

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