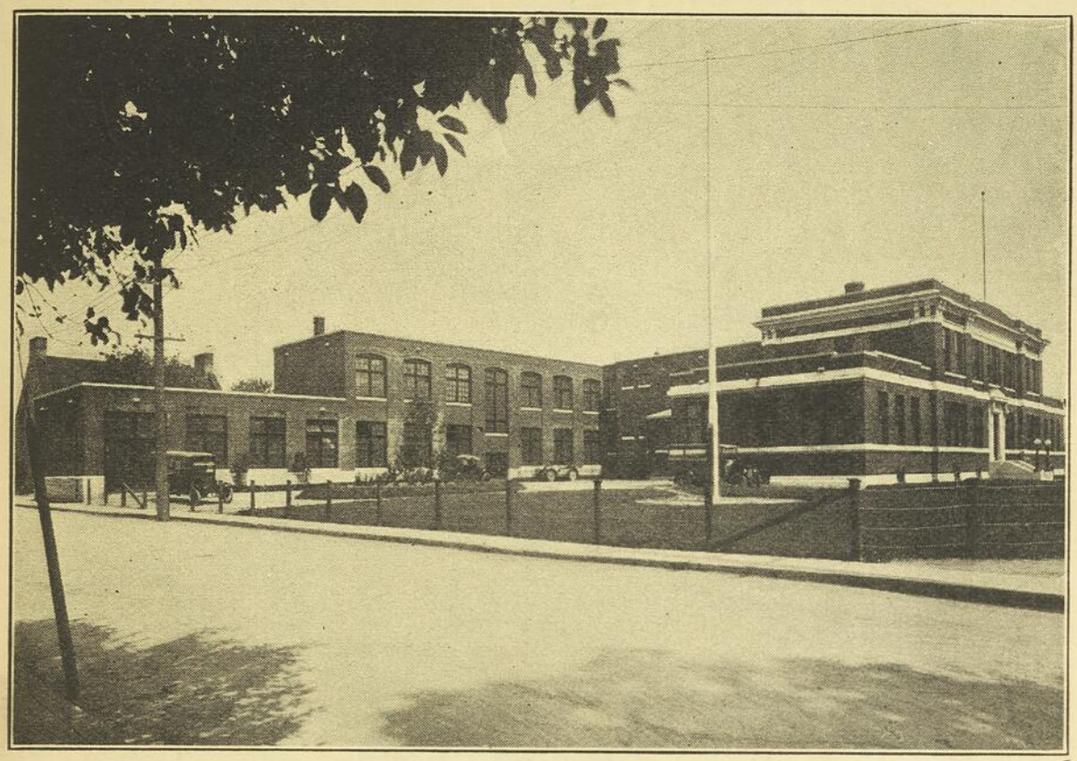


Ecole Technique — TROIS-RIVIÈRES / THREE RIVERS — *Technical School*

VOL. V MONTREAL No 7

TECHNIQUE

REVUE INDUSTRIELLE
INDUSTRIAL
REVIEW

SEPTEMBRE · SEPTEMBER

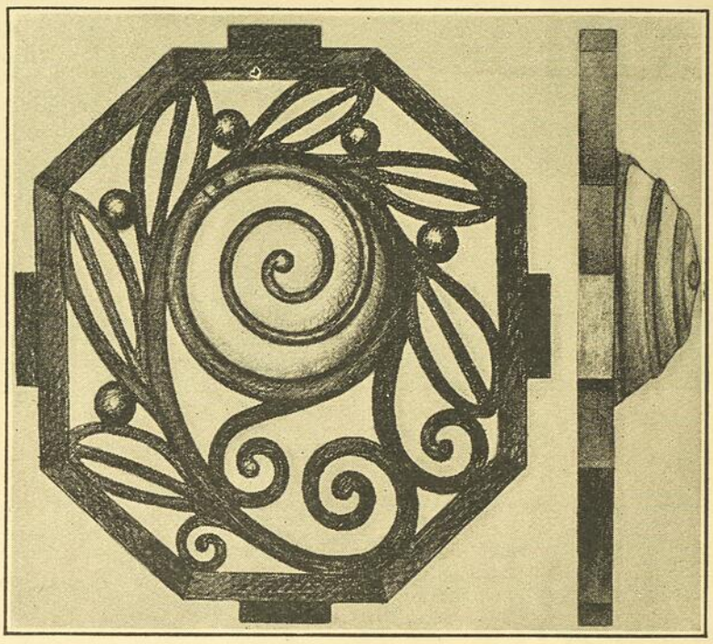
MCMXXX

PROVINCE DE QUEBEC, SECRETARIAT DE LA PROVINCE

Ecole des Beaux Arts de Montréal

628, rue Saint-Urbain, près Sherbrooke (ouest)

Directeur: CHARLES MAILLARD



ÉTUDE D'UN ÉLÈVE DU COURS D'ART DÉCORATIF

ENSEIGNEMENT GRATUIT

L'école est ouverte aux jeunes gens et aux jeunes filles, avec ateliers séparés sauf pour les cours oraux, ainsi que pour les cours d'architecture et de composition décorative, où cependant les sections sont divisées.

L'Enseignement comprend:

ARCHITECTURE, PEINTURE, SCULPTURE, ART DECORATIF

1. Architecture:—Formation d'architectes diplômés (5 ans d'études) de dessinateurs pour entrepreneurs industriels, etc. Architecture pratique (cours du soir).
2. Dessin et Peinture d'Art, Aquarelle.
3. Statuaire.
4. Art Décoratif dans toutes ses applications (théorie et réalisations.)
   a) Adaptation architecturale, comprenant une section de sculpture ornementale et une section de peinture décorative.
   b) Adaptation aux métiers; étude des différentes techniques—bois, métaux, céramique, verre, etc.
5. Cours Oraux et Spéciaux:—Sciences appliquées à l'architecture; perspective; anatomie artistique; histoire de l'art.
6. Formation de professeurs de Dessin à Vue, diplômés après 4 ans d'études.

LES COURS ONT LIEU DU 1er OCTOBRE A FIN MAI

L'inscription des élèves commence le 15 septembre

ELECTRICITY

Montreal Technical School

200 SHERBROOKE STREET WEST

Founded by the Goverment of the Province of Quebec
Subsidized by the Provincial Government and the City of Montreal

Prepares young men for positions in industrial life as experts, foremen, etc.

DAY CLASSES

1.—Regular three year Technical Course for boys and young men who have completed at least one year in a regular high school or its equivalent.

2.—Trades' School Course for boys and young men who have not the necessary preparation to follow Course No. 1.

3.—Printing Course for young men who have completed one year of a regular high school course and who are at least 16 years of age.

4.—Automobile Short Term Course (9 weeks) for young men who wish to learn the care and repair of the automobile. Applicants must be at least 18 years of age.

EVENING CLASSES

5.—All Trades and Technical Subjects.

Ask for a Prospectus

For further information, apply to Montreal Technical School

Note: Regarding Courses 1 and 2 for worthy cases, pupils whose family conditions warrant the same, may receive a remission in part or in full of the fees required for these courses.

MORE PEOPLE MEANS MORE FORESTS

An increasing population means an increasing need for wood. Although our population may increase, the amount of land in this country does not. The only way out of the problem of supplying a continually increasing demand for wood—a demand that is being made upon a continually decreasing forest—is to put every acre of available land to work growing trees.

After Marjorie and Mary had gone to bed, a piercing wail, followed by sobs, came from their room. Their mother hurried up.

Marjorie (crying): "Mary hit me on the nose."

Mother: "Mary, why did you hit Marjorie on the nose?"

Mary: "Well, mother, you don't think I'm going to get up and turn on the light just to see where to hit her."

HARDWOOD FROM SOFTWOOD

The time is coming when wood as hard as ebo may be produced, by special treatment, from e quick-growing, soft textured woods, say scient who are investigating this particular question.

THE WORM AT THE CORE

When you find a worm in your apple, don't bla the merchant who sold you the fruit,—blame e person who destroyed the bird that would have ea the worm. Those who do not protect the birds e greatly to blame for wormy fruit and vegetable

---

PROLIFIC PARENTS

The average pine or spruce tree produces fr 50,000 to 100,000 seeds, which are carried far a wide by the wind, often to a distance of as m as a mile from the parent tree.

LIBERATION

ONE does not have to go back many years to reach the time when most of the water used in the house had to be carried from the spring or well, not always situated close to the house.

Even the introduction of the hand pump, which brought water to the kitchen, did not dispense with the backbreaking work of pumping and lifting heavy pails.

Woman's work on the farm, and indeed in the city, involved an enormous expenditure of strength and vitality. Among other tasks she was dependent on her own hands to do the family washing, a good deal of the milking, the filling and cleaning of lamps, ironing, taking care of the poultry (which meant also the poultry house), to say nothing of innumerable minor tasks, and at the same time had to rear, feed, clothe and otherwise provide for her children.

Today she is liberated from much of the drudgery of household tasks. The washing, ironing, lighting, cooking; and on the farm, milking, poultry work, dairy work, and the pumping of water, can now be done by electricity.

The electrical servant also relieves the man of the household from many tasks which he used to take as a matter of course.

The Northern Electric Company is pleased that in the manufacture of wires and cables, and in the distribution of many electrical household appliances, it has been able to assist in the liberation of woman from some of her work, that so frequently overtaxed her strength and endurance.

Northern Electric

COMPANY LIMITED

A National Electrical Service

DO YOU KNOW

That as a result of experimental work carried out by the various agencies which had been enlisted, more than 250 practical, profitable and proved uses for electrical current for farms have been developed, all of which are in everyday use?

ÉCOLE TECHNIQUE DE HULL

Ouverte en octobre 1924

Destinée à une population canadienne-française de 85,000 âmes répartie entre Ottawa et Hull

HULL compte, en 1926, 38,000 âmes (troisième ville de la province de Québec), possède plus de trente industries dont la principale est la manufacture de pulpe, papier et allumettes Eddy. Avec les 1,700,000 C.-V. disponibles sur les rivières Ottawa et Gatineau, Hull est le plus grand centre de production d'énergie hydro-électrique de l'Amérique du Nord. L'Ecole Technique de Hull offre, en un cours bilingue de trois années, l'enseignement théorique et la formation manuelle dans les spécialités suivantes:

AJUSTAGE MENUISERIE
MODELAGE FONDERIE
FORGE ELECTRICITE

RÉTRIBUTION MENSUELLE: $1.50 en première année, $2.00 en deuxième année, $3.00 en troisième année. Un cours abrégé de douze semaines offre la formation théorique et pratique aux mécaniciens de garage.

COURS DU SOIR GRATUITS

Etablis en 1924

De 7 h. 30 à 9 h. 30 du soir

(1er OCTOBRE-AVRIL)

Ajustage, 40 leçons de 2 heures
Menuiserie et Modelage, 40 leçons de 2 heures
Dessin, 40 leçons de 2 heures
Electricité, 40 leçons théoriques de 2 heures
Electricité, 20 leçons pratiques de 2 heures
Automobile, 25 leçons théoriques et pratiques
Automobile, 40 leçons pratiques

COURS NOUVEAUX OFFERTS EN OCTOBRE 1926

Chimie industrielle (Pulpe et Papier)..... 40 leçons
Plomberie et Ferblanterie.....40 leçons
Electricité de l'Automobile..... 20 leçons

TECHNIQUE

REVUE INDUSTRIELLE

'araît mensuelle - - excepté juillet et août
.e Numéro - - - - - - - - - .10

Abonnement:

'anada - - - - - par année, $1.00
'tranger - - - - par année, 1.50

Publiée sous le patronage de
L'HON. ATHANASE DAVID
et sous la direction de
AUGUSTIN FRIGON
Directeur Général de l'Enseignement Technique
dans la Province de Québec

INDUSTRIAL REVIEW

Published monthly - except July and August
One copy - - - - - - - - - .10

Subscription:

Canada - - - - - per annum, $1.00
Other Countries - - - per annum, 1.50

Published under the patronage of
HON. ATHANASE DAVID
and under the direction of
AUGUSTIN FRIGON
General Director of Technical Education in the
Province of Quebec

Adresser toute correspondance:
1430, rue St-Denis

TECHNIQUE

Address correspondence to:
1430 St. Denis Street, Montreal

eptembre 1930 — SOMMAIRE — SUMMARY — September, 1930

nprimé par la Section d'Imprimerie
Ecole Technique de Montréal

Printed by the Printing Section
Montreal Technical School

Ecole Technique de Québec

Fondée en 1910

Subventionnée conjointement par le Gouvernement Provincial et la Cité de Québec

Aux termes mêmes de sa charte, l'Ecole Technique de Québec a pour but: de préparer, par des études théoriques et techniques, les jeunes gens qui se destinent aux carrières industrielles, et de développer chez eux, par une instruction adéquate et capable de les former d'une manière pratique, une connaissance suffisante des professions manuelles et de l'industrie, en général.

RETRIBUTION:
$1.50 par mois en 1re année

Les cours sont organisés comme suit:

1° —COURS REGULIERS:
- a) COURS TECHNIQUE (TROIS ANNEES)
- b) COURS DE METIERS (DEUX ANNEES)

2° —MECANIQUE D'AUTOMOBILE (CINQ MOIS)

3° —COURS DU SOIR:
COMPRENANT DE NOMBREUX COURS LIBRES

L'Administration accorde des bourses aux élèves méritants.

Prospectus et renseignements additionnels sur demande en s'adressant au secrétariat:

185, Boulevard Langelier
Téléphone: 3-3313

TECHNIQUE

REVUE INDUSTRIELLE — INDUSTRIAL REVIEW

VOL. V SEPTEMBRE — SEPTEMBER N° 7

EDITORIAL

"Breathes there a man with soul so dead,
Who never to himself hath said,
This is my ain, my nature land."

When Scott wrote the above quotation filled as he always was with a great love for his country and fellow men, he doubtless could hardly conceive of anyone being so dead to all sentiment, that he could not be aroused, at least to a small extent, on viewing the land of his birth. People were intensely patriotic in those days and Scott helped to make that patriotism even more intense.

In this mechanical age, when the big quest seems to be the almighty dollar and the search for pleasure, the man or woman who devotes no thought to the welfare of his country and his fellow men is perhaps not so rare a specimen as formerly, and yet we venture to greater affirm that at no time in her history has Canada had a need of patriots to guide her destiny, of statesmen to guide the ship of state, and of engineers and technical men to see that her resources are developed economically and in the best interests of all.

Canada has a wonderful future ahead of her, of that there can be no doubt. One has only to consider her vast stores of minerals (she controls the worlds nickel output already), the increasing finds of copper, tin, zinc and other minerals precious and otherwise; her generous supply of water power and all that that will mean in the future in new and large industries, home comforts, electrification of railways, and possibilities yet unseen or only vaguely surmised; her rich and fertile fields, which have already made Canada the granary of the empire, the present depression notwithstanding; her vast forests of pulp and other woods, which, if scientifically exploited, with proper schemes of re-afforestation, will provide future generations with almost unlimited supplies of paper and wood for construction and other purposes; the mighty St. Lawrence and other navigable waters on which our various products may be conveyed in ships from practically the center of our vast Dominion, thus reducing transportation charges to a minimum, and enabling us to compete on very favourable terms in the world's markets; not forgetting, too, our fur-bearing resources, which if properly developed will produce a continuous supply of the best furs for which our climate is so eminently suited; and when in addition to all this we consider our rigourous and healthful climate, which will permit the survival of only the hardiest races, a climate which has no use for the sluggard and the hoboe, it requires very little imagination to visualize how Canada may develope during the next hundred years, provided each and every one of us does his share in bringing about the desired result.

To develope our natural resources and at the same time to conserve them requires intelligent effort. To take our raw materials and manufacture them into articles which the world wants requires again intelligent effort. To develope our water powers, electrify our railroads, build the necessary roads, bridges and canals—to farm our lands properly—to develope our cities and harbours—all requires intelligent effort.

Can intelligent effort be expected of an uneducated people? History proves that it cannot. All of which implies that in order that Canada may develope along proper lines, her people must first of all be educated. Hence the importance of education in all its branches. It is the teacher who moulds the character of the rising generation and developes their intelligence. Education is the most important portfolio any minister can carry.

The development of our natural resources, the conversion of our raw materials and the building up of our railways, bridges and cities, requires a special form of training —a technical training, and since Canada is only at the beginnings of things—when it comes to all these developments—it follows that as time goes on more and more technically trained men will be required. As a matter of fact, the young men who are now entering the technical schools,

will be in a position, as they acquire experience, to take a greater and ever greater part in the development of this country to their own advantage, and, we trust, for the good of their fellow men also.

The technical graduate, however, should not confine his attention to technical matters alone, but should take a general interest in all matters pertaining to the welfare of his country. With his ability to reason, made possible by this study of mathematics and the sciences, he should be in a better position to study the *pros* and *cons* of any matter that comes up for discussion or for decision, than his less favoured fellow citizen, and we would urge on all our graduates, present and to come, the necessity of taking an active part or of having an active voice in all questions —political, economic, social and educational. In this way and in this way only may we expect to develope an intelligent mass opinion.

To the new students entering the various schools, we would advise them to bear these things in mind and to try and realize that they, too, are to take a part in the future development of this wonderful country of ours, so that they will put forth their best efforts while at school, laying the foundations for their future career. If they do this, they will be able to join with the poet in saying with pride "This is my ain, my native land."

NOTICE

We beg to inform our readers that the present issue of TECHNIQUE is exclusively English, owing to special circumstances beyond the control of the Direction.

As a compensation the October number will be entirely French, after which our periodical will resume its usual bilingual character.

AVIS

Nous prions nos lecteurs de bien vouloir prendre note que la présente édition de TECHNIQUE a dû être publiée exclusivement en anglais, en raison de certaines circonstances particulières échappant au contrôle de la Direction.

Par mesure de compensation, le prochain numéro sera totalement français, après quoi notre périodique reprendra son caractère bilingue du passé.

NEW SWITCHING EQUIPMENT FOR EMERGENCY ENGINE-DRIVEN GENERATORS

The Canadian General Electric Co. Ltd., an nounces a new development in automatic switchin equipment for use when a-c. generators are directl connected to gasoline engines used as an emergenc power source. The equipment is mounted o standard size panels and may form part of a switch board which also takes care of power distribution Either single or double unit equipments are available

An automative starting unit is provided for th engine and is energized from a storage batter which is kept charged by means of a tungar rectifie connected to the a-c. source. Therefore when th indication is given of the failure of the normal a-c power supply the engine starts automatically an the generator is then connected to supply emergency power.

Upon return of power to the preferred source th ignition system of the engine is interrupted to shu down the unit and the preferred line breaker i reclosed restoring normal operation. Standard pro tective features are also included.

A recent installation included two automatically controlled gasoline engine-driven generators rate 50 kv-a., 4000 volts. These are used as an emergenc power supply for connecting to a substation bu fed normally from an incoming line. This bus feed both a power and a lighting feeder. On voltag failure of the incoming line one engine-driven se starts and is connected to the bus to carry th lighting load. The second set is started, synchro nized and connected to the bus manually. Sufficien capacity is then available to supply the powe feeder also.

Upon return of power to the normal voltag source the main incoming line breaker is reclose and both generator breakers open after a time delay The engines are then shut down by de-energizing their ignition circuits. They can be shut down manually by pulling the "open" buttons of the respective master elements of each unit.

The control is so arranged that, in case of failure of the first set to respond to the starting indicatio within a given time the second unit will start automatically. If this occurs the first set is locked out and will require the manual resetting of a relay before it will again function automatically. A powe source for the lighting feeder is therefore assured The order in which the units start may be reverse if desired. A voltage regulator adjusted to hold bus voltage is automatically connected to whichever generator is started first.

If overcurrent occurs on either of the generato lines the corresponding breaker will be tripped and locked out. It must be reclosed manually.

The Department of the Interior has issued a new edition of a land map which shows at a glance the total number of quarter sections of Crown land still available in each township. The map also indicates Dominion Land Offices, existing railway facilities in each district and provides the customary information regarding cities, towns and villages.

A copy of this map together with other materia of interest to the prospective settler may be obtained free of charge on application to the Natural Re sources Intelligence Service of the Department o the Interior at Ottawa.

Canadian Logging Methods Changing

THE Provincial Pulp & Paper Company of Port Arthur, one of the most progressive companies in Canada, onstantly watches its costs, that it may now exactly what is the most economical way to log. Mr. Charlie Gardner, Woods Manager for the Provincial Pulp & Paper Company, has developed an organization of which to be proud. He, Mr. Gardner, plans his work only after going into details to see that the final cost of his wood is rock bottom.

This company produces 160 tons of pulp daily, of which 50 tons is sulphite pulp and 100 tons is mechanical pulp. Of this amount only 60 tons is made into paper at this plant, the rest being sent to their other mills located at Georgetown, Mille Roches or Thorold.

The timber is mostly black spruce, cruising 11 cords to the acre. All wood is cut into 8-ft. lengths and piled in half double cord, three-quarter double cord and double cord piles. After sawing, the wood is so piled that it can be easily taken out of the strip roads.

To break down the snow in the strip roads, a "Caterpillar" Thirty is used. By using a tractor the snow is packed so that teams can come in, load up the wood on sleighs and haul it to a common make-up point, which is, on the average, about 2000 feet from the pile. No time is lost and the stock are not injured by being forced into deep snow. Everywhere progressive loggers are using "Caterpillars" to break out the snow on their strip roads and main sled roads. On this operation, 250 cords of wood

At the make up siding of the Provincial Pulp and Paper Co. They started their tractor work 4 years ago by buying 2 Fordsons. They junked these and now own 2-5 tons and 2 thirtys. This year with these machines they hauled 15,000 cords of pulp wood over a 4½ mile haul for $1.45 a cord. Picture shows Thirty starting for dump with 20 cords of wood.

are taken out daily. Thirty-two men working in pairs are used to load the wood on sleighs; a sleigh holding 3½ cords. Twelve teams are used to bring out the 250 cords hauled daily to the make-up point.

Arriving at the make-up point the sleigh is run up just as close to the previously lined-up loaded sleighs as possible, the tongue is uncoupled from the roller and the team returns to the bush with an empty sleigh. On the main haul which was over four and a half miles long, three "Caterpillar" Thirtys were used.

Just as the tractor came in with an empty train of sleighs it was uncoupled from them and connected up to the leading sleigh of the loaded train, cross chains and bunting poles were used to connect up the sleighs.

The trains being made up of five or six sleighs the tractor then started for the dump, travelling five miles per hour. The country was extremely rough and broken, many hills being encountered. One hill in particular was fairly steep, having a gradient of 24%. These steep pitches wer sanded to hold the loads back. Arrivin at the dump the entire train was left ther to be unloaded. The tractor then connecte to an empty string of sleighs and proceede back to the make-up point by a return roa 4½ trips were made, a total of 250 cord being brought in with three "Caterpillars' The crew per "Caterpillar" was one drive and one conductor to ride the loads.

At night there was still another use fo the tractors. Two of them would go ou each night and haul a huge tank of wate so that the main haul road would be kep iced. In this way they could have goo sized loads over the uphill or level grad sections. The other two tractors were kep in the garage to be greased and oiled. Th following night the tractors that remaine in were put to icing the road, which gav the mechanic a chance to entirely greas and oil each "Caterpillar" every othe night.

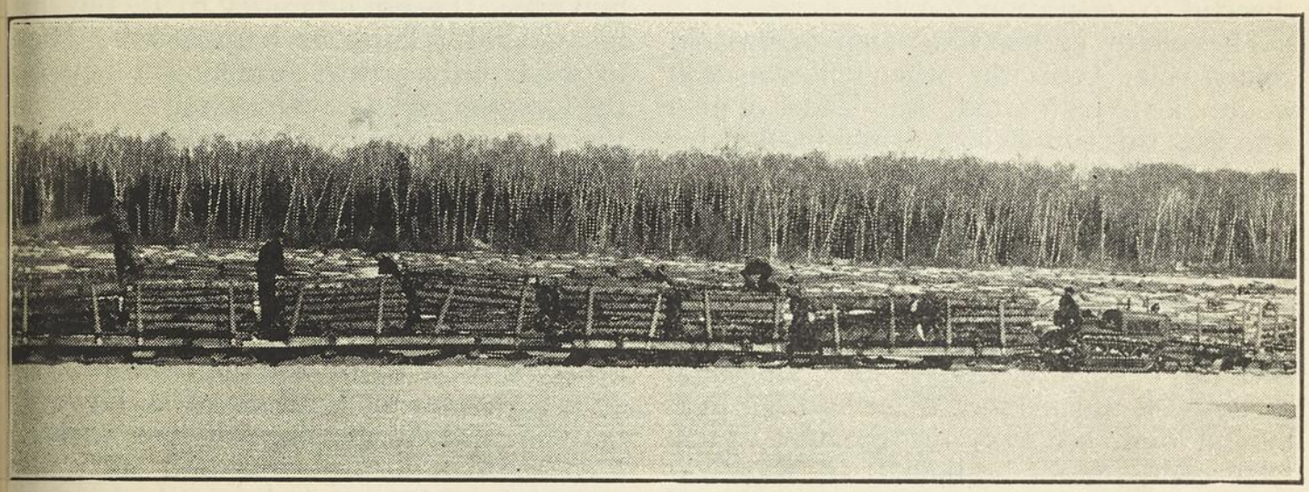
In the event of a heavy snowfall, th

Provincial Pulp and Paper Co. Port Arthur, Canada. "Caterpillar" Thirty coming up with empty sleigh to be loaded with pulp wood. Thirty actually runs into the strip roads and loads up. Total cost everything figured on 4½ mile haul $1.45 a cord.

tractor that was used to break the snow on the strip road is used to plow the snow off the main sled road. On an iced road, the effect or efficiency is cut down the minute any snow gets on the road, consequently, it is highly essential to remove this snow just as fast as possible to permit the sleigh hauling to continue. "Caterpillars" because of their untiring effort, speed and power, are able to clear roads faster and cheaper than any other means.

In commenting on this work, Mr. Gardner states that the loading of his wood, hauling it to the dump and unloading it, costs approximately $1.45 per cord. This includes all labor charges, gas and oil for the tractors, maintenance, depreciation, overhead, road construction and, in fact, every possible charge that can be made against the job. It can readily be understood that such a low cost can only be made by the use of modern equipment and constantly checking up on the cost of doing the work. Mr. Gardner anticipates doing all of his work with "Caterpillar" tractors in the future. This can be accomplished by using the smaller tractors to haul from the strip roads and the larger ones to haul the trains on the main sled road.

By using tractors the Provincial Pulp & Paper Company are getting the cheapest costs of anyone in their district.



Provincial Pulp and Paper Co. At the dump 250 ties are hauled and dumped daily on 4½ mile haul. Total cost everything figured such as depreciation of equipment operating expense, labor for loading, hauling and unloading $1.45 a cord.

THE MINING INDUSTRY HOLDS IMPORTANT MEETING

Despite the fact that Yavapai County, Arizona, s today the leading mining county of that great nining state, having according to figures compiled by G. M. Gerry, of the United States Bureau of Mines, Department of Commerce, Washington, D. C., 64 mines producing within its area, repreienting a total value in production of $26,750,353 n 1928, that district believes thoroughly in stimulating further its great industry and mineral assets. To that end the mining committee of the Yavapai County Chamber of Commerce, with the co-operation of the Arizona Industrial Congress, the Arizona Chapter of the American Mining Congress and the Arizona Section of the American Institute of Mining and Metallurgical Engineers, recently held one of the most successful mining revival meetings ever held in the Southwest. Yavapai and Prescott, the "Home of the Protector," welcomed the prospector, miner and small mine operator to this meeting which was attended by over 300 individuals actively identified with the mining industry.

Geologists, operators of the larger companies, field men, engineers, metallurgists, rubbed shoulder to shoulder with the man from the hills. The purpose of the meeting, that of discussing the problems of the prospector and small operator, was carried out to the letter, and as a direct result of the same, renewed activity is apparent in many sections.

Papers presented at the meeting embraced every line of mining activity. Such a demand has been made for them, that hundreds of copies have been prepared and mailed. Those wishing copies may obtain same by writing to the mining committee of the Yavapai County Chamber of Commerce, at Prescott, Arizona.

Demonstrations in first aid, safe practices, and geophysical prospecting were given prominent places on the program, which embraced an intensive two-days' study of the entire situation. The meeting went on record asking the Arizona Congressional delegation to work to secure such legislation in Congress as will clarify the situation now existing relative to the incomplete provision of the present laws for the location of disseminated copper deposits and other blanket or flat lying veins or deposits of ore and especially those lying beneath an overburden of wash or other material. A request was made for additional and ample financial support of the Arizona Bureau of Mines, that even more worth while results may be obtained. The meeting protested vigorously any proposed change in the freight rates and charges applicable to the transportation of non-ferrous metals and their products, as detrimental to the small operator.

Foremen and Foremanship

By Edgar N. Baker
Graduate, Montreal Technical School

CAN you handle men? Unless an executive, whether he is the general manager or the lowest foreman, can answer this question in the affirmative, he cannot be successful. There is no book of rules to refer to, learn what to do under various circumstances. At the same time there is nothing mysterious about handling men. Successful man handling requires tactics and treatment which will obtain cheerful co-operation.

The secret of handling men is the old golden rule. Treat the other fellow as you would like to be treated. Any leader of men who gets this simple idea firmly fixed in his mind, has learned the secret of successful man-handling.

One man can do little by himself. The successful man is the one who has the knack of getting the co-operation of others. A department head may be able to force work because of his authority, but he could accomplish much more if he had his men behind him. Loyalty, the greatest industrial asset, cannot be bought by wages, it must be earned by fair treatment and skillful handling of men.

Few men are born to be leaders. Most men are followers. The average man likes to follow if he can only see a leader. Industry if full of followers.

It is recognized that the modern foreman is in the best position in industry, to act as the leader in the thought and actions of the workmen in the ranks. In this way he may act as an interpreter of the management to the men under him.

G. L. Gardener, employment manager of the Chevrolet Motor Co. at Wisconsin, gives the following ten key-words to the successful handling of men:—"Service, justice, sincerity, sympathy, friendliness, co-operation, equality, impartiality, patience and honesty."

A good foreman will never try to use force to maintain discipline. Bulldozing requires no skill. A foreman who threatens to discharge a man in order to get results is admitting that he is a poor man-handler. Threatening to discharge a man is simply crawling under the cloak of the authority of the firm.

In place of blustering, bluffing and threatening, an efficient executive handle his men by playing upon their self-interest At the same time there may be occasion where it is found necessary to discharg or lay off a man or men. When it necessary to discharge a man, it is poo practice to "pass the buck" by sendin him to the time-keeper or have somebod else do the "dirty work" for you. No, te the man yourself, and what is more te him why. It is not necessary to use physic force, loud talking or hard words. Thes methods only create antagonism betwee the foreman and the man as well as loweri the respect of the other men for their for man. A "straight shooter" is always re pected.

The foreman who shows favoritism certain persons for personal reasons, is on making trouble for himself. It creates feeling of being unjustly treated in th other men. Where a foreman shows fav to a man who really deserves it, howeve he will seldom get himself "in wrong. Favors, such as overtime and such lik should be split up and everybody give a chance.

Some foremen try to obtain the goo will of their men by going out with the after hours. This is not good practice familiarity breeds contempt. A forema who has been out with his men the nigh before, is placed in an awkward positio if he has to call one of them to order th next day. The extent to which a forema or executive can mingle with his men social functions and other gatherings depe a great deal upon his personality. Son leaders can mingle with their men in occasions and still maintain all poise an dignity.

It is a good thing to know the names the men who are working for you. Th makes for a closer bond of goodwill in yo department. To know something abo their private interests and hobbies is st better. Then, by speaking to the differe men in your department about these thin which interest them most, you make the feel that you are taking an interest in the This flatters them and they think you are "regular fellow," and are willing to c operate that much more with you.

Remember at all times that the men under you are observant of your attitude towards the company's rules. They also observe how you do any work, whether it is well finished or not, and the methods you use. If a company ruling says that there shall be no smoking in certain or all parts of its plant, what will be the attitude of the men if they see their foreman smoking?

Firms are coming to realize more and more the value of industrial goodwill between themselves and their men. In order to maintain the confidence of the men in the management, it is the duty of the foreman to bridge the gap between them. He has to act as an interpreter between them. He has to know the policies and pass them on to his men. He should have the confidence of his men, in order to get their honest opinions and pass these on to the management.

Too often a well meaning management is misrepresented by an unfair foreman. This gives his men, who look upon him as a representative of the management, a poor opinion of the company and he cannot have a feeling of goodwill towards the firm. Most of the illwill which workmen hold against the management comes from the treatment they receive from their foremen and such like petty officials. Remember a company is judged by every act of its foremen.

In all new modern firms, the hiring of new men is done by an employment manager. This man is better able to judge a man for the job. He knows by a man's past experience and physical conditions just about the way he will make out on the job. Most foremen are inclined to judge a man by his strength especially if the work is enclined to be heavy. They seem to forget how the environment will affect the men. It would not do to put a man on a sand-blast who has always worked on a farm. He would not be used to the close atmosphere and could not stay on the job. This would increase the labor turnover. Neither would it do to place a small undersized man on a large heavy job or a large slow moving man on a small fast operating press for punching out small parts. This would be the cause of decreased production and increased overhead costs.

It is up to the foreman to break in the new man properly, if he is not properly trained, he will not be as good a man, and will not be satisfied with his new job. The labor-turnover is always highest among new men. Keep in touch with the new man, let him see that you are interested in his progress. If you can get him interested in his work you will have a much better man in him.

Another important phase of a foreman's job is to see that the plant for which he is responsible is kept in a safe operating condition. Instruct your men in the proper operation of new safety devices as they come into the shop. Do not allow them to remove safety guards while machines are in operation. Do not allow them to lean on the guards. Remember safety pays and an orderly well-kept shop always has a much lower accident rate.

Briefly, a foreman must have the threefold capacity of supervisor, organizer and instructor.

A NEW CATALOG FOR LATHE USERS

The South Bend Lathe Works, South Bend, Indiana has just published a new general Catalog No. 91-A. The catalogue is a 108 page, 2-color book and completely describes, illustrates and prices the 96 sizes and types of New Model South Bend Precision Lathes with their tools and attachments.

A feature of particular interest is to be found in the 24-inch New Model South Bend Large Swing Lathe which is especially valuable for work in machine shops, repair shops, service stations, and for general all around lathe work.

Another item of interest is the New Model South Bend Precision Metric Lathe which is built to cut International and French Standard Metric Screw Threads of standard pitches.

This catalogue also gives important information regarding lathe construction, the proper lathe to buy for the particular kind of work to be done and other data for the mechanic and shop owner; complete Export Information is also given in the English, Spanish, Portguese, French and German languages.

The factory states that a free copy of the new 91-A Catalogue will be mailed postpaid to anyone who writes for it.

NEW BOOKLET ON PROVINCE OF QUEBEC

The Department of the Interior, Ottawa, has just issued a booklet entitled *Natural Resources of Quebec.* It is a succinct resumé of the natural resources and economic conditions existing in the Province of Quebec and includes not only a bit of history but also the present conditions and opportunities existing in the Province. The booklet is accompanied by several maps showing the agricultural areas, the mining districts, and location of the forests, and is well illustrated. It is a publication that will be of service to the capitalist, the industrialist, to those interested in agriculture, minerals, or fisheries, and to prospective settlers. The latest statistics obtainable are included and only accurate and reliable information is given. The booklet is not only useful but well written and readable and we commend it to the attention of all interested. Copies in either English or French may be had on application to the Natural Resources Intelligence Service, Department of the Interior, at Ottawa.

Light Plants Provide Unique Illumination for Air Mail Landing Fields

By W. T. P. S.

IN the establishment of the United States Government Air Mail Service, one of the great modern achievements—night flying, is one of the important factors, and one that has probably presented the most difficulties. Upon the success of this factor depends to a great extent the success or failure of air mail service, and in turn, the safety and feasibility of this night flying is dependent upon the ability to provide suitable airways, efficient illumination at the many landing and airway beacons.

The selection of the most suitable equipment for providing the desired lighting has been a difficult proposition and only after thorough experiment and test of various manufacturer's types of equipment, the Government decided to install the Westinghouse type E-86 light and power plants. The installation of these light plants for Airway routes Nos. 1, 2 and 3 is now finished.

Airway Route No. 1 extends from Hadley Field, New Brunswick, N. J., to Boston, Mass., via Hasbrook Heights, N. J., Bethany, Conn., Hartford, Conn. and Framingham, Mass.

Airway Route No. 2 extends from St Louis, Mo., to Chicago, Ill., a distance o approximately 277 miles, via Springfiel and Peoria.

Airway Route No. 3 extends from Chi cago, Ill., to Dallas, Texas, via Moline, St Joseph, Kansas City and Witchita, Ponc City, Oklahoma, and Fort Worth.

The revolving searchlight beacons (se Fig. 1) on the airways are spaced approxi mately 7 to 13 miles apart and emergenc landing fields are provided at 30 mil intervals. The landing fields are approxi mately 40 acres in size with 1500 ft. run ways, and are identified by the searchligh beacon and boundary lighting showing th outline of the field. Each airway beaco has a directional arrow, consisting of power house, concrete walks and towe forming an arrow pointed along the airway The power house is located at the feathe end of the arrow, and is approximatel 12 ft. by 14 ft. The light plant is locate in this house. It is of Westinghouse manu

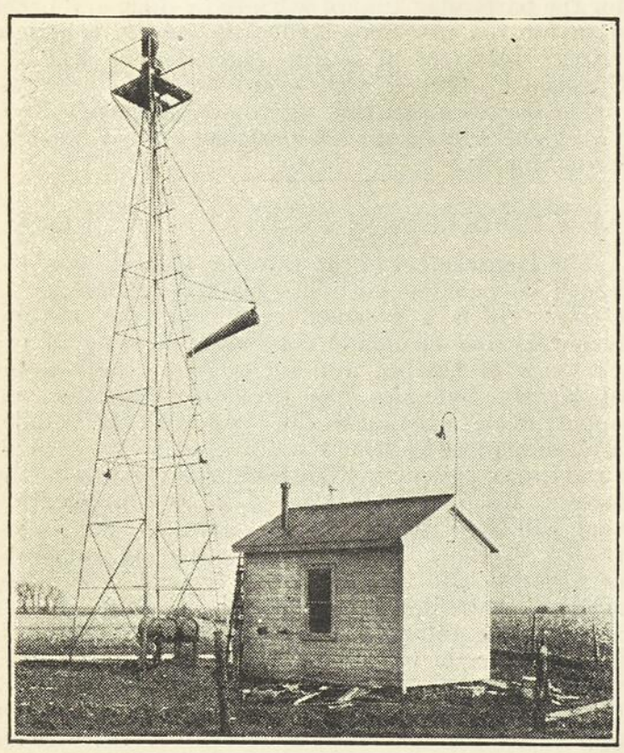


FIG. 1—Mail Landing Fields

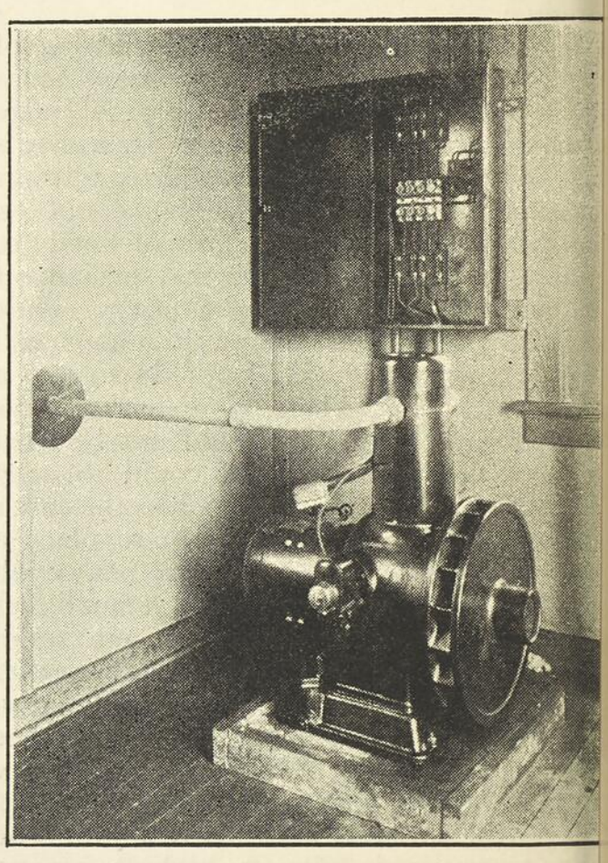


FIG. 2—Lighting Plant

facture standard make, non-battery type, for 110 volt service, with a capacity of 2000 watts (see Fig. 2). It is easily started by hand cranking, and supplies the power for the entire lighting at the airway beacons and emergency landing fields. A 500 gallon fuel tank is placed underground in the rear of the house to provide storage over long periods of time. The house itself is lighted inside with a 75 watt lamp.

The roof of the house is of a gable shape and is painted white on the right side of the ridge, and a bright non-fading red on the left side of the ridge. A number corresponding with the route number is painted white on the red and a number corresponding with the beacon number is painted black on the white. The numbers are 6 feet high, 4 ft. wide, with lines 12" wide.

The tower is of skeleton steel 50 ft. high, surmounted by a 24" Sperry revolving beacon driven by a 1/6 hp. motor, and so arranged that a powerful searchlight beam is directed slightly above the horizon. The concrete directional arrow is lighted by means of 100 watt lamps and reflectors, located on the tower at a height of 21 feet, illuminating the route number and beacon number for identification from the air.

In addition to this lighting, the emergency landing fields have 20-15 watt boundary lights at intervals around the field. Green lights show the best normal approach and obstructions are marked by red lights.

Care of the Westinghouse lighting plants to prevent the possibility of failure are in the hands of caretakers, who, in most cases, are farmers on whose property the beacons are located.

These illuminated arrows present a striking picture from the air with the route and beacon numbers standing out plainly against red and white ridges of the roof, the powerful ray of the beacon playing around on the horizon. Thus is provided an excellent guide for the air mail planes, enabling the aviators to know the location of emergency landing fields, if landing becomes a necessity.

WHAT IS A CORD OF WOOD?

A stacked cord is a pile of wood 4 feet high, 8 feet long, of pieces 4 feet long, containing 128 cubic feet. Stacked, round bolts, however, never yield 127 cubic feet of solid wood to the cord. Straight, smooth sticks of uniform sizes, carefully piled, may yield from 105 to 107 cubic feet of wood substance, but this is the maximum to be expected, and is quite exceptional.

DOES EDUCATION PAY

You have all heard the word "Statistics." They usually deal with the law of averages. Our experts have boiled down the records of about forty-million men and have found the following facts:

To the uneducated boy's one chance of attaining distinction, the public school boy has 4 chances, the high school graduate has 102 chances, the college graduate has 945 chances.

When we consider earnings, we find that the boy who leaves public school and goes to work. in the average 44 years of his working life earns $22,000. The high-school graduate in his 40 years earns $40,000 or $18,000 more than the public school boy. Therefore each additional day spent in a high school adds $25 to a boy's life-earnings.

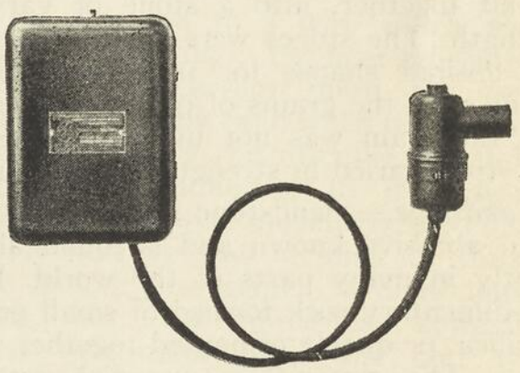
When we come to college graduates, we find an even greater difference. Data gathered out of the experience of 100 business firms disclosed the fact that about 90% of their college trained men were successful in rising to large salaries, as compared with 25% of men without college training.

A class of young men graduated from a big university in 1912. Ten years later a census was taken of them. The largest income was $50,000 per year, a manufacturer; the smallest income $3,525 per year, a teacher. The average annual income was $6,750 per year.

Does education pay? "Nuff sed."

ENGINE SPEED INDICATOR WORKS ON FREQUENCY PRINCIPLE

The Canadian General Electric Co., Ltd. has announced an electric tachometer designed to indicate the speed of aircraft engines. This tachometer operates on the principle of generated frequency (instead of generated voltage) of a small magneto type generator which is part of the equipment. It was exhibited to the public for the first time at the International Aircraft Exposition at St. Louis.



The tachometer generator is a simple inductor type having no brushes, commutator or slip rings. In addition, an indicating instrument and a special type of transformer are used, which, together with the necessary wiring to complete the electric circuit, constitute the installation. The generating unit weighs 1 lb. 7 oz., the indicating instrument 10½ ounces, the transformer 11 ounces, and, with the addition of the usual length of armored twin-conductor wiring, the total weight is three pounds.

Q. How many fire rangers are employed throughout Canada?

A. About six thousand, at the height of the fire season.

Abrasives

By C. D. YOUNG
Student, Montreal Technical School

PART I—NATURAL ABRASIVES

THE shaping of metallic and other hard substances by grinding, or abrading, has been practiced for many generations. It is undoubtedly one of the earliest operations to be practiced by man.

The substances used were those found in nature in the crude state, such as the harder rocks, etc. It has only been in recent years that any advance was made from the primitive state.

The grindstone.— The grindstone and wetstone which up to fifty or so years ago were the only tools available for grinding and abrading, are derived from natural rock, which was found in dried up sand-beds, which were covered up by water generations ago. The stones were formed by the grains of quartz and sand, coarse and fine in beds of various thicknesses. The water gradually withdrew through the sand, and cementing materials of various kinds being present, the materials were bound together, into a stone of varying strength. The stones were then hewn into the desired shapes for use, the cutting agent were the grains of quartz and sand, but the grain was not uniform therefore the stone varied in strength throughout.

Sandstone.— Sandstone is the oldest natural abrasive known and is found abundantly in many parts of the world. It is a sedimentary rock formed of small grains of silica, or quartz cemented together with silica. The material is quarried out, by open cut methods, graded and hewed into grindstones for various purposes.

Pumice.— Pumice is of volcanic origin, being an igneous rock of an amorphorus nature with impurities. Primitive methods are followed in mining foreign pumice. The material is taken out of deep caves in the mountains in lump form. It is then sorted and graded. Pumice is used in the automobile body finishing industry, and is used as a powder with water for rubbing paint.

Diamond.— The diamond is the hardest stone or substance known hence the best abrasive. The diamond runs in color from pure white to dark brown. The specif gravity of the diamond is 3.5 and i hardness is No. 10 on mohs scale. Th diamonds used in the abrasive industry a called borts and are in reality imperfe gem stones, which because of flaws, co struction characteristics etc., cannot b cut into gems, and are called borts. Ninet per cent. of the diamonds are found i Africa, but they also have been found i India, South America, New South Wale Borneo, British Guiana and in the Unite States. Most of the diamonds are foun in what is technically termed "blue ground In general it takes about four tons of blu earth to produce a carat weight of diamond Borts are used for truing grinding whee and for drills for boring rock, etc., and i saws for different purposes.

Some of the less important natura abrasives are as follows: Flint, garne tripoli, diatomaceous earth, etc.

Flint.— Flint is a very hard materia (mineral substance) with a density o almost 2.6. Its chief component is silica It has been used for ages. The so-calle flint paper of commerce is coated with variety of flint, called flint quartz. Thi mineral is mined extensively in Wisconsi Maryland, and Maine.

Garnet.— Garnet is a name given to certain group of minerals possessing simila physical properties and crystal form

The group consists of seven differen species, all of which are silicates of eithe aluminum, calcium, magnesium, iron manganese or chromium, the different sil cates being replaced one with another The trade names given are as follows Grossulanite, pyrope, alamandite, spess artite, andradite, uvaronite and rhodolit which is a mixture of two molecules o pyrope to one of almandite. Many of th grades of garnet vary considerably as t color, hardness and toughness and metho of fracture. For the best purposes i grinding or abrading, the mineral must be th hardest possible, at least 7.5 (mohs) whereas quartz is 7. Color does not seem to hav

ıy particular bearing on the abrasive ıalities but the deep red-colored garnet always preferred.

Almandite is by far the commonest of the ırnets and is the type most employed r abrasive purposes although andradite ıd rhodolite are also being used. They are l iron garnets.

Over ninety percent of the garnet is used manufacture of garnet coated paper ıd cloth and the remainder a lower iced material in the form of loose grain r various purposes such as surfacing and lishing marble, slate, etc.

Diatomaceous Earth. — Diatomaceous rth is more commonly known as infurial earth. It is also called tripoli. It is a mpound of the silicious remains of minute uatic plants. The silicious parts accumue on the bottom of the bodies of water which the plants lived, and in time tain considerable thickness. They may be her found in fresh or salt water. Chemilly diatomaceous earth is a hydrous silica opal, but it generally contains a conderable amount of earthy impurities.

As an abrasive the earth is used in the nufacture of polishing compositions. It ıused on buffing machines for cutting down lfore polishing. In preparing the earth r industrial use it is heated to expel the ıter and organic matter and is then put i a furnace and heated to a high temıperature, after which it is crushed to powder, sted and sacked.

Tripoli.— Originally tripoli was the name ven to a diatomaceous earth from Tripoli i Northern Africa. Tripoli when pure is a ıite, finely granular very porous silicious rk and is sometimes described as a limesne. The individual grain will scratch sel. The true specific gravity of diatoıceous earth is 2.1—2.2 but the apparent ecific gravity is as low as .45 due to its h porosity.

Tripoli is heavier than diatomaceous eth.

Emery and Corundum.— Of all the natal commercial abrasives emery and cundum rank highest. These natural minels are of greater hardness than quartz.

Emery.— The grain of emery is of a riable composition. It is an impure form o ruby ($Al_2 O_3$) with impurities such as sca, ferric oxide, etc. and is also combined h water. In general it may be said to cisist of crystals of aluminum oxide ebedded in a matrix of iron oxide. The crystals of aluminum oxide vary in size, but in all cases they are very small, so that the abrasive grain, almost regardless of its actual size, is composed of a number of the crystals together with the matrix material.

Corundum.— Corundum also occurs freely in nature, usually associated with impurities. It has been found in sufficient quantity so that abrasive grains have been prepared from it, consisting in some cases of individual crystals which are capable of being binded or cemented together by means of some suitable material.

But it was found that the natural abrasives, emery and corundum, were not of uniform strength and grain, and the deposits of one locality did not duplicate those of another. And this started the search for means of finding a better abrasive.

Manufactured Abrasives

The first manufactured abrasive was discovered by Edward Goodrich Acheson, in 1891, in a little work-shop located at Monongahela City, Pa.

It was discovered quite by accident. One day he was experimenting with an electric current with some clay and coke, in a small bowl such as plumbers use. The coke was crushed and mixed with the clay. In this mixture he then thrust a piece of carbon fastened to a wire which was connected to a dynamo. The heat generated by the electric current fused the two substances in the bowl and when the carbon rod was withdrawn, he discovered a few minute crystals adhering to it. These jewel-like crystals were amazingly hard and sharp. At first he was inclined to think that he had at last made, "a man made diamond," but a few simple tests however dispelled this theory. But the fact remained that these crystals had wonderful abrasive properties and were second only to the diamond.

The inventor collected enough of the material to fill a small vial, and gave it the name of Carborundum. He went to New York to interview the jewelers with the idea of substituting the diamond dust with carborundum in the polishing of jewels. The prominent jewelers gave the material a trial and the results were amazingly successful. Acheson then got his first order for carborundum the price being $880 per pound. It is hardly conceivable, to-day, that such a price ever was paid for this material.

Carborundum.— This was the beginning of the commercial career of carborundum. The inventor went back to his shop and began to make the material by the pound instead of the carat. After many discouragements and manufacturing difficulties the Carborundum Company was organized for the manufacture of this product, moved to Niagara Falls and was one of the first to make use of the hydro-electric power developed there. Millions of pounds of the products are made yearly and there are thirty of the largest and highest temperature electric furnaces in the world.

Today carborundum sells for about ten cents a pound. The improvement in the process of manufacture, the enormous supply of electricity from Niagara. and the great demand for it in the place of the natural abrasive all tend to lower the cost of carborundum on the market. The process of manufacturing carborundum is practically the same as it was years ago, only on a greatly enlarged scale and wonderfully improved methods.

Manufacture of Carborundum (SiC).— Carborundum is the trade name given to silicon carbide, carbide of silicon being a chemical combination of carbon and silicon. The chemical transformation is brought about in the following way:—The element, carbon, is supplied in the form of crushed coke and, silicon, by sand. These two materials are mixed in the right proportions and loaded into the electric furnace. A little sawdust is added to the mixture to make it porous, so that certain gases that form in the heating of the mixture can escape. A little salt is added to drive out certain impurities. The usual charge is 34 parts coke, 54 parts sand, 10 parts sawdust, and 2 parts salt.

The furnaces used are large brick boxes, rectangular in shape, built of fine brick. They are about 20 feet long, 7 feet wide and 6 feet high. At each end of the furnace are thick cables connected to big carbon rods which are connected to the terminals of the electric power supply. The charge of sand, carbon, etc., is then packed in the bed of the furnace, and an alternating current of 190 volts and 6000 amperes is passed through the crude mixture, the current passing through the carbon conductor after the manner in which the current passes through the incandescent lamp filament. The resistance lowers as the charge heats and after four hours of operation it remains constant at 125 vo and 6000 amperes. This current generat a temperature of approximately 4060 and at this temperature brings about t reaction of the sand and coke, while t sawdust in the mixture makes it poro leaving a means of escape for the infla mable gases so that it will not explode. this tremendous heat, steel, iron, gran or marble are vaporized, and the most fractory materials volatilize readily.

It is claimed enough electric power is co sumed in a carborundum furnace to opera an arc light, day and night for twelve yea or to operate one sixteen candle pow carbon incandescent lamp for two hundr and twenty years.

In this tremendous heat carborundu crystals are created. At the end of thir six hours, the sides of the furnace are tak down, and under a thick black coat lie t carborundum crystals of all brilliant colo

The masses of crystals are taken fr the furnace, crushed or broken into sm individual crystals under big iron whe The crystals or grains thus obtained a carefully washed free from all forei materials and are then dried in a rota drier. The grains are then sent to t sifting room and are sieved through s screens into grits or sizes correspondi to emery. They are then moulded into t desired shapes with the required bindi material and the moulds are placed in gr hydraulic presses. The moulded shapes a then loaded into fine clay holders a placed in kilns such as potters use, and a baked for a week in a temperature of abo 2500°F. They are then taken from the k and dressed to size. The wheels are subject to rigid speed tests before go on the market.

Numerous trade-marks have been giv to silicon carbide such as, carborundu carbolite, carbolon, carbona, carbowa carbo X, corex, crystolon, electrolon, g solite, to-tens, staralon, and sterbon.

Aluminum Oxide

The next step in the development of e artificial abrasive was made with e experiments in the laboratories of Ampe Electro - Chemical Company at Ampe New Jersey. The natural aluminous ab sives, emery and corundum, were rep duced by the heat of the electric furna Perfection of this abrasive is due to t

xperimenters, Charles B. Jacobs and rank J. Tone.

The first experiment was carried on in 897 by M. A. A. Gaudin, and consisted f the fusion of the mineral bauxite, the hief ore of aluminum. The product was ubmitted to the Norton Emery Wheel ompany, which made arrangements for dditional quantities of the product. Sev- ral hundred tons were prepared, which llowed the manufacturers to make exten- ive tests. The results of these tests was he construction of a small plant at Niagara alls by the Norton Emery Wheel Com- any, in which the manufacture of crys- alline aluminum oxide on a commercial cale was begun in 1901.

Almost at once the replacement of the atural abrasive material began, and before ong the artificial abrasive had come to be sed by the trade extensively. The company nder the name of Norton Emery Wheel ompany changed its name to "Norton ompany."

Alundum.— In the manufacturing of lundum (Aluminum Oxide), the process s as follows:

The furnace is a simple affair consisting f an outer shell which rests on a base, hile two electrodes supply the current. he shell is cooled by water jacket cir- ulation. It does not contain a refractory ining as the charge forms one itself. It is nounted on wheels so that it can be moved rom under the electrodes after the burn- ng operation is completed.

In making up the charge, the bottom f the furnace is first lined with a carbon nd tar mixture, then a layer of bauxite s introduced and the electrodes lowered o rest on it. A layer of graphite is then aid between the electrodes. This forms a ood conductor for the current, but as soon s the bauxite is melted it forms its own onductor. The current is passed through nd the charge is brought to a molten state. he current is alternating 6000 amperes nd 100 volts. After the first layer is nelted, another layer is put in place and he electrodes raised. This process is con- inued for about thirty-six hours. During he melting process the oxide of iron and ilica in the charge unite and form ferro- ilicon, so that the abrasive is practically ure. After the furnace is cooled off the uter shell or crust is removed and the ingot aken out.

It is broken up under a special crusher called a shell crusher and then passes through an ore crusher. From the ore crusher it goes through a magnetic separator and subsequent operations consist of feeding the material through a roller crusher. It is then graded into various sizes.

Aluminum oxide varys in color from a light purple to a dark brown, but there is also a special variety which is almost white. Some of the trade names given to aluminum oxide are as follows. Alawalt, aloxite, aluminox, alundum, bathite, borite, boro-carbone, borolon, carbo-alumina, coralox, corowalt, exolon, ky-tens, lionite, oxaluma rex, rexite, staraloxite and X-L.

(End of Part I)

THE GREEN BUSH IS NURSERY OF SPORT

By Allan G. McAvity

President, New Brunswick Fish and Game Protective Association, Vice-President, Dominion Fish and Game Protective Association.

After all is said that can be said about enforcement of fish and game laws, proper methods of propagation, and so forth, we must admit that the future of fishing and hunting in Canada depends primarily upon the forest that gives them birth.

There could be no hunting of moose or deer in a treeless, foodless barren. No stream can maintain its fish when shorn of forest cover along its banks. It is therefore obvious that the sportsman is also a lover of the woods and desires to preserve for all time to come the natural forest conditions that mean everything to the pleasure of his outing.

Quarrels Will Fade Out

At times we see a flicker of controversy as between the sportsman and the lumberman. There are a good many situations in which the sportsman properly demands protection of streams against pollution by mills and more frequently against the building of dams that prevent the natural seasonal movement of fish. I believe however, that these controversies will fade out as the rights of the sportsman become expressed more emphatically in public policy and in government regulation.

Considering the vastness of the Canadian woods, and the fact that only a trifling percentage of the area is operated by logging crews at any one time, there ought to be plenty of room for all industrial and recreational interests desiring to utilize the forests of this Dominion.

Praise for the Guides

On one subject certainly the sportsman and the log maker are agreed, and that is forest fires. Nobody gains from fire destruction and everybody is an immediate loser. My observation leads me to state that the Canadian guides are the greatest friends that forest protection has. The guide's attitude is closely paralleled by that of the members of any reputable fish and game association or club. Organization creates a sense of pride and responsibility. Steady personal contact with fellow members breeds in the individual the rules of conduct enunciated by the organized body.

The Magic of a Tree

By Constance Troy

WHAT is there that is more beautiful than an old tree? Mellowed through canhging seasons, it lifts a proud head to greet each day, and with the evening shadows it cradles in its beautiful branches the vivid sunbeams that danced and played among its leaves through daylight hours.

Trees, no matter what kind they may be, have a fine dignity that impresses us directly we see them. And each tree-family has its own proud lineage going bak through the centuries to the world's beg- ning.

Knowing this, how then can we mo mortal beings bring ourselves to inju them? To mar or destroy their loveline! And yet we do this in all thoughtlessns and usually with no intent to hurt. Et that does not lessen the damage; nor hast ever yet been known to put out a fire.

(*Continued on page 14*)

How can we mortal beings bring ourselves to destroy their loveliness?

Hand Lettering for the Apprentice Typographer

By Frank Rhodes
Instructor, Printing Section, Montreal Technical School

THERE are comparatively few young typographers, daily working at their trade, who do not have the desire to become "artists" in type, and who are not possessed with the wish to handle "creative" work.

The apprentice, even while learning to set solid matter, longs for the day when he will be allowed the run of the shop and free access to the case of ornaments. To his immature taste, ornament means art.

Unfortunately, even in the minds of many typographers who have graduated from apprenticeship, "creative" work is a synonym for "fancy work," and, so thinking, many workmen, when given a job that demands original ideas in composition, proceed to fashion their work upon some unit of decoration, making their type fit the ornamentation, which is comparable to trying to make a man fit his clothes—an entirely wrong process.

When an attempt is made to carry out this idea in type, the finished product may be fancy but its artistic merit will be doubtful.

To a printer, the word "art" should not necessarily imply embellishment — fancy type, printers' flowers, decorative initials, etc. While these units, viewed as designs in themselves, may be artistic, we may have good typographical design without using any of them.

If we take steps to learn how to employ our artistic impulses in the correct way to the work we do, we will discover that this matter of art is not an elusive vision of a masterpiece of typography, but that it is the application to our work of a cultivated taste in the assembling of measures, shapes and tones.

Some printers who have not made any attempt to learn the principles governing art typography, occasionally produce artistic work. Naturally, they are pleased with this particular work; they realize that it is good and perhaps wonder why they cannot always do work so pleasing. The truth is, they have, in that particular instance, carried into effect certain principles—principles that should underlie all their efforts; but not knowing of what these principles consist, they cannot consistently do good work.

There are many young printers who know comparatively nothing about good typography, yet are authorities on sport. Some of these young men are keenly interested in hobbies outside of printing and yet they know little, for instance, of type harmony.

Any boy or man who is not interested in his vocation is to be pitied, and if he finds that he cannot become interested in it, he had better give it up and go into something in which he has a natural interest, because without interest one cannot have success.

It is possible to develop interest. If the young typographer will spend a portion of the time that he now spends on outside matters in the study of the craft, his work will become interesting. Efficiency is necessary in obtaining a good position with good pay and helps the employer to keep steady customers and obtain good prices.

If we are prepared to study the principles governing fine work, that which at one time looked to us good, will not look quite so good as it once did, because we will bring to bear upon it a more critical eye with a greater knowledge of recognized standards of excellence.

Education in art typography must begin with elementals—a study and understanding of the formation and proper use of the various letter forms used by the printer.

Personally, we acknowledge with pleasure the benefits received from the instruction in lettering imparted to us many years ago, and upon which instruction this article is based.

We venture to say that a large number of today's printers would be at a loss if asked to indicate the distribution of light and heavy elements in an alphabet of type faces; which lines of the letters, N and W, for instance, are light and which are heavy. An appreciation of these apparently insignificant factors is really necessary. An understanding of letter design is a first step to an understanding of type harmony.

Ask the average typographer to make a layout. With a ruler and pencil he will most likely produce a neat outline. Now ask him to fill in the letters on the chief lines and the result of his efforts will not be so pleasing.

A real layout, one that can be appreciated by the customer, should contain at least *some* lettering and it behooves the typographer to possess some skill in this direction. To be able to do a certain amount of lettering is a distinct asset.

Our letters as used by printers, today, fall into five groups. We have the sans serif roman, the oldstyle romans, the modern romans, italics and texts (Old English).

At present, the sans serif types are popular but we only give them passing reference because anyone who is capable of making a presentable drawing of types with serifs should have little difficulty in drawing one without serifs. This, then, leaves us the roman types with serifs, the italics and text.

It can thus be readily understood that if a typographer has some proficiency in the drawing of these faces, he has a groundwork of knowledge in this particular field that can be extended in any direction in regard to type faces.

In examining a roman capital letter we notice that it is composed of light and heavy elements. We may at first see no apparent reason why this should be so and wonder why our letters have been designed in this style. But we must remember that the scribe of ancient days wrote with a reed sharpened to a flat point, so that when he made an upward stroke from *left and right* he necessarily used his reed the thin way on, thus drawing a light line; when he made a downward stroke in the same direction, a

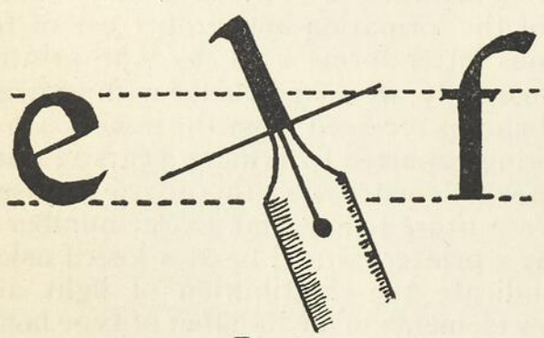


FIG. 1

perpendicular stroke as in I, or a *right to left* diagonal stroke as in Z, he used the reed the broad way and the result was a heavy line. See Fig. 1.

We at once see, then, that all vertica lines will be heavy, with the exception o the first lines in M and the first and fina lines in N. This is because, originally, th first lines in M and N were sloping fron *left to right* and the final stroke in th letter N was made by an upward move ment of the writer's fingers.

If we try to follow the movement of th reed we will see that all horizontal stroke will be light.

All lines sloping upward from left to right are light, with the exception of the letter Z as before mentioned.

Having now defined the peculiarities o the "main" and "minor" lines as they are called, we have the "serif." This name is given to the cross stroke at the ends o the main and minor lines.

The serif has much to do in giving character to the letter face. It is not exactly known why the serif originally was added, but in our opinion (and we give it for what it is worth), it is a development o a cross chisel-cut made by early letterers on stone as a guide for the length of the vertical lines. In the oldstyle roman capitals, the serifs are joined to the main and minor lines by a curve; in the modern roman capitals, the serifs are at right angles.

With the circle, the tortuous line and the straight line, the designer is able to make any design. These elements used in correct proportions will make a beautiful and legible letter. Unfortunately, at the present time we are seeing produced by certain designers letters that are distorted and not in good proportions. These have attained a certain vogue which we feel will soon pass. In the meantime the young printer is becoming utterly befogged as to what constitutes a good letter.

We then see that in making a layout the typographer should be able to insert a few lines of hand-lettering that shows some considerable degree of completeness and that will project the thought of the customer towards a well-balanced type.

In learning to do lettering, a few general rules must be remembered by the student.

Generally speaking, the roman capitals are based upon the square, the letters T, H, N, for instance, being about as wide as they are high. W and M are extra wide, B, E, F, I, L, P, S, J are usually a little narrower. The so-called round letters, C, D, G, O and Q should always be given their full width.

Optical illusion compels us to make a distinction in the length of letters. Certain letters, on account of their design, must be made a little higher at the top or lower at the bottom than others. The letters A and V are examples of this. When the A is drawn to a point it should project a little above the other letters and in the same fashion the point of the V should project downward. In connection also with optical illusion, other peculiarities manifest themselves in other letters but as they are only evident in letters of considerable size, the student need not concern himself with these when drawing letters in a layout.

Let the width of the heavy elements (main lines) be about one-eighth the height of the letter; the weight of the light elements (minor lines) to be proportionate to the heavy elements.

To give structure to the letter design, let the inner side of the vertical lines be rounded into the horizontal lines by a gentle curve (see Figure 2). The same rule applies in forming the serifs.

Let us now take up the making of the alphabet. We need a drawing-board, T-square, pencil, ruler, and a sheet of white paper 9 x 12 inches in size.

Pin the paper squarely on the board and then with the aid of the T-square draw a diagram as shown in Figure 3.

For the letters we would suggest a space of one inch. This diagram to be in pencil.

FIG. 2

The dotted line centered between the guide lines is for the waist lines of the letters, all of which, with the exception of the letter A, should be slightly above this dotted line. The top of the waist line of the A should be on the dotted line. Vertical guide lines should now be drawn about a quarter or half-an-inch apart, not necessarily exactly regular as to space between each. They are there merely to help the student keep his lines straight.

Model for our alphabet is given in Fig. 4

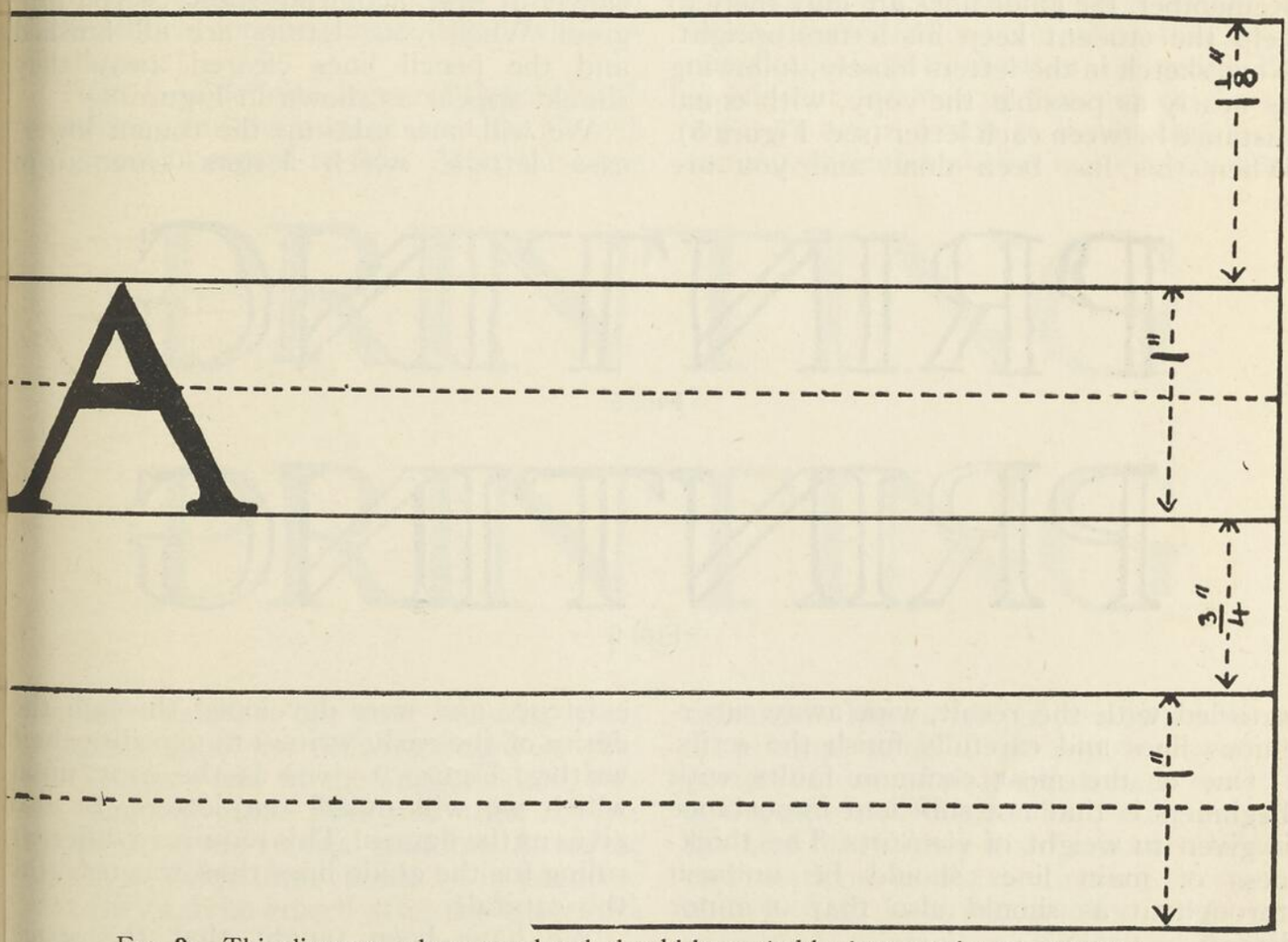


FIG. 3.—This diagram, when completed, should have six blank spaces for the alphabet.

A B C D
E F G H I
K L M N
O P Q R S
T V W X
Y Z J U

FIG. 4

The vertical lines of the actual letters should not be drawn on the guide lines. Remember, the guide lines are only there to help the student keep his letters upright. Now, sketch in the letters loosely, following as nearly as possible the copy, with equal distance between each letter (see Figure 5). When this has been done and you are satisfied with the result, wipe away superfluous lines and carefully finish the serifs.

One of the most common faults with beginners is that not sufficient importance is given to weight of elements. The thickness of main lines should be uniform throughout as should also that of minor lines.

Let each letter have its own prope character. Do not condense letters tha should be round and if a letter should be little extended in the original copy, se that you follow it.

Assuming that you have carefully fo lowed instructions your drawing will sho a clear outline in pencil of each letter a Figure 6.

It is important that all the lines draw when making the letters should be free hand. It is not necessary that they shoul be mathematically exact, but it is necessar that the student learn how to make hi characters so that there is a unity in thei general appearance.

We are now ready to ink in the letter we have drawn. Proceed as follows:

A bottle of india ink and a pen ar needed. This pen should not be too fin or too stiff, otherwise it will scratch or cu into the paper. You can determine by tria the correct style of pen nib required.

Begin with a full stroke between th lines. This is easy to do as it does no touch the lines of the letter on each side From this stroke work gradually outward toward the edges letting the finish of eac line come inward (see Figure 7). Star slowly at first, acquiring speed as you pro gress. When your letters are all finishe and the pencil lines cleared away the should appear as shown in Figure 8.

We will now take up the roman lower case letters, which letters came int existence and were developed through th desire of the early writers to expedite thei writing. Figure 9 gives us the copy upo which we will model our letters. It als gives us the figures. This requires a differen ruling for the guide lines than was used fo the capitals.

We have been taught that the spac

PRINTING

FIG. 5

PRINTING

FIG. 6

between the top and bottom lines is divided into thirds. The upper third is then divided in the center to give the line for the letter "t," the middle third is used for the body of the letter, and the lower third is divided by a line which indicates the reach of the descending letters—"g," "p," "q," and "y." See Figure 10.

The rules governing which parts of the design are main lines and which are minor lines is the same as for capitals. However, the proportionate width of lower case elements to those of the capitals of same font must be left to the discretion of the student.

So far we have dealt only with "roman" or upright type. It is almost needless to mention that there are many occasions upon which a word or line is desired in italic. Italic letters are informal and graceful and are especially appropriate where the dignity of the roman is not required. A few words regarding the drawing of this form of letter will thus be opportune.

Any student who has carefully made the roman style of letter will not find the drawing of italic very difficult. The same kind of diagram with horizontal and other guide lines as used for the roman may be used, with this difference—the guide lines that were vertical for the roman letters will now be diagonal.

There is no definite degree of slope for italic lettering and the student must use his own judgment in regard to this. After the slope has been decided, pin your drawing sheet obliquely upon the drawing board so that the T-square will fit the angle desired, rule the diagonal guide lines and then replace the paper to the vertical position. As before stated, all guide lines should be in pencil so that they can be erased after the letters are inked in.

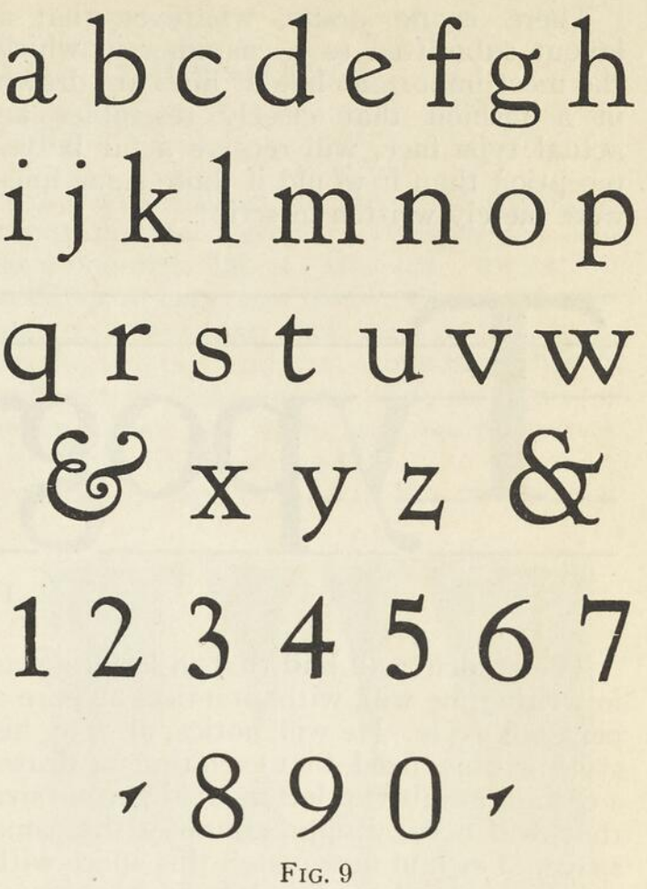


FIG. 9

There is little doubt that the first efforts at lettering will be slow in progress and the finished letters may be in altogether different atmosphere to those of the copy. This should not induce discouragement. Lettering is an art in which it is not easy to become proficient and that is, by many, never mastered. The object of this article is not an attempt to make of the young printer a perfect letterer, but is an attempt to instill in the minds of these same young printers the fact that if they wish to attain the better positions in the composing room, an ability to do lettering quickly in the preparation of a layout is a decided advantage.

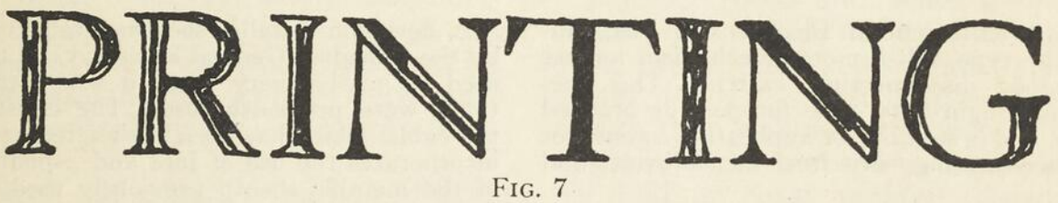


FIG. 7

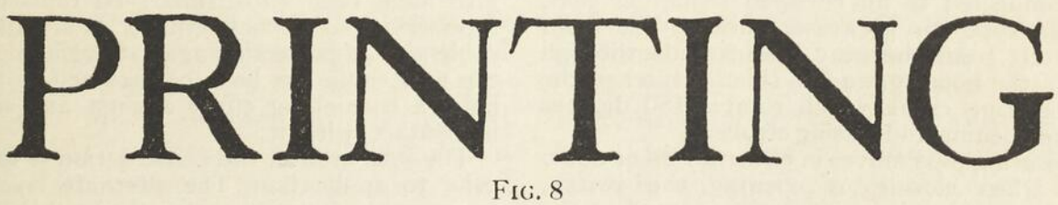


FIG. 8

There is no doubt whatever that a layout submitted to a customer in which the most important line or lines are drawn in a fashion that closely resembles an actual type face, will receive a far better reception than it would if those same lines were merely written in script.

visualize the relation in length of word o the most popular type faces to that drawi by his own hand, an advantage that wil save time in composition.

It may be argued that all this is going to a lot of trouble in order to learn simpl lettering. Perhaps so, yet the test o

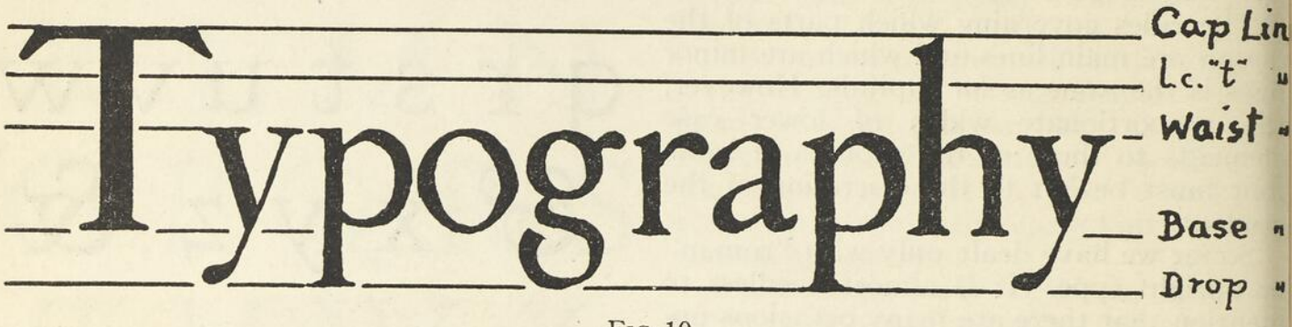


FIG 10

The student will find that in lettering, as in writing, he will, with practice, acquire a personal style. He will notice, also, as his style becomes fixed, that each time he draws a certain number of letters of the same size they will occupy approximately the same space. Let him now match this space with the same number of letters in some type face that he may have at his disposal. From then on he will know that the length of any word he may letter by hand will have its length equalled by this particular type face and he will, with experience, be able to

whether an effort is worth while or not is gauged only by the benefits obtained. One of the best positions to be obtained today in any reputable printing office is that of "layout man" or "typotect," and nearly every compositor and compositor's apprentice looks to the day when he will hold this enviable position.

There are few successful typotects who have not some fair command of hand lettering and to this part of the typographer's calling not sufficient importance in the past has been given.

NEW MOTOR MECHANISM FOR DISCONNECTING SWITCHES

The Canadian General Electric Co. Ltd., announces the type MR-5 motor mechanism for use with outdoor disconnecting switches. This mechanism is a light-duty type for pole or bracked mounting, and is suitable for application to outdoor group disconnecting switches, 44 kilovolt and below.

The device consists of a ½ horsepower motor directly connected to an enclosed reduction gear, with a cam-type spring-pressure brake. The main driving shaft from the gear box extends through the rear of the housing, and to this is attached the switch operating crank which rotates 180 degrees in both the opening and closing strokes.

The operating pipe moves in either an up or down direction when closing or opening the switch, respectively, making it particularly adapted to the C. G. E. type TA tilting-insulator switch. For application to rotating insulator switches, an indirect type of operating mechanism is used; the transfer of motion from the vertical to the horizontal is obtained by replacing the outboard bearing with a bell crank.

The housing enclosing the mechanism is an iron casting with a protective coating of aluminum paint. In the closed position, the housing is weatherproof. Auxiliary switches and motor control contactors are furnished enclosed in the housing.

NEW NON-METALLIC SHEATHED PARKWAY CABLE

A new non-metallic sheathed cable, introduced by the Canadian General Electric Co. Ltd., may be used in nearly every location where the metallic types were previously used. The construction of the cable, which has been designated as Type CA, incorporates the use of jute and asphalt. In place of the metallic sheath previously used, successive wraps of hard vacuum impregnated, closely woven jute have been substituted. To replace the steel tape serving as a shock retarder on metallic parkway cable and as protection against mechanical injuries, the new cable has been constructed so that it will have a cushioning effect against any hard object in contact with it.

The jute used in the construction is impregnated prior to application. The alternate layers, applied in reverse direction, are thoroughly filled and separated by additional layers of weatherproof, non-corrosive, non-oxidizing compound. The entire assembly is impervious to the corrosive elements usually found in the ground. The construction is such that the cable can be readily spliced and installed with a minimum of energy and time.

Q. How does Canada stand in the British Empire as regards extent of timber supplies?

A. This Dominion contains the only extensive storehouse of softwood timber in the whole Empire.

Freeze 'em with "Dry-Ice"

By Douglas Leechman

As far as one could see, it was just an ordinary trout. Quite a nice one, of course, in fact it weighed about five pounds, but there was nothing unusual in that. But when Bob held it straight out in front of him by the tail, horizontal with the ground, old Pierre could hardly keep his eyes off it.

"We've been up to the cave," said Bob, by way of explanation.

"Cave, *mais* what cave? There is no cave here," and Pierre removed his hat the better to scratch his sadly puzzled head.

"Why, the cold cave down at the end of the lake. We left the fish in there for ten minutes and they were all frozen stiff, like this," and again he extended the fish, holding it by the tip of the tail. It didn't sag an inch.

Pierre gave it up, and led the way into his shack. The stove was going and the top almost red hot, for he had seen us coming from far down the lake and knew that we would have fish to cook.

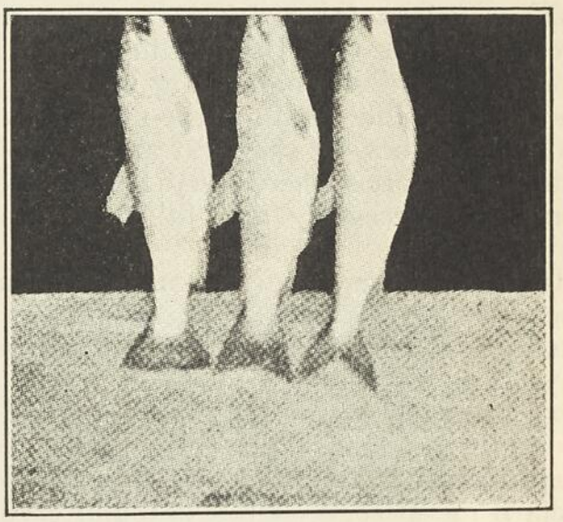
Still holding his fish, Bob walked over to the stove, followed by the old habitant.

"Look, Pierre, it's frozen all right. It's a mighty cold cave," and he rapped the fish smartly on the hot stove. It snapped neatly into three or four pieces!

"*Bon Dieu, c'est la magie anglaise,*" shouted old Pierre, and fled through the open doorway, still insisting that nothing but "English magic" could work such wonders. He had never heard of "Dry-Ice."

"Dry-Ice" is solidified carbon dioxide and has a temperature of 110 degrees Fahrenheit below zero! You can buy as much or as little of it as you like, wrapped up in several thicknesses of heavy paper and packed in a shipper of corrugated board. In this condition it will last for a long time in normal temperatures, and when it evaporates, instead of leaving pools of ice-water wherever it stands, it turns directly into an odorless gas and just evaporates like Little Orphan Annie's misguided hero and "isn't there at all."

Given these advantages over water ice, it is obvious that "Dry-Ice" is a boon to enthusiastic fishermen and hunters. Now, when you catch a fish worthy of your skill and competent to sustain your dwindling reputation for veracity, you can lay him on a one-inch slab of "Dry-Ice," freeze him solid in a very few minutes, put another slab on top of him, stick the whole business in the shipper and rest confident that he will reach home frozen stiff, as fresh as when he left the water and ready to cook, or, if he still looks as big as he did when you caught him, to send to the taxidermist.



A comparison of tails. Right to left, lake trout, brown and speckled.

Ducks, grouse and other game can, of course, be handled in the same way. Moreover, the freezing is so rapid that it apparently has a less destructive effect on the tissues than ordinary methods of refrigeration and the fish or game can be put on to fry, boil or roast without thawing if so desired. If you take the precaution to clean your fish or birds before freezing them, this method is, indeed, preferable.

As is the case with most new things, there are one or two little points to remember. One is, don't handle solidified carbon dioxide without gloves. Its very low temperature will freeze your hand just as effectively as it will your fish. Of course, you can juggle a block for a second or so, much as you could a live coal, but don't hold on to it. Another point is, don't leave it exposed to the heat any more than you would ordinary water ice. Keep it well wrapped up and in a cool place and it will last that much longer. If it must be left

without protection, at least shield it from the wind. The carbon dioxide gas which is given off in evaporating is heavier than air and hangs round the block like clouds round a hilltop in rainy weather, and protects it to that extent from the warmer surrounding air. If there is a wind blowing directly on to the substance, it will drive off the gas and evaporation will be quicker.

Solidified carbon dioxide can be used for shipping many things other than fish and game. Its chief use is in the ice-cream industry at present, but new methods of applying it are being developed rapidly. Railway cars can be refrigerated with it, and fresh fish is shipped from the Atlantic to the Pacific in perfect condition and without delays for re-icing. A novel and unexpected use is in the freezing of quicksand and mud in engineering work. It is also used in the manufacture of golf balls and radio tubes, in chemical and pathological laboratories where very low temperatures are necessary and in many other ways.

In appearance, solidified carbon dioxide resembles a very pure white marble. It is usually sold in cubes about ten inches each way. It is advisable to get the manufacturer to cut it into slabs one inch by ten by ten for you, or you can cut it with a saw. Small blocks can be knocked off by placing a sharp metal edge on the slab and giving it a tap with whatever comes handy, hammer, camp axe or a stick of firewood. The ten-inch cube weighs about thirty-five pounds and when properly insulated loses ten per cent. or less of its weight every twenty-four hours.

Carbon dioxide is exactly the same gas that is used in all carbonated beverages, and must not be confused with the highly poisonous and dangerous carbon monoxide. Foodstuffs kept in an atmosphere charged with carbon dioxide do not putrefy and experiments are now being conducted in the shipping of eggs and other perishable foods in this way.

Q. Are the forest protection systems of Canada equal to those of the United States?

A. Taken as a whole, the Canadian systems are the equal of any on this continent. Enormous improvement has been made in the past five years. Efficient management, good discipline, the best of equipment, have been established by governments and private agencies.

"And they call America the land of free speech!" said the disgusted Scot when the telephone operator told him to put five cents in the box.

STEEL MILL PANELS HAVE NEW MASTER SWITCHES

The Canadian General Electric Co. Ltd., announces the redesign of its line of magnetic controllers for steel mill auxiliaries, bearing the designation CR-4261. In addition to the features already provided in the superseded design, a number of improvements have been incorporated in the new line.

A separate line contactor is used instead of a "circuit breaker" contactor. This allows complete isolation of the motor and starting resistor from the source of power. An additional relay is used for undervoltage protection. All devices are mounted on a single compound base in the case of the smaller panels rated up to 55 horsepower, while three compound bases are used for the larger panels.

A new type overload relay, very accurate in adjustment and using but one size of coil for the entire range of hosepower of any given panel, is also used. This relay is not affected by vibration. A large number of the parts of the overload relay are interchangeable with those of the accelerating relays. New master switches have been developed for use with the panels to allow single—or three-point operation of the line contactor. Each switch includes double-break, silver-faced contacts carried on molded operating arms actuated by molded cams bolted to the shaft. The handle of the switch is fitted with a well-designed grip and may be locked in the "off" position.

The redesigned line is also equipped with a new type of edgewise wound resistor. This is especially arranged for mill service.

CONSCRIPTION IN FIRE FIGHTING

In Sweden every able-bodied man between the ages of eighteen and sixty must fight forest fires. Failure to do so when called upon entails heavy punishment.

The Magic of a Tree

(*Continued from page 14*)

Have you ever sat under a tree on a drowsy summer afternoon listening to the hum of insect life and watching through half-closed eyes, the heat haze quivering all around? How grateful you were for the shade of those wide-spreading branches! How nice of them to have caught what little breeze there was, that by a whispered movement of leaves they might give you even some small benefit!

And what have you to give in return? Much if you will, yet so easily given as to become the lightest of all tasks. A little thought is all that is required of us who reap some benefit from the trees that are part of our magnificent heritage—our birthright.

Canada's forests!—our forests! Let us keep them always green and beautiful. They belong to all of us; let it be our sacred trust to care for and preserve them. They are our richest heritage.

Forest Crops Improve Lands

In this they Differ from the Effects of Agricultural Operations

By Clifton D. Howe
Dean, Faculty of Forestry, University of Toronto

IT has been definitely proved that forest crops maintain the fertility of the soil on which they grow when they are not abused by man, while on the other hand most agricultural crops bring about eventual deterioration of soil fertility. This is because the materials richest in plant food substances are left behind when a forest crop is harvested, while they are taken away and sold in the markets of the world in the case of agricultural crops. Forest crops are self-fertilizing and soil-enriching; farm crops are fertility-reducing and soil-exhausting. Compared with the average farmer in eastern Canada, the forester is saved a lot of worries in respect to maintaining the fertility of his crop-bearing soil. too poor in fertility to support profitable agricultural plants. Fortunately for us, trees have the capacity for growing on soils that are too sterile, too steep, too stony or too wet for the ordinary agricultural purposes. Foresters speak of such as absolute forest soils, and most of the forests in the older settled portions of Canada are to be found in soils of this kind. Therefore there need be no conflict between the interests of the farmer and the forester. There is land enough of each class and probably will be for a good many years to come in this country. Anyway, their interests are interdependent. Speaking generally, one cannot be prosperous over an extended period without the other, and

Forest Lands for Forest Crops

Forests will thrive on lands unsuitable for agriculture. Why permit a settler to occupy such lands in the first place?

A corollary follows naturally from the proposition that forest crops extract less plant food material from the soil than farm crops. Productive forests can grow on soils moreover, farm cropping and forest cropping could be very profitably combined in some of the older settled regions of the Dominion. In fact, it is entirely probable with the

depressed condition of agriculture for the past two decades and with the advancing values of lumber that a good many farm soils would yield better financial returns if they supported forests. It is a well-known fact that pioneers do not select their farm lands with discretion. Too often they base the selection on ease of clearing or on the value of the timber rather than on the quality of the soil for agricultural purposes. This was extensively done in older Canada and it is still being done in newer Canada. Canada is not alone in this, however, It has been the experience of the old European countries and of the eastern United States. Farmers have encroached upon forest soils to a much greater extent than foresters have invaded agricultural soils. Economic considerations have kept foresters off the latter while, in the main, political considerations have allowed farmers to trespass on the domain of the foresters.

With the gradual change in the economic conditions, especially with the development of the rich farm lands in the prairies, th low grade farm lands in the east droppe out of the race, with result of abandone and semi-abandoned farms, literally b the thousands. Nature is restoring the to their rightful crop, the forest. Man als is aiding her by the great reforesting pr grammes of the eastern provinces, especial those of Ontario and Quebec. Thus are th mistakes of the past remedied by the ta paying capacity of the present generatio The proper selection of land and the settin aside of that land for the definite obje of wood production are the first steps i any system of forestry management. A has been said before, certain soils are fitte only for the growing of trees and they ca be grown and harvested so that crop wi follow crop, thus giving permanent em ployment to the people. That is wha forestry means, permanent instead itinerant wood-using industries. There ca be no doubt which is the better for th country.

"This New Art"

By D. Maud Bellis,
Macdonald College

PEOPLE of progressive tendencies or inquiring mind are eager to know "something," if they already do not, about the new movement which has been discernible in the graphic and the plastic arts for some years, and which, it is plain to see, is founding a new school in spite of all conservatism which opposes it. What is "impressionism"? What is "futurism"? Is there anything in "cubism"? How distinguish ultra modernism from the properly modern? These are questions asked every day, and perhaps a little general explanation of the point of view will enable the interested student to make further decisions and draw finer lines himself.

Some forty years ago or more, a few French artists of original and audacious mind dared to attempt to place colors upon canvas in such a way that the eye of the onlooker must mix the colors, at the proper focal point, and thus recognize the objects or people depicted. Perhaps we should go back further than this and say that Turner, when he painted a ship's mast red from the stain of the sun's last rays, originated impressionism, or Tintoretto, even, when he painted pictures to be seen from distant point instead of a close proximit to the wall.

In any case we find that these modern Manet, Monet, Renoir, Cezanne, Dega etc., worked upon that scientific foundatio which holds that we see objects onl through the sensitiveness of the retina t colors which are reflected to the eye. I other words, for instance, there is no suc thing as a white dress, since white is not color but a combination of hues. Natur or the painter depicts, by means of colo that which appears as white to the eye and, therefore, also, is so called in the ver nacular of the observer.

Colour is the painter's instrument, and most sensitive one, since each colou affects every other seen at the same mo ment. The painter's pallette is the key board from which colour may be jux taposed in such a way as to delineate thre dimensions upon surfaces of two dimen sions. Absolute imitation is a commo fallacy to the effect that a very near ap proach, a slavish imitation of nature, i always the best painting. In that case

as one critic has put it, "Why not look at ever-present nature instead of at a picture of nature"? Is not the personal interpretation more important than mere representation? Have we not, rather, in painting, a communication of ideas by means of a universal language? In the broadest sense, painting is a transmutation of the spirit of nature rather than a translation of light and air by means of paint. Necessarily, the idea communicated is transmutable or translatable only by means of paint. Otherwise, we would better use sounds; i.e., words or music or appeals to other senses.

When a study in paint is inspired to the extent that the form, as well as the colour, balances in a nice order or design, we have what the moderns term a "work of art." This can, of course, occur in portrait, landscape, or other painting (or, plastically, in sculpture or modelling, etc.) and need in no wise interfere with the depth of the work or the emotional stress of the artist. In fact, it should assist such component parts of a work.

Line, space, and form intensify colour, and each helps the other. Line and suggestion are used freely, whenever necessary, to serve the intent of the artist, as well as colour-movement through the spectrum or counter-clockwise of the spectrum. Facility with the brush means nothing in itself and a technique as an individual mannerism will become a thing of the past. Logically, there should be a special technique for every picture or subject, i.e., one sympathetic to it.

The modern artist organizes his canvas using these elements in a somewhat different way from the old masters. He is not living in their day and should not paint altogether in their ways. He argues that if he can make, through conscious effort, or through better chemistry, a canvas in clearer colour, he should do so. Clear colour can be of a high key, a low or subdued key, or a middle key, and it can be refined without being muddy. Consistency or the lack of consistency is the only logical foundation for criticism. Beautiful line and colour in purely abstract forms, "cubism," is one process through which the artist gains intellectual power for later work. All processes do this for one can hardly go backward through a serious process of study.

Has, however, more change occurred in the modern use of colour, than in the composition or design of a picture? The fusing of Oriental and Occidental ideas has led to the assimilation of a greater philosophical comprehension of general compositional laws in this hemisphere, at least two dimensionally, while the design of the picture from within, outward, or in the third dimension, is enhanced. The modern painter must have intelligent understanding of form and be able to reproduce it with accuracy at the expense of idea or design, but he can tolerate good art, with liberties taken in, for instance, the perspective lines, better than he can tolerate good perspective and poor art. It is evident to the initiated whether a deviation from "true drawing" is purposeful or unintentional. Study alone can help the layman to intelligence along such lines.

The painter, then, sees in ordered colour as a musical composer translates in terms of sound. And this, whether his message be in part showing "that rare quality of unexpected" (an attribute of Monet) or "an intense realization of what is beyond material and intense powers to employ materials constructively" (Henri on Cezanne) to express.

Art and life are one, and Wagnerism in music, the new forms, as Vers Libre in literature, the various schools of the graphic and plastic arts which fuse into and overlap each other, show the present endeavour to express that inexpressible vision of higher things which it has always been the highest aim of life and art to express.

And something of the inexpressible breaks through, as waters percolate through dykes and breakwaters, whether it be in life, in science, or in art. Some names will stand out in every era, in the present and future as in the past, in the West and in the East, until the now inexpressible becomes the expressible. Shall we discourage or encourage the serious work of the artist in his endeavor to express his era? Can we not, with him, sing life, "Songs of the Soul" with the Hindu poet:

These thoughts of my inmost soul I sing,
It matters not whether they be in rhyme, rhapsody, or prayer.
The songs of the soul are not made of words,
The singers that are true sing not with their voice or tongue,
But with feelings which are beyond utterance.

Improving Gray Cast Iron with Nickel

By The Development and Research Department of the International Nickel Co

PART I

REQUIREMENTS for gray iron castings are continually becoming more exacting and severe. Both engineer and manufacturer are demanding better quality and substantial improvements in many physical features, such as hardness, strength and machinability.

These demands are frequently of a conflicting nature and present a real problem to the foundry, the solution of which by the usual means available is often not possible. In order to successfully meet these problems many foundries are using nickel additions in their iron. They are thereby securing the following improvements:

Improvement and stabilization of machinability.

Increase of "machinable hardness."

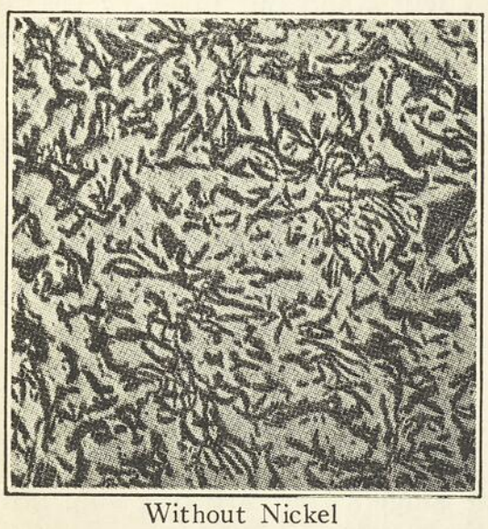
Increase of wear-resistance.

Elimination of porosity and internal shrinkage.

Increase of strength.

Reduction and regulation of chill.

It is the purpose of this pamphlet to describe briefly the various useful effects of nickel additions to gray iron and to suggest ways in which they can be and are used today by iron foundries in meeting many of their problems. They are not recommended as panacea for all ills but they are very efficacious in solving many of the most difficult and serious problems foundries have to meet today.



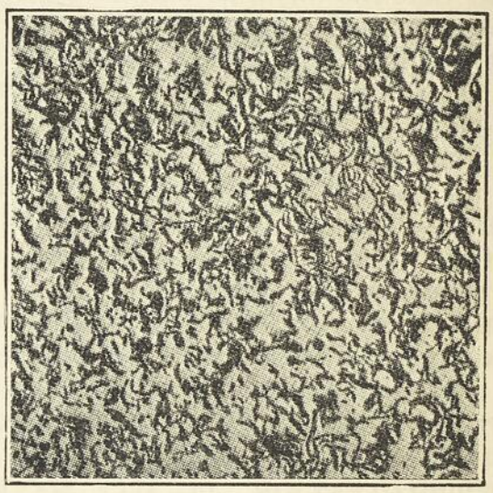
Without Nickel

A list of castings for which nickel additions are recommended will follow.

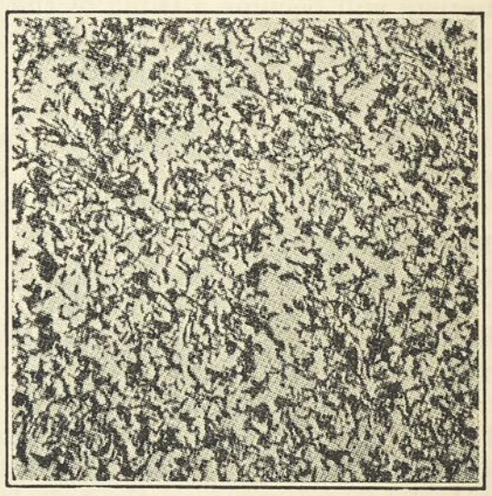
USES OF NICKEL IN SOLVING FOUNDRY PROBLEMS

Refining Grain

Nickel refines the grain or texture of gra iron, and small additions are in general mos effective for this purpose; viz., from 0.10% to 1%. Large amounts of nickel — fron 3% to 5%—may coarsen the grain if th



With .73% Nickel



With 2.12% Nickel

(The general statements here made refer more particularly to ordinary cupola iron. Cast iron is a very complex material and its properties are influenced considerably by many factors,—composition, cupola practice, brands of pig used, molding practice, etc. Proper allowance must be made in applying these general statements, therefore, to the particular and varied materials and conditions of different foundries.)

silicon content is too high for the amount of nickel added.

The photographs illustrate the effect of nickel in refining the grain and graphite flakes in gray iron.

THE REFINING EFFECT OF NICKEL ON THE GRAIN OF GRAY IRON

Cupola Iron	Carbon	3.50%
	Silicon	1.00%
	Manganese	.60%

Photomicrographs on previous page show Arbritration Bars at 30 Magnification

Controlling or Reducing Chill and Eliminating Hard Spots, Chilled Corners, Etc.

Nickel, like silicon, assists graphite formation and carbide decomposition. It, therefore, *acts effectively to reduce chill and to eliminate hard carbide spots, chilled edges and mottled areas*. Roughly speaking, 1% of nickel is equal to ½% of silicon in this respect.

There is a limit, however, beyond which silicon is no longer effective in reducing chill,—about 3%. The effect of nickel is progressive and extends beyond that of silicon. Small and quickly cooled sections of iron, which cannot be rendered completely gray by the use of 3% of silicon can be cast gray by the use of nickel.

When nickel is added to iron, less silicon is necessary in order to keep castings completely gray and machinable. This is shown clearly in Figure 3, in which are given the percentages of nickel and silicon required to render castings of different section completely gray and machinable.

The reduction of chilling power of an iron and consequent elimination from castings of hard and brittle spots can, of course, be accomplished by the use of higher silicon, and more cheaply than by the use of nickel. But *the silicon method entails progressive impairment of physical properties*, more open grain, greater tendency to porosity and internal shrinkage, decreased hardness and strength, whereas *the nickel method secures progressive improvement in these properties*, as will be shown below.

Improving Machinability

The machinability of gray iron depends primarily on its freedom from chilled areas, corners and edges and from carbide spots which quickly dull the tool. Since nickel reduces chilling power and acts powerfully to eliminate free carbides it definitely improves the machinability of castings. The amounts of nickel to be used for this purpose are essentially those shown in Figure 3, varying from ½% to 4%, depending on composition, section of casting, etc.

(Stepped cylinders similar to the sketch were cast from the same 1.40% silicon iron, making successive additions of nickel in separate hand ladles. Fracture and hardness of the different sections of the cylinder are given in the table.

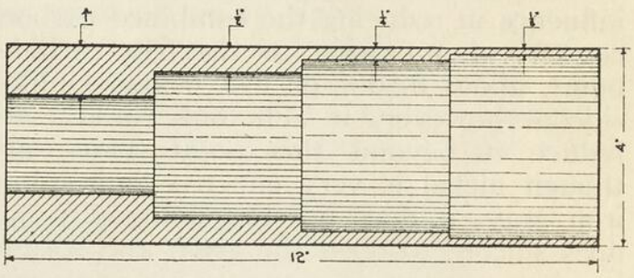


Fig. 2

Brinell Hardness

Nickel Percent	1 inch section	¼ inch section	⅛ inch section
0	234	255 gray	4 inch white iron at end
½	244	255 gray	2 inch white iron at end
1	248	255 gray	⅜ inch white iron at end
2	255	269 gray	1/32 inch white iron at end
3	269	269 gray	free from white iron

The cylinders were placed in a lathe and machined on the outside face, starting at the thick end. A 1/16" cut was taken, the feed and speed remaining the same in each case.

The cylinder of plain iron machined with difficulty, requiring regrinding of the tool three times before the chilled ⅛" section was reached. The cylinder with ½% nickel was machined to the ⅛" section before dulling, and after regrinding, machined up to the chilled section. The cylinder with 1% nickel was machined to the chilled iron without regrinding. The cylinder with 2% nickel was machined the entire length without difficulty. The tool was not reground for the cylinder with 3% nickel which was also machined its entire length without difficulty.

Thus the nickel-iron cylinders machined more readily than the plain iron one, although they were actually harder than the latter.)

Machinability alone can be improved also by the use of higher silicon, of course, and more cheaply, but with attendant and progressive impairment of physical properties. When these may not be sacrified, nickel should be used; it will improve machinability and at the same time progressively improve physical properties.

(One manufacturer of motor cars uses from 1 to 1½% nickel in thin wall pistons of 2.50% to 2.75% silicon iron in order to secure greater machining production without sacrifice of physical properties: hardness and wear-resistance.)

Controlling Combined Carbon

Every foundryman knows that the combined carbon content of his castings is a controlling factor of their quality, strength and machinability. Many of his mixing operations are designed for no other purpose than to control combined carbon. When it is too great, his castings are hard and unmachinable; when too low, they are too soft, open in grain and often porous.

Nickel, like silicon, exercises a marked influence in reducing the combined carbon content of a casting to the free carbide point, about 0.80% or just below. Unlike silicon, however, it acts only mildly to reduce it beyond this point. Thus, although nickel is very effective in keeping iron gray, it does not act powerfully, as does silicon, to open the grain and soften it when present in excess. This is shown in the following Table I:

Table I

Comparison of the Effect of Silicon and Nickel on Combined Carbon Content of a 1¼" Cast Arbitration Bar.

	In a 3.60% carbon iron					
	Increase of nickel			Increase of silicon		
Silicon	1.40%	1.40%	1.40%	1.40%	2.03%	2.56%
Nickel	3.88	1.23	0.67	0.00	0.00	0.00
Combined Carbon	0.56	0.62	0.76	0.72	0.59	0.45

	In a 3.15% carbon iron			
	Increase of nickel			Increase of silicc
Silicon	1.25%	1.25%	1.25%	2.00%
Nickel	4.00	1.00	0.00	0.00
Combined Carbon	0.74	0.80	0.83	0.46

Percentages of Silicon and Nickel Required to Render Castings of Different Section Completely Gray and Machinable

With Carbon 3.40-3.60%
With Carbon 3.10-3.30%
% Silicon
Thickness of Section—Fig. 3

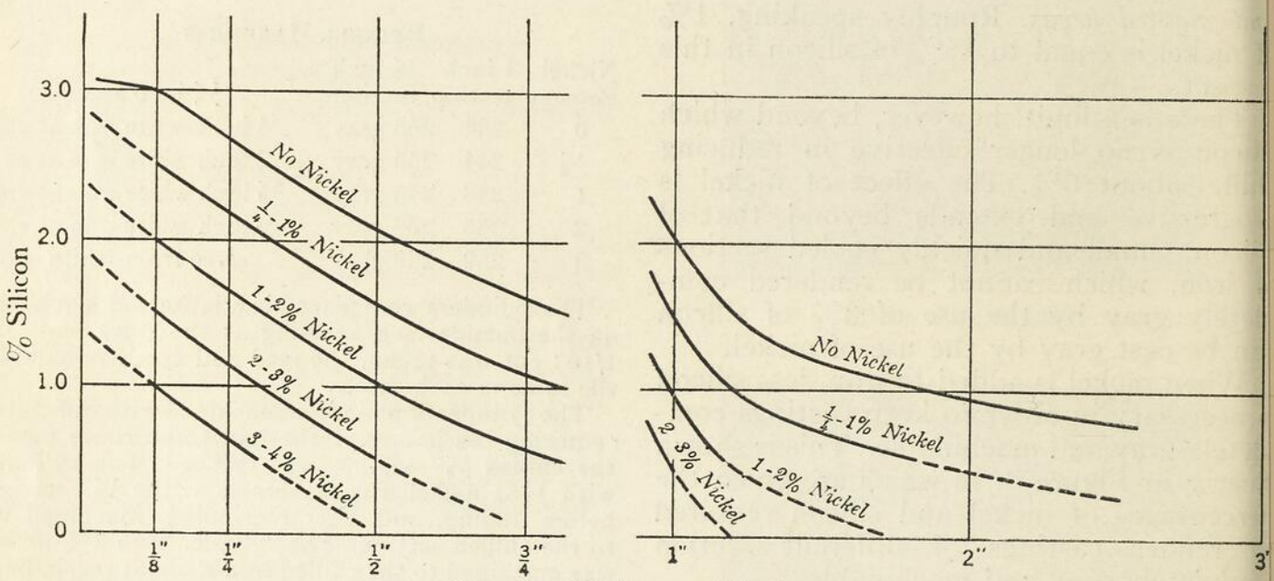


Fig. 3.—Thickness of Section

Acoustical Characteristics of Movie Screens*

By H. F. Hopkins
Transmission Instruments Research

In its pioneer stages the sound-picture system was used chiefly to provide a synchronized musical accompaniment for the picture. The loud speakers, as a result, were frequently placed in the orchestra pit to give the effect of the presence of an actual orchestra. With improvement in technique, however, the reproduction of dialog became more general; the accompaniment feature decreased in importance until now a sound-picture is usually understood to mean a talking picture—a dramatic screen entertainment reproducing the voice as well as the scene. To produce the proper effect under these new conditions, a different location for the loud speakers was necessary since the sound should

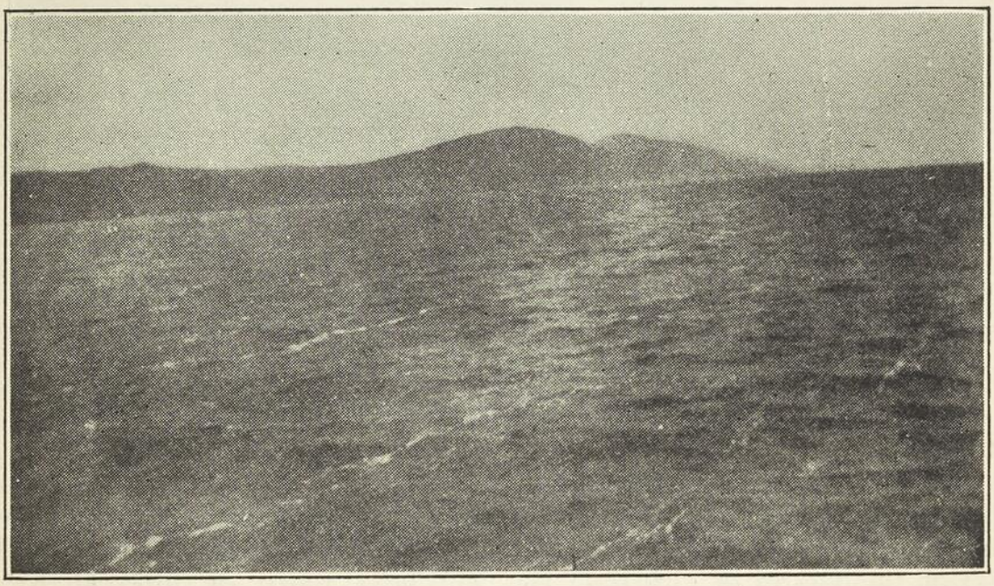
(*Continued on page 33*)

*Printed through the courtesy of the *Bell Laboratories Record*

Discovering the Saguenay

By Agnes Esther McLeish

IF you desire to feast your eyes on the solemn beauties of nature, where rugged mountains and rushing waters find their being; where the wild creatures of the forest wander unmolested through their leafy domain; you have only to board a Saguenay-bound vessel from the harbour of Montreal and before you lies a voyage that for grandeur of scenery and wealth of historical associations, is unsurpassed throughout the broad and fertile Dominion of Canada.



The St. Lawrence Coast.

Those who are familiar with the mighty St. Lawrence can easily visualize the broad expanse of green country and sloping hills against a background of higher mountains in the distance, which border its curving shoreline. To them, it is, perhaps, the height of enjoyment to sit on the deck of a swiftly-moving steamer, watch the shore slip gently by, follow the sea-gulls as they swoop and soar between river and sky, and note the sun as it kisses the sparkling waters until they break forth into golden smiles.

This voyage by boat is famous throughout the world, and once experienced, it is never to be forgotten. It is a great pity that more people do not grasp this opportunity of a glorious adventure into the very heart of nature. Besides the lure of beauty, this excursion also presents an educational treat; not only to Canadians, who can never learn too much about their country, but to those who may not realize or suspect what the real Canada is like.

The boat slips anchor at sunset. Travellers, embark! Before you lies a long and delightful journey filled with many wonderful and intriguing sights.

The harbour is bathed in a flood of living gold which transforms the water for miles around into a molten likeness of that same precious metal. Purple clouds float high in the heavens like royal banners waving farewell. The island of Montreal soon vanishes in a shining mist and the epochal voyage has begun.

Twilight's dusky gloom pursues the craft as she glides onward over the rosy surface. The moon rises and casts her silver beams over the darkling waters. The stars emerge, one by one, from the velvet cloak of night and nod gaily to their reflections which smile back at them across the great gulf of space.

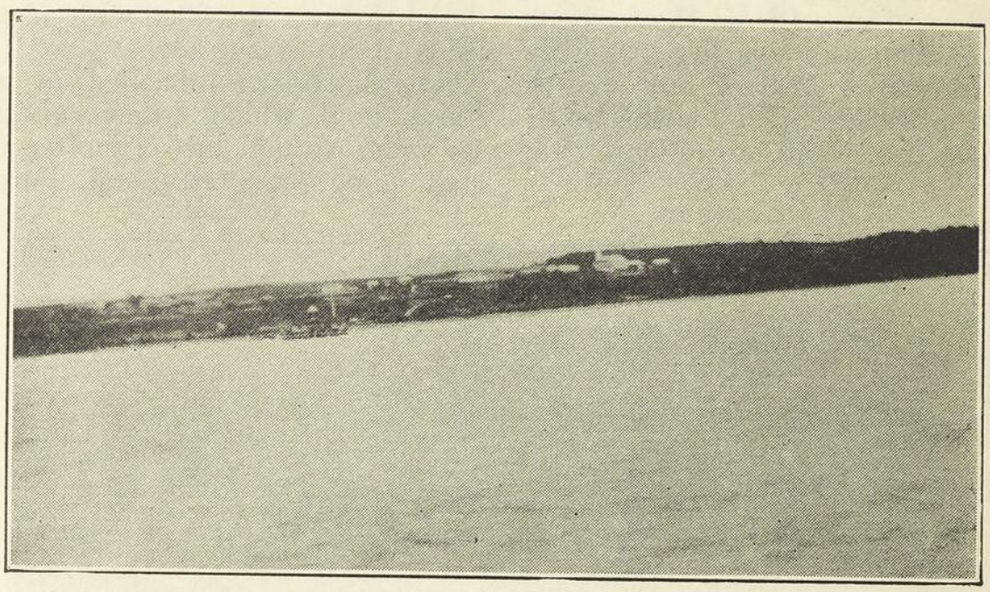
Three Rivers is reached in the wee sma' hours of the morning. The boat docks at the quay for the space of an hour or so. It is performed with a smothered commotion and low hum of voices so that the sleeping passengers may slumber undisturbed.

Dawn the following morning finds the

boat anchored in the vicinity of Cape Diamond, above which rise the stately ramparts of Quebec—that justly called Gibraltar of America. The gray-walled citadel crowns the highest point, while to the left, as your face the river, Chateau Frontenac with old-time hospitality flings wide her portals. But we cannot linger to admire, lest like Ulysses of old, we yield to the siren call of old Quebec and remain beyond the appointed time.

with tall, swaying trees and flower-clustere fields that seek the water's edge—a ver table woodland paradise surrounded by a azure sea that, murmuring, gently laps it sun-kissed shore. It would not take a grea deal of imagination to picture it people with myriads of tiny fairy-folk playing never-ending game of hide-and-seek amon the whispering flowers.

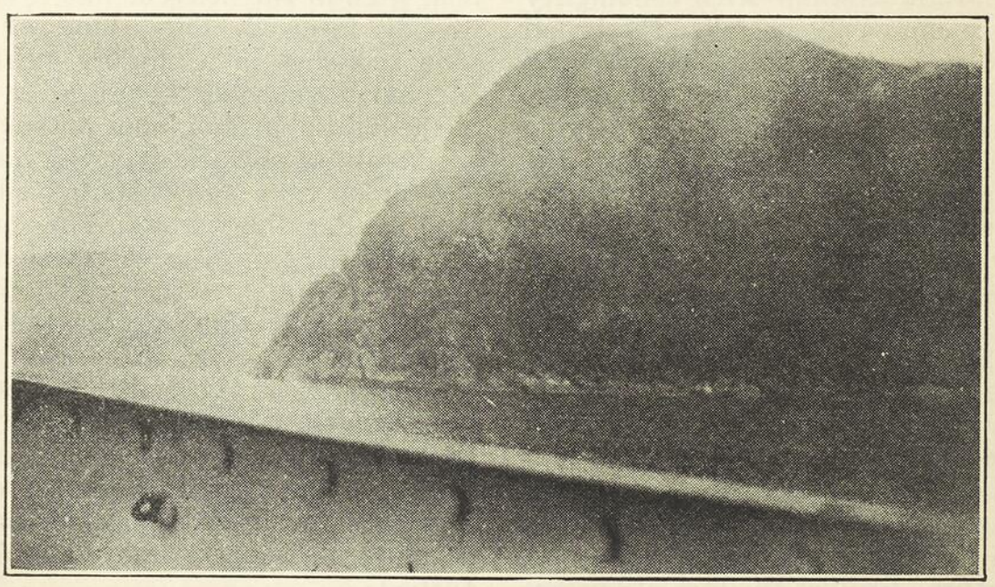
The scene assumes a different aspec as lofty mountains begin to rise boldl



After leaving Chicoutimi.

A rapid transfer of boats is made and we resume our journey in the special Saguenay steamer. Quebec fades in the distance, while before our eyes spreads the broad, green bosom of the Island of Orleans. It lies like a huge emerald leaf on the surface of the St. Lawrence, so thickly is it covered

along the shore. The river broadens no- ticeably as mile after mile is swallowed by the gray distance. Murray Bay with its glistening white stone Manoir Richelieu is the next place of interest to greet the traveller's eye. Framed by purple-misted mountains, its magnificent grounds and



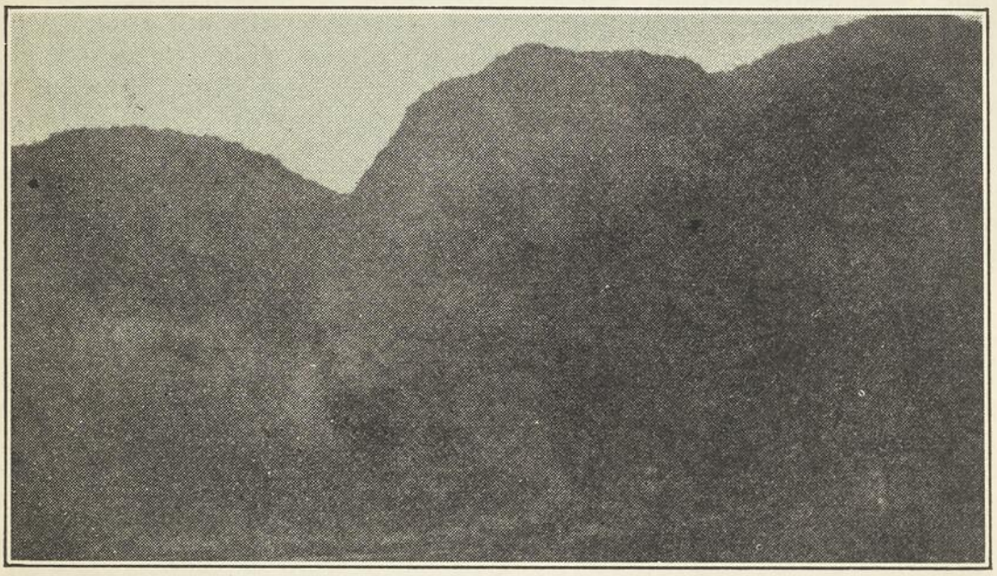
Trinity on a Foggy Day.

splendid golf course create a summer resort that is known the length and breadth of the continent. Beautiful homes emboss the hill sides, like lesser stones in the cluster of a ring.

Time moves on and, in the light of the setting sun, Tadoussac is beheld in all the grace of her cool northern charm. Her sandy beach gleams like mother-of-pearl in the fading light of day. Surely the spirit of the ancient Indian broods over this beauteous land, smoking his pipe of peace, the while he gazes with sad eye over his lost domain.

broken shoreline. The lights of Tadoussac fade in the darkness as the vessel noses her way over the dark expanse of that mysterious river.

The passage up the Saguenay is a swift and silent one for it is made in the deep of night. Little can be seen of either shore, except darker shadow against a somber sky, which indicates the presence of rocky cliffs. Occasionally, the night blackness is pierced by the warm glow of a beacon light, which forms the sole guide of the pilot in steering his course through the treacherous channel.



Triple-Towered Trinity.

At this point the boat leaves the mighty St. Lawrence and turns her prow up the turbulant Saguenay, which leaps like a wild animal, unleashed, from behind the

Chicoutimi is reached in the early morning. It proves to be a busy little city with many fine streets and nobly constructed buildings. It is a surprise to those who

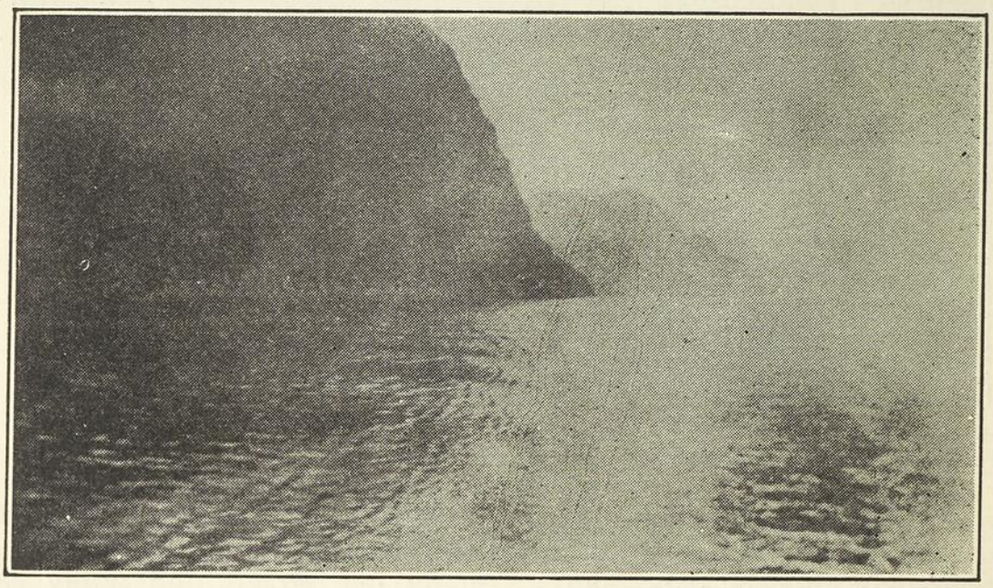
Giant Eternity.

expect to find northern Quebec a country of rustic villages and old-fashioned trading-posts, still menaced by the danger of lurking Indian braves.

The return voyage along the Saguenay is viewed with great expectation by all on board, for the combined beauties of Capes Trinity and Eternity lie in store for them.

On both sides, rise steep cliffs, that for the most part, are innocent of vegetation. They jut out sharply into the water, creating a wild and irregular shoreline. The clouds hang low and lazy, trailing white ones wreath the highest peaks, softening their rough contours, and almost hiding them from view. They appear remote and unreal like angry gods veiling themselves with clouds to hide their scars from the gaze of mortals. Here, the river down into rocky hills and jagged cliff The great river itself was once a migh chasm through which white-frothed wate roared, cutting deeper and deeper into th stony heart of the mountains, until blossomed forth into the broad and flowin stream which finds its source at Lake S John. The Saguenay has not the seren quiet loveliness of the mighty St. Lawrenc but rather a stern, majestic grandeur of i own which reaches a climax in the twi Capes of Trinity and Eternity.

A pen wielded by the human hand ca never do justice to the solemn dignity the scene we are now approaching. The ai are crowded with impatient people, arme with cameras. Their curiosity changes int something resembling awe as they drin in the wonder of what lies before them.

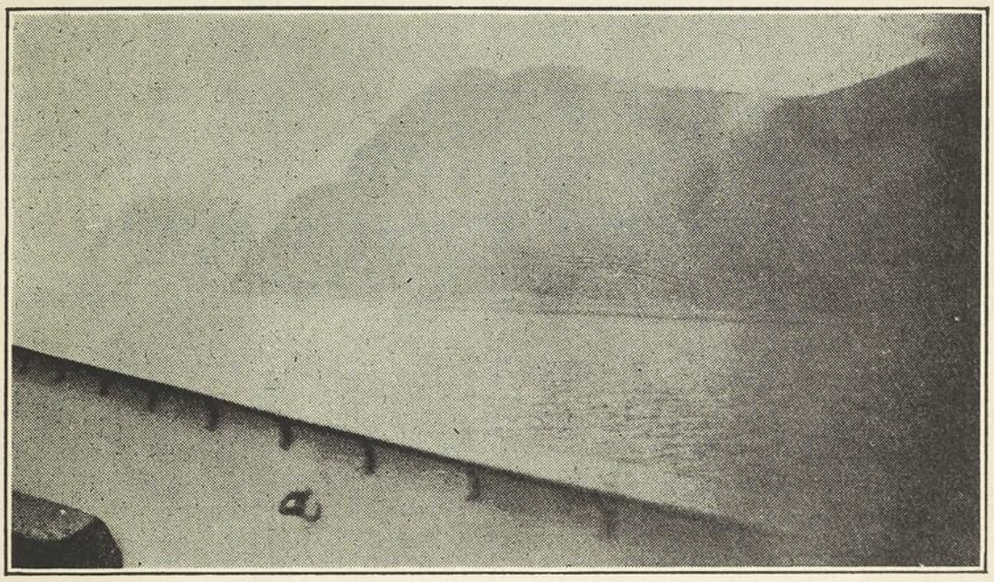


Capes Trinity and Eternity as seen through the Fog.

is extremely deep and is a dull slate in color, except where an errant white-capped wave is tossed up by the wind. This is no simple, pastoral beauty of land, nor yet the glorious panorama of color that riots through mountain and valley, but rather a stately, melancholy splendor that strikes a minor note in the world's symphony of color. Grey is the keynote in rocky coast and river, but through this runs a melody of green and bronze which is found in some lonely tree or moss-covered stone. In spite of the lack of warmer hues, the scene does not give the impression of bleakness but rather of a solitude and greatness of things that endure forever; for here we are in the very heart of the oldest mountain chain on the American continent, towering peaks that, by the hand of time, have been worn

Two, gigantic masses of rock rise shee from the mirror-like calmness of the tin bay. Up and up travels the gaze before on can discern the summit and then it seem so infinitely far from where one stands, mere atom on the deck of a toy ship. Hew from solid rock, Trinity and Eternity ar masterpieces of nature's sculpturing; sleep ing giants in whose bosoms thunders th heart of the world; an eternal pledge of th Creator's infinite power, and enduring lik faith throughout the countless years gon by and those to come. They seem to pierc the sky, almost rending the veil that bar us from the unknown—yet not quite. Cap Eternity is an immense pile of stone whic faces Cape Trinity. As the name suggest Trinity is split in twain near its crest and when seen from the Bay, resembles

mediaeval, triple-turreted castle. Perhaps, thousands of years ago, some great internal disturbance within the earth's interior caused these great cracks to open massive



Cape Trinity as seen from the deck of the "Saguenay"

Trinity sides, leaving scars that will take eons of time to obliterate. High on the first summit, stands the statue of "Our Lady of the Saguenay," placed there by the faithful hands of an old French trapper, some fifty years ago. Alone, she watches over this grim land, a proper guardian for its frowning solitude—a white emblem of peace in a scene desolate and wild. Eternity raises its head to the skies, communing with beings unseen by human eyes. A shapeless mass of rock, yet Eternity is invested with a silent majesty which is enhanced by the glory of Trinity.

A single shriek of the ship's siren is sufficient to set the echoes ringing wildly. They bound from height to height with a wail that dies away into a long drawn cadence of sound. It brings to mind the stirring lines of Tennyson's "Bugle Song," in which he immortalizes the echoes in the lakes of Killarney.

After skirting the little bay, we bid a last farewell to Cape Trinity and Eternity and continue our voyage back along the Saguenay. The coast which the darkness of the night had hidden is now visible to the eye. The shore is very picturesque and becomes heavily wooded as the mouth of the Saguenay is reached.

The passage up the St. Lawrence is made at night, and another dawn discovers the steamer anchored at the foot of Quebec.

The great voyage is over and the travellers may disperse to their various homes. But we know they carry in their hearts the memory of a wonderful experience. They have only to close their eyes and before them will pass the various scenes they have witnessed, which culminate in the silent glory of Cape Trinity and Eternity.

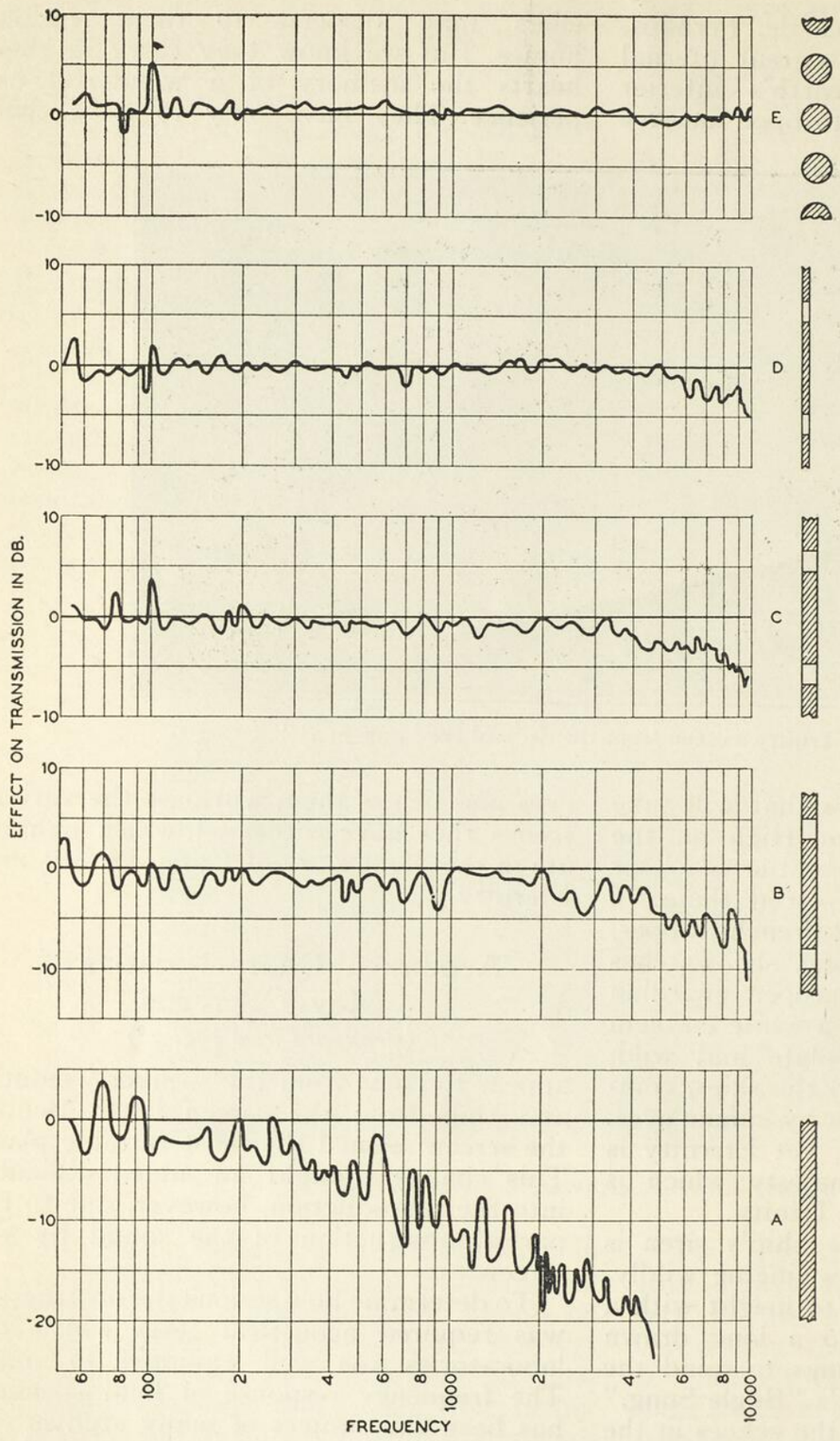
Acoustical Characteristics of Movie Screens

(*Continued from page 28*)

appear to come from the speakers' mouths and thus from the screen itself. Behind the screen seemed the most suitable place. This change brought an added difficulty into the reproduction, however, due to the partial obstruction of the sound by the screen.

To determine how serious the obstruction was required acoustical tests which the laboratories was well equipped to make. The frequency response of loud speakers has been the subject of many studies. To make similar tests with a screen in front of the loud speaker, and to compare the resultant sound received to that without the screen in place was, therefore, a comparatively simple matter. This has been done to a large extent as a matter of routine in determining whether certain screens will be satisfactory for sound-picture reproductions.

A screen may be expected to transmit sound in three ways. It may vibrate as a diaphragm driven by the sound from the horn and in turn produce new waves which



Aggregate area of openings 44% of total screen area.

Aggregate area of openings 5% of total screen area.
Area of individual openings .0013 sq. in.
Screen thickness .013 in.

Aggregate area openings 5% of total screen area.
Area of individual openings .0013 sq. in.
Screen thickness .030 in.

Aggregate area of openings 4% of total screen area.
Area of individual openings .0013 sq. in.
Screen thickness .030 in.

Type of screen used before advent of sound pictures.

FIG. 1—Transmission characteristics of modern movie screens with punched openings compared to the earlier solid type.

will be heard by the observers. Also the original sound may be transmitted through air passages in the screen itself, which is a second method. The third is by wave propagation with the screen material as the conducting medium. Because of the physical properties of the screen, however, the power transmitted by this last method is much smaller than for the other two so that for practical purposes it may be neglected.

From a knowledge of the tension to which a screen may be stretched and of the density of the material, it might be expected that the natural frequency of the screen as a whole would be low. At this natural frequency the screen would transmit efficiently but for higher frequencies, where the mass reaction becomes large, the greater portion of the driving force would be consumed in accelerating the screen

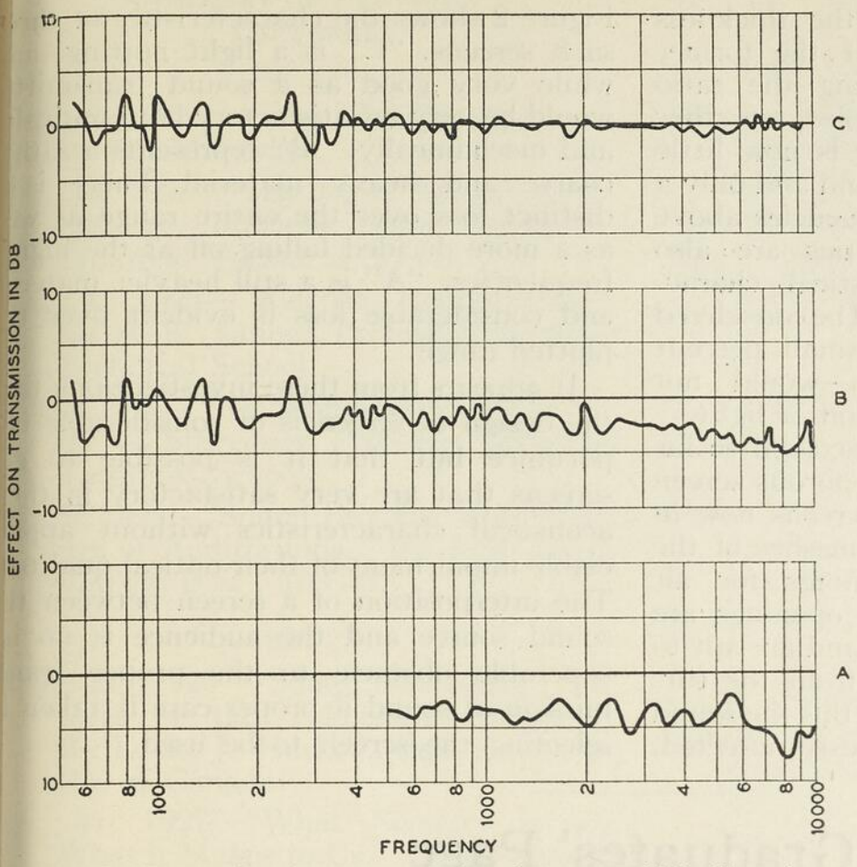


FIG. 2—Transmission characteristics of screens which allow the mesh opening of the weave to transmit the sound.

and little would remain for moving the air load. This natural frequency, however, is ordinarily below the frequency band used in sound-pictures. The transmission efficiency of speech vibrations, therefore, would be highest at the lower frequencies and would decrease as the frequency increases. Furthermore over the range of frequencies involved, the screen is far from a simple vibrating system. Irregularities occur, therefore, in the sound transmitted although they may be small compared to the total effect.

Transmission through air passages in the material proves to be much more satisfactory. Two factors are of primary importance. The aggregate area of the openings in the screen must be adequate to give the proper air load for sound radiation into the theater, and the dimension of the holes, principally the ratio of diameter to the thickness of the fabric should be sufficiently large to reduce the mass reaction to a satisfactory value. The effect of too high a mass reaction is to produce an attenuation that increases with frequency; while an improper air load produces a general decrease in the efficiency of transmission. If these factors are considered in the design, screens may be made which have very satisfactory transmission characteristics.

Before the advent of sound-pictures the screens were heavy and not porous. Sound could be transmitted only by diaphragm action. The result is shown at "A" of Fig. 1. There is a rapidly increasing loss with increasing frequency, and the irregularities mentioned above are plainly evident. Since a loss of three db means that only about half of the power is transmitted the seriousness of the loss indicated is obvious.

Curve "E" shows the other extreme where the major part of the energy is transmitted through openings in the screen. For this screen the openings constituted about 44% of the screen area, and it will be observed that there is practically no attenuation of the sound, and that the irregularities, except at the very low frequencies where the data are perhaps less reliable, have been considerably reduced.

Although such a screen is entirely satisfactory for the transmission of sound it is lacking in the desirable optical characteristics. Light is not reflected from the openings so that the total light reflected is reduced in direct proportion to the total area of the aperture. The tendency therefore is to provide smaller and more widely spaced openings, as a result of which sound transmission may be partly due to diaphragm action. Curve "B" shows a characteristic screen of this type. The screen is like that of "A" but punched in it are holes .040" in diameter which comprise about 4% of the total area. The screen thickness is .030 inches. The drooping of the curve at the high frequencies due to mass reactance, is plainly evident although not nearly so pronounced as in "A". There is also a noticeable loss over the entire range compared with "E".

Curve "C" shows the effect of increasing the open area by 25%—using holes of the same size but with less separation. Although the dropping off at higher frequencies is still evident, the loss over the entire band is appreciably decreased.

By maintaining the same percentage

of open area but reducing the thickness of the screen to about half the former value, and thereby increasing the ratio of diameter to thickness of holes, a further evident gain is made. There is now little or no loss over most of the band and only a very slight falling off at frequencies above 3,000 cycles. The irregularities are also greatly reduced. The acoustical characteristics of such a screen would be considered very satisfactory, and the small percent of open space—about 5%—would not materially reduce the reflection of light.

Openings in the screens discussed so far have been punched in a non-porous screen material, but many of the screens now in use are coarsely woven and meshes of the weave form the only openings for air conduction. As a result the openings are small and irregular in shape, and are apt to be partially filled by fibres from the surrounding threads. Because of this the sound transmission may be seriously affected. Figure 2 shows the characteristics of thr such screens. "C" is a light netting, a while very good as a sound transmitt would be very unsatisfactory both optica and mechanically. "B" represents a ratl coarse and heavy material. There is a distinct loss over the entire range as w as a more decided falling off at the high frequencies. "A" is a still heavier mater and considerable loss is evident over t plotted range.

It appears from these investigations th the design of screen is of considerable i portance but that it is possible to g screens that are very satisfactory in th acoustical characteristics without appr ciable impairment of their optical qualiti The interposition of a screen between t sound source and the audience is no i superable obstacle to the proper tran mission of sound if proper care is taken selecting the screen to be used.

Graduates' Page

ENGLISH GRADUATE SOCIETY
Montreal Technical School

OFFICERS 1930-31

Hon. President . . . IAN McLEISH, B.Sc.

President
W. H. JARAND, A.M.E.I.C.

First Vice President:
C. H. DAVIS Assoc. A.I.E.E.

Second Vice President:
WM. BRADNER,

Secretary:
FRANK YATES, '24
2437 Orleans Ave., Montreal.

Treasurer:
T. L. DODS
2420 Pie IX Blvd., Montreal.

Activities

A programme of the year's activities is outlined below and, while every effort will be made to work to schedule it may be necessary to vary this arrangement slightly. Individual notices will be mailed to each member covering these activities in detail.

A summary of the Society's activities since its inception is also given which is both interesting and enlightening.

It is the sincere wish of the council that with the aid and co-operation of all the graduates the coming year will show the steady progress as made in the past.

Schedule 1930–1931

Mon. Sept. 29th, General Meeting.
Mon. Oct. 6th, 1st Lecture.
Fri. Oct. 24th, Smoker.
Mon. Nov. 3rd, 2nd Lecture.
Fri. Nov. 28th, Mid-Season Dance.
Mon. Dec. 1st, 3rd Lecture.
Mon. Jan. 5th, 4th Lecture.
Mon. Feb. 2nd, 5th Lecture.
Fri. Feb. 6th, 6th Annual Dance.
Mon. Mar. 2nd, 6th Lecture.
Mon. Apr. 6th, 7th Lecture.
Wed. May 20th, 6th Annual Banquet.

Past Dances

1st Annual, April 23, 1926—Majestic Ha
2nd Annual, April 22, 1927—Majestic Ha
3rd Annual, April 13, 1928—K. of C. Ha
Mid-Season, November 30, 1928—Majest Hall.
4th Annual, April 4, 1929—K. of C. Ha
Mid-Season, November 28, 1929—K. of Hall.
5th Annual, April 25, 1930—K. of C. Ha

Past Banquets

1st Annual, May 20, 1926—Queens Hote
2nd Annual, May 19, 1927—Queens Hote
3rd Annual, May 23, 1928—Queens Hote
4th Annual, May 23, 1929—Queens Hote
5th Annual, May 22, 1930—Queens Hote

Past Smokers

1st Annual, October 26, 1928—Montre Technical School.
2nd Annual, October 25, 1929—Montre Technical School.

Summary of Previous Lectures

1925-26

Nov. 16, 1925—"Scientific Illumination." By M. Mortimer.

Dec. 16, 1925—"History of Steel." By F. Roberge, Machine Shop Instructor. Montreal Technical School.

Feb. 1, 1926—"Electric Refrigeration." By H. E. Tanner, Professor, Montreal Technical School.

Mar. 8, 1926—"Revision Survey on C.P.R." By G. Stevenson, Professor, Montreal Technical School.

Apr. 9, 1926—"Sound Proofing and Acoustics of Auditoriums." By Prof. H. E. Reilley, B.Sc., McGill.

1926-27

Nov. 22, 1926—"Some Interesting Features of the Telephone Industry." By L. St. J. Haskell, Bell Telephone Co. of Canada.

Jan. 31, 1927—"What Forestry is and What it Means to Us." By K. Fenson, B.Sc.F., Forest Products Laboratories of Canada.

Feb. 28, 1927—"Sound Reproduction with Special Reference to Causes of Distortion." By H. J. Vennes, Transmission Engineer, N.E. Company.

Mar. 21, 1927—"Underfeed Mechanical Stokers, and its Relation to the Lowest Overall Cost of 1000 lbs. of Steam." By F. S. B. Heward, Director Affiliated Engineering Companies Limited.

1927-28

Nov. 21, 1927—"The Magic of Communication." By L. St. J. Haskell, Bell Telephone Co. of Canada.

Jan. 16, 1928—"Testing Telephone Transmission." By E. S. Kelsey, B.Sc., Engineering Department, N.E. Company.

Feb. 20, 1928—"Glass Bottle Manufacture." By D. D. Gordon, Dominion Glass Company.

Feb. 27, 1928—"Manufacture and Uses of Portland Cement." By A. G. Fleming, Chief Chemist, Canada Cement Company.

Mar. 19, 1928—"Steelwork of the Royal Bank Building of Montreal." By R. M. Robertson, Eng. Dept., Dominion Bridge Company.

Apr. 2, 1928—"Pulp and Paper Manufacture." By J. M. Payne, Forest Products Laboratories of Canada.

Apr. 25, 1928—"Power, and From Coal to Electricity." By F. S. B. Heward, Director, Affiliated Engineering Companies of Canada Ltd.

May 7, 1928—"Electric Elevators." By C. F. Ritchie, Otis Fensom Elevator Co.

1928-29

Oct. 1, 1928—"Television." By W. A. Dancey, B.A.Sc., Engineering Dept., Bell Telephone Co. of Canada.

Nov. 9, 1928—"Colour Photography" Agfa Products Ltd. By Rev. J. M. Baillergon, Professor Montreal College.

Dec. 3, 1928—"Ice Fighting." By Dr. H. T. Barnes, F.R.S., Research Professor of Physics, McGill University.

Feb. 18, 1929—"Development of Canada's Resources." By G. G. Ommannay, Director of Development, Canadian Pacific Railway.

Mar. 11, 1929—"Audible Motion Pictures." By H. J. Vennes, Transmission Engineer N.E. Co.

Apr. 8, 1929—"Making the Most of a Telephone Line." By W. H. Jarand, Engineering Dept., N.E. Co. Ltd.,

1929-30

Oct. 28, 1929—"Construction of Outside Telephone Plant." By H. C. Nourse, B.Sc., Bell Telephone Co. of Canada.

Nov. 4, 1929—"Application of the Oil Engine to Railway Motive Power." By R. G. Gage, Canadian National Railways.

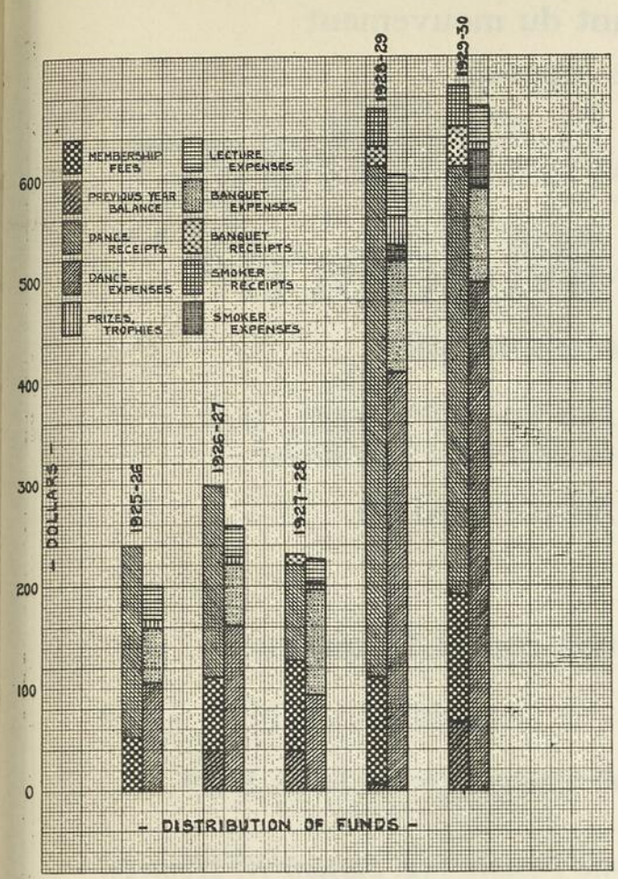
Nov. 18, 1929—"Faster Transportation." By R. B. Genest, Montreal Light Aeroplane Club Inc.

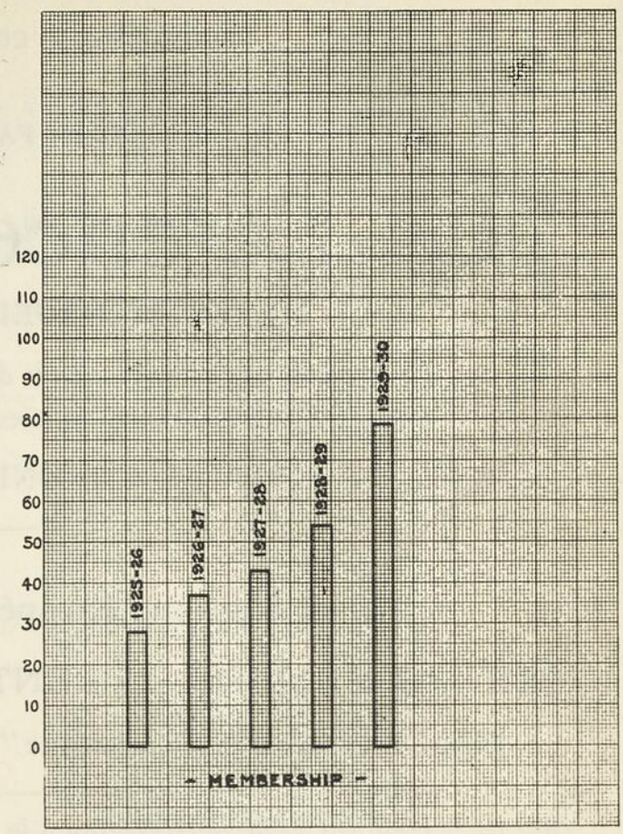
Mar. 10, 1930—"Diathermy." By Dr. L. E. Pariseau, Radiologist, Hotel Dieu Hospital.

Apr. 25, 1930—"Manufacture of Carbon With Special Reference to its Use in Electrical Machinery." By A. G. Dilks, Canadian National Carbon Co.

May 12, 1930—"Telephotography." By W. H. Jarand, Eng. Dept., Northern Electric Company, Ltd.

Cup donated for Annual Inter-Class Hockey Competition





MEMBERS OF PAST COUNCILS

Year	Hon. Pres.	President	First Vice-President	Second Vice-President	Secretary	Treasurer
1925	Ian. McLeish	F. A. Foster	L. Cowan	W.H. Jarand	K. V. Burkett	F. Hawker
1925–26	Ian. McLeish	F. A. Foster	W. N. McGuinness	R. Weldon	K. V. Burkett	W. H. Jarand
1926–27	Ian. McLeish	R. Flynn	W. N. McGuinness	R. Johnston	K. V. Burkett	J. R. McGrath
1927–28	Ian. McLeish	L. Cowan	R. Johnston	C. Ball	K. V. Burkett	J. R. McGarth
1928–29	Ian. McLeish	J. R. McGrath	K. V. Burkett	C. Ball	V. Schenker	J. Alt
1929–30	Ian. McLeish	K. V. Burkett	W. H. Jarand	J. R. McGrath	F. Yates	J. Alt

FIRE-PROOFING TREES

Q. Is there any way of fire-proofing wood?

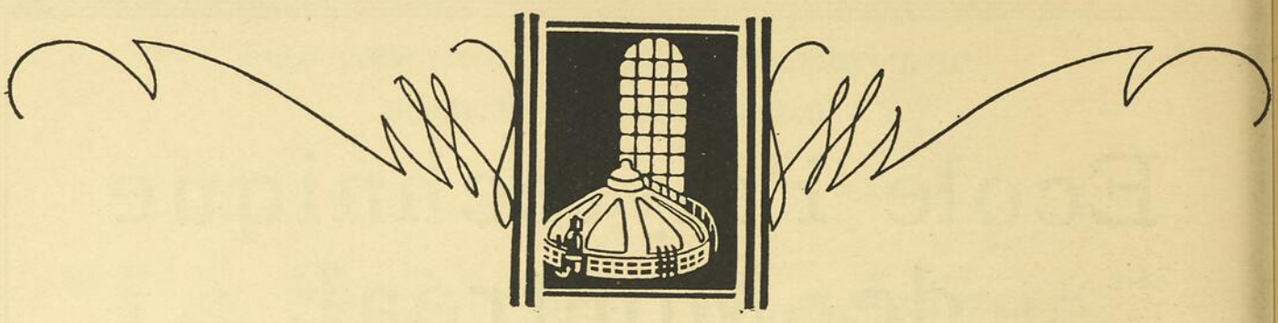
A. The College of Forestry at Tharandt, Germany, recently announced an interesting experiment dealing with this question. Living trees were injected with fire-resisting mineral "soup." Trees thus treated are said to have produced lumber which is strongly resistant to flames. The "soup" is injected by feeding thin solutions composed of compounds of silicon and flourine and other chemicals to the tree through holes bored into the trunk close to the ground. As the sap rises it carries the solution to all parts of the tree, rendering it fire-proof.

Visitor to Studio: "What is it?"
Artist: "A sunset. Haven't you ever seen one?"
Visitor: "Yes, that's why I asked."

CONSERVATION IN IRELAND

In the Irish Free State, twenty-one days' notice of the intention to cut down trees must be given to the Government, following which the Minister of Agriculture may or may not, as he sees fit, issue a permit to cut or uproot. A negative order, however, does not apply to trees which are to be transplanted. Failure to secure a permit is punishable by a $25 fine, and in granting a felling license the department may stipulate that trees felled or uprooted must be replaced by planting others of a specified kind within a year (or shorter period).

Four thousand articles of common use, and three-quarters of the houses in Canada and the United States, are made from wood. A city four times the size of Toronto could be built annually from the wood practically wasted in North America.



Looking Forward

DURING the year 1929 the province of Quebec advanced industrially at a greater rate than any other province in the Dominion. As this has been true of several years past, it indicates in a striking manner the fact that this province is fast becoming very important industrially. It means that by the addition of factories and the expansion of those already running, the province is growing at a greater rate than heretofore. Indications are that Quebec will continue to progress at an even greater rate in the future than in the past.

This progress has been built on the strong foundation of available power supplied by The Shawinigan Water & Power Company, whose plans for the future comprise the development of a greater amount of power than is now used by all its customers combined.

Un Coup d'Oeil dans l'Avenir

PENDANT l'année 1929 la province de Québec a fait des progrès industriels plus rapides que toute autre province dans la Puissance du Canada. Ceci étant vrai des années passées, il est tout indiqué que cette province devient rapidement un centre industriel très important. Par la construction de nouvelles usines et l'extension de celles existantes, la province se développe d'une manière plus rapide qu'elle ne l'a fait jusqu'ici. Tout tend à démontrer que dans l'avenir Québec continuera à progresser de plus en plus rapidement.

Ce progrès est établi sur la fondation solide d'énergie disponible fournie par The Shawinigan Water & Power Company, dont les projets pour l'avenir comprennent le développement d'une quantité d'énergie plus grande encore que celle actuellement consommée par l'ensemble de ses clients.

THE
SHAWINIGAN WATER & POWER
COMPANY