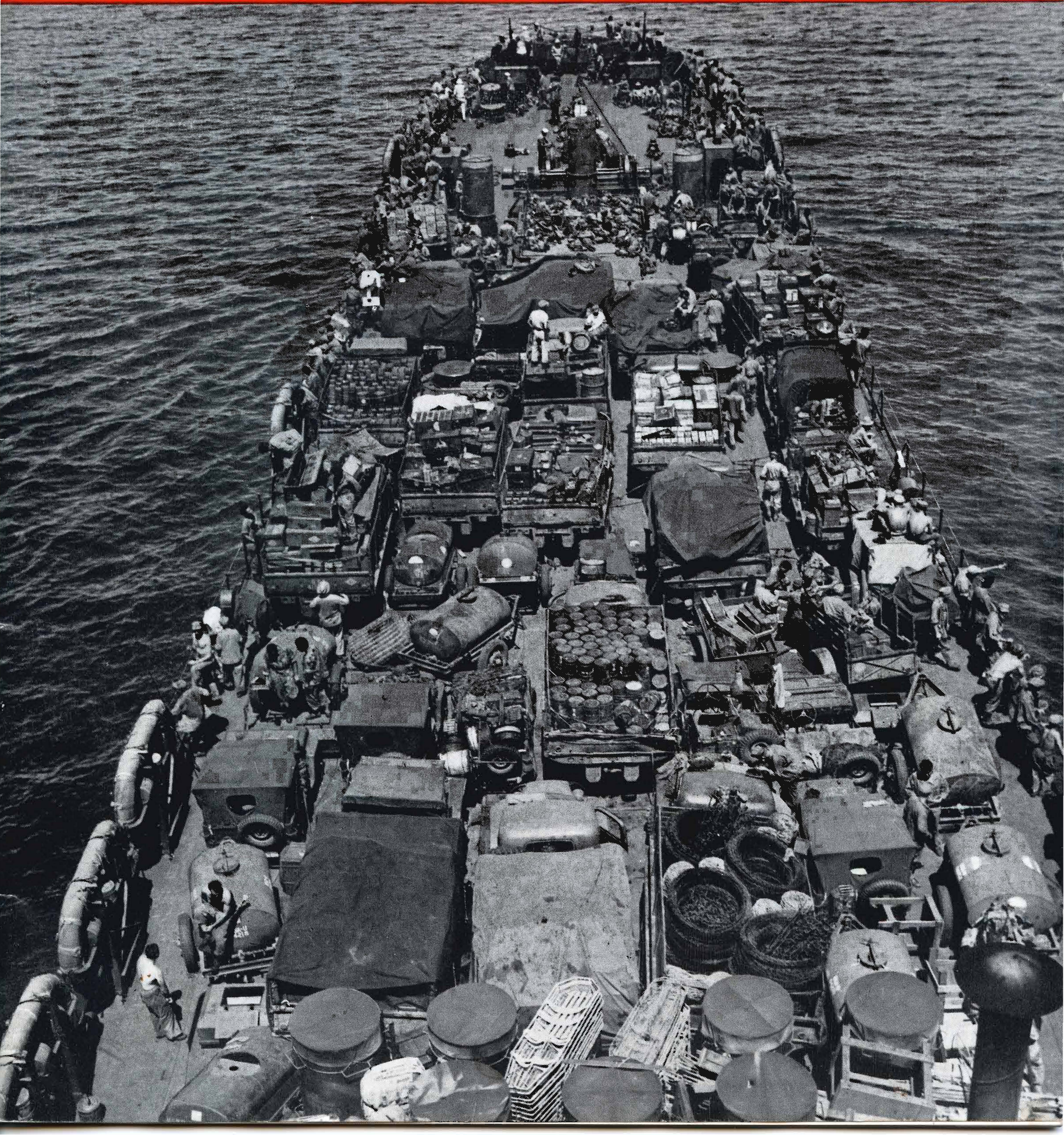
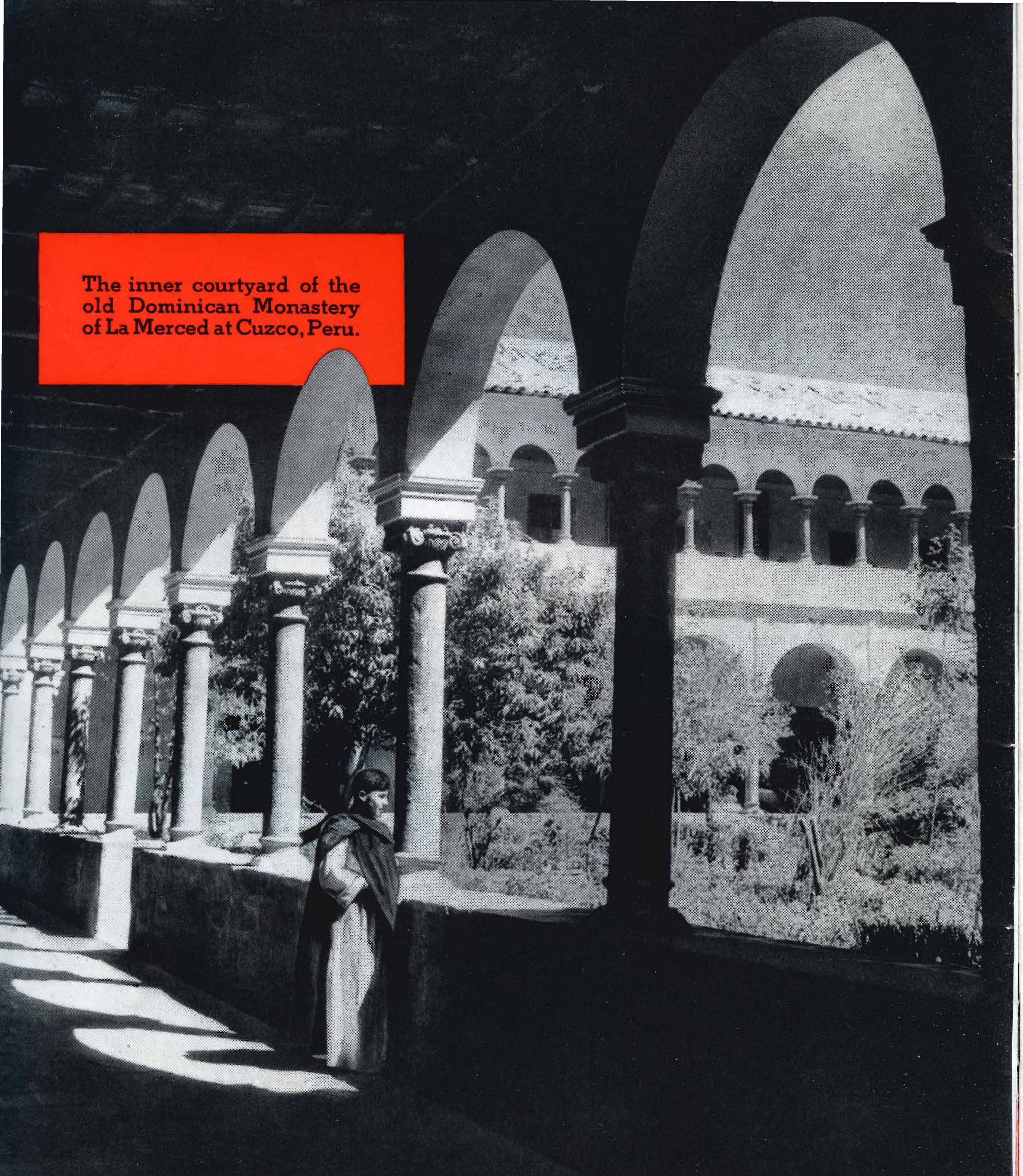
The Imperial Oil REVIEW

SUMMER 1944





FRONT COVER PICTURE: Invasion supplies. On the heels of Allied troops who landed on European soil come the big supply ships crowded with everything from barb wire to drums of gasoline. *O.W.I. Photo*

VOL. 28, NO. 1

The Imperial Oil REVIEW

SUMMER, 1944

The REVIEW is published periodically by Imperial Oil Limited, in the interests of shareholders and employees. Correspondence should be addressed to the Editorial Office, 56 Church Street, Toronto Ont.

HOSPITALIZATION AND SURGICAL BENEFITS PLAN INTRODUCED

TO ITS programme of employee security, Imperial Oil Limited has added an hospitalization plan which provides hospitalization and surgical benefits for employees and their wives and children. The new plan is a further extension of the basic programme for employee security which was inaugurated in 1919.

This programme was announced at Sarnia on December 18, 1918, by the late W. J. Hanna, then President of Imperial Oil Limited. Speaking at a meeting of the elected delegates of the Sarnia refinery, he stated that the new plan was being introduced not in any spirit of philanthropy, but in the knowledge that employees whose minds were free of the fear and worry of insecurity would be better able to carry out their work with the Company. In the 24 years of the existence of the annuities and benefits plan this policy has been faithfully carried out. Provision is made to look after employees during sickness. They are enabled to provide for their dependents through group insurance policies of which part of the cost is borne by the Company. Death benefits are established. Old-age protection is available through annuities.

Sickness benefits provide that employees with one or more years of service receive pay allowance during sickness disability for varying periods up to a maximum of one year, depending on length of service. Death benefits provide that the dependents of the deceased employee are paid amounts varying from three months to one year's pay, depending on the length of service of the employee.

The annuities plan provides for security in old age. Inaugurated in 1919, this plan was revised in 1932 and again in 1939 when the present thrift plan was introduced. Under the thrift plan employees may secure old-age protection on favourable terms. This plan has the added inducement of a savings phase, through which savings can be accumulated either as cash savings; or converted to the purchase of war savings certificates, victory bonds, or Imperial Oil stock.

In 1930 the Company put into effect the group insurance plan, under which employees after three months' service are eligible to take out life insurance according to their salary range. This insurance is available to the employees at the very low premium rate of 60 cents a month per thousand dollars of insurance, the Company paying the balance of the premium.

The new hospitalization and surgical benefits plan is a further step toward the establishment of security for the company's employees. One of the greatest worries of the wage earner is that of meeting the expense incurred by sickness. The hospitalization and surgical benefits plan helps to relieve that worry.

The hospitalization and surgical benefits plan provides employees and their dependents with hospitalization for 31 days at $3.50 per day as well as $17.50 for special hospital services such as anaesthetics, laboratory service and operating room. Surgical benefits are allowed ranging from $5.00 to $150.00 for any one operation according to the operation. The cost to the employees is as follows: Single person 40c per month, employee with one dependent $1.25, employee with more than one dependent $1.65 per month. The company pays the major part of the cost of this plan.

All employees at present are eligible for participation after three months of service. Dependents of all employees coming under the military policy are also eligible for coverage.

G. HARRISON SMITH, *Chairman of the Board, Imperial Oil Limited*

G. H. SMITH ELECTED CHAIRMAN OF THE BOARD

G. HARRISON SMITH has been elected Chairman of the Board of Imperial Oil Limited. Mr. Smith's new appointment, which was made at his own request, relieves him of some of the great burden of responsibility which he has carried for the past 12 years as President of the Company, while allowing him to continue an active interest in the Company's operations.

As Chairman of the Board of Imperial Oil Limited, Mr. Smith climaxes a career in the oil business which began as a boy in 1898. After 13 years spent mostly in the accounting and sales departments, he was elected vice-president of the West India Oil Company, and was also engaged in an executive capacity in connection with the export and sale of petroleum products in Brazil.

In 1914 he resigned these positions to become vice-president of Imperial Oil Limited and vice-president of International Petroleum Company Limited. In these capacities Mr. Smith assisted Walter C. Teagle, then President of the Company, in putting into effect the great program of expansion which resulted in the development of a large oil refining industry in Canada, and which enabled the industry to meet the then unprecedented demands of the First World War.

In 1917 Mr. Smith was elected president of International Petroleum, and with his appointment the expansion of International Petroleum began. It was about this time that Mr. Smith, along with Mr. Teagle and other high oil officials, made a trip to Peru that will always be memorable in Imperial Oil annals. It was made in the yacht Diana across one of the stormiest seas ever encountered by that vessel. It was as a result of that trip that International Petroleum decided on "going the limit" to develop the concessions then and now held in Peru. It is rather characteristic of Mr. Smith that in his enthusiasm for Peru and his plans for development in a big way, the storm and the accompanying peril are forgotten. That part of the trip is covered in some such words as these: "We went to Peru in the yacht Diana". Nothing about storm or peril or mountainous seas. Yet others on that trip refer to it as one of the unforgettable experiences of their lives. G. H. Smith, engrossed in his job, apparently forgot the storm as soon as it was over.

In 1926 the benefit of Mr. Smith's South American experience was desired by Standard Oil of New Jersey, which elected him a director. In 1930 he was elected a director of the Royal Bank of Canada and it is difficult to escape the conclusion that this was due in part to Mr. Smith's knowledge of South America. In 1933 he was elected president of Imperial Oil Limited.

Probably as just a tribute as any to Mr. Smith was that made by the late C. O. Stillman. He referred to Mr. Smith as "that dynamo of energy and master of all situations," and continued as follows: "He has great gifts and extraordinary ability which he has placed wholly and unselfishly at the disposal of this Company and its associated companies."

IMPERIAL OIL'S NEW PRESIDENT

ELECTION of Richard Vryling LeSueur, K.C., to the Presidency of Imperial Oil Limited further advances a notable career that began at Sarnia, Ontario, early in the present century.

The youthful "Dick" LeSueur quickly attracted attention by his engaging manner, and quick, eager mind and the late W. J. Hanna told him one day that if he would apply his talents to the study of law he would be assured of a place in the Hanna Law Offices. Accordingly Mr. LeSueur came to Toronto and entered University where he soon attracted further attention not alone by his progress in his own curriculum but also by his appetite for divers learning that led to many borrowings of text books from students who were headed for careers other than law, such as medicine and engineering.

Graduating from Osgoode, Mr. LeSueur joined the Hanna Law firm and before long he had attracted wide notice for his legal talents. It seemed for a while that he was destined to specialize in criminal law, but the development by Imperial Oil Limited of a great oil industry in South America was demanding more and more attention from sound, enterprising talent. The Hanna firm were solicitors for Imperial Oil, and Mr. LeSueur gradually became more and more immersed in matters relating to International Petroleum with its large program for development of oil production, refining, and distribution in South America and other markets. He reserved some time, however, to exercise his keen interests in public affairs, and in 1921 was elected to the Commons for West Lambton. Increasing needs for long trips to Europe and South America in the interest of International Petroleum did not, however, favor a Parliamentary career, which terminated in 1925.

Few North Americans have a wider acquaintance in South America or a better knowledge of its people, its problems and potentialities than R. V. LeSueur. He particularly knows Colombia, Ecuador, Peru, and Venezuela where International Petroleum operations are important factors in the national economies. G. Harrison Smith together with other high officers of the Company, give Mr. LeSueur a large measure of the credit due for the development of International Petroleum's interest in these Southern countries. However, born and brought up within a few miles of Canada's first oil fields in Western Ontario, Mr. LeSueur has also a very keen interest in the development of a large oil production in Canada, and has had much to do in directing the widespread explorations of the Company in Canada, and with the development of the Turner Valley and Fort Norman Fields.

In stature Mr. LeSueur is slim and above medium height. He has keen blue eyes and an invincible smile. He is a good talker and an equally good listener. He believes there is no problem that cannot be settled to the mutual satisfaction of all concerned if they will sit down together in a spirit of frankness and fairness.

He has been on the Board of Directors of International Petroleum since 1926, and became a vice-president of that Company in 1933. In the same year he was made a director and vice-president of Imperial Oil Limited.

He is president of the Ontario branch of the St. John Ambulance Association and vice-chairman for Ontario of the National War Finance Committee. He is an enthusiastic golfer when time permits—which is not often—and plays a tidy game of bridge. He takes an unostentatious but effective part in the affairs of a number of charitable and public-spirited organizations.

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RICHARD VRYLING LESUEUR, K.C. *President, Imperial Oil Limited*

G. L. STEWART... *elected a Vice-President and Director*

G. L. STEWART has been elected a vice-president and director of Imperial Oil Limited, succeding L. C. McCloskey who has retired after 41 years of service with the Company.

Mr. Stewart was born in Winnipeg, and received his secondary education there. He went east to McGill University in Montreal for his university training and graduated in 1914 as a Bachelor of Science, Mechanical Engineering. For a while it seemed as though he were destined for a teaching career, for after graduation he stayed with the University for nearly two years as a lecturer and demonstrator.

His career in the oil business began in 1916 when he joined the Engineering Department of Imperial Oil at Sarnia. After two years there he was transferred to Halifax as mechanical superintendent.

In 1919 the Manufacturing Department in Toronto was looking for an expert in mechanical matters, and asked Tom Montgomery, veteran head of the Engineering Department whom he would recommend for the job. Mr. Montgomery recommended Mr. Stewart.

After two years in Toronto Mr. Stewart was sent to Regina as assistant superintendent, and in 1923 was transferred to Sarnia in the same capacity. He was made superintendent of Sarnia Refinery in 1931, and in 1934 was appointed general manager in charge of refineries. He served in this capacity until his recent appointment as vice-president in charge of manufacturing.

G. L. STEWART, *Vice-President and Director, Imperial Oil Limited*

FRANK W. PIERCE . . . *elected a Director*

FRANK W. PIERCE has been elected a director of Imperial Oil Limited.

A graduate of Cornell University in mechanical enginering in 1916, Mr. Pierce's first position was with Goodyear Tire and Rubber Company, and his first assignment was a survey of the company's trade outlets in Panama, Venezuela and the West Indies. On outbreak of the first world war he was recalled to organize a method of speeding priorities and expediting delivery of rubber products for war uses.

Another assignment at Goodyear, which in some degree established the pattern of his business life, was the creation of a department to handle interplant relations. This department gave increasingly numerous subsidiary plants a representation at headquarters. Liking the way that job was done, Mr. Pierce's employers put him to work making a survey of industrial relations. In 1923 he became personnel manager of Goodyear. In 1924 he was invited to join the industrial relations department of Standard Oil Company (New Jersey).

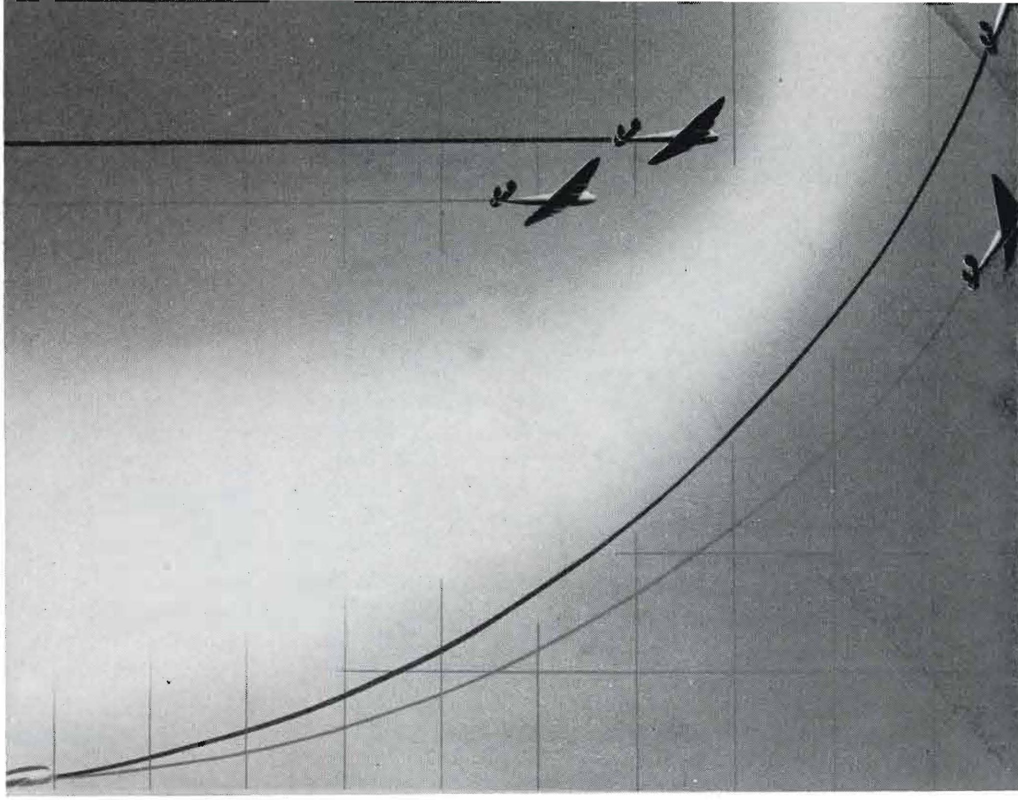
He assumed full direction of the industrial relation department of Standard Oil Company (New Jersey) in 1933, with the title of executive assistant to the president, and maintained these responsibilities until his election to the Jersey Board in 1942.

Imperial Oil Limited was one of the first Canadian industries to see the need for new thinking regarding the relationship between employer and employee when in 1918 it inaugurated its joint council programme in which employees have a voice in matters pertaining to their welfare. Mr. Pierce's recent appointment is in line with this programme of promoting and maintaining helpful and understanding employee-employer relations.

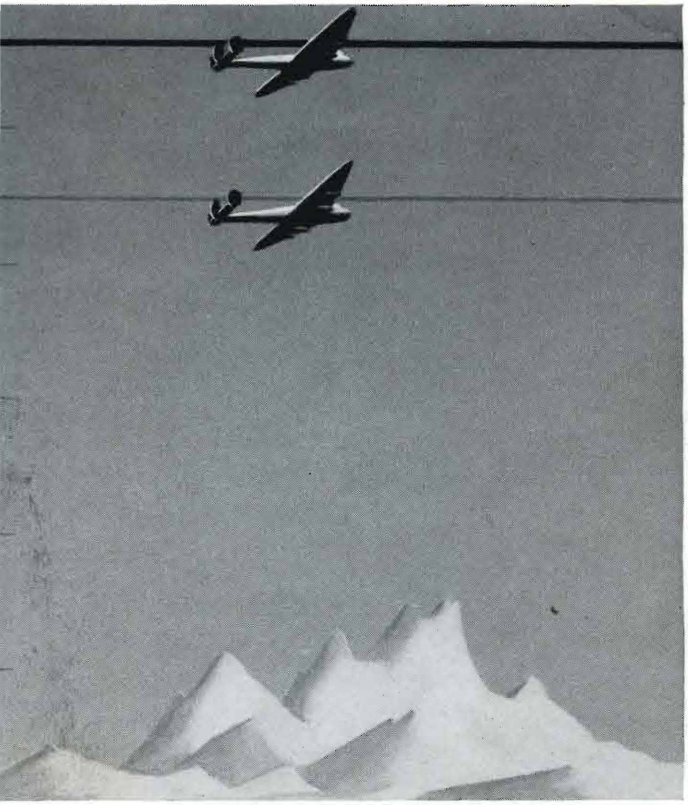
FRANK W. PIERCE, *Director, Imperial Oil Limited*

WHAT HIGH OCTANE DOES

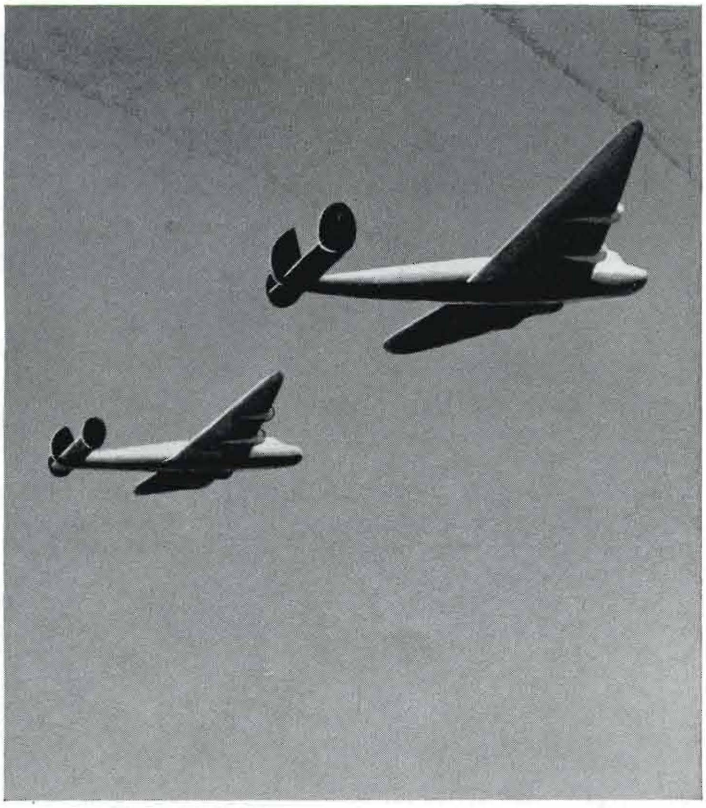
FOR the same gross weight at take-off, a plane using 100 octane gasoline can fly 20 per cent farther than a plane which used only 87 octane gasoline. A heavy bomber flying to an objective 1000 miles distant can carry five more 1,000-pound bombs than one using 87 octane gasoline. Greater power for the same weight of engine means much to our airmen: capacity to carry deadlier guns, heavier armor; ability to operate from smaller fields.



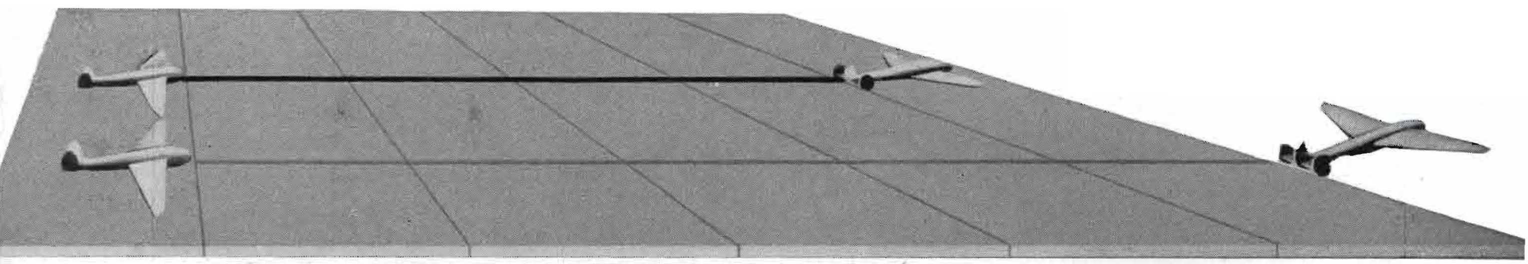
WITH IT PLANES CAN FLY FARTHER, CLIMB FASTER



—FLY HIGHER



—CARRY MORE



—TAKE OFF IN SHORTER SPACE

100 OCTANE AVIATION GASOLINE

The story behind the development of the aviation fuel that helped to give the United Nations air superiority over Germany.

WHEN the Luftwaffe took to the air on August 8, 1940 to deliver the death-blow to England, they were confident of easily being able to overcome the outnumbered R.A.F. Eighty-four days later they were forced by their heavy loss of planes to abandon the battle.

The success of the R.A.F. was due in no small part to the fact that the skill of the flyers was matched by the performance of their planes. The planes were powered with engines able to take full advantage of a superior gasoline, that gave the planes an edge in speed and manoeuverability over those of the formidable opponents.

The important characteristic of the R.A.F. gasoline was its high octane rating. R.A.F. gasoline rated 100, as compared with about 87 for the Luftwaffe. The 100 octane aviation gasoline available to the R.A.F. had permitted plane builders in England to design high compression engines—and the high compression meant high power. Much of the success of the R.A.F. in the battle of Britain was derived from the difference in octane rating of opposing fuels.

By good fortune the production of 100 octane aviation gasoline had attained commercial proportions shortly before the war. The gasoline was far different from that known to aviators in 1918 at the end of the first world war. In those days the importance of anti-knock quality was realized, but no way of attaining it was known beyond the only moderately effective means of adding alcohol or coal tar products such as benzol or toluol to the gasoline.

After the first world war, laboratories throughout the world sought the secret of engine "knock", the "ping" that occurred when high compression engines were run on ordinary gasoline. Engine knock due to low octane gasoline prevented the development of high efficiency high compression engines. Automotive laboratories installed test engines equipped with a bouncing pin, whose bouncings were used to indicate knock more effectively than could be done by ear alone. Compound after compound was added to gasoline and tested as anti-knock agent. Benzol was effective, so was aniline, so were a host of others; but relatively large proportions of all of these were required in gasoline to eliminate the knock at high pressures. When all common compounds had been tested, obscure compounds mentioned in old chemical journals were prepared and tested. At last in 1922 Thomas Midgley of the General Motors Corporation, who had been particularly active in the work, was rewarded by the discovery that tetraethyl lead, when added to gasoline in small fractions of a per cent, was far more effective than anything previously tested. No anti-knock agent better than tetraethyl lead has since been found. Tetraethyl lead is an important ingredient of to-day's high octane gasoline.

The next discovery on the road to commercial 100 octane aviation gasoline was made in 1927, when Graham Edgar of the Ethyl Gasoline Corporation found that iso-octane, a paraffin hydrocarbon, gave no knock when used on any engine of that day. Because of its knock-free behavior iso-octane was taken as the standard of reference, and was used as the basis of the octane rating scale. Thereafter any gasoline mixture that equalled iso-octane in knock rating was said to have 100 octane rating.

PRODUCTION PROGRESS

Commercial production of gasoline with a 100 octane rating had to wait years while chemists and engineers developed commercial methods of production. Iso-octane itself might be considered to be 100 octane gasoline. But at a cost of something like $16.00 per gallon, and made in small quantities by laborious methods, it could hardly be marketed as a commercial gasoline. By 1934, however, chemists had found a way of making a

100-octane aviation gasoline gave R.A.F. fighter planes greater speed which enabled them to out-fight the German Luftwaffe in the Battle of Britain. The high octane gasoline which powered the 1939-40 Spitfires above was far different from the fuel used by the men who flew World War I planes of the vintage pictured on the right.

commercial iso-octane, of almost 100 octane rating that could be prepared for a little over $2.00 per gallon. This iso-octane could be blended in regular gasoline, tetraethyl lead added, and 100 octane gasoline produced at a reasonable cost for an aviation fuel.

On the basis of their tests, the U.S. Army Air Corps in 1934 issued their first specifications covering 100 octane aviation gasoline. The importance of the fuel was definitely recognized, and every effort was made to produce it in increasing quantities and at lower cost. At a reasonable price the fuel was of interest to commercial air transport as well as military authorities in view of the fuel economy that could be attained with it as compared with fuels of lower octane rating. In air transport every pound of fuel carried represents a loss in payload; and every increment of distance flown on a pound of gasoline represents that much less gasoline that need be carried on a flight over a given distance.

The first commercial iso-octane used in large quantities was known as hydrocodimer, and because it was blended into regular gasoline to make aviation gasoline it was termed a blending agent. Hydrocodimer was prepared from butylenes, hitherto more or less waste products in refinery gases. Conversion of butylenes to iso-octane was accomplished by the two recently developed processes of polymerization and hydrogenation.

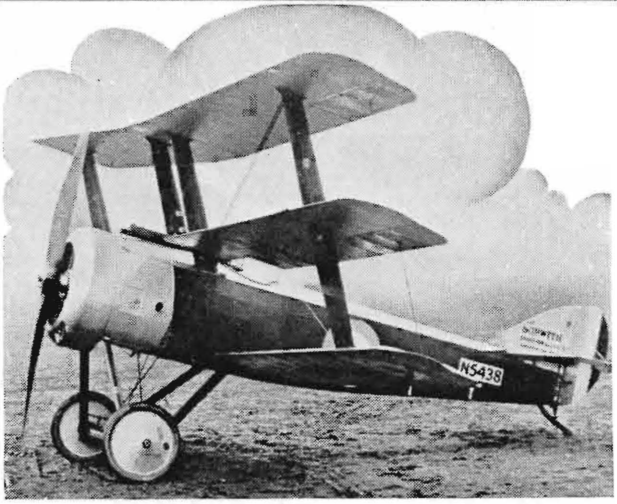


Photo Courtesy Canadian Aviation

Hydrogenation had some drawbacks as a process for making gasoline. It required pressures of several thousand pounds per square inch, and was carried out in heavy equipment able to withstand these pressures. Hydrogenation plants were costly to build, and were not well adapted to the production of products in the large volumes generally associated with gasoline production. The need for a better method than polymerization and hydrogenation was, therefore, apparent.

Petroleum technologists had already travelled a long way along the road of unconventional chemistry. Consequently, it was not surprising that still another new chemical process should arise just when needed. This process, known as alkylation was announced in 1938, and first operated commercially by the Humble Oil and Refining Company in the United States. Alkylation produced a product quite similar to hydrocodimer without requiring the hydrogenation step. The process was simple, consisting essentially in bubbling butylene and iso-butane, obtained from refinery gases, through sulfuric acid. It could be expanded almost indefinitely to yield large quantities of a new blending agent, alkylate, to supplement hydrocodimer.

With means at hand for producing large volumes of blending agents it was soon realized that it would become difficult to find enough of the high octane gasoline base to which blending agents were added to make the 100 octane aviation gasoline. The usual method of making 100 octane aviation gasoline consisted in blending together in about equal proportions straight run high octane gasoline obtained from crude petroleum with alkylate or hydrocodimer, and adding a small quantity of tetraethyl-lead. With increasing amounts of alkylate becoming available, more and more of the high octane straight run or base gasoline was needed. However, the quantity of this gasoline, of 74 or better octane rating, segregated from the petroleum from special fields, was limited. Again, therefore, a new process was called for, that would produce high octane base gasoline and free the refiner from the restrictions necessarily resulting from depending on nature for the supply of high octane gasoline.

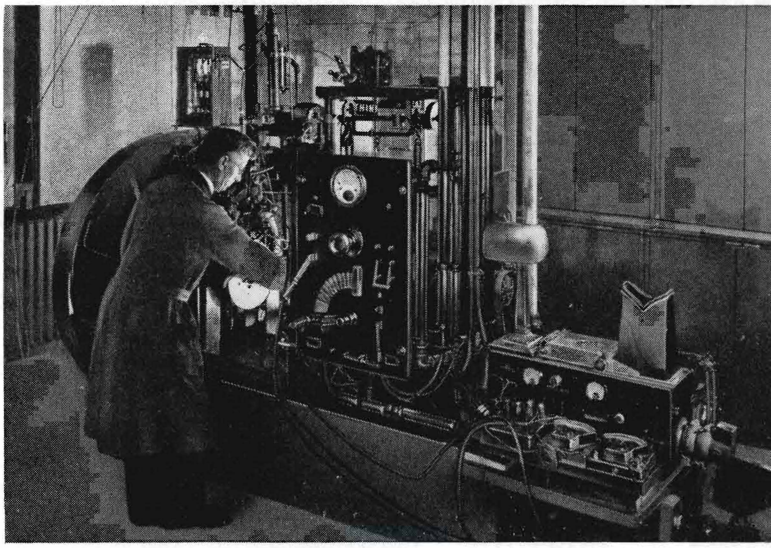
CATALYTIC CRACKING

The process that fitted in exactly at this point was catalytic cracking. This process, in conjunction with the others, made possible the production of the huge quantities of aviation gasoline needed for the tremendous aerial activities carried out in this war. When it is realized that a single four-engine bomber consumes something like eight barrels of gasoline in an hour, the vast amounts of gasoline needed for a flight of hundreds of bombers can be appreciated.

"Cracking" is the general term that describes the conversion of usually heavier petroleum oils to lighter petroleum products which consist chiefly of cracked gasoline. This is accomplished by the controlled application of heat to the heavier oils. In catalytic cracking the heavier oils are brought, while in a heated condition, in contact with a catalyst which directs the conversion of the heavier oils into products with more desirable characteristics. The catalyst is a solid such as a specially treated clay or similar material. The gasoline produced by catalytic cracking has a higher octane number than that produced by ordinary cracking.

Catalytic cracking was being developed before the war as a means of increasing the octane number of motor gasoline. However, with the tremendous increase in Allied military airplane construction it was obvious that catalytic cracking capacity would have to be greatly expanded almost over night. The Allied global mastery of the air testifies to the extent of the expansion that has taken place in two years.

In spite of little experience with the Catalytic Cracking process the plants that have been completed have operated with amazing success. Many of the plants are extremely large, rising high above surrounding equipment on the refinery landscape, and their designs represent remarkable engineering achievements.



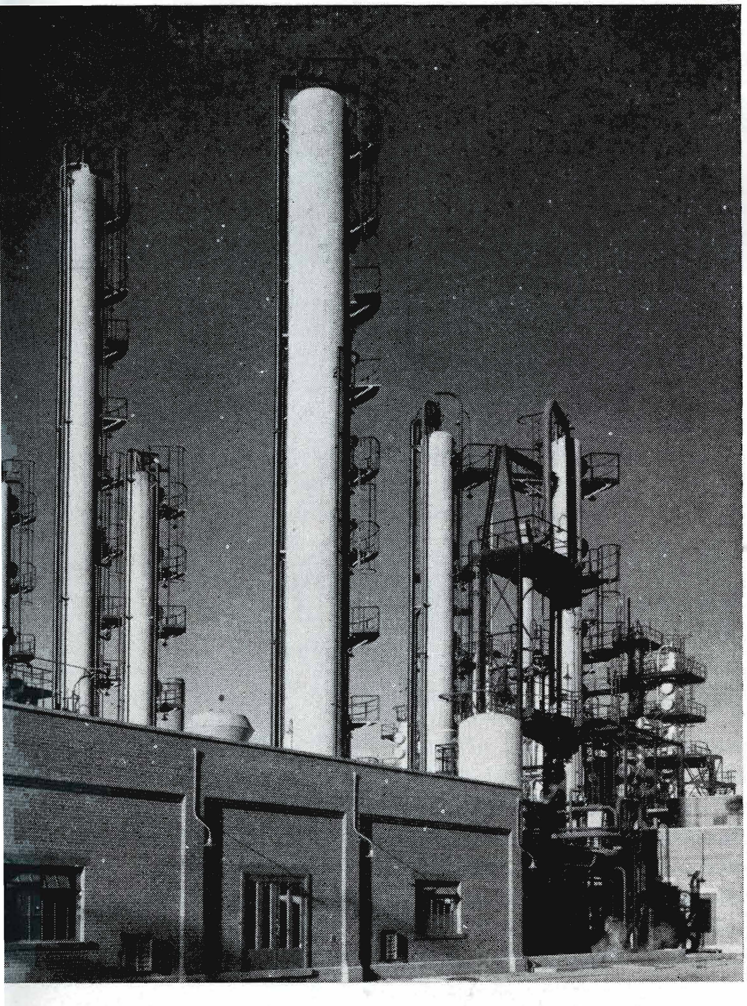
To test and improve its aviation fuels the petroleum industry employs the most scientific laboratory methods. Here gasoline is being tested for anti-knock qualities.

No previous process had ever called for mixing vaporized oil with a solid clay-like substance, heating the mixture to high temperatures, separating the vapors from the solid, processing the solid, and operating continuously on a basis of thousands of barrels of oil per day. Catalytic cracking consists of such a series of steps, the dry solid being the catalyst, the agent that in a mysterious manner controls the chemistry of the cracking reaction. The problems of moving the catalyst through the cracking plant was solved in different ways by different oil companies. An interesting method was that of handling the catalyst as a fine powder suspended in the oil vapor, so that it could be circulated through the cracking plant like a liquid. This method, known as the fluid catalyst cracking process, developed by the Standard Oil Company (New Jersey) and its subsidiary and affiliated companies, is employed in plants producing a large proportion of the catalytically cracked gasoline in the United States.

In Canada Imperial Oil Limited, in addition to establishing an Alkylation Plant at Calgary early in 1943, has developed the suspended cracking process. This process differs from the other catalytic process primarily in the use of a relatively small amount of catalyst. The catalyst as a powder is mixed with a light oil and then injected into the stream of oil that is to be cracked. The catalyst is carried in the oil through the furnace tubes where heat causes the cracking reactions to take place.

From a comparatively simple product, 100 octane aviation gasoline has grown into a complex blend of many components. The needs of war could not await completion of construction of manufacturing facilities. In the interim production of the gasoline has been augmented by adding special ingredients and by increasing the content of tetraethyl lead. Upon completion of the facilities, the special ingredients will continue to be used to impart special properties and further augment supplies.

Alkylation plant completed early in 1943 at Imperial Oil's Calgary refinery is the first of its kind in Canada and produces high octane alkylate blending agent for fighting-grade aviation gasoline from refinery gas and Turner Valley gas.



100 octane aviation gasoline represents a revolutionary fuel, whose production has required revolutionizing petroleum refining in the space of a few years and for the most part under the stress of war. In order to produce many of the products required today, refiners must be able to break down molecules and to rebuild them into special molecules adapted to materials such as 100 octane aviation gasoline. With 100 octane aviation gasoline, planes need less distance for take-off than with lower rating fuels. They can fly faster and fly to greater heights. The greater power with the 100 octane gasoline has given fighter planes a tremendous advantage over opposing planes in aerial warfare. It allows bombers to carry out longer bombing missions with heavier bomb loads. All the advantages are being well exploited during the war.

POST-WAR POSSIBILITIES

Before the war the little 100 octane aviation gasoline available did not permit its extensive use for commercial aviation. After the war the supply will be many times greater than that of pre-war days. This 100 octane fuel to which commercial aviation will fall heir may be expected to help commercial aviation advance with unprecedented strides. Developments which normally would have taken decades to complete will have been compressed into a few years. Thanks to the fuel economy possible with the 100 octane gasoline, the large post-war planes will be able to carry high payloads, despite heavy fuel loads. The powerful fuel will give the plane high speed, and will reduce to a minimum the number of refueling stops needed along extended routes.

Progress in high octane fuels will not stop with the 100 octane aviation gasoline of today. The development of the fuel has left in its wake many new refining processes. These will be combined and modified to produce even superior fuels in the future. But whatever the qualities of the ultimate fuel may be, the successful production of 100 octane aviation gasoline in the volume needed for military operations during the war has been a triumph of petroleum technology.

PAT REID WINS McKEE TROPHY

Air Vice-Marshal J. A. Sully presents the McKee Trans-Canada trophy to Mr. Reid.

T. M. (Pat) REID, D.F.M., aviation sales manager of Imperial Oil Limited, was awarded the McKee Trans-Canada Trophy for meritorious service in the advancement of aviation in Canada, for the joint years of 1942 and 1943. In announcing the award, Air Minister C. G. Power said that throughout the past year Mr. Reid "contributed materially to Canada's war effort through his energetic co-operation with the research and manufacturing branches of Imperial Oil Limited, in producing aviation oil which would meet Canada's conditions and requirements and could be produced in Canada".

"Pat" as he is known to fellow fliers throughout Canada has, during his career, probably flown over more Canadian territory and made more notable flights than any other Canadian pilot. He began flying in March, 1915, with the Royal Navy Air Service, and like most World War I pilots his experiences were many and exciting. In 1918 he was awarded the Distinguished Flying Medal for bravery.

Coming to Canada in 1924 he joined the Ontario Provincial Air Services, remaining with it until 1927. In 1928 and 1929 he served as pilot for Northern Aerial Minerals Exploration. In 1929 he headed a search for Carl Ben Eilson who disappeared while flying to relieve a schooner caught in the ice off the coast of Siberia, 200 miles north of the Arctic Circle. After being forced down and given up for lost, Pat and his mechanic repaired their damaged plane and carried on with the search. On returning to his base Pat was quite interested to read his own obituary, which had been published in the Canadian press.

In 1931 Mr. Reid joined Imperial Oil Limited as aviation sales manager, and acted as tour leader of the first Trans-Canada air pageant. In charge of the Company's aviation sales, he was responsible for the distribution of aviation gasoline and oil to all parts of Canada for commercial operations in peacetime, and organized the Company's supplies for the British Commonwealth Air Training Plan after the outbreak of the war.

SARNIA ENLISTED EMPLOYEES

Shortly after the last issue of the Imperial Oil Review was distributed, your editors were advised that the names of 42 employees from Sarnia Refinery who have volunteered for Service, were not included in the Service List in the last Review. Listed below are the names of enlisted employees from Sarnia Refinery which were not included in the last issue:—

Baker, R. E. F/O, RCAF
Bayduck, Ivan, Prob. Shpwt, RCNVR
Bloomfield, Miss J. K. AW1, RCAF
Barr, S. CSM, A & T Staff
Batey, D. Honourable Discharge
Corner, R. AC2, RCAF
Couse, W. A. AC2, RCAF
Czomko, J. J. Stkr 1, RCNVR
Davis, B. Pte. RCASC
Derush, F. J. L/Cpl.
Emard, V. G.
Eveland, C. A. L. AC1, RCAF
Fennell, F. S. Pte., RCE
Finlay, R. L. O/S, RCNVR
Fuller, G. W. Tpr. CABTC
Glass, J. G. AC2, RCAF
Harris, C. J.
Harris, M. D. Pte., TCCA
Haywood, W. C. Honourable Discharge
Humphries, R. A. Steward Pro. RCNVR
Lang, W. E. LAC, RCAF
Lawson, A. M. Honourable Discharge
Leach, D. C. Tpr. CACTR
McDonald, C.
McMahon, F.
Moore, G. A. AC2, RCAF
Neal, C. T. Pte. CAO
O'Dell, J. E. AC2, RCAF
Parkinson, K. L. AC2, RCAF
Perry, C. B. A. B. RCNVR
Randall, C. D. O/S, RCNVR
Robinson, R. W. Pte. CAO
Ryan, C. J. M. Tpr. GMT
Sayers, G. R. AC2, RCAF
Shanks, James, P/O, RCAF. Killed in Canada.
Smuck, Thos. CERA, RCNVR
Taylor, R. M. Bandsman, RCNVR
Thompson, H. F. Killed in Action
Thorpe, R. H. O/S, RCNVR
Wade, J. W. Lieut. RCASC
Watson, Neal M. Lieut. Prisoner of War
Wright, J. D. Killed in Action

One use for petroleum solvents is in impregnating the fabric in anti-gas clothing to make it gas proof.

Refining

No. 7 IN A SERIES

SOLVENTS

IN THE previous articles of this series the refining of a sequence of familiar petroleum products ranging from light liquids (gasolines) to heavy solids (asphalts) has been described. In this and the following article the refining of a second sequence of petroleum products ranging from light to heavy will be related. The products to be described are solvents, illuminating oils, fuel oils and waxes. In many respects, particularly from the chemical viewpoint, these resemble products already described. They differ primarily in boiling range, gravity and the type of refining used to extract them. The chief uses of the products in this sequence are perhaps less familiar than those of the first series and this is the only reason for treating them as a second series.

Crude oil consists of many hydrocarbons with boiling points at normal atmospheric pressure ranging from 258° below zero to over 800° F. The hydrocarbons with boiling points above approximately 800° F. decompose or crack before they get a chance to boil when heated to these high temperatures at normal pressures. Such hydrocarbons are caused to boil at 800° F. or lower by heating them under vacuum (vacuum distillation).

Distillation separates from the crude groups of hydrocarbons with boiling ranges as required for specific uses. After further treating these hydrocarbon fractions become finished petroleum products ready for the consumer.

In addition the many treating processes used in the modern refinery produce a still greater variety of products. Still more products are made by blending and compounding with materials other than those derived from petroleum. A description of all the petroleum products and of their methods of manufacture is thus a lengthy and complex procedure—much too long for presentation in a magazine series.

With the descriptions of the manufacture of solvents, illuminating oils, fuel oils and waxes, which are presented in this and the following article, the highlights of most of the chief refining processes of petroleum products will have been covered.

HISTORY

To the first refiners, crude oil meant just one product—lamp oil. All the other products which now are produced were regarded as impurities in the desired lamp oil. Included in these unwanted products was the fraction from which solvents are made—naphtha, or "petroleum spirits" as it was called by the refining pioneers.

One of the first refineries in Ontario near the town of Petrolia (or Petrolea, as it was then known), disposed of its unwanted petroleum spirits by running it into Black Creek. A sudden summer flood caused the creek to rise and the water to back up. With it came the petroleum spirits floating on top. Higher rose the water until the inflammable layer reached the fires under the stills. Immediately Black Creek became a river of fire, destroying all that it touched—including the refinery. It is easy to see why early refiners didn't like petroleum spirits.

Today petroleum spirits, tamed and industry-broken, are the handmaidens of many manufacturing processes. They make rubber cements, dissolve grease from leather, clean clothes, serve as component parts of many polishes, paints and similar products and are used in the manufacturing of linoleum flooring. To best serve these many uses the original petroleum spirits have been subdivided into fractions more suitable for specific purposes. These are referred to in general as naphthas, and more specifically as solvents.

REFINING

Solvents are produced from the same part of the crude as are straight-run gasolines. Aside from the purity of the products, two chief characteristics are looked for in solvents, namely, boiling range and solvency. Boiling range is important in that it determines the rate of evaporation of the solvent. For example a paint thinner with too low a boiling range will cause the paint to "set" too quickly; too high a boiling range will cause the paint to remain "tacky" long after it should have set. The boiling range depends on careful subdivision by redistillation or rerunning of the original naptha fraction from the crude. Solvency is a measure of the amount of material that a solvent can dissolve. It is dependent on the type of the crude. In general, the more aromatic hydrocarbons present the higher is the solvency of the naphtha.

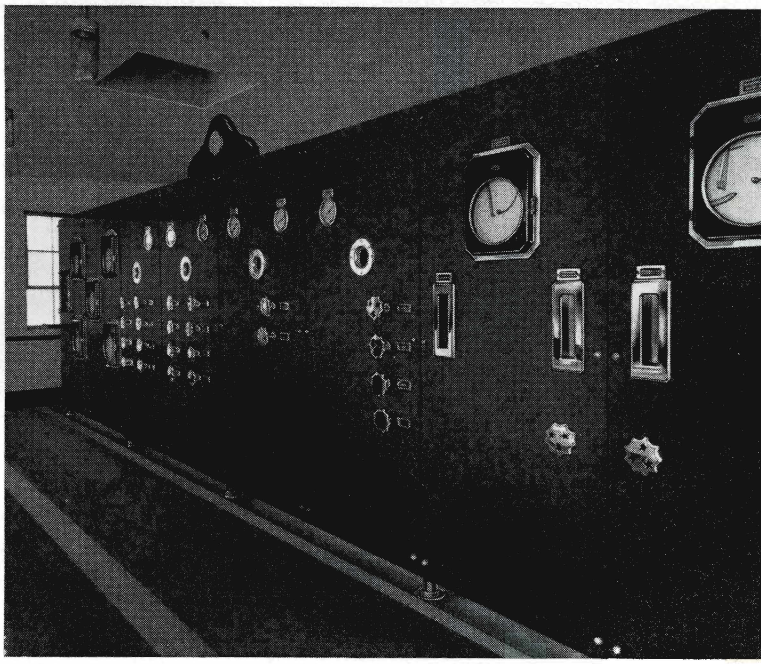
The first step in the production of solvents takes place in the crude bubble tower. Here the naphtha is separated from the rest of the crude as an overhead product. This immediately enters the rerun tower as shown in diagram on Page 16 where the naphtha is divided into an overhead "light" naphtha and a bottom "heavy" naphtha. The latter is pumped to temporary storage tanks. The light naphtha is passed into still another bubble tower called a depropanizer or "light ends stripper" where "wild" gasses are removed overhead. The depropranized light naphtha is also sent to tankage. These naphthas are the base stocks from which solvents are made.

TREATING

As a rule both the light and heavy naphthas contain foul-smelling sulphur compounds that may be corrosive to metals under certain conditions. These sulphur compounds are removed by lead-lye treating followed by redistillation. Lead-lye treating is also known as "doctor treating" or "sweetening".

Lead-lye treating removes some of the corrosive sulphur compounds (hydrogen-sulphide) and converts other sulphur compounds (mercaptans) into non-odoriferous, relatively harmless, high boiling compounds which are removed by the redistillation step. The lead-lye solution is a water solution of lye (caustic soda) and litharge (lead-oxide).

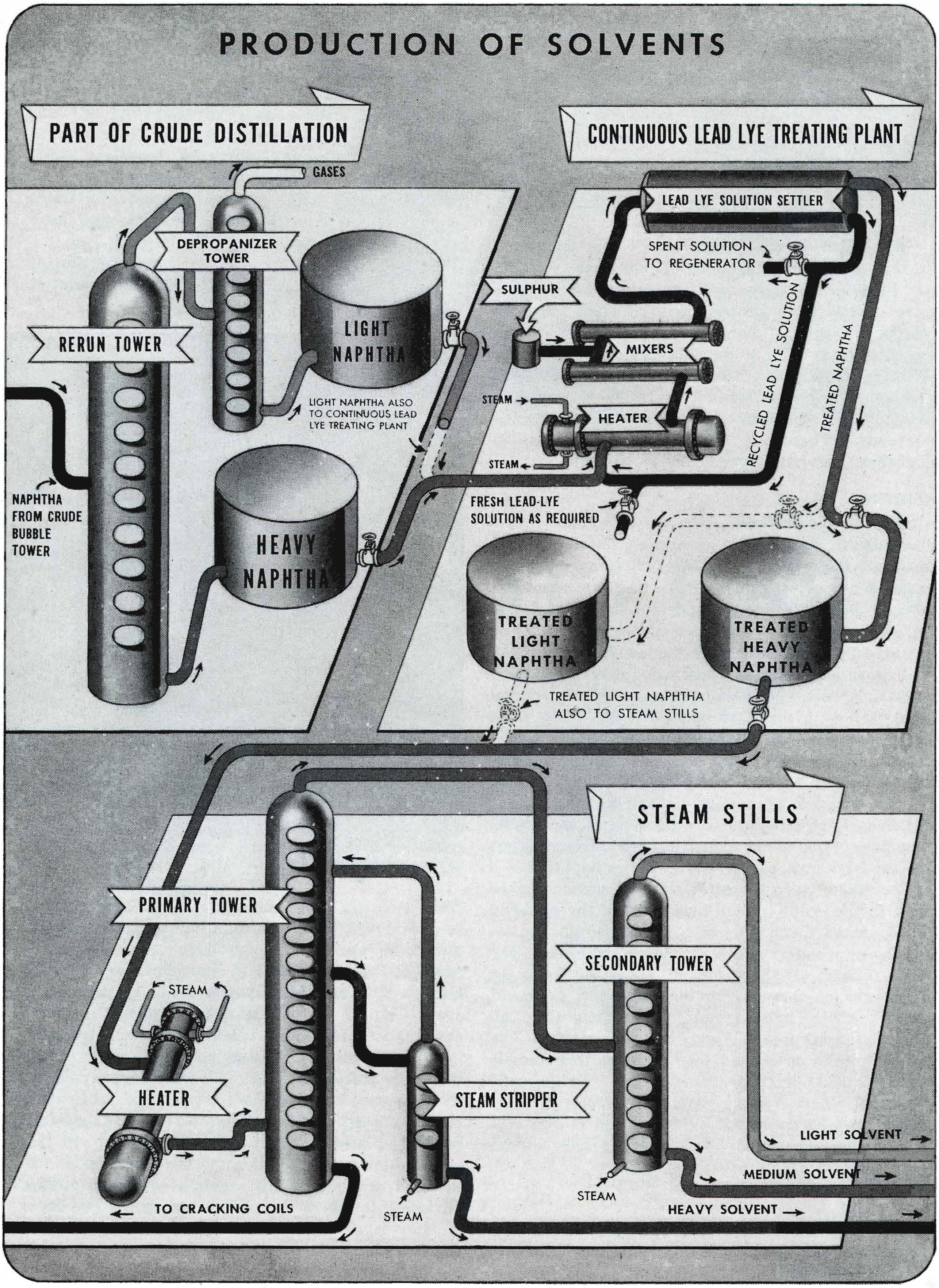
In lead-lye treating the lead-lye solution is added to the naphtha and the mixture agitated.



Very accurate control of temperature is necessary in the distillation of solvents. Above is the control panel at the column steam stills at Sarnia.

Then a small, exact amount of powdered sulphur is added. After the sulphur has been thoroughly mixed in, the mixing action is stopped and the used or "spent" lead-lye solution is allowed to settle. The treated naphtha floats on top. The spent lead-lye solution is drawn from the bottom and regenerated to be used for further treating.

The mixing of lead-lye solution and naphtha may take place in batches in an agitator similar to that described for the acid treating of lubricating oils in the 4th article of this series. The modern method of lead-lye treating is continuous. In this process untreated naphtha and lead-lye solution are warmed and pumped through a series of mixing devices into which the proper amount of powdered sulphur is constantly added. The stream leaving the mixers enters a settling tank where partially spent lead-lye solution separates entirely from the


PRODUCTION OF SOLVENTS
PART OF CRUDE DISTILLATION
CONTINUOUS LEAD LYE TREATING PLANT
GASES
DEPROPANIZER TOWER
LIGHT NAPHTHA
RERUN TOWER
LIGHT NAPHTHA ALSO TO CONTINUOUS LEAD LYE TREATING PLANT
NAPHTHA FROM CRUDE BUBBLE TOWER
HEAVY NAPHTHA
LEAD LYE SOLUTION SETTLER
SPENT SOLUTION TO REGENERATOR
SULPHUR
MIXERS
STEAM
HEATER
STEAM
RECYCLED LEAD LYE SOLUTION
TREATED NAPHTHA
FRESH LEAD-LYE SOLUTION AS REQUIRED
TREATED LIGHT NAPHTHA
TREATED HEAVY NAPHTHA
TREATED LIGHT NAPHTHA ALSO TO STEAM STILLS
STEAM STILLS
PRIMARY TOWER
SECONDARY TOWER
STEAM
HEATER
STEAM STRIPPER
LIGHT SOLVENT
MEDIUM SOLVENT
STEAM
HEAVY SOLVENT
TO CRACKING COILS
STEAM

naphtha. At the far end of the tank, treated naphtha is continuously withdrawn from a point near the top while partially spent lead-lye solution is continuously withdrawn from the bottom. The latter may be circulated to treat more untreated naphtha or sent to a regenerator where air bubbled through the spent solution recreates its original treating ability.

REDISTRIBUTION

Both light and heavy lead-lye treated naphthas are pumped in turn to the steam stills for redistillation. Here each is divided into several products with different boiling ranges. Column steam stills consist usually of two bubble towers which may be operated under vacuum. Owing to the volatile nature of the naphthas, heating is done by steam in closed coils. Steam may also be injected into the towers themselves to aid in sharply separating the narrow boiling range naphthas from each other. As the towers are maintained under low pressure (vacuum), distillation can be carried out with the temperature available from steam. Steam-heated stills are not only less hazardous than fired stills but they allow the accurate control of temperature necessary for sharply fractionated solvents.

As the flow diagram indicates, naphtha is heated in a steam heater and passed into the primary tower which is maintained under a vacuum. Here the naphtha is separated into three narrower boiling range fractions. The highest boiling fraction leaving the bottom of the tower includes the sulphur compounds and is sent to the cracking coils.

The side stream product from the middle of the tower is passed through a stream-stripper where traces of unwanted lower-boiling hydrocarbons are removed. The product from the bottom of this stripper bubble tower is a finished naphtha which quite properly takes on the name solvent at this point.

The overhead from the primary tower enters a secondary tower where it is separated into an overhead and a bottom product, both of which are finished solvents. The secondary tower is also operated under vacuum and usually has open steam injected into it.

From the light and heavy naphthas half a dozen solvents are manufactured. The flexibility of the steam stills permits the number of solvents produced to be varied as desired.

THE FLOW DIAGRAM

The diagram on the opposite page illustrates in much simplified form the production of solvents.

The first step in the production of solvents takes place in the Crude Bubble Tower, where the naphtha is separated from the crude as an overhead product. This immediately enters the Rerun Tower which divides the fraction into an overhead "light" naphtha and a bottom "heavy" naphtha. The light naphtha is passed into a Depropanizer Tower where "wild" gasses are removed overhead.

Each of these naphthas then pass in turn through a continuous lead-lye treating process to remove undesirable sulphur compounds. In this process the naphtha and the lead-lye solution are warmed and then thoroughly mixed together. During the mixing a small amount of sulphur is added. The treated naphtha separates from the "spent" lead-lye solution in a Settler Tank. The lead-lye solution is withdrawn from the bottom of the tank, and regenerated or recycled to treat further quantities of naphtha.

Both light and heavy lead-lye treated naphthas are pumped in turn to the Steam Stills for redistillation. Here each is divided into several products with different boiling ranges. Owing to the volatile nature of the naphthas heating is done by steam in closed coils.

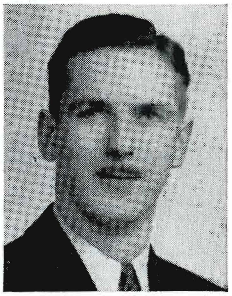
Passing into the Primary Tower after being heated, the naphtha is separated into three narrower boiling range fractions. The highest boiling fraction which leaves the bottom of the tower includes sulphur compounds and is sent to the cracking coils.

The side stream product from the middle of the tower is passed through a Steam Stripper where traces of unwanted lower boiling hydrocarbons are removed. The product from the bottom of this stripper bubble tower is a finished solvent.

The overhead from the Primary Tower enters a Secondary Tower where it is separated into an overhead and a bottom product, both of which are finished solvents.

HELPED MOVE RCAF BASE

Flight Lieutenant G. R. Crichton, who was Senior Credit Clerk with Imperial Oil Limited before he enlisted in the R.C.A.F., played an active part in what is believed to be the largest non-stop advance by air-field crew and complete equipment in the present war, it was reported recently by British United Press.



Flight Lieutenant
G. R. CRICHTON

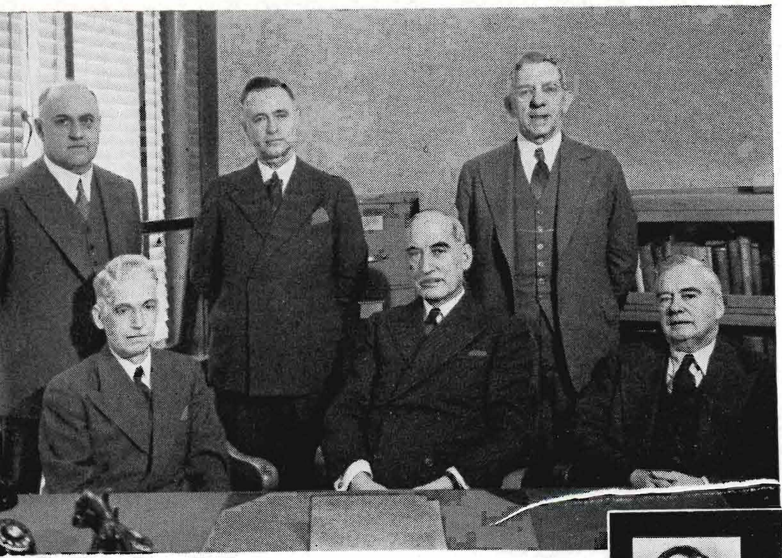
The operation was the movement of a complete air-field from Scotland to Southern England precisely on schedule, remaining fully operational during the 500-mile journey. The move required three convoys of camouflaged lorries, the largest of which was five miles long.

The advance party was in charge of Flight Lieutenant Crichton, and reached the future base three days before the main move to ready it and check landing facilities. Within 36 hours of arrival of the main party, Flight Lieutenant Crichton who is senior intelligence officer briefed the crews, and the first operational flight was made by the aircrews served by the mobile field. For several of his pilots it was their first flight over Europe.

George Crichton joined Imperial Oil Limited as a service station salesman in Toronto in 1933. Later that year he was made a ledger clerk. In 1941, he was appointed senior credit clerk.

Enlisting in the R.C.A.F. in 1941 as a Pilot Officer, Flight Lieutenant Crichton went overseas in January of 1943.

1944 INDUSTRIAL COUNCILS



ANNUITIES AND BENEFITS COMMITTEE

Standing, left to right—R. C. Moore, A. Gibson, T. J. Millar. *Seated, left to right*—J. A. New, Dr. R. Macleod (Chairman), G. L. Thompson (Secretary).

Manufacturing Department

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Top row, left to right—C. Hedderick, J. McClune, E. O. Davidson, A. G. Stewart, W. E. Campbell, E. S. McKee. *Centre Row*—F. I. Gardner, A. C. Harrop, C. M. Moore (Chairman), J. J. Hanna' D. M. Allan Jr. *Bottom Row*—W. E. Frost, L. W. Howell, F. C. Tempest, A. Anscombe, F. I. Gardner Jr., J. Kirkland.

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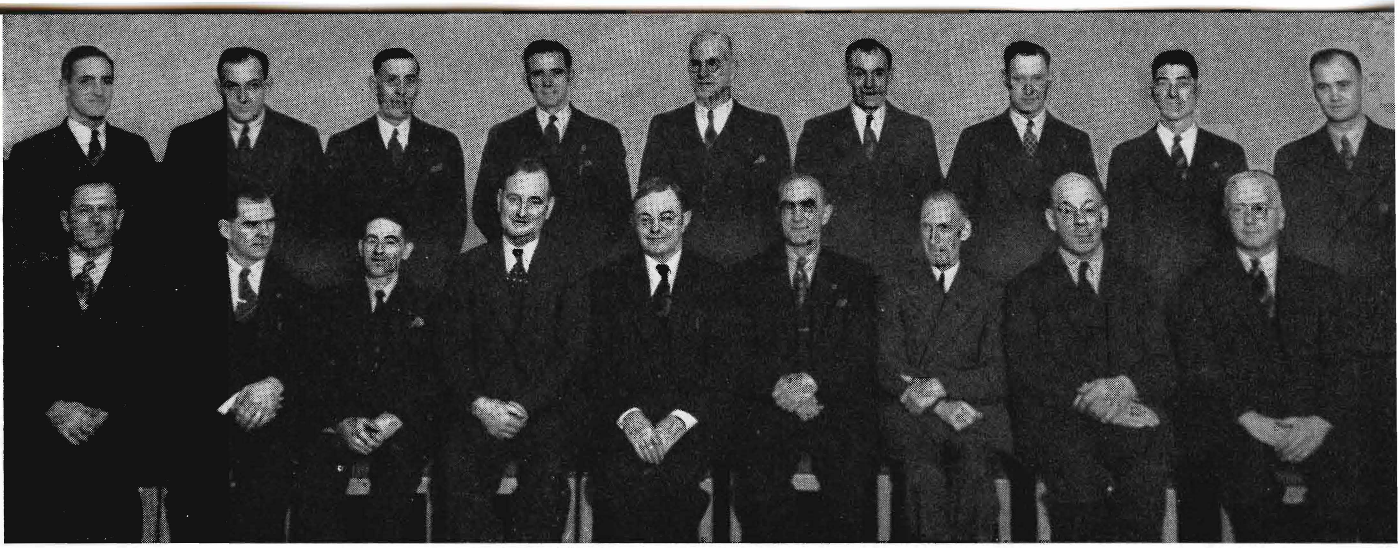
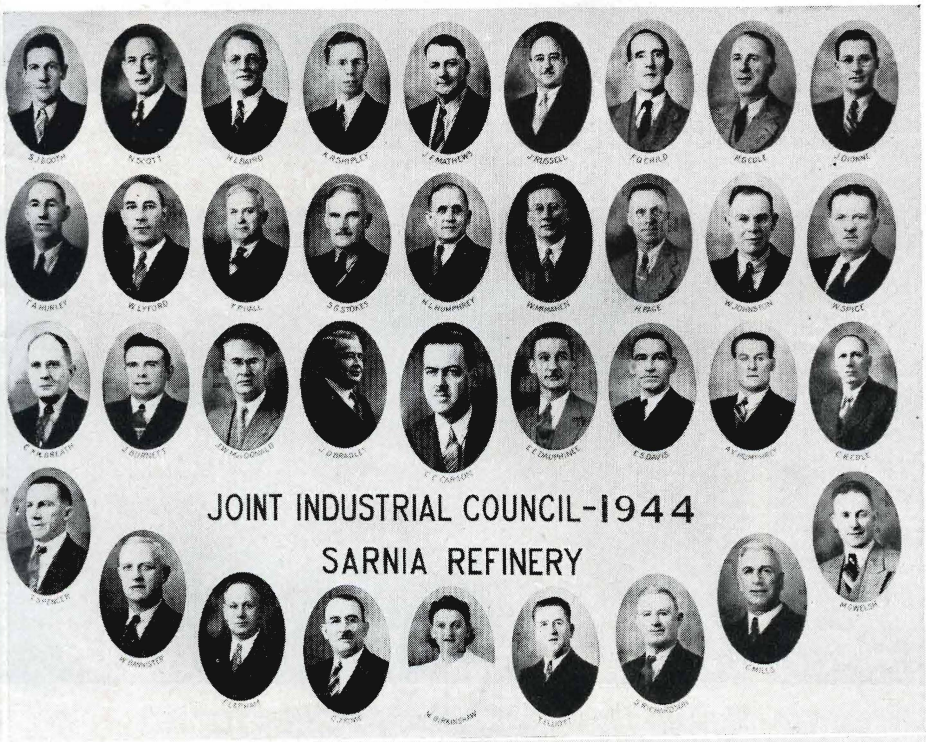
Top row, left to right—A. J. Baker, S. A. L. Jenkins, G. R. McMillin, C. Scrymgeour, G. H. Dyer, W. C. Myres, L. E. Mitchell. *Centre row*—A. T. Fredricks, L. J. Isnor, A. Gates, S. L. Anderson. *Bottom row, left to right*—T. W. O'Neil, W. E. Gates, Alex McLeod, Alex Hart, L. H. Sawlor, L. E. Naugle, J. E. Rodgers.



IOCO REFINERY

Standing, left to right—C. Mackenzie, D. M. Petrie, F. Moore, J. S. McMillan, W. Walker, W. Petrie, E. G. Davis, A. Jopling, W. D. Farrell. *Seated, left to right*—C. W. Tait, V. P. Thomas, J. R. Nicol, R. J. Cameron, A. D. Grant, F. Havill, W. A. Tremaine, H. N. McLellan, G. S. Kidd.



SARNIA REFINERY

(Left)

Top row, left to right—S. J. Booth, N. Scott, H. L. Baird, K. R. Shipley, J. F. Mathews, J. Russell, F. D. Child, R. G. Cole, J. Dionne. *Second row from top, left to right*—T. A. Hurley, W. Lyford, T. P. Hall, S. G. Stokes, H. L. Humphrey, W. McMahen, H. Page• W. Johnston, W. Spice. *Third row from top*—C. Kilbreath, J. Burnett, J. W. MacDonald, J. D. Bradley, C. E. Carson, E. E. Dauphine, E. S. Davis, A. V, Humphrey, C. R. Cole. *Bottom row, left to right*—T. Spencer, W. Bannister, F. Lapham, C. J. Rowe, M. Birkinshaw, T. Elliott, S. Richardson, C. Mills, M. G. Welsh.

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(Lower left)

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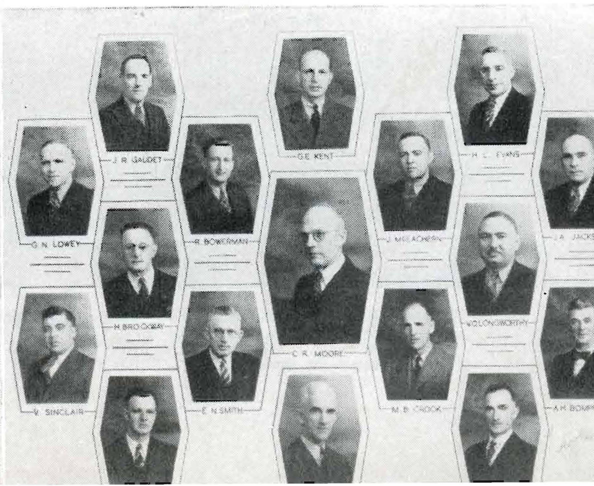
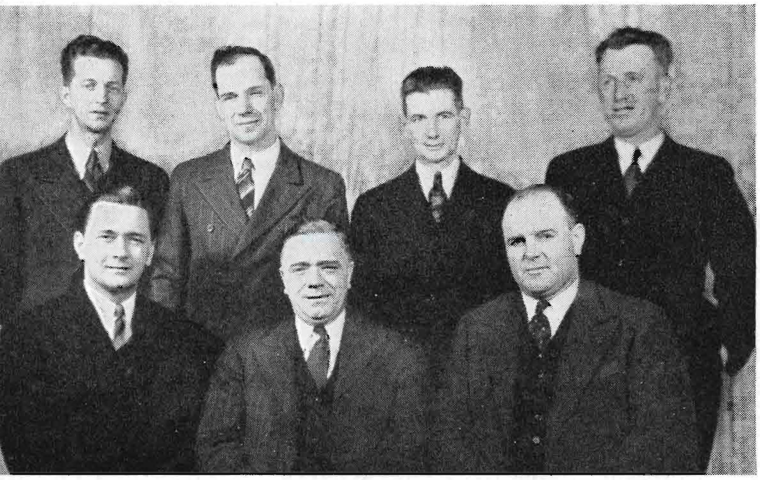
REGINA REFINERY

(Below)

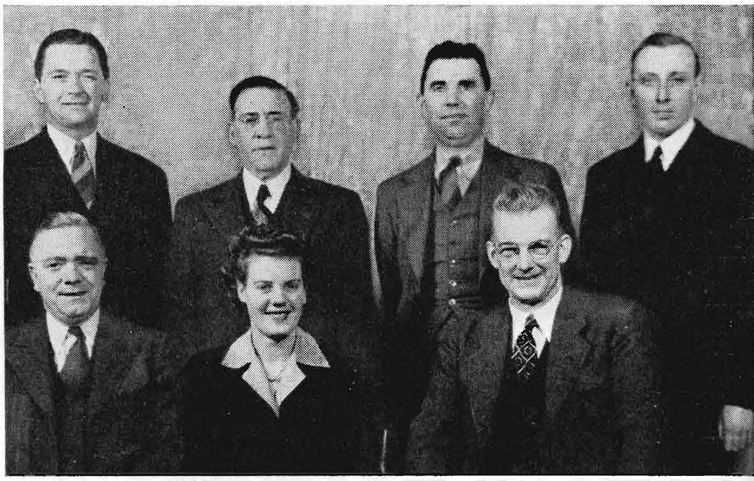
Top row, left to right—J. R. Gaudet, G. E. Kent, H. L. Evans. *Second row from top, left to right*—G. N. Lowey, R. Bowerman, J. McEachern, J. A. Jackson. *Middle row, left to right*—H. Brockway, C. R. Moore, W. O. Longworthy. *Second row from bottom, left to right*—V. Sinclair, E. N. Smith, M. B. Crook, A. H. Bomphray. *Bottom row, left to right*—R. G. Dixon, W. W. Wightman, T. Robinson.



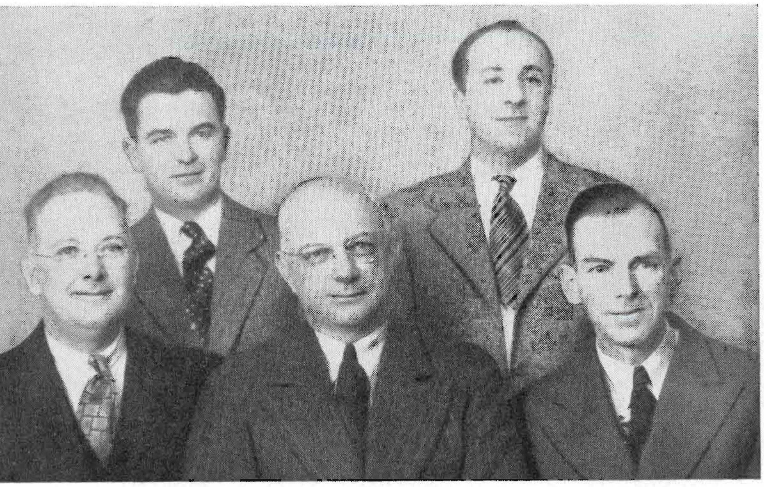
1944 INDUSTRIAL COUNCILS



ST. JOHN'S, NFLD., JOINT INDUSTRIAL COUNCIL — *Standing, left to right*—C. W. Reid, D. B. Sexton, C. Fry, A. Greenslade. *Seated, left to right*—B. A. Valde, A. T. Roblin, C. C. Platt.

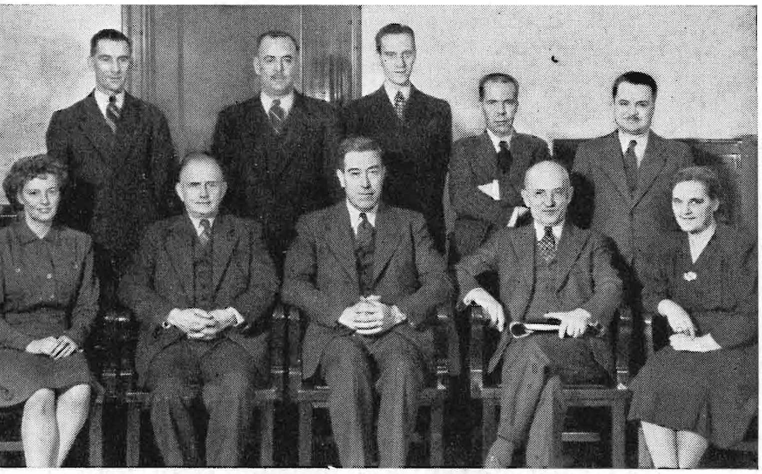


ST. JOHN'S, NFLD., OFFICE COUNCIL—*Standing, left to right*—B. A. Valde, A. R. Evans, F. W. Graham, L. Wight. *Seated, left to right*—A. T. Roblin, B. B. Thompson, H. Woods.

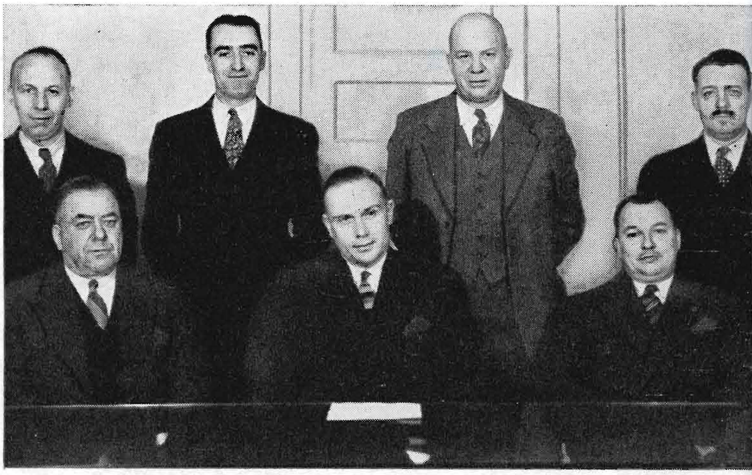


SYDNEY, N.S., JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—P. McFadyen, A. Tomko. *Seated, left to right*—R. D. Jones, F. C. Wyman, (Chairman), C. K. Wightman.

ST. JOHN, N.B., JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—F. T. Gaynes, C. W. Dompierre, C. A. Woodley, T. E. Mantle. *Seated, left to right*—J. S. Murphy, H. F. Jardine, (Chairman), W. F. Elliott.



MONTREAL OFFICE COUNCIL—*Standing, left to right*—P. H. Spencer, E. B. Baikie, C. Lafortune, S. Chisnall, P. E. Belanger. *Seated, left to right*—Miss M. Felsen, D. F. Harris, W. T. A. Bell (Chairman), J. A. Leclerc, Miss R. Petit. (Absent—M. Barbeau.)



OTTAWA JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—M. R. Horne, H. L. Piche, A. W. Blade, J. D. Brisson. *Seated, left to right*—A. L. Pearce, C. H. Everett, A. A. D'Aoust.

Marketing Division

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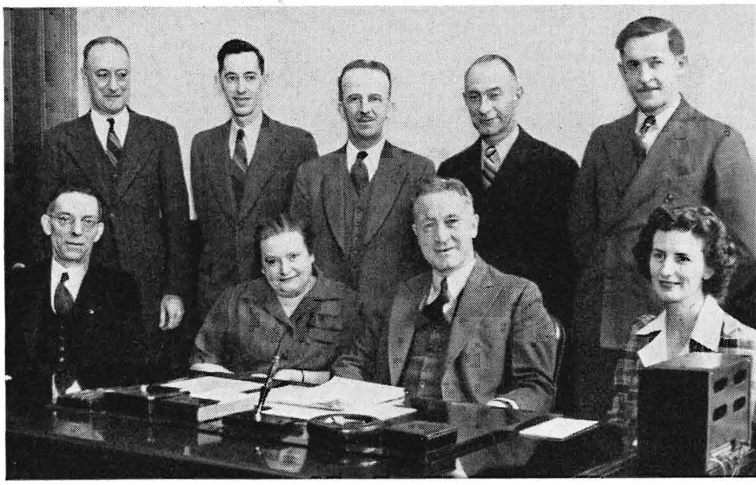
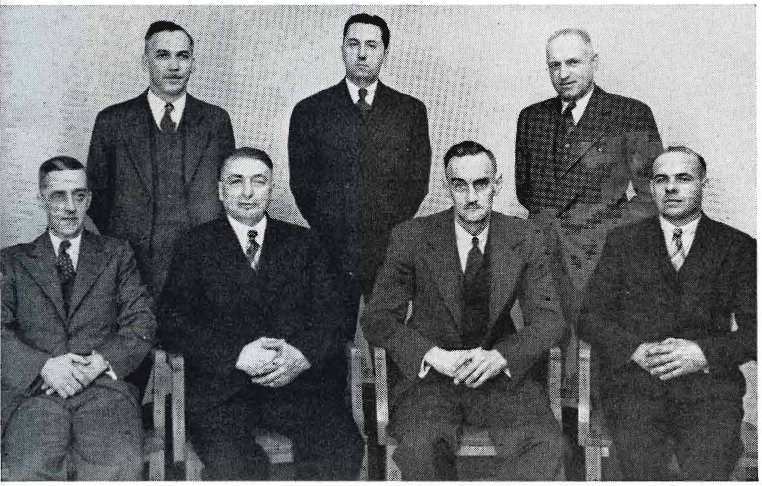
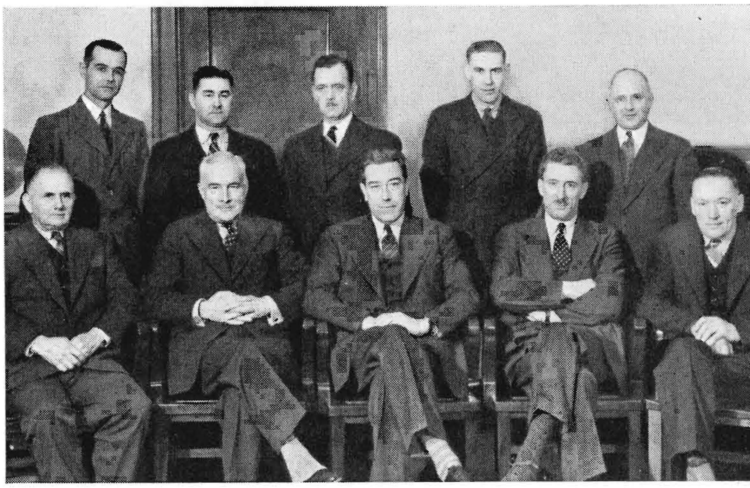


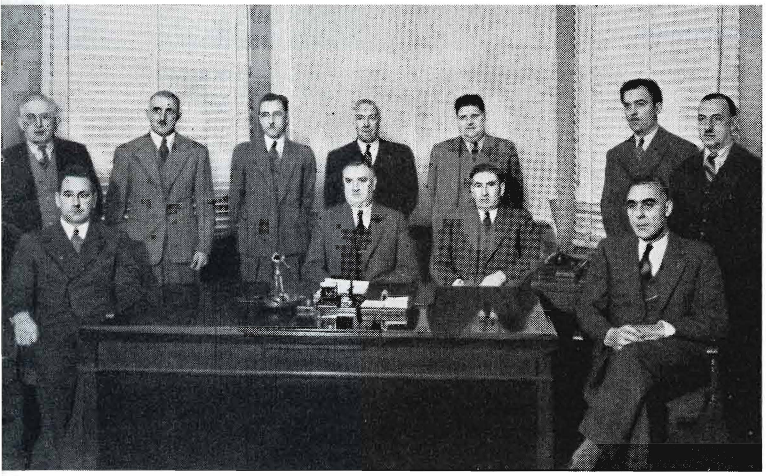
HALIFAX OFFICE COUNCIL—*Standing, left to right*—G. C. Teed, R. O. Richardson, W. G. O'Neil, F. W. McPherson, R. A. Carroll. *Seated, left to right*—J. W. Mahen, Miss F. I. Phillips, J. G. Dunlop (Chairman), Miss M. A. Coolen.



QUEBEC JOINT INDUSTRIAL COUNCIL—W. Aubin, D. F. Kindellan, R. L'Heureux. *Seated, left to right*—Geo. Marchand, Geo. Lamontagne, H. J. Hamilton, Ed. Dube.

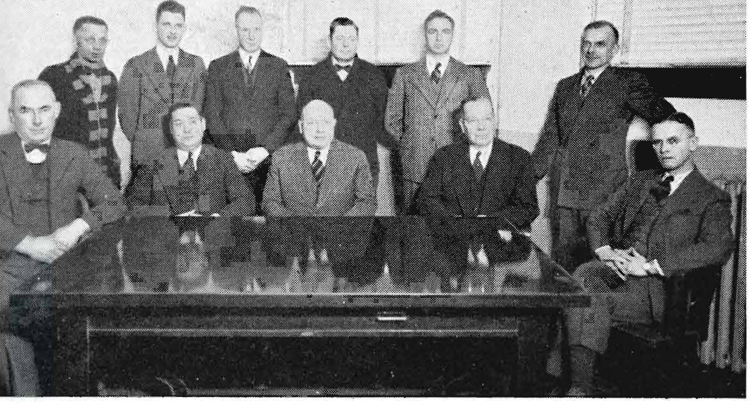


MONTREAL JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—A. Brault, A. Dubreuil, L. Deschamps, I. Henders, R. Dicaire. *Seated, left to right*—D. F. Harris, A. E. Patterson, W. T. A. Bell (Chairman), D. Kerr, W. Winchester.



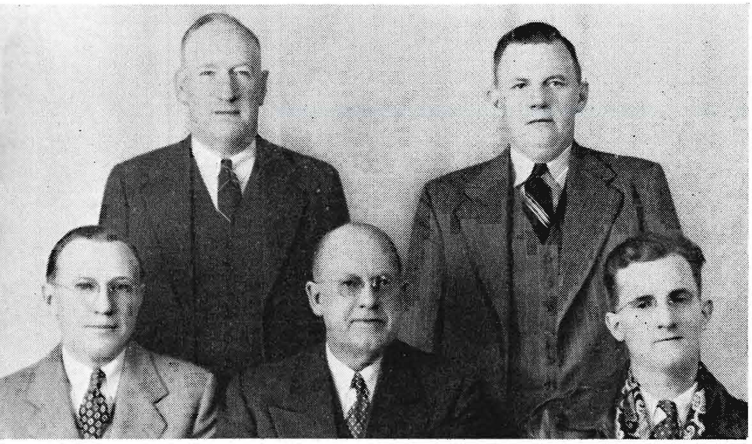
TORONTO JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—M. L. Marshall, F. Roadhouse, G. Ridler, A. Thomson, W. R. Kedwell, H. J. Worboys, H. C. Wilson. *Seated, left to right*—R. A. Stone, H. L. Magee, C. A. Robinson, J. P. Warren.

TORONTO OFFICE COUNCIL—F. Turner, E. J. Cluskey, I. Luttrell, A. F. King, H. B. Reid, E. Norris. *Seated, left to right*—S. E. Creighton, W. D. Norval, H. L. Magee, J. W. Sutton, Miss K. Lacey.

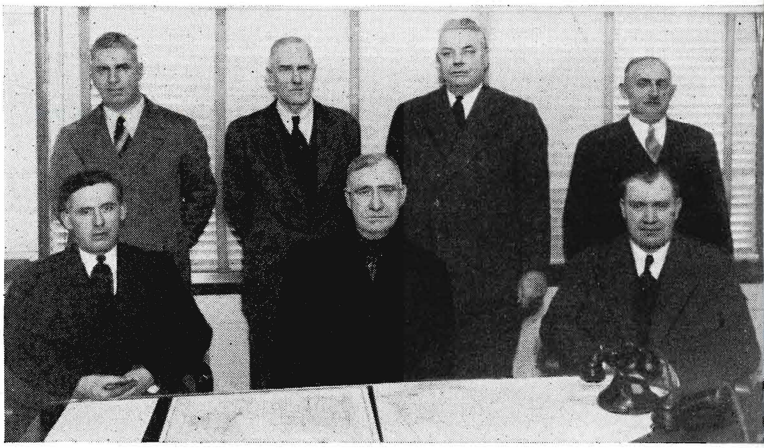


HAMILTON JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—R. V. Chester, R. J. Sinden, F. T. Crisp, C. J. Hildreth, J. Low, J. L. Brown. *Seated, left to right*—H. W. Hill, T. H. Wilkinson, L. W. Ouelette (Chairman), R. C. Aldridge, L. D. M. Johnston.

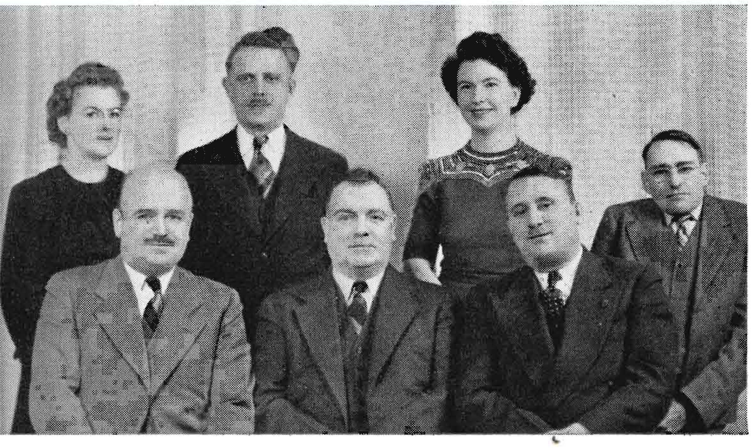
WELLAND JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—G. C. Herrington, A. R. Ogilvie. *Seated, left to right*—A. R. Hume, J. R. Henderson, W. C. Wilds.



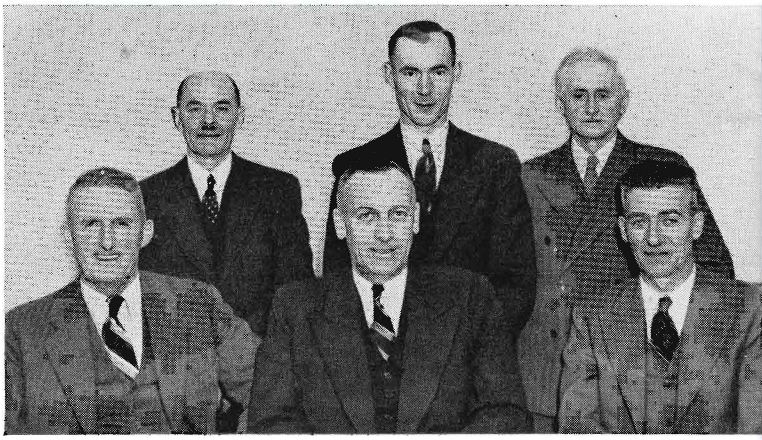
SARNIA JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—L. W. Harper, A. F. McLachlin. *Seated, left to right*—F. W. Kelch, F. H. Kern, W. V. Atmore.



WINNIPEG JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—A. W. Whitford, W. Scaife, L. H. Griffiths (Chairman), W. Corrie. *Seated, from left to right*—M. Neill, Bruce Tulloch, H. J. Briggs.

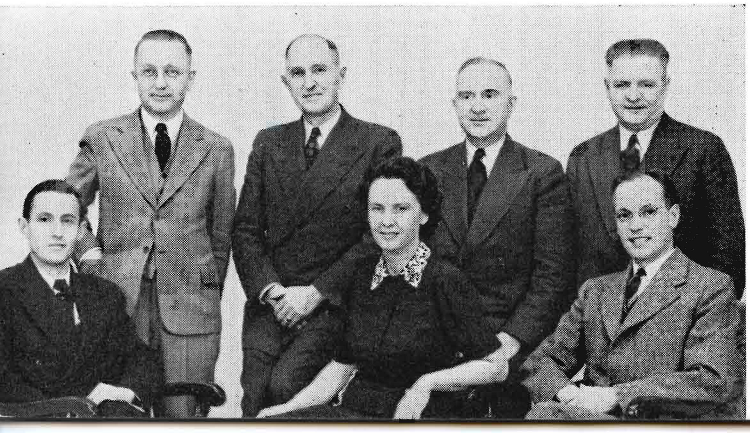


REGINA OFFICE COUNCIL—*Standing, left to right*—Miss R. V. Ross, P. J. Joslin, Miss A. M. Moore, J. L. Brown. *Seated, left to right*—W. J. Plant, D. J. Avison (Chairman), E. T. Raike.

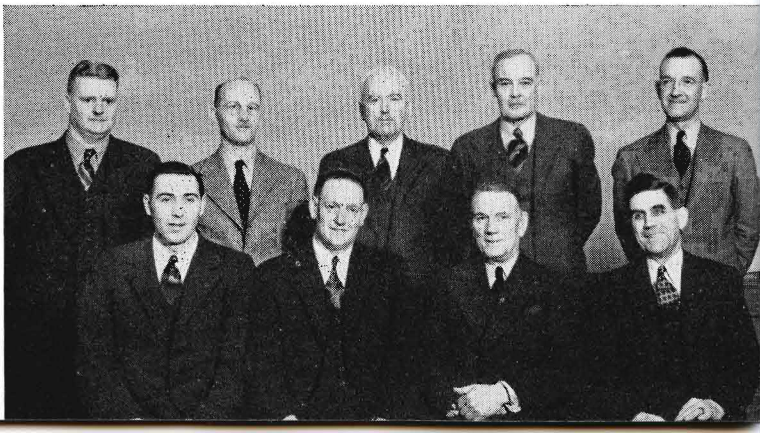


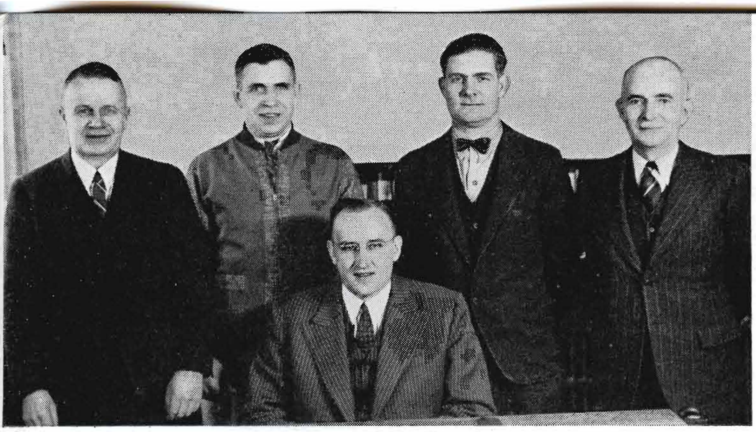
SASKATOON JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—T. Potts, V. Smith, E. F. Hyde. *Seated, left to right*—J. W. Moffatt, J. A. L. McNaill (Chairman), L. O. Brown.

EDMONTON OFFICE COUNCIL—*Standing, left to right*—L. H. Cobbledick, S. R. Stevens (Chairman), R. J. Jamieson, J. Whittaker. *Seated, left to right*—J. D. Richards, Miss H. M. Shantz, J. R. Wilson.

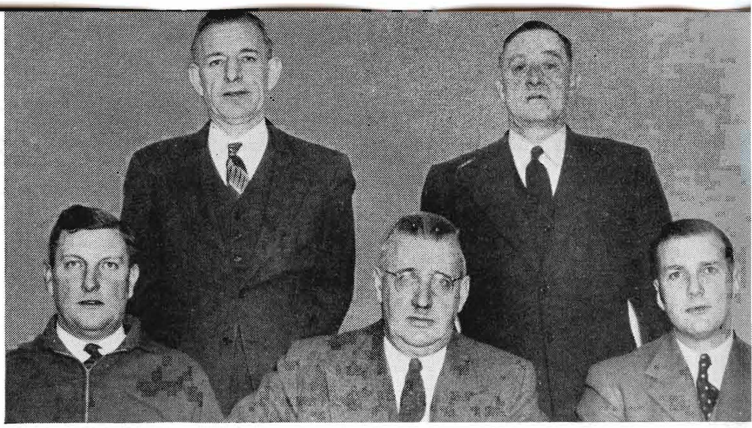


VANCOUVER JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—J. McCurrach, C. A. Foster, W. C. Garbutt, E. Dickinson, M. O. Corkill. *Seated, left to right*—J. MacWilliam, A. Hilton, R. M. Pidgeon (Chairman), F. H. Betait.

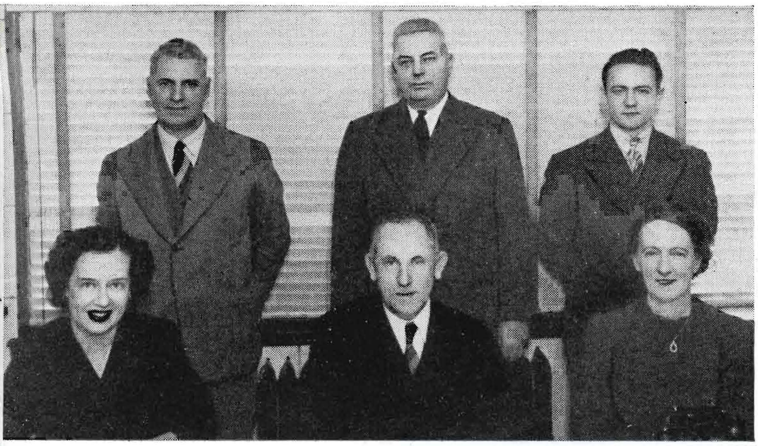




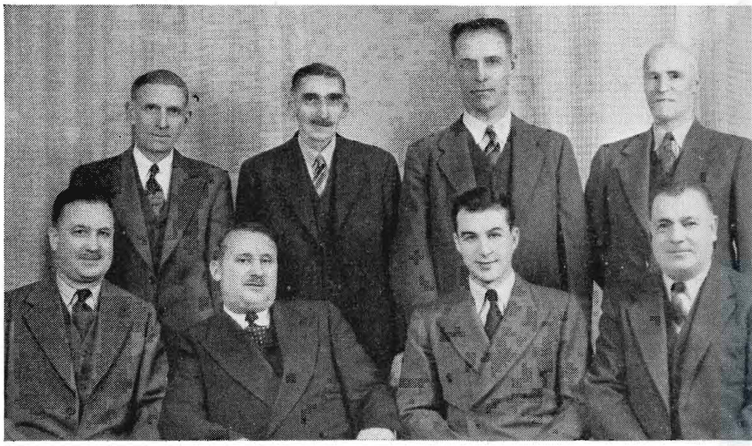
LONDON JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—J. S. Garner, J. J. Baker, C. L. Bloomdale, A. B. Yeo. *Seated*—G. J. Dell.



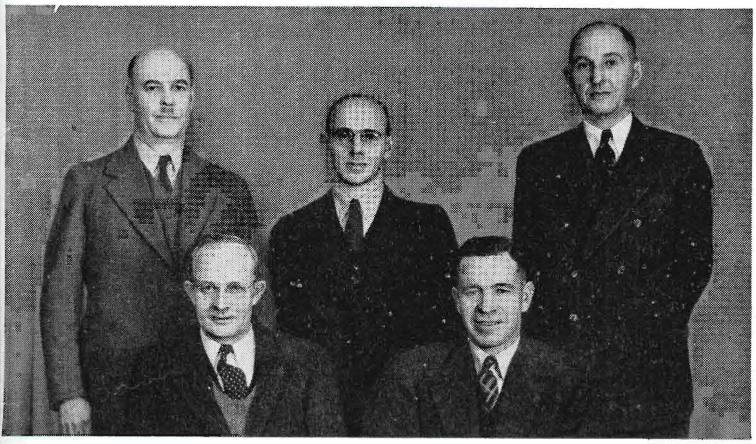
WINDSOR JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—W. A. Roberson, A. Teaney. *Seated, left to right*—W. J. Carmichael, G. M. Thomas, R. R. Weston.



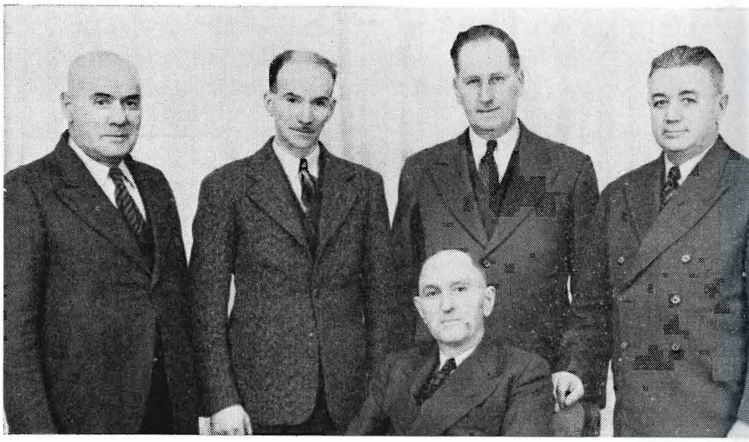
WINNIPEG OFFICE COUNCIL—*Standing, left to right*—A. W. Whitford, L. H. Griffiths (Chairman), C. M. Wilson. *Seated, left to right*—Mrs. M. Hilton, T. G. Clough, Miss I. Cuthbert. (Absent, Mr. J. J. Devine.)



REGINA JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—E. C. Chrystal, A. Grieg, W. E. Tufford, H. Chambers. *Seated, left to right*—J. E. Akitt, E. T. Raike, G. R. Watson, D. J. Avison (Chairman).



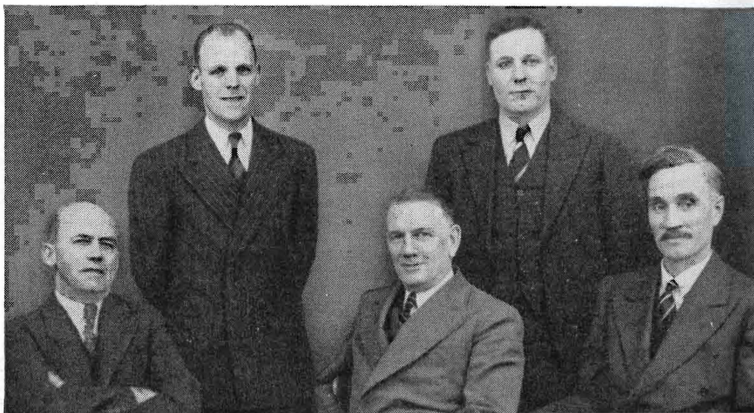
CALGARY JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—F. T. Norris, A. A. Bayley, S. R. Stevens. *Seated, left to right*—C. L. Kerr, A. T. Reid.



EDMONTON JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—D. C. Fisk, J. Walker, J. D. Morrison, F. E. Gallagher. *Seated*—S. R. Stevens.

VANCOUVER OFFICE COUNCIL—*Standing, left to right*—W. C. Garbutt, W. J. S. Chatwin, N. C. Grainger, V. C. Carter, R. Sutcliffe. *Seated, left to right*—Mrs. J. Kain, R. M. Pidgeon (Chairman), Miss N. McLaren, C. F. Waring.

VICTORIA JOINT INDUSTRIAL COUNCIL—*Standing, left to right*—H. G. Bothwell, G. R. Guillemaud. *Seated, left to right*—P. E. Corcoran, R. M. Pidgeon (Chairman), H. W. Bigsby.



J. H. McLEOD PASSES

Was President of Royalite Oil Company

J. H. McLEOD

J. H. McLEOD, President of the Royalite Oil Company, passed away suddenly on June 9th.

Mr. McLeod was one of Canada's pioneer oil-men. Born in Petrolia, Ontario, the home of the Canadian oil industry, his active association with the oil business began at the age of fourteen when he decided to learn the drilling trade. However, about the time his apprenticeship was completed oil became plentiful and drillers were little in demand, and Mr. McLeod turned his hand to refining in the M. J. Woodward Refinery. He did not like refining, however, and when there came a boom in drilling in Bothwell he was quick to return to his first love.

He remained in Bothwell until 1916, when he was placed in charge of exploratory drilling in Western Ontario with the Carman-Fairbank Company.

In 1920 he joined Imperial Oil Limited and supervised the completion of tests which the company was undertaking in Western Ontario. He was then sent to the West as drilling foreman and in March of 1921 was appointed manager of the newly-formed Royalite Oil Company Limited.

After two years in this capacity Mr. McLeod was transferred to Peru as assistant manager of operation there. Returning to Western Canada in 1925 he was appointed manager of the Dalhousie Oil Company. In 1927 it was decided to place all Imperial subsidiaries in the West under one management and this was entrusted to Mr. McLeod.

To the family of the late John McLeod his many friends at Imperial Oil extend deepest sympathy.

CAPTAIN MURRAY GERRARD PASSES

Capt. Murray Gerrard

It was with the deepest regret that his many friends heard of the death, after a long illness, of Captain Murray Gerrard on May 8th.

Captain Allen Murray Gerrard was a native son of British Columbia, having been born August 15, 1892, in Ladner, B.C. He followed the sea from an early age and while still a young man obtained his Captain's papers. After working on towboats mostly engaged in towing scows of ore, he was appointed Shore Captain for the Granby Company at Anyox, B.C. His career with Imperial Oil Limited began in June of 1926.

A Master Mariner, Murray Gerrard was a member of the Canadian Merchant Seaman's Guild. He was the original Master of M. V. "Marvolite," the Company's first marketing tanker on the Pacific Coast, transferring his flag to the M. V. "Beeceelite" when the second and larger boat went into service in February 1938.

In early 1939 he was appointed Shore Captain and served at this post until the illness from which he never recovered overtook him.

Funeral services were held for Captain Gerrard in Vancouver on May 10th, followed by cremation, and final tribute was paid on May 30th when, as he had requested, the ashes were committed to the deep from the deck of the "Beeceelite".

The Imperial Oil Review joins with the many friends of the late Captain Gerrard in extending sincere sympathy to his family.

Fashion Show

★ What the well-dressed business girl will wear was displayed recently by ladies of the 56 Church Street and Leaside offices before an audience of more than 1400. The occasion was a fashion show put on by the Imperial War Services Group in Toronto, on the evening of March 21st.

Put on with the co-operation of the T. Eaton Company, the fashion show was an outstanding success. The auditorium was completely sold out and The War Services Group netted more than $550.00.

During the evening lucky number draws were held with prizes ranging from make-up kits to an Atlas battery. G. H. Smith, Chairman of the Board of the Company, made the first series of draws and C. A. Eames, Vice President, made the second series.

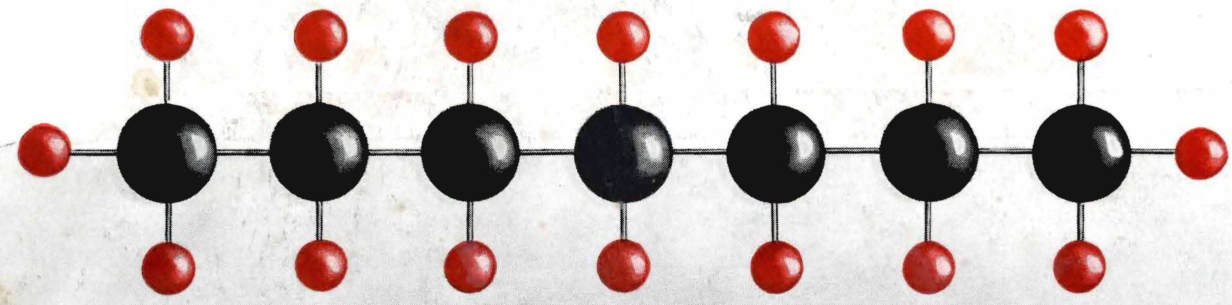
An event of the evening was the modelling of children's clothes made by the War Services Group for the Red Cross. The little models "stole the show."

Pictured above are two of the pretty models. They are:—Miss Jean Robertson of Ontario Division office at Leaside (left) and Miss Helen Muirhead of the Aviation Sales Department at 56 Church Street, (right).

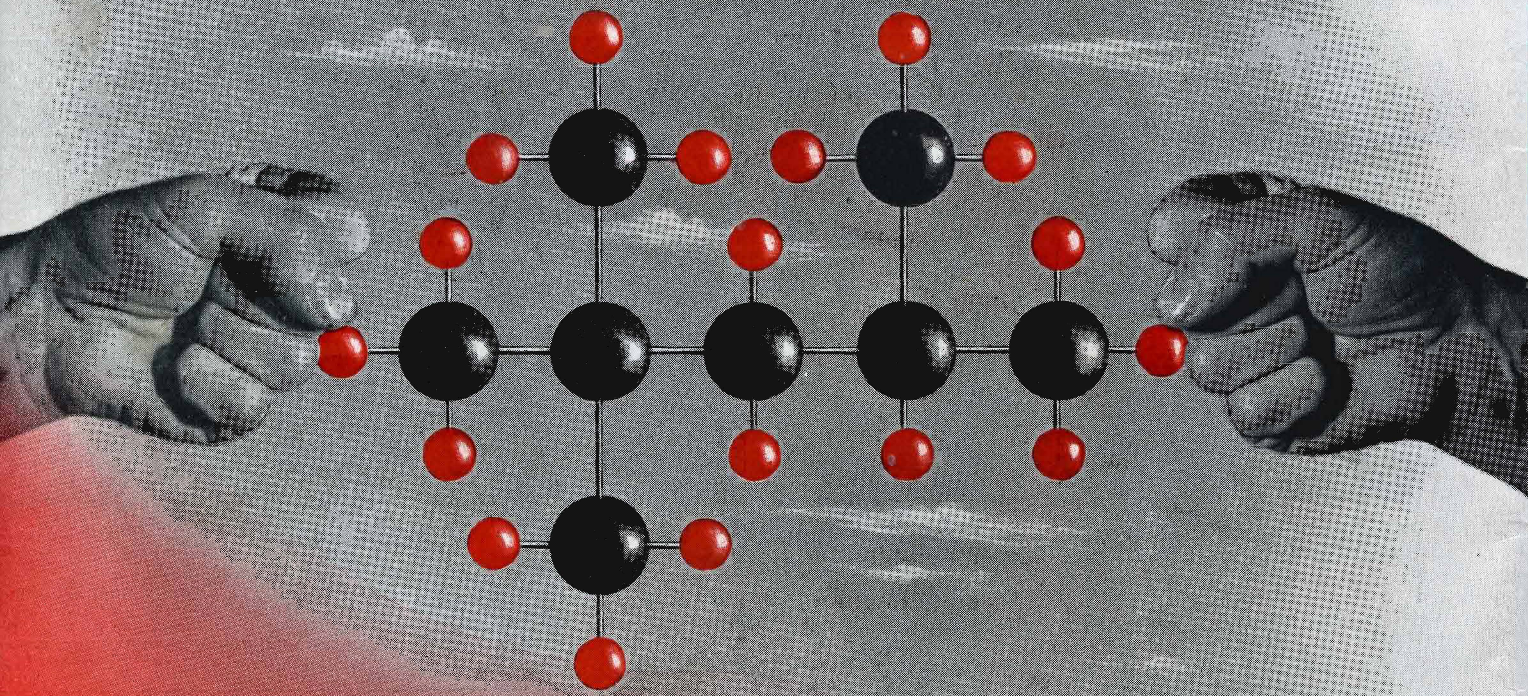
During the evening lucky number draws were made for a number of different prizes. Mr. G. H. Smith and Mr. C. A. Eames made the draws with the assistance of Miss Vera Wilkinson, President of the War Services Group. Mr. Smith is shown making a draw in the picture to the left, and Mr. Eames in the picture to the right.

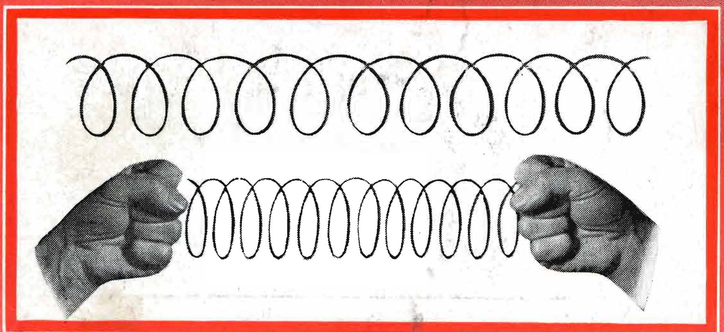
The six little girls shown here modelled some of the children's clothes which the War Services Group has made for the Red Cross. They are:—(left to right)—Barbara Wagner, Melinda Lee Clarke, Lynn Murray, Frances Halsall, Bette Pinkham, Pamela Kidson.

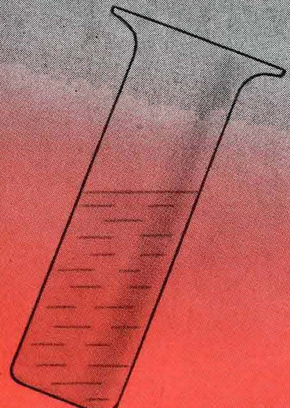
ZERO OCTANE



100 OCTANE







The skinny chain molecule at the top makes a very poor gasoline. The compact molecule below is the one that packs the punch. Both are made up of the same atoms of hydrogen (red) and carbon (black). The way the atoms are arranged makes all the difference. Compactly arranged atoms form the molecule of a gasoline called iso-octane, which, when vaporized and mixed with air, can be subjected to very great pressure in an engine and yet burn without knocking. For that reason it can generate more power. Iso-octane is needed for high octane gasoline, vital to victory in the air.