REVIEW IN REVIEW

Togetherness at the Kenyons . . . During working hours most writers inhabit a small hostile private world that is out-of-bounds to women, children and dogs. Not so Ron Kenyon, author of the Wilder Penfield article, page 2. Kenyon may go down in history as the man who put magazine writing on the family plan.

In the Kenyon household, Ron, a newspaperman since 1942 and a free-lancer since 1955, is head writer. He specializes in medicine and science pieces but is willing and able to write anything from advertising copy to patter for a night club comic. He's also a virtuoso on the typewriter, and has typed all his own manuscripts since one black day when he had to relieve a plodding professional typist who obviously wasn't enjoying her occupation.

His brunette wife, Sheila, is a nurse by training, a housewife by necessity and her husband's assistant by preference. With instruction from Ron, and a University of Toronto night course in journalism, she became adept at background research, interviewing and broadcasting. She also manages the team's bookkeeping and sales, tends their house in suburban Toronto and is learning to write.

When the parents have a manuscript ready for the mail eight-year-old Cliff Kenyon gets into the act. He kicks stamps, This professional togetherness pays off for all. "Housework bores me," explains Sheila. Ron adds, "A man and woman are a team in giving notices and remembers details that escape me completely."

But it doesn't necessarily follow that Kenyon is less temperament than any other writer. "When I go to bed," says his wife, "he ROARS at me."

Six B.C. And All That . . . While working on How Can We Get Better Roads?, page 22, Michael Jacot delved into the history of the "modern" controlled-access highway. Turns out that some planning genius in Assyris dreamed up the whole idea 2,500 years ago. The principle of controlled-access was applied to the world's first known highway, which linked the Persian Gulf with the Mediterranean in six B.C.

Even so the road became jammed in the city of Nineveh, what with rush-hour chariot traffic to the suburbs, women drivers and all. Whereupon the reigning monarch decreed death, by impalement on a pole, for anyone whose property was encroached on the right-of-way . . . Did we hear somebody complaining about modern expropriation methods?

Do we need a highways conference?

In the last 15 years the builders of roads in this country have waged a battle but losing battle with the ubiquitous automobile. In that time motor vehicle registrations have increased 190 percent (compared to a population increase of 42 percent). There are now five million vehicles on the roads: 10 for every mile of street and highway; one for every 3.5 persons. We're short of expressways, paved highways and access roads. We live in an age of traffic jams, stone-pitted windshields and frizzled nerves.

In the next 20 years motor vehicle registrations will probably double. Some provinces are already preparing to meet the traffic onslaught; they have calculated what roadwork is needed and what it will cost. Ontario has been a leader in this regard, with exhaustive engineering studies on roads, streets and highways in 1956 and 1958. But this in itself is not enough. Because Canada has no national highways agency (unlike most other major automobile-using countries) our provinces, cities, counties and municipalities are tackling the job independently. Once this system was good enough. Now, say the professional planners, road-building is too complex, physically and financially, for any regional body to handle alone. What is the solution? One answer may be more provincial planning aid for cities. Ontario tried this in Port Arthur and Fort William, with some success.

Another answer may be a national highways agency to help plan, design and integrate the interprovincial and international highways. The idea is not new. Among others, Dr. E. G. Pleva, planning authority at the University of Western Ontario, for years has advocated such co-operation.

"The problem has been in how to get the federal government to participate without having to go through Confederation again," he told us. Pleva thinks the federal government's share in building the Trans-Canada highway has now set a precedent.

All planners question approved of a national agency, but differ in opinion on its duties and powers. Most feel it should be an advisory, not a controlling body. The central director of the Canadian section of the Institute of Traffic Engineers, Ray Desjardins, adds, "The federal government should show more leadership in the development of design standards. It should also be ready to carry out top-level research."

Hugh Lemon of the Town Planning Institute of Canada says, "More federal assistance should be given to provincial and local authorities."

The matter of financing does, at least, need examination. In the past, roads have to a considerable extent paid their own way, through the various taxes and licensing fees imposed upon highway users. But if highway costs continue to rise, should more of those costs be borne by general taxation, inasmuch as good roads benefit all Canadians? And should highway-user taxes be more clearly and specifically earmarked for highway construction?

These are points that need expert thought and discussion. An eminently sensible first step appears to be that suggested by Col. C. W. Gilchrist of the Canadian Good Roads Association: a federal-provincial highways conference—to lick the roads problem before it licks us.
The man who maps the human mind

by Ron Kenyon

Canada’s famed Wilder Penfield, neurologist and surgeon, draws from his intimate knowledge of the brain for these provocative views on education.

After thousands of years of struggle and doubt, man is beginning to know his own mind.

Some day this knowledge may restore the mentally sick, more rapidly and suggest ways of rehabilitating some kinds of criminals. It may explain how to prevent illtreatment, hatred, cruelty and how to educate children more surely in knowledge and good character.

In the studies of the brain, and its potential, few men are more expert than Dr. Wilder Penfield of Montreal, neurologist, neurosurgeon, author and philosopher. Certainly no Canadian has been more widely honored for scientific achievement. This doctor’s son who once did not even want to be a doctor himself, has:

- Been awarded the British Order of Merit (there are only 24 O.M.’s in the world at any one time. Among the other 23 today are Sir Winston Churchill, Lord Attlee, poet T. S. Eliot and President Eisenhower);
- Received the Cross of the Legion of Honor;
- Been given the U.S. Medal of Freedom with Pinback;
- Been elected a member of Russia’s Academy of Sciences (one of two Canadian members);
- He is also a fellow of the Royal Society of London, the Royal College of Physicians and Surgeons of Canada, an Honorary Fellow of the Royal College of Surgeons, the Royal Society of Medicine and Royal College of Physicians of England, and of Marischal College, Oxford.

Why has Penfield, among Canadian doctors, been so signally honored? Some of the reasons are well known. Penfield has mapped the human brain like a cartographer drawing the outlines of an unknown land. He showed which areas of the brain control speech, movement and intellect. He revealed a mechanism in the brain, more precise than what we call memory, in which is stored a treasury of past experiences. He proved, too, that epilepsy, always thought incurable, can be treated surgically. Finally, he set up at the Montreal Neurological Institute, one of the finest neurological and neurosurgical research teams in the world.

These facts are, on the whole, well-known. Yet there is another side to the Penfield story, an outgrowth from his studies of the brain. It is his increasingly important role in education. To Penfield this is a “hobby” though to other men it would represent the culmination of a lifetime of endeavor.

He holds “certain heretical views,” as he told the first Canadian Conference on Education in 1958. “That these views are considered important by educators is borne out by the fact that he was named chairman of that conference.

In essence, these views are expressed in Penfield’s own words: “Educational experts should plan curriculums with more consideration of the unfolding function of the brain. They should watch the biological clock of childhood’s changing capabilities.”

The brain, says Penfield, is not a machine like other machines. “It is a living, growing, changing mechanism—the most complicated and fascinating of all mechanisms.” Educational curricula should be planned to take advantage of the growing brain and its changing characteristics.

This is particularly true of the teaching of languages, in which Penfield has been interested for years. Once, before a trip to Russia, he tried to learn Russian in three weeks, and failed.

The ideal time to learn languages is in childhood. Penfield maintains. This means that they should be part of the public school curriculum, not the secondary school curriculum, as is present in most areas.

“Any country could be truly bilingual or even trilingual if they would let children learn when they are ready to learn,” says Penfield. “During the earlier period the child is developing, within the brain, language units which he will later utilize for all additions to his vocabulary. These are units of pronunciation and also of understanding. The unit is recorded in the nerve cells of the brain for use in that language immediately or at some later time.”

He later life, says Penfield, the individual may expand his vocabulary from 300 to 10,000 words, but he will probably pronounce all the words acquired at a later age in a manner that brings the accent of his early teachers.

Thus, these earlier units are more than mere skills of tongue and lip. They are “units of sound and units of thought established in a physical form within the brain. A child uses these units over and
over again while constructing the nerve cell basis of each new word.

Children of central Europe, who hear many languages spoken casually around them as they grow up, are usually better linguists than Anglo-Saxon peoples who hear only one language in childhood and then try to learn others in high school.

Until languages are taught in public school, Dr. Penfield believes parents should let children hear foreign tongues in the home. He himself hired a German governess and instructed her to speak only German in the nursery. His own children learned fluent German.

Will learning several languages at once confuse a child? Penfield says this is not so, especially if different languages are studied in particular places. If German alone is spoken in the nursery, the child quickly learns to associate German sounds with that room. Elsewhere, he may think in English, but in the nursery he will think in German.

Penfield has pointed out a particularly interesting biological fact related to the learning of speech. Although the two hemispheres of the brain are identical and could, through interchanging, only one hemisphere actually “takes charge.” If this dominant hemisphere is damaged when the child is very young, the result may not be apparent in terms of hampered speech response. The undamaged hemisphere of the brain takes over without much trouble. If, however, the child is older, and speech patterns have already been established, damage to one hemisphere may result in permanent handicaps because the brain is less flexible. Thus it is an advantage if one hemisphere cannot “switch over.”

Similarly, if an older child or adult learns a foreign language after his basic speech units have been formed, he will speak it with an accent, because he cannot form the new basic units for the foreign tongue.

With his intimate knowledge of the brain’s potential, Penfield also speaks out strongly against our present concept of retirement. Unlimited rest “corrodes the mechanism of the brain,” he says. At 60 the body has passed its greatest strength but the brain is normally ready for its best performance in certain fields.

“Retirement should be the time for embarking on new work,” Dr. Penfield once told a Toronto audience recently. “It may be that the last work of the old man’s hands is to serve society best, and him as well.”

The preparation for a second career should be undertaken long before retirement, preferably in the forties, says Penfield.

“Herein lies a great educational opportunity—the training of retiring men for second careers. Not everyone will be ready to decide for himself what his second career might be. Corporations and colleges and governments may have to put such men through a set of psychological tests. This will call for new techniques of testing. Those who pass should be entitled to training for new jobs... Those who explore this field will discover, I suspect, that the broad early education serves the specialist best.

Although Penfield’s utterances have attracted wide interest, he never seeks acclaim. He speaks of himself with great reluctance. When he makes a pronouncement it is without fanfare. Yet behind the quiet statements, lie years of study and thought. They have the impact of truth which may not be recognized at once but which gradually adheres.

Penfield’s Institute, like the man, is not ostentatious. The gray stone architecture is reminiscent of the medieval. The entrance hall is austere marble; the corridors dim and cool. The operating rooms are the most modern available. Penfield has two private offices at the Institute, one upstairs, where he usually receives distinguished visitors, of which he has an inordinate number, and one on the ground floor, where he interviews patients. Though both are comfortable, it is typical of the man that the office for patients is slightly the better.

The man himself is 67. He is tall and slender, with high forehead, kindly eyes and wide mouth. He dresses well but not nattily. He is very much the Victorian or Edwardian gentleman. To visitors he serves tea and a couple of biscuits, sometimes with the remark that tea is the most widely used drink in the world.

Yet Penfield is much more than just a Victorian gentleman. If in some respects he seems to enjoy being old-fashioned, it is presumably because he has recognized its graces. But there is nothing old-fashioned about his surgery. If he appears gentle and mild, this is not to be mistaken for meekness; he once coached a Princeton football team to the most successful year the freshmen ever had. If he seems the soul of courtesy, he can also be impatient, incisive and even rude. It seems that little could disturb the orderly routine of the Montreal Neurological Institute or the silent efficiency of Penfield’s own rooms. Yet this is an order created out of strife and struggle. One suspects that, if the ceiling fell in, Penfield would be quiet, unexcited and efficient.

Once, during World War I, Penfield was aboard a ship that was torpedoed. As the explosion flung him into the air, he remained observant and analytic enough to assess and record his own feelings. They were: “This can’t be the end. There are so many things I have to do.”

Yet Penfield is not unemotional. Inefficiency, or even fancied inefficiency can put him into a considerable rage. Thus, he is apparently many things and many men at the same time—the sort of personality that appears in truly great men like Churchill and de Vincz. Perhaps it is this free-ranging person-ality that enables him to wrestle with problems that defeat lesser men. It is common belief that religion and science don’t mix. Not so, says Penfield firmly. He is an elder of the Presbyterian Church, has written a novel, No Other Gods, based on Biblical times and has even preached sermons. “Science,” he says, “casts no light on the nature of the mind or spirit. Perhaps it never will.”

Materialism, he adds, is not scientific. It is a matter of faith too. “A kind of religion to which many cling in ignorance.”

Penfield’s deep interest in religion reaches back to boyhood in Spokane. His mother, a Sunday School teacher, instilled a strong Biblical background in him (his writings and speeches are still richly adored with Biblical quotations).

Oddly, Penfield did not want to be a doctor. He had seen the hard life his father lived. He chose Princeton as his university partly because it had no medical school. He received his degree in philosophy in 1913 and won a Rhodes scholarship to Oxford. His study of philosophy before medicine had a highly important effect on his life, and may partly explain his later interest in writing and education.

At Oxford he fell under the influence of Sir Charles Sherrington, Britain’s most eminent neurophysiologist. Penfield decided to become a neurosurgeon.

Once his mind was made up Penfield left no stone unturned. He worked directly with Sherrington and Sir Wil- liam Osler, that greatest of Canadian doctors. Osler, then at Oxford, became Penfield’s chief and had great hopes for Penfield. After the torpedoing incident, for instance, the Oslers took Penfield into their home and nursed him back to health.

Many young doctors would have been content with such an auspicious beginning and would have hung out a shingle promptly on graduation. But Penfield was determined to find out all there was to know about neurosurgery.

He studied at Johns Hopkins University, interned at the famous Peter Bent Brigham Hospital in Boston (where the world-renowned Dr. Harvey Cushing was his chief), then returned to Oxford and worked at the National Nervous Hospital, London, with Sir Percy Sargent and Sir Gordon Holmes. Still later, he studied in Spain with Don Santiago y Cajal and in Germany with Otfried Foerster.

The Penfields had little money during these years. Scholarships took care of the tuition but left little over for a student who had married part way through his training and had four children. Penfield and his wife, Helen, rode bicycles with attachments to carry babies. Perhaps his own difficulties prompted him to maintain a close interest in education ever since.

Between trips abroad Penfield worked at Presbyterian Hospital, New York, and met Dr. William Cottle, a well-trained neurologist. The two men spent a life-time together until Cone died last year. In 1920, Edward Archibald, professor of surgery at McGill, asked Penfield to work toward the foundation of a neurological institute in Montreal. In October of that year, with support from
the Rockefeller Foundation, the province of Quebec, the city of Montreal and private citizens, the Montreal Neurological Institute was planned.

It was an historic but tragic year for, that same autumn, Penfield discovered that his only sister had an incurable brain tumor. He saw that surgery could only lengthen her life by a year or two. Most doctors are reluctant to perform surgery on their loved ones, but Penfield himself operated on his sister. He introduced a technique still used, requiring only a local anesthetic. His sister was able to describe the exact effect of surgery as it went along, making the whole procedure more sure and reliable. At the same time, Penfield kept careful notes. From operations like this he "mapped" the functions of the brain.

The Institute was completed in 1934. Today it serves for research and has a staff of about 30 doctors and 40 to 50 "fellows". On the day it opened Dr. Penfield and his wife became Canadian citizens.

The Institute was just getting into its research stride when World War II broke out. Its facilities were turned over to the treatment and study of war wounds of nerves and brain. It was at MNI that the now-famous tantalum (a rare metal) plate for the brain was first used. Penfield, with Dr. Charles H. Best and Sir Frederick Banting, developed a pill to overcome seasickness and other forms of motion sickness. After the war he and his colleagues settled down again to study the brain and, particularly, epilepsy. They discovered that epilepsy is a sort of short-circuit in the brain, caused by damaged or defective brain cells. By surgically removing the damaged areas, epilepsy could often be relieved.

Still later, Penfield found a mechanism in the brain far more precise than what we call memory. By touching a certain area with an electrode he could cause patients to "recall" events in their lives which they had long forgotten.

More recently, he became vitally interested in education and financial support of research.

"Never has the race between education and catastrophe been so clear," says Penfield. "We are not unteachable. Atomic war is not inevitable. Destruction by it is not completely unavoidable . . . Education is our only hope, our challenge, in the peaceful competition of the future. But, if war should come, our wits might well save us. We would be well advised to spend, on the cultivation of these wits, a sum comparable to what we are spending on defensive forces." In the research field, Penfield is trying to get governments to endow institutions. At present, most governmental grants for research are given annually. In a few cases the grant may run longer than a year. A researcher must state what he hopes to achieve with the money. But Penfield points out that great discoveries are not made that way. Researchers don't know what they are going to find before they look.

"No one could have tossed an edict to discover the law of gravity," he says caustically.

The answer, he believes, is in a plan to provide part of the money for government in the form of endowments. These would enable institutions to carry on whatever studies they liked. The grants, as at present, would be continued for special projects.

Penfield's private life is as full as his professional life. He is a keen skier, tennis player and yachtsman. He has a 500-acre farm at Lake Memphremagog, near Montreal. He likes to entertain house guests and, at Christmas, all guests are supplied with Dickens' A Christmas Carol for readings aloud.

Whatever reasons may be ascribed to his fame, none would include conformism. He speaks his mind bluntly.

He once criticized the Mousey Commission for ignoring science although its terms of reference called for a study of "the arts, letters and sciences." He told a Queen's University medical convention that doctors should be made to study literature and to have hobbies. Of fiction, he has observed that "what the novelist discovers in the hearts and minds of men may be a science in itself. Fiction at its best is a careful search for truth."

On one occasion Penfield managed to get himself fined for contempt of court. Called as a witness in a civil action, he failed to appear. Later, he told the court he had been busy looking after patients. The court was sympathetic but fined him anyway.

For those who want to explore the universe, Penfield has words that are strangely reminiscent of the poet Alexander Pope—and, perhaps, sum up the doctor's philosophy of his life's work:

"The firmament shoveth His handiwork—no doubt of that. But in the brain of man there is a microcosm that is no less vast than that of the universe. In it the secrets of God's purpose are written as well as in the stars. These secrets are of far greater importance to mankind than the laws that control the movements of the stars."

Photographs by Roy Nichols

They'll Grow Anything In Essex

By Pierre de Boinod

Essex County, a 700-square mile tract of southern Ontario farmland, has been called every resilient agricultural and climatic name in the dictionary, from "Canada's sun parlor" to the nation's tomato-land. It is the sort of country on which publicity-minded chambers of commerce can let out all the stops—and in Essex they do.

They speak glowingly of "waving palms and sun-drenched sands"; of sturdy, red-faced farmers tending acres of tobacco and ripe tomatoes; of the factory-dotted industry of Windsor; of the gainst cracker-barrel country stores and a temperature 30 degrees warmer than any other part of Canada. (Its summer mean temperature is one degree higher than Los Angeles.) And strange things is that it is all true.

Essex, at the southwestern tip of Ontario, is the flattest and one of the most fertile and highly-diversified farming areas in the province. It grows everything from peas and corn to tobacco and chrysanthemums. It is also rich in
They'll Grow Anything in Essex

history, tradition, character, scenery, beaches, wildfowl, tourism and amateur smuggling.
Now Essex has a new crop: oil. Last summer Imperial Oil, working with Submarine Oil and Gas and Harvest Petroleums, brought in one of the best oil wells drilled in Ontario in recent years—right in the middle of a corn field belonging to Perry Wright of Colchester. Since then, six other wells have been drilled, four of which have been successful, and more wells are being drilled or planned.

Last year, Ontario’s 1,400 oil wells produced slightly more than a million barrels of oil, over 3,000 barrels daily. One well in the Colchester field now produces at the rate of 170 barrels a day, about six percent of the total Ontario production.

The find has given new life to Ontario drilling activity, Imperial land man Russ Dufton says, “The interest is not so much in the size of the new field, but in the rock formation in which it is drilled. It lies about 2,100 feet below the farmlands, and is called the Trenton formation. Oil companies previously have had little luck with this formation which underlies all of Essex county.”

How extensive the new find will be, and what it will mean to the Essex farmer cannot be determined until the field is fully proven, which may take a year or two.

“Imperial will continue its interest in the Colchester area for some time,” says George McClintock, the company’s exploration manager at London. “Many wells will have to be drilled over the next year, perhaps as many as 20, to outline the field itself and evaluate the immediate area.”

Many unsuccessful wells have been drilled, sparsely located, in the area over the past 70 years. So, until the new “crop” proves itself, Essex farmers refuse to get excited. “If oil comes to us, good. If it doesn’t, too bad,” draws one man, on whose land a producing well was drilled. “We’re farmers. Our main interest is in the land.”

To say that Essex County men are farmers is an understatement. Every inch of available land is planted around the neat, clean farmhouses. With the price of some land running at over $1,000 an acre, a half-million square feet of greenhouse glass in the county and with groves of hops valued at over $8 million a year, Essex men have some of the greenest thumbs and bank accounts in Canadian agriculture. Average farm income is about $5,000. Average size of a farm is 100 acres. Soil is nearly all top quality, varying from sandy in the south, around Colchester, to clay and heavier soils in the north.

A Leamington farmer, in his eighties, perched on a roadside fence last fall, pointed to a neighbor working on a tractor and told me, “Land round here was once $5 an acre. But people like that fellow have jumped it to $1,500. He’s from the Ukraine. Came here 15 years ago. He owns 100 acres. Not bad, $150,000 in 15 years!”

The old man himself was born in Essex. His grandfather came out from Ireland to farm there a century ago. The years had scumbled on his face, hard work had broken his knuckles with rheumatism, but his eyes were alive with joy at seeing his neighbor carry out the county’s farming tradition.

Perry Wright, a younger man, on whose land Imperial found oil, has the same feeling for Essex County soil. His forebears farmed there 150 years ago and he hopes they’ll be Wrights on the land for the next 150 years.

You see the character of the people in the small tidy market towns: Essex itself (not the capital; Sandwich, now part of Windsor, is the county seat), Kingsville, Leamington, Harrow, Amherstburg, Cottam and Wheatley. You see wide streets, shaded and unhurried; an occasional glimpse of the past through the façade of some old brick house or in the corner store; the almost buoyant friendliness of people who, living close with a common purpose, have an innate mutual sympathy.

Yet Essex is no sleepy backwater. Last year fruit and vegetable crops brought in nearly $6 million. Production figures show that Leamington (where Heinz has a plant), Essex (Shokeleys), Tilbury (Canadian Canners) and Tecumseh (Green Giant of Canada) process more vegetables and fruits than any other similar plants in Ontario. Standards of living are high: refrigerators, cars, TV sets, washers, and air-conditioners have high sales records.

Some Essex towns have great plans for expansion. Leamington chamber of commerce president, Gerry Wight, talks of an airport, hopes his town will become the market centre for the county and expects the population to leap from 20,000 to 20,000 by 1970. Leamington is now trying to attract more industry. Essex already has Windsor, of course, a leading city in Canada in terms of the value of its manufactured products.

But however industrialized Essex becomes, it is essentially an agricultural county, both in fact and in spirit. “There should be a law,” grumbled a Harrow man one day, “to stop them taking away good farmlands for factories and houses. They’ll never find land like this anywhere else in Canada. Put the factories and houses somewhere else!”

Industrialization has not changed tradition. Some farmers with sewer con-
ections in their homes still keep their outside facilities.
Sunday suits, porch-rocking, big family gatherings, the almost patriarchal authority of the head of the family, and the time-honored tradition of smuggling are facets of Essex life which die hard. Smuggling was once both a profitable and highly-organized occupation and a service to mankind. In American Civil War times, slaves were smuggled to freedom here from Detroit, Amherstburg, a centre for this activity, has many colored citizens today. In prohibition days whisky runners plied Lake Erie and the Detroit River. Today, smuggling is a personal and less profitable sideline, generally involving only clothing or the occasional pack of cigarettes.
A new more respectable tradition has taken hold: Essex has become a mecca for American tourists. Partly because it's a pleasant vacation area and partly because it's a geographical odd-ball. Here cactus and northern trees such as tamarack live side by side. At Point Pleasant national park, a nine-mile finger jutting out into Lake Erie, you can raise peaches, oranges and cotton. You can also hear more than 200 species of birds, from the Arctic siskin to the Carolina wren.
Pelope, with its adjoining island, is Canada's southernmost point and it draws more visitors every year than any Canadian park except Banff and Riding Mountain. Some go to the island, a 40-square mile tract south of the Point, for hunting and fishing. Others come especially to see the world-renowned Jack Miner bird sanctuary near Kingsville, where some 8,000 wild geese and many other Canadian birds rest every year.
Many Americans retire to Essex; their cottages hug the south shore from Leamington to Amherstburg. They're just a few of the "foreigners" who have succumbed to the charm of the country. During the last 25 years thousands of immigrants-Holstein, Poles, Ukrainians, Czechs and Germans-have come to work the rich farms. The sunny climate, combined with the use of green houses or polythene covers for the plants, enables them to raise as many as three crops a year.
What of the new industrial crop-oil? Among farmers and oil men, at present, the attitude is one of good humor and caution.
"We'll be in the area, with our partners, Submarine-Harvest, for some time," says Jesse Hackett, Imperial's district superintendent at nearby Chatham.
"And we're enjoying the experience very much. There's been a friendly attitude throughout all our operations."
But there's been no rush on Cadillacs, yachts or trips around the world. No Colchester man has sold his farm and probably none will—not merely because the royalties are small in many cases, but because of a fundamental love of the land.
The day the first well came in on Perry Wright's farm, he was performing one of his most pleasant chores: raking leaves into a bonfire. As the flames cracked near the wellhead, one of the oil crew cried: "Put out that fire! We've struck oil!"
Perry looked up from his raking.
"Do you expect the whole darn farm to stop working because of it?"
But he smoothed his fire and laconically watched the historic first well "come in," with the air of a man who hoped the job would soon be done so he could get back to farming.

What does the businessman owe his community?

by Ronald S. Ritchie

The conscientious businessman today is often hard-pressed to find where his duty lies. It is somewhere between the interests of the inventor, to whom he has a clear responsibility and the interests of the community, to which he has a less well-defined responsibility.

He is told by governments, newspaper editors, labor leaders and university professors, about his duty to combat inflation by keeping prices down; to maintain employment by avoiding lay-offs and to counter recession by raising wages.

In the community he is expected to (and often does) lend fund-raising drives; sit on governing bodies and sub-committees of hospitals, universities and welfare agencies; and aid the financing of education. He even expresses opinions about what should be taught in the schools.

Which of these obligations does he really owe the community? Perhaps we can suggest some guidelines for both business and the community, examining the subject under three headings:

- how well the businessman performs his job as a manager;
- the contributions he can make to fundamental social decisions of the day;
- and the extent and form of his participation in community activities.

The most important claim which the community should make on the business man is that he be a good manager. Many other groups contribute to the economic welfare of the community, but few can so affect that economic welfare for better or worse.

The idea that the manager is a trustee for the investor is a familiar one. The idea that he holds and administers assets and resources in trust for society as a whole is less commonly held. Yet trustee he is. We have only to remind ourselves that in Canada, as in the world at large, the greatest economic ingredient is capital. Neither investors nor society can afford the waste of capital. The business manager must combine human and material resources to the greatest economic effect. Only by good management can he properly serve both his enterprise and the community.

This is no easy responsibility. The skills needed grow increasingly complex.

In a market economy such as ours, the assessing and forecasting of complex economic forces, domestic and external, is vital if capital and other resources are not to be wasted.

Production techniques change so rapidly that obsolescence is a continuing threat to most enterprises. Skills and foresight in labor relations, government relations, and public relations may be just as essential today as skills in evaluating markets, managing capital investment, or supervising production processes.

The electronic computer and recent major break-throughs in information theory may mean that past wisdom and past techniques will no longer be enough to help the business manager make tomorrow's decisions.

Good business management, then, whether conceived to be in the interest
of the firm or in the interest of both the firm and the community, demands a wide complex of skills, a broad perspective, and a great deal of hard work. Poor management can cost both the firm and the community dearly.

While the community has the right to expect the businessman to be good at his job, it should ask something more. It should expect him to make a contribution to the continuous debate on a wide variety of fundamental social, economic, and political questions. These questions have their origins partly in technological change, partly in a questioning of old values. Many have important economic implications. The businessman is immersed in the economic system, and should be able to make an intelligent contribution to much of the decision-making of the community. The community should expect him to do so.

Three current questions illustrate this point: the future of our present economic system itself, the length of the work week, and the objectives of our school system.

The values of our economic system—the enterprise system—have been critically examined over the years and will continue to be examined, or easily being modified—by legislation, regulation, taxation and subsidy; by labor, professional and industrial combinations; and by changing social attitudes.

Unless the fundamentals of the system are deliberately emphasized, this inevitable process of change involves serious risks. The businessman has a prime responsibility here to the community as well as to his own firm. He must provide public leadership. He must be prepared to explain to governments, to his own employees, and to the public, how the enterprise system works and why society collectively has a stake in conserving it. He must vigorously discipline himself whenever it appears that his own interests might be served by some tampering (governmental or private) with the principles of the enterprise system he supports.

To be able to explain the enterprise system, businessmen must thoughtfully understand it. They must understand current social and political thinking, and their mainstays, in order to demonstrate to an inherently suspicious public that the price mechanism and the economic motive (of which the profit motive is only a special part) are in society's interest, not in a class interest.

As never before businessmen must study our society—both its history and its current trends. This is a role which most businessmen have left to the academic scholar or the politician.

Businessmen must be willing and able to put public and industrial policies (including their own) to this test: are these policies consistent with maintaining the values of the enterprise system?

This calls for both insight and foresight. Easy acceptance of unwarranted labor demands, for example, may be just as destructive in the long run as the stubborn refusal of reasonable requests. Undesirable legislation may sometimes result from short-sighted business practices or come in answer to short-sighted requests for special help.

This is no easy task. No person or group can have a completely objective understanding of the complex and changing enterprise system. The task of understanding is more difficult because it is a system built on reorganizing an apparent conflict of individual interest with the good of the group.

The businessman can keep up-to-date on legislation and regulations which are relevant to his firm, his industry, or the economy as a whole. These are only two facets of a complex question. The final answer cannot be given by businessmen alone. But the community needs the facts and the judgments businessmen can provide in order to develop the answer—and soon. Even now social attitudes are being formed before all the relevant facts have been weighed.

On our third question of the day—education—businessmen can again urge at least some of the ingredients of the answers. Remembering that the basic purpose of education is to help young men and women learn how to live, we must recognize that today no person lives and works in the kind of world into which he was born, or in the kind of world which existed while he was at school. Education's most important job may be to fit him to deal with a changing world.

This is as true in the world of work as in our many other worlds. New technology is constantly creating new jobs and changing or eliminating old ones. This can affect the form and content of elementary, secondary and university education.

It is increasingly obvious that schools can't train a man completely for his career. A great many jobs demand further training on the job, or special courses, when the man enters a specific industry. Sooner or later a philosophy will evolve for the division of education. We may well find that the schools should return to broader education while industries should provide more vocational training.

What emerges from this brief examination of the relationship between businessmen and the community? Certain, no haphazard, amorphous, or too sweeping claim on the part of the community or any of its self-appointed authorities.

What I do suggest is a wider concept. Because businessmen perform a vital economic function in society, the community has a stake in how well they perform it. Because so many political and social questions are largely economic, businessmen have a contribution to make to their debate, and to the answers.
The Enigma of Athabasca

by Michael Pongsley

For millions of years the oil-soaked gritty substance cupped in these hands has remained locked in a lonely muskeg-laden pocket of the Canadian north. It was there long before human life made its appearance on earth; long before the Ice Age helped scour today’s lines into Canada’s face.

Slowly, down through time, the world’s greatest known oil deposit—larger than any other in North America, the Middle East or South America—was trapped in the now-famed Athabasca oil sands of northern Alberta.

These sands (some at the surface, some at varying depths down to 1,500 feet) contain an estimated 100 to 300 billion barrels of crude oil. For more than 60 years men from a half-dozen countries have sought a technique that would free the oil, simply and cheaply.

Early this year four oil companies once again took up the challenge. Pooling their efforts in the most comprehensive research project ever undertaken on the sands, Imperial Oil, Cities Service, Richfield Oil Corp. of Los Angeles and Royalite Oil Co. will pour millions of dollars into experiments aimed at solving the riddle. Instead of drilling for oil they will “mine” for oil.

Conventional oil deposits are trapped underground in the pores of rock. The oil is forced through drill holes to the surface by subterranean gas and water pressure and, as natural pressure recedes, by pumping.

But the Athabasca deposit consists of firm, saturated, grains of sand. It looks and feels somewhat like plasticine and smells like a freshly tarred road. It extends over an estimated 30,000 square miles along the banks of the Athabasca River, 300 miles north of Edmonton. Since much of it lies below the surface, there are varying estimates of the reserves. But in the area where the sands lie at or near the surface they contain more than 40 billion barrels of recoverable oil—about the same amount as the entire proved crude oil reserves of North America.

In the latest venture, the four companies have moved a specially-designed mining wheel (adapted from models used in Germany’s Ruhr Valley) into the Mildred Lake region, some 30 miles north of McMurray. Here, where a $3.5 million pilot plant is in operation, the sands occur at the surface and range from 150 to 200 feet thick.

The rotating wheel, nine feet in diameter and resting on tractor treads, has six buckets with hard-surfaced cutting edges. They strip sand from the surface and drop it on a conveyor belt which transfers the load to a portable extraction plant. Water and a light oil diluent are added to cause the sand to precipitate, freeing diluted bitumen for further processing.

However, “mining” the sands is costly. It takes approximately a ton of sand to produce a barrel of bitumen. The companies therefore face a combined problem in
techniques and economics: the Athabasca oil must be partially processed on the site and transported to a refinery at a price which will allow it to compete economically with oil produced by conventional means.

Yet the prize is worth the effort. Already, in 60-odd years, men have spent between $50 million and $100 million trying to extract oil from the sand economically. And they have been eyeing the deposits for nearly two centuries. Traveling down the Athabasca River in 1788, Sir Alexander Mackenzie observed dark veins in the cliffs and "some bituminous fountains into which a pole of twenty feet may be inserted without the least resistance." Ten years earlier, explorer Pierre Pond noticed Indians caulkng their canoes with pitch from the river banks. Neither man could have dreamed that this substance would one day cause excitement reminiscent of an old-time gold rush.

In the river town of McMurray the oil sands fever does go back to gold rush days. The first oil seekers tried drilling for it on the theory that whole lakes must lie beneath the saturated sand. In 1897 federal geologist R. G. Connell sunk a hole upstream at Pelican Rapids but found no oil. The same year an enterprising German nobleman named Alfred von Hammerstein noticed the sands while on his way to the Klondike. He lost a fortune drilling six dry holes.

Since then the history of the oil sands has been depressingly similar but on a much larger scale.

Royalite, one of the firms sharing in the current experiments, devoted much effort and expense to a centrifugal unit intended to separate sand from oil by whirling it loose in huge bowls.

An Alberta Research Council chemist, Dr. Karl A. Clark, spent 40 years studying the commercial development of the sands. He favored flushing the sand with hot water which would cause the oil molecules to attach themselves to bubbles of air and rise to the surface.

Other experimenters have recommended squeezing the sand, blasting it with an underground atom bomb, and cracking it apart with ultrasonic waves. One even suggested coating the sand with a bacteria that would strip the oil free. A resourceful Montana oil man named J. O. Absher once tried to set fire to the sands and condense the residual vapors.

Before World War II, a Denver geologist, Max Ball, built a pilot plant called Abashand a mile from McMurray.

Imperial Oil has joined three other oil companies in an experiment aimed at commercial development of the world's largest single oil reserve.
During the war the Canadian government took it over for hurry-up development when it looked as though enemy submarines might seriously curtail oil imports. Nearly a million dollars was spent rebuilding and extending the plant. Then, at war's end, a welder's spark sent the place up in flames.

This was only the beginning. At Bitumount, 60 miles downriver from McMurray, two other luckless firms went aground on oil sands experiments. Then the Alberta government stepped in with a $700,000 plant to test Clark's hot water theory. Although Clark and others claimed the sands could be exploited at a profit, the government couldn't interest firms in commercial development.

The Suez crisis again boosted the oil sands into the world oil limelight: here lay the world's greatest potential oil supply safely removed from shipping disruption. But the Suez crisis was brief and suddenly there was a surplus rather than a shortage of oil in the West.

Nevertheless, if techniques unfold and markets develop, the oil sands may yet prove to be this country's most valuable single natural resource. Authorities already know that a good quality oil can be refined from the deposit. So, the mining wheel bites into the black banks of the Athabasca—opening yet another chapter in the treasure hunt of the century.

Heavy supplies, always a problem in the north, can be delivered by barges on the Athabasca River.

Much more testing is needed to determine the best method of converting the bitumen into transportable oil.

For wily Norman Arnott of Dawson Creek, B.C., one of three postmen on the world's longest rural mail route, the Alaska Highway isn't quite what it used to be. After a decade as a fixture in the northwest, Yukon Joe has disappeared into the bush, dogs and all.

Arnott, wheeling his big diesel-powered van over the lonely 918-mile stretch between Dawson Creek and Whitehorse, used to look forward to his unpredictable meetings with Joe. The bearded figure in tattered buckskin was apt to pop up anywhere, shuffling along under convoy of a half-dozen Husky dogs. Most of his mail was addressed simply: "Yukon Joe, Alaska Highway."

"In the summer the tourists were his trapline," says Arnott. "Joe would pose for a picture with his dogs for a dollar, or sell moosehorns on which he'd painted northern scenes."

Arnott hasn't made a delivery to the highway's mystery man for more than a year. But in his three seven-day trips each month along the famed wartime highway, Arnott still logs more offbeat and sometimes dangerous encounters than most mailmen collect in a lifetime.

It is not his trials as postman to the 5,000 happy people who live along the highway that give him his worst moments. In the last four years the mailman...
has whistled through a Yukon forest fire, gingerly eased his tractor and 32-foot van over highway stretches ashaw with spring floods, and played a deadly game of tick-tack-toe with ice on Steamboat Mountain. He has been ditched by motorists, pushed over a 22-foot embankment by the straying "pup" of another trailer rig and rammed by a car on an icy mountain grade.

"It's all in the job," he grins. "The mail must go through, you know."

"Not long," is a known fact, even more than his joyful "mail call" on the klaxon horn for nearly 40 lonely settlements along the highway; for more, too, than being a highly-skilled driver on one of the world's toughest long-distance truck hauls. He is the highway Good Samaritan who pulls motorists from snow banks, bills pups for an elderly woman with heart trouble and picks up a toy for a child overlooked by Santa. He is also a highway town-crier—a clearing house for news of the people and events which add a sparkle to life in the northwest.

"The best people in the world live along the highway," he says.

The love affair between Norm Arnott and the residents of the Alaska Highway began in 1955. Northern Freightways Ltd., of Dawson Creek, which originated from a bruce of dump trucks during highway construction days, went a post office contract for two-way delivery to highway points. Arnott, a driver on regular freight hauls through the north, was one of those tabbed for the assign- ment. Sworn in as a postal courier for Her Majesty's, he cleared on a round trip: ground check, he was handed a schedule of stops that included wayside post boxes made from old oil drums and apple boxes.

Since then, and fellow-couriers Lloyd "Sparky" McFadden and John Poyer have rolled up a million miles. Their schedule has scarcely shifted, even the face of the routes marked in the side- tudies as the collapse of the 2.200-foot bridge over the Peace River, skiing 50 below zero cold and the worst quakes of spring washouts in highway history.

Ernie Thaed, Northern Freightways' traffic manager, says proudly: "I visited 95 percent of the mail stops last summer. There wasn't a single complaint."

The three times a week schedule of the drivers correlates to a daily tractor a standard covered-trailer unit, lab- elled, "Reserve send to Dawson Creek, Alaska Avenue. At the city's mid-town post office:

the traveling postman takes aboard up to 600 bags of first and second-class mail. From that moment until he pulls into the Whitehorse post office some three days later, he works for the post office department.

On the long run to Whitehorse—with overnight stops at Fort Nelson and Watson Lake—mail is dropped and collect ed at a number of post office stops. But it is at the 28 non-post-office delivery points—Army maintenance camps, tourist lodges, oil exploitation and pipeline, line camps and roadside boxes for trampers, prospectors and big game guides—that the highway mailman blossoms as a full-fledged, if unofficial, postmaster. He takes applications for money orders, sells stamps and cancels postage on letters destined for points farther along the highway.

It was 20 below one day last winter when Arnott pulled away from the Dawson Creek post office and lumbered past the Alaska Highway "Mile Zero" post at the main intersection. Most of the city still slept as he headed for Fort Nelson, 300 miles away, and his first overnight stop.

The mail van crunched smoothly over the snow-covered hardtop, slicing through a corner of the rich Peace River farming belt. It looped across the Peace River valley and up to the Fort St. John plains where pumps pump natural gas from one of the continent's great fields into a pipe line to Vancouver. Milepost 50. Fifty reared up from the snow beside the road and the hardtop changed to gravel. The driver eyed the occasional ice patch with an appraising eye.

"I won't be barefoot for long," he said. "I'll put on the steel (chains) at the first corner we start to float. Any driver who says he isn't afraid of ice is lying."

The highway slashed through tall stands of spruce and pine, flecked by the roadside perennials of oil company seismi- c crews and opening every few miles on brush trails carved out by the oil men. As the miles rolled by, the mailman rumbled through his memories.

"A month ago, this side of Fort Nel- son, the pup trailer on a big rig smashed my cab and shoved me over a bank," he recalled. "I wasn't hurt but my rig wasn't going anywhere. We transferred the mail to the next truck along and I finished the run."

At Northern Freightways—which has been on 20 trucks on freight hauls on the highway at any one time—the mail takes priority over all other loads. If the diesel

unit hauling the mail van is put out of action, the driver of the first freight truck on the scene must surrender his tractor to the mailman. The mail goes through while the freight waits.

So closely does the mail keep to sched ule that there is rarely a five-minute variation through the year in arrival time at any stop along the long road.

Arnott, who at times carries a thick pad of money order receipts, points to the milepost-second smile as his reason for not packing a gun.

"If anything happened to the mail everybody on the highway would be out looking for the postman," he said. "This would be the worst road in North America for a robbery. The thief would never get away."

Only twice in the four-year history of the Alaska Highway postal run has the mail been a day or more late. Three years ago, mountain streams went up in a springtime spree, tearing 60-foot chunks out of the highway midway between Dawson Creek and Whitehorse. The mail vans were the first to cross the temporary bridges and detour grade shows thrown up by the Canuelian Army and civilian maintenance crews.

With the collapse of the graceful sus pension bridge over the Peace River at the southern end of the highway in the vacation season in 1957, the "poloits" lost a day while traffic jams on both banks were cut back and re-routed over gusseted country trails to a ferry crossing.

"You forget about the bad trips," Arnott said. "You remember the people. They make the job really worthwhile."

So popular is the mailman with the residents of the lovely communities that it, at times, gets a little embarrassing. "If there's anything done along the highway, we're automatically invited," he said. "We have to say 'no' many times or we'd never get the mail through."

During his stops at Whitehorse and Watson Lake, Arnott lays aside his mail on the trucks, even buying a few ends at the curling rinks. He is an honorary member of both clubs.

Milepost 300 showed at the side of the road. The mail van lumbered up the steep slope of the long right-hand set at the summit. The base of the hill was crossed by the restaurant operated by big game guide Don Peck, lidded the heads of mechanics in the nearby Army maintenance camp and pulled open the doors of the cabins rimming the settle ment. In a twiskling the mailman was the centre of a joshing, eager group. With one hopeful voice they cried, "Any mail?" It was the same electric air of hope and expectancy that flashed through wartime Army barracks when the mail-corps peaked in.

"I should have the catalogues next week," Arnott told an anxious in quirer. Twice a year, the mailman crams his van with 12 tons of department store catalogues, his heaviest loads of the year. On the highway, where almost all pur chased are made by mail, new catalogues are greeted with the enthusiasm book collectors reserve for a newly-acquired rare first edition.

From Thutch, the van snaked over 30 miles of endless curves, then coasted down into the Prophet River Valley. An Indian drove flaking the road reminded Arnott of stories about the tourist explosion that Alaska's statehood has touched off along the highway.

"Mind you, I haven't seen him my self," he said, "but they tell me there's an Indian along here who sticks a few feathers in his boy's hair and sends him out on the highway with a bow and arrow to scare the tourists, and the old man makes a good living out of the donations."

As the rainstorm and an incoming North ern Freights' truck came into view, the winter sun glinting on the trailer's silver sides with their foot-high letters that spelled out, "Serving a Land of Opportunity." The driver called, "Two feet down for San Simon Station. I come through." Arnott waved his thanks. That Steamboat (a vast-packet moun tain north of Fort Nelson with resemblance to its name) can be a mean one," said Arnott. "But it's this hill driving that makes us run a real fast job for truck drivers. Especially during the winter when you can get 40 below in the truck, and every five miles farther on, a chinook at Muncho. Then you have ice."

The small stops clicked by—Lam 'n About's, a famous stopping-place for highway travelers at Mile 231; lodges like the White Mountains, and the "The Village"; and a handful of solitary mailboxes in roadside snow.

For Northern Freights, winter's early darkness when Arnott swang the van up to the post office steps, fifteen minutes later, he was happy, happening upper from "one of the best cooks on the Alaska High way."

"While Tom Parker refused to admit the existence of diesel tanks, his wife, who presides over the restaurant at their Imperial Esso station, proved "there's no such things as a diesel tank."

The temperature had plummeted to 35 below when Arnott checked the beds on the mail van and headed for bed. Plans of getting smoke pumped into the frosty air from the diesel stack. The engine would run all night, ensuring a fast getaway in the morning. Ahead were 600 miles and a new brew of sur-prises and winter experiences for the highway's favorite son.
HOW CAN WE GET BETTER ROADS?

by Michael Jacot

When the Russian moon rocket circled its target one morning last October, stalled commuters were backed up as usual for half a mile at the intersection of highways 401 and 11 outside Toronto. It was painfully evident that while the world was well into the Space Age, the six-year-old section of highway 401 at least had never caught up with the Automobile Age.

Today, there are about five million vehicles on about half a million miles of Canadian highways, roads and streets. If you spread them across the country, there'd be a Canadian car, bus or truck for every 180 yards of road.

But, in fact, the problem is much worse than that. About 90 percent of vehicles—4.6 million of them—are concentrated on the 10,000 miles of road in or near a dozen big cities, often during just one hour in the morning and another at night. This is at the rate of one car for every 11.5 feet—an impossibility if all the cars were out at once, because the average car is 18 feet long.

Inadequate though our roads are at present—and everyone admits they are—they are liable to be twice as congested within 20 years. The 10-year period from 1948 to 1958 saw a doubling of motor vehicle registrations so the 1980 figure well may be above 11 million. Theoretically, you won't be able to squeeze a car onto a Canadian road with a shoehorn.

This, then, is a critical situation. What roads do we need? How can we get them? What problems are involved?

In many areas of Canada, economic progress depends on adequate roads. To survey the situation we polled planners, highway engineers and the departments of highways in every province.

Many provinces already have assessed their needs and made their plans. They estimate that a total of at least $25 billion should be spent on roads in Canada during the next 20 years. This is an average annual expenditure of $1.25 billion, only slightly more than the estimated $1.15 billion spent in the fiscal year just ended.

Two years ago, however, the total annual outlay was only $727 million. Since road budgets are an increasingly large and—all provinces agree—an essential item, the next question is: what can we do to get the most value from our highway dollar?

Canada is the only major automobile-using country which has no true federal highway body. No organization, government arm or national group has authority to plan, co-ordinate and carry out such a program nationally. The nearest thing to it is the Trans-Canada highway division of the federal Public Works department, but it deals only with the Trans-Canada route. The U.S., in contrast, has the Federal Bureau of Public Roads which does little highway building, but offers planning, advice on standards, and financing to each state.

At present the Canadian government's part in making our roads amounts to four percent of the annual total road budgets. This includes payments for Trans-Canada, and the building and maintaining of about 900 miles of road through Indian reservations, national parks, defence bases and the financing of the Federal District Commission in Ottawa which builds special roads around the capital. During the period 1930 to 1952, the total federal expenditure was only $175 million.
How can we get BETTER roads?

The only roads now owned by the federal government run through Indian reservations, national parks and the NWT and Yukon. When you drive along highway 2 between Haifax and Truro, along No. 11 from Regina to Saskatoon, or No. 1 from Vancouver to Chilliwack, you are on a federal highway. Even the Trans-Canada route belongs to each province that it passes through, although sections were paid for by the government of Canada.

Canada's system has worked well enough in the past but planners fear it is nearing the breaking point. At present each province has a staff of highway engineers. Some have professional highway planners. Within each province responsibility is divided among the cities, such areas as counties or municipalities and the provincial government.

In spite of this scrambled situation, amiable co-operation has usually existed. But the problems of financing, planning, building and co-ordinating are becoming too great for these semi-isolated groups.

The federal government plans to increase its activity; it will share in the cost of building new roads into new mining and other development areas at a total cost of about $150 million. Today 72 percent of road costs are financed by provinces; 24 percent by municipalities.

Where does the money come from?

Much is derived from the gasoline tax, although this is not officially ear-marked for highway use alone. Each province levies its own tax (ranging from 17 cents a gallon in Nova Scotia and Newfoundland to one cent in the Northwest Territories) and about $36 million a year is collected on the nearly 3½ billion gallons sold.

Car registrations yield another $137.7 million. The remainder comes from municipal taxation.

Therefore, in the past, roads have had to a considerable extent paid their own way. As the number of vehicles increases there will be a corresponding increase in tax and license revenue. But highway construction costs are increasing too. In the 1920s you could lay a highway for a few thousand dollars a mile. Today, costs vary from $500,000 to around $10 million a mile, depending on land costs and the kind of road, materials and terrain.

The planning and physical aspects of road-making are also becoming increasingly complex. Canada has about 560,000 miles of road. Only about five percent is paved, 26 percent is gravel-surfaced and 69 percent is earth-surfaced. This percentage breakdown applies to each province, with a few variations. Saskatchewan has the most road mileage of any province—145,000—but only 2,200 miles paved. About 14 percent of Ontario's 83,000 miles is paved.

Ten percent of B.C.'s 23,000 miles is hard-surfaced.

In reply to a recent survey by the Institute of Town Planning, thirty percent of the country's towns and cities believe the federal government should plan a road network for the whole country. In New England—where, after all, we raise our sheep—60 percent of our roads are federal. We don't claim they are the best in the land, but a lot of them are usable.
Vancouver, with 120,000 cars, needs $300 million by 1980. In Winnipeg, planners are suggesting a network of expressways and 13 bridges across its rivers.

Although these cities are notable trouble spots, improvements are needed everywhere in almost every province. Somewhere are now undertaking to make these improvements. Ontario expects by 1980 to have 6.3 million cars on its roads and will spend $7.2 billion to deal with them. British Columbia is budgeting for $100 million a year for the next 10 years.

Saskatchewan deputy highways minister L. T. Holmes says, "...the greater bulk of our primary highways will become obsolete over the next 20 years." By 1980, Saskatchewan will need 300 miles of controlled-access road—compared to 15 miles today. In Manitoba, a consultant group working with assistant deputy public works minister L. W. Blackman will publish in 1961 a study of the province's future needs. Alberta has had a road budget of about $40 million a year, expects an increase over the next 20 years, but not at the rate of the last 10 years.

In some provinces, engineers and planners have carefully worked out the necessary highway programs. They know that two in every nine people still walk to work, that about the same proportion use public transportation systems and more than three out of five drive cars. They also know that two-thirds of all Canadians live in cities, and most traveling is along city roads or roads adjoining cities. No city has the same—or the perfect—traffic flow, and engineers try to groom the roads to fit the city and its surrounding area.

However, before plans can be translated into action you need money and a right-of-way. Getting the proper right-of-way can be difficult. California authorities, when building the futuristic network of overlapping highways outside Los Angeles, had to relocate a Finnish colony with backyard bath houses, a bookie with 32 telephones and a congregation of Russian Holy Jumpers who wanted a reinforced concrete floor in their new meeting hall.

One Quebec farmer's wife resisted a highway expropriation order for 20 days, standing a 24-hour guard with a rifle at the gate of her farm. In Saskatchewan, just after the war, a group of farmers attacked a new roadway with pucks and shovels during the night.

The choice of highway right-of-way sometimes seems arbitrary and unreasonable to property owners, planners are guided in their decisions chiefly by the best access to cities and the best use of the topography.

When built in a good location, a new highway has far-reaching effects.

"Light industrial and warehousing firms, for instance, are increasingly interested in being near new highways," says Dr. Kenneth Walter, geographic advisor of Imperial Oil. "Many more factories will be located along these routes, capitalizing on the quicker access to wider markets, sources of material and homes for the labor force."

The focal points of the new highways are cloverleaves and interchanges—the equivalent of the old-time railway division point or the meeting of the rivers, which sparked the development of so many modern cities. How and where these cloverleaves are built is important from more than a traffic standpoint because new self-contained communities spring up around them.

In cities, new arterial and feeder roads also serve a secondary purpose, by causing the clearance of slums and "skid rows" and the replanning of entire downtown areas. In the U.S., some cities have banned downtown traffic, built huge parking lots and cleared previously congested streets for parks, street cafes and furnished squares.

Obviously, then, good roads pay off in better living conditions, increased land values, lower automobile operating costs and in time saved. But, just as obviously, the growth of motorizing has complicated and multiplied the problems of planning, financing and building new roads.

The time for a change in our highway-building system seems to have come. What form will that change take? The Canadian Good Roads Association, an independent organization which has been fighting the battle for better Canadian roads for decades, believes in increased collaboration among federal, provincial and municipal governments. Its managing director, Col. C. W. Gilchrist, says, "Before our steady-growing road and street problems can be solved, they must be faced co-operatively on a nation-wide front. A federal-provincial conference would be a great first step towards a solution."

Unless we reach that solution we may have to resort to the facetious suggestion of one planner: "Put the cars end to end across the country—they'll fit snugly bumper to bumper. Then just lay a giant asphalt road right over the top of the lot of them, and start over again!"
NEW POST PROPOSED FOR J. R. WHITE

In 1933 a mechanical engineer named John Rigby White walked into Imperial Oil's Sarnia offices. He was 24 years old, two years out of college and recently unemployed as a result of the depression: the small steel plant where he'd been working had closed down. He started work as a draftsman—the beginning of a long, fruitful partnership for both company and man.

Twelve years later he was made an Imperial director and, the same year, a vice-president. In 1953, at age 44, he was elected president, one of the youngest heads of any major company in Canada.

Last month Mr. White became the first Canadian to be designated for election to the board of directors of Standard Oil Company (N.J.), one of the world's largest oil companies.

During his 27 years in the industry he has shared in some of the most significant developments in Canadian oil history. As a member of the Imperial top management team he helped organize the search for major oil reserves in Canada which led to the Leduc discovery in 1947. Later he took a leading part in the successful search for crude markets, including the planning of Interprovincial pipeline (now the longest crude oil pipe line in the world), and Trans Mountain pipe line.

As president he has guided Imperial through some of its greatest expansion and stiffest competition. During those seven years the company's gross income increased more than 40 percent and total assets rose nearly 60 percent.

Ownership of oil and gas wells has increased by 50 percent, to 2,478. The company formed a chemical products department and installed nearly $40 million worth of petrochemical plant facilities in Sarnia.

Since 1953 capital expenditures for exploration, replacement and expansion of plants and equipment have totaled more than $770 million. In that period the company has invested some $175 million in new or improved refinery facilities alone. Refinery capacity has increased from 199,000 to 312,000 barrels of crude per day.

Mr. White is almost as well-known for his activities outside the oil business as for those in it. He is a governor of the University of Toronto and a chairman of the advisory committee of the School of Business Administration at the University of Western Ontario, from which he holds an honorary degree.

He is a former president of the Canadian Inter-American Association and a member of the Canadian-American committee of the National Planning Association. He is a governor of the Ontario Research Foundation and a director of the Royal Bank of Canada, Maple Leaf Gardens and the Canadian Council of the International Chamber of Commerce.

He is a member of the executive council, Canadian Chamber of Commerce; the Royal Canadian Institute, and the Canadian Council of the National Industrial Conference Board Inc.

Recently he received the Human Relations Award of the Canadian Council of Christians and Jews. His achievements in engineering and leadership were recognized by the University of Toronto Engineering Alumni Association when it gave him its medal—a triennial award—for his part in the development of the Canadian petroleum industry and the expansion of crude petroleum resources.

Mr. White was born in London, Ont., spent two years at the University of Western Ontario and graduated from the University of Toronto. After experience with Imperial he spent a year in New York in manufacturing co-ordination, then six years in Venezuela where he was engaged in production and movement of crude oil. On the side he learned Spanish and developed a keen appreciation for Latin-American culture and people. He became a vice-president of Standard of Venezuela. He rejoined Imperial and moved rapidly to the board of directors—a full-time job in this company.

He has a sharp eye as a skeet shooter, is a keen sailor and plays both golf and bridge frequently. He believes in keeping fit and sandwiches his recreation into a tight schedule of board meetings, conferences, speaking engagements and twice-a-year visits to the western oil fields. Last year he logged 44,000 air-miles in 67 different trips.

A newspaperman once wrote of J. R. White: "He appears unburdened and unworried—yet he wastes time at neither work nor play." It was a fair assessment.

Imperial's president is first Canadian to be designated for election to Standard Oil board of directors.