The View from the 21st Floor

Want to feel on top of the world? It's easy, if you take an elevator to our observation deck, the highest lookout point in Toronto.

The building itself is 285 feet high and stands on top of a 500-foot escarpment, which means the deck is almost 800 feet above sea level. That much of a vantage point reduces Toronto's traffic-plagued streets to an animated cartoon, and makes the untidy clusters of downtown buildings look like on Lumiére's dream of the New World. Toronto's aggressively urban centre fades northward into gentle countryside and across Lake Ontario the town of Niagara Falls, 75 miles away, hangs like a grey chiffon scarf on the horizon.

There are tours to the observation deck every half hour, 2-4 pm, Monday through Saturday all year long. Who takes them? Well, tourists of course—not only Canadians, but U.S. visitors and Europeans—schoolchildren, and groups of children visiting from hospitals. Almost everyone is vocal in his astonishment at the number of trees Toronto retains. During the last month the hares seem to be flushing in a sea of green.

And in September a flock of birds watchers use our deck to Rubberneck when thousands of broad-winged hawks do their annual migratory fling.

The Music Makers

When Helen Gagne was three years old she heard a recording of Schubert's Trout Quintet. 'Which sound do you like best?' her mother asked. 'That one,' she answered, a cello sounded its mellow notes, 'I'm going to play one soon.'

She didn't change her mind by her tenth birthday, so her parents bought her a cello and provided her with lessons. And by the time she was 14, she was playing with the National Youth Orchestra (see story page 23). Not all the young music makers with the NYO are as disillusioned, but they all approach their seven week engagement in the orchestra with brio. In Montreal an aggressive, violent player who couldn't find a space corner in which to practically was discovered fiddling while the hotel management burned—his shed had been left between floors and was enjoying the quiet of his personal practice room.

And there was the morning in Toronto that the entire flute section failed to show up for full rehearsal. They were located in the not yet completed subway where they'd rehearsed, after an early breakfast, to conduct their own group rehearsal.

Ah, youth!

F.Y.I.

For your information the north shore map below shows principal towns and locations mentioned in our story on that iron band (page 2).

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PUBLISHED WEEKLY in English and French by Imperial Oil Limited, 111 St. Clair Avenue West, Toronto, Ontario. Editorial material may be reproduced in aural or visual media if it is not copyrighted. Credit to Imperial Oil and/or photographer will be appreciated. Issued by Canadian Periodical Index.
THE IRON LAND

An army of young men sweats 24 hours a day to coax ore from the hard heart of Quebec's North Shore

By Tom Alderman

Its brutal grandeur grows gradually on your consciousness, like hunger.

It's impossible to assimilate in the three easy flying hours from Montreal 550 miles northeast to its main port of Seven Islands. Nor can it be digested in the one to two hours it takes to fly from Seven Islands north to its iron mining towns of Gagnon, Wabush, Laurier City and Schefferville. Quebec's North Shore is another country, a vast and stubby jowabone jutting from the edge of Canada, defying anyone to try an uppercut. Except for eastern Siberia, no country so far south from the Arctic is
swept by such chilling temperatures. It's caught in an icy vise between sub-Arctic currents blowing off Davis Strait from the northeast and Hudson's Bay from the northwest.

But the North Shore has iron. At last count, 20 billion tons of iron ore were locked within its rocky terrain. And each year even more is discovered. From its mines pour 20 million tons yearly of iron ore products, almost two-thirds the total of Canada. From its ports these products are shipped to the steel mills of the U.S., Canada, and Europe. A decade ago, iron was sixth in Canada among metallic minerals in terms of dollar production. It is now Canada's second most important metallic mineral, preceded only by nickel, all because men with big ideas had the courage to put them over on that sullen section of the country.

Because of the North Shore, Canada now ranks as the world's fifth largest iron ore producer, behind the U.S.S.R., U.S.A., France and China. By the end of this year, Canada will be turning out an estimated 40 million tons of iron ore yearly, with much of the increase coming from the North Shore. That means a half billion dollars yearly pumped into our economy. It means a potential source of raw material for Quebec's newly proposed steel complex. It means replacement of U.S. steel imports, cutting heavily into our unfavorable trade balance. Every Canadian must be affected for the better, directly or indirectly, by the opening up of the North Shore.

Back 15 years ago, when they first took on the North Shore in earnest, there were few roads and no railways, and only ships in deep trouble stopped at its fishing villages. It was rock, spume and muskeg wasteland embracing most of eastern Quebec north of the St. Lawrence, and a chunk off the west corner of Labrador. Except for the Quebec North Shore Paper Company, which in 1913 started harvesting pulpwood for its U.S. newspaper customers, industry wasn't interested. Clarke City and Baie Comeau flourished with forest activities, but for the most part the country hadn't changed much in more than 10,000 years, when the last glacier retreated.

Then iron was struck. The pioneers created four new towns and finished two railways to connect the iron country to the outside world. They transformed the 600-soul village of Seven Islands, which had slumbered for three centuries among the Laurentian rocks, into a lively seaport of Cadillac, cocktail bars and bright new company homes. Imperial Oil moved into the North Shore with them, supplying oil products to growing industry and a growing population on one of the last frontiers in North America. That unknotted country is now being plucked of its treasures in timber, minerals and hydro power by more than 100,000 people, almost three times the 1950 population. Their average age is 29, which in sports— including the challenging of one of making a new country—is about the peak championship age.

Walk into the Wabush office of the head of plant engineering for Wabush Mines, and you'll find a young man. Ray Pafford, 27, has been working seven days a week since he came up a year ago from the University of New Brunswick. He had plenty of softer offers when he graduated, but he came up where he could ripple his muscles. Where else could a guy just out of col-
And because it exists, converts drive through the Arctic-like streets of Labor-
dor City; boats and small yachts ply the icy lake-front at Gagnon, Quebec; a
new York chanteuse arrives to play the Town and Country Club in isolated
Schefferville; and $60,000 raceh- and executive homes squash hard by Indian
tar paper shacks along one of the main streets of Seven Islands.

Three mining companies have gamed more than $1 billion that they can
make money out of the North Shore. First, in 1959, Iron Ore Company of
Canada started building a railway to bring the rich, reddish ore containing 53 per
cent iron from Schefferville, Que-
bec, 350 miles south to the port of
Seven Islands. About six years ago, the
company took over an even more valu-
able lode in the mountain country
some 250 miles north and slightly west of Seven Islands. The ore here
was of lesser quality—only about 37 percent iron—but it could be upgraded
into 62 percent iron concentrate and pellets. Iron Ore created Labor-
dor City. Now, to mine similar ore, Wabush Mines is completing its Wabush town-
site five miles southeast of Labor-
dor City. Both towns, with 6,500 people
between them, are tucked just inside
the construc-
tion ecumene.

Now that most of the mining
construction is over, life on the new frontier is but an echo of what it was.
You can live and work out of doors—red earth spattered with 53 per cent iron ore.
In summer, the mines are blood-red craters sinking down into the earth in a
dance of magnificent ter-
tar races. The hills are
red. Water lies in pools of scarlet. The men their-
selves are red, caked with the red dust that rises in clouds and pervades
everything so that clothing, tools, buildings, and clothing are laced with a
vermin of crimson.

Banana Belt up North
Such a life is for men fortunate enough
and determined enough to make their
own worlds. "You call this cold?" asks
Dox Dooley, Imperial's plant super-
tendent. "I worked in Baflin Island be-
fore Schefferville. And I call this the
banana belt." Be careful of you're the outdoors type.
"Why should I leave?" asks construction
foreman Jules Foresi, aghast that any-
one should ask such a thing. "You can hunt and fish, and curl and bond, play
hockey, swim indoors. Does a man want any more?"

1959, Schefferville was the darling of
the North Shore, sending 13 million tons yearly of direct shipping ore south to
Seven Islands' port. But the iron con-
test was about the best steel-
makers could get anywhere in North America. But in the Sixties, steel did an about face. Wary at first of en- 
worship some lower-quality ores, like
those further south around Gagnon, Wabush and Labrador City, into iron pellets and coarse pig iron, 60 per cent iron content. This higher-
quality iron made for a better steel product. Now, unless it is a choice, it's hard to get steelmen to look at any-
thing less than 60 percent. Scheffer-
ville shipped about 8 million tons last year. Its 3 million tons a year is still a research method of improving the grade of its ore. In the meantime, the manle has passed to Gagnon, and the twin towns of Wabush and Schefferville.

Wabush and Labrador City have also inherited the one-time vogue of Schefferville. They're new, strong, open-air
municipalities, English-speaking, spread at the base and along the sides of Labrador moun-
tains. They are big enough to acquire the thin-skinned self-confidence that comes to company towns soon after construction.

No Place for Bums
The men who work in the twin towns-
sites are a salty, uninhibited people, heartily of cheery and buroque of
tone, but infused with a frontier sense. The frontier forthrightness strikes you abruptly in a hand-lettered sign in front of the Wabush cafeteria, where about 1,000 men eat daily. "No running Vio-
lators will be terminated." Some men have tramplned in the rush into the dining hall. The proprietor can see it. It bears the indelible mark of anger, of long-suffering patience exhausted at last. You jost for the man who lettered that sign. But the men run anyway.

There are no bums in these places. A bum couldn't survive in the environ-
ment. The men are there to work as hard as they can. That is how they make money as possible. The open pit mines shimmer with activity every hour of every day. The coldest weather, jet-piercing drills — looking somewhat at a distance like undesitired oil drilling rigs—hove into the ore bodies. Forty-ton charges of explosives
Come, Josephine

The Long Iron Country

The only way to appreciate what they did is to spend $14.30 at Seven Islands, and ride the railway up to Schefferville, 350 miles north. It's an 11-hour trip and, if you're easily bored, monotonous after the first 80 miles. The track tunnels through the Laurentian Scarp, a 3,000-foot-deep granite barrier which walls off the interior from the outside world. Then it slides across the Labrador Trough tableland, where winds chilled over Hudson's Bay sweep in at 60 miles an hour. Past miles of boreal forest caused by the spontaneous combustion of caribou moss. And into deep iron country, where tree growth stops and ice grows thicker on the lakes, and the soil grows redder. At one time, during its construction from 1950 to 1954, more than 7,000 men worked on the railway, attacked by cold in winter and black flies in summer.

The railway opened the North Shore to exploitation. A road has now been built along the coast right to Quebec City. The towns are spreading, the old individualism is消亡ing, and you need a licence to shoot the moose. There's so much money around that, a few years back, someone actually robbed the bank at little Hallowell. The culprit couldn't leave by getaway car, because there wasn't any road. He had to hike to the docks and wait for a boat to pick him up. The police arrived first.

North Shore people use this incident to illustrate their economic progress. 'But he should have waited a few years,' says one Seven Islands' citizen. 'Now he could have taken the road all the way back to Quebec City.'

Flying machines for Josephines (as well as businessmen, grandparents, teenagers and bird counters) are on the way around satellite airports like Buttonville, Ontario.

by DON SNELL
like it, deal in all these, and.

Television cameras are regularly charter
turbulent planes to create special film
effects, such as the tube of landscape
drawn from a low-flying plane. Skydivers,
police and real estate agents use charter
aircraft, as did four racing fans on route (and in a hurry) to watch Northern
Dancer win the Kentucky Derby. Radio
controlled model aircraft often slip
beyond range of their control beams,
run out of gas and lie in a farmer’s field
or beside a tree. They’re almost im-
possible to spot—except from a low-
lying small plane.

probably one of the more imaginative
uses of the small plane was shown
last Mother’s Day when a man turned
up at Butttonville, looking for a twi-
scater he could rent in which to take his
77-year-old mother for her first flight.

Many knowledgeable people see the
small, privately owned airfield as a
symbol of tomorrow. J. W. ’Joe’ Gerace,
Charles Dunn and Michael Silton of
Toronto Airways (which owns and
operates the Butttonville Airport) believe
that Butttonville-type operations will
mushroom up on the perimeters of Cana-
dian cities to meet the growing demand
for business and recreational flying.

Their own setup includes five hangars,
a lounge and administration building, a
3000 foot paved runway equipped with
lights for night flying, a refueling island
that can pump E90 aviation gasoline
into five aircraft at once, and complete
repair and overhaul services. There’s a
200 car paved parking lot and a chil-
dren’s playground; regular dances and
winter roasts are held, with an annual
wings banquet for new graduates.

Butttonville’s clients can stable their
flying horses at the field (and 60 fliers
do), rent a plane to fly themselves (To-
ronto Airways operates 11 aircraft and
plans to buy more), rent a plane com-
plete with pilot, or take flying instruc-
tions (which cost $400 for the govern-
ment- required 35 hour course). There
are two full-time and six part-time in-
structors, a Link trainer for instrument
instruction and a complete ground
school. With this kind of versatility,
Butttonville can and does meet almost
any request.

Flight instructor Gordon Craig still
shakes his head over the case of the air-
sick provincial government official. As an aid
in estimating next year’s hawk popula-
tion, it was necessary to fly the pale green
official for two hours in low long sweeps
some 50 feet above a forest while he
counted hawks’ nests in the treetops.

It is regularly as Christmas, super-
market Santa Claus take off from
Butttonville and fly, without benefit of
reindeer, to their destinations. Craig
and other pilots have bombarded chil-
dren at country fairs with candy kises
and bubble gum, operated airborne
loudspeakers for campaigning politici-
ans, flown businessmen to inspect fac-
tory sites as far away as Great Britain
and rushed spare machinery parts to rural hospitals.

Craig recalls flying a group of duck
hunters into northern Ontario where,
he says, ‘they snapped photographs of
their cottages and all the small lakes in
the area. Then they drew a map which
showed logging roads into the lakes.

The ducks won’t have a chance.”

Craig was once hired by a gravel pit
owner who’d had his front end loader
stolen. Flying within a 35 mile radius of
Toronto at a low altitude, they soon
located five machines and turned the
information over to police; investigation proved one of them was the stolen ma-
cine, disguised under a fresh coat of
paint. For a flight costing him $60 the
owner had found a $30,000 loader.

Businessmen, rather than charter
a plane and pilot, are learning to
fly. Some are buying their own aircraft.
Rentals range from $11 an hour ($14 with pilot) for an Aerocopa Champ to
$20 an hour ($24 with pilot) for a Piper
Canguar which carries three, plus
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Many knowledgeable people see the
small, privately owned airfield as a
symbol of tomorrow. J. W. ’Joe’ Gerace,
Once you've flown, you're hooked—like this man on his way home from an airborne weekend.

flying because they're afraid of the idea. "But a trained pilot in a sound aircraft is as safe—probably safer—than in an automobile on a busy highway." Although there aren't any accident statistics on private flying, a 1961 study of scheduled U.S. airlines by the Air Transport Association of America seems to agree with Gerace. In 1961 there were only 124 air fatalities for a death rate of 0.2 per million miles. Automobiles, in which 24,700 people died, showed a rate of 2.2. Buttonville has had only one accident in its history, a two-man fatal crash in June of last year.

Confirmed flyers like Gerace feel that the risk, such as it is, is more than outweighed by the pleasures. "When you fly your own plane, you're literally above everything—somewhere the everyday worries, work problems, family troubles are far away. There's just you and your aircraft, and just for a little while you're as close to being free as a bird as it's possible to get." Gerace finds it difficult to communicate his feelings about flying, but after hesitating a moment he went on, "I guess, actually, it's like having your own particular piece of heaven." Once you're flown, you're hooked, he believes.

And this was certainly the case in the intricate anecdote of Stan Gnosinski and George Szalowski. Gnosinski, a 55-year-old mechanical engineer, learned to fly with the Polish Air Force Reserve in 1928. Today he flies his own Piper Cruiser out of Buttonville airport. A few months ago, he took up as a passenger the man who taught him to fly in Warsaw, George Szalowski, now a Toronto draftsman. Szalowski liked it so much he took lessons all over again and got his licence.

So it was that a man who hadn't flown since the third day of World War II when, as a pilot in the Polish Air Force, he was shot down by the Luftwaffe, joined the growing squadron of Canada's weekend flyers.

FROM THE BEGINNING OF TIME

This unique atlas, prepared by Calgary cartographers, tells the oldest story in the world.

Take 42 different authors from across Canada, a couple of amateur editors, a publisher unfamiliar with large-scale publishing and the odds are that the resultant book will be a classic of literary hodgepodge.

But just such an organization, working out of Calgary, has produced a unique book: an aesthetically attractive, thoroughly professional atlas crammed with technical information under the title 'Geological History of Western Canada'.

The contributors are geologists, researchers and other professional people from Canada's oil industry, universities, research councils and government agencies. The co-editors are Dr. R. G. McCrossan and Dr. R. Perry Glanister, both with Imperial's geological research group in Calgary, assisted by G. H. Austin, Socore Mobil Oil of Canada Ltd., and professor S. J. Nelson, University of Alberta. The publisher is the Alberta Society of Petroleum Geologists and the book came off the press this year, after four years of planning and concerted effort.

In simplest terms, the atlas is a study of the ins and outs of western Canada in living color. It provides a comprehensive description of the geology of western Canada from the earliest geological time, the Precambrian, 2.5 billion years ago, to the present or Quaternary. Most of the book is concerned with the last 600 million years. It is more than a mere compilation of previously published material. The atlas contains data and interpretations that were impossible with the fragmentary information available a few years ago.

The publishers know of no comparable atlas anywhere in the world. The atlas, with maps drawn on a 1:5,000,000 scale (1 inch = 78.91 miles), deals with about one million square miles. It includes the prairie provinces and Cordilleran region but excludes the Northwest Territories where intensified drilling in the future is expected to change present geological concepts markedly. There are 16 chapters, each written by one or more specialists. The 235 pages, 15 by 22 inches each, add up to nearly 10 pounds and cost $25.00.

The first material for the book arrived about two years ago, the last contributions came just a few weeks before the atlas was due off the press. The co-editors spent about one man-year of work each on the job, mainly on their own time, "generally on a cord table..."
A NEW LOOK AT THE OLD WEST

Geologists examining this map can tell by its colors roughly in what era the sections of country were formed. Generally, browns and reds indicate the oldest geological time, greens and yellows the youngest, blues and purples the middle ages. For instance, this map's oldest sections are along B.C.'s coast (Jurassic-Cretaceous period: 155-120 million years ago)

Teachers and students—this map can be removed for use as a teaching aid
at home where we could wander about in our socks.

Sixteen papers had to be correlated into smooth-running chapters. Some had to be expanded, others cut. Color shadings that give necessary contrasts on maps and charts had to be exact. Some maps went through 14 or more press runs and if a page, printed on both sides, had to be re-run it could cost over $1,000," says Glatter.

The Calgary printers, Aicraft Printing Ltd., spent more than 50 hours just trying to come up with a realistic quotation on the job's time and cost. The original material made three station wagon loads when delivered to the printing plant. Since most of the material was irreplaceable, it was kept under locks and insured for $30,000. The printers had 32 special inks mixed to their specifications to get the necessary colors. The paper is of high opacity, to take the heavily colored printing on both sides of some sheets.

The book will be invaluable to universities, libraries and oil companies (few of which have acclimatized so complete a geological record of western Canada on their own). It can serve as a text on the fundamentals of geology or as a source of highly technical data for use in interpretive work by oil explorers.

'This is the first time such a large area has been selected for complete geological analysis,' says Bob McRossan, 'from the granite “basement” of the Precambrian to the gravel on the surface.'

'The atlas probably couldn't have been produced by any single company. Calgary, with its concentration of oil company head offices and the more than 1,000 geologists in or around the city, provided a unique environment for the project. Furthermore, the geological subsurface information on the western plains is better than that of any other area in the world. Much exploration and drilling has contributed to this data. The work of government conservation boards also helped substantially; these boards accumulate information from all companies, which was available to the editors. Already it looks as though the atlas is a best seller. Its 1,500 first-print copies were nearly all spoken for before it went to press. With a plot like that—the story of time in full color—how could it miss?'

HIGH NORTH

At 50 below zero the spruce branches crack like pistol shots, a motor vehicle skids in a slush of its own exhalant and each cold breath dips deep into a man's lungs. And in January around Fort McPherson, 130 miles inland from the Arctic Ocean, the sun skims only fleetingly along the rim of the southern sky and the days are mostly night. In this setting, in the dark and bitter winter just past, Imperial Oil geophysical party #23 went about its work.

The catskinner went first, slashing trails through the snow and scrub timber. The seismic crew followed in tracked vehicles that crept over the snow like prehistoric monsters. Day after day the men pursued the same routine. Drill a small hole in the frozen earth. Load a small charge of dynamite. Lay strings of sensitive microphones (called geophones) across the surface of the snow. Hook them up to a recording truck. Explode the dynamite, sending shock waves racing into the earth, to rebound back through the geophones and into the recording truck where they are recorded on magnetic tape.
They traveled in Bombardiers or Nodwellts, tracked vehicles named after the manufacturers and able to move on snow or, in warm weather, muskeg. It is a slow, rough and, in the Arctic, sometimes dangerous way to travel.

"Funny thing about these lakes," a driver said matter of factly to Reuters photographer Ron Cole. "You'd think they'd be frozen solid in this weather. But one of the Nodwellts—they weigh up to four tons—we went through the ice, right to the bottom of a lake."

"What happened to the driver?"

"Oh, he jumped. He got out all right. We went to Calgary for a driver and he came and put a line on the Nodwell and we hauled it out. Funny thing about those lakes, though—"

It was a funny thing, too, because the weather was surely cold. Most of the camp thermometers bottomed out at 50 below and, sometimes, the last item of discussion before bedtime was, "Should we bring the thermometer in so it won't burst?"

In such weather a motor will freeze solid in hours if not running; then sometimes even a blowtorch won't thaw it. So one crewman slept all day and stayed up all night, solely to keep the motors warm: starting each one up for an hour, shutting it off for a half-hour, starting it again.

One night according to thermometers at nearby McPherson, it went to 74 below. At this temperature the tracked vehicles broke down. The rubber pads, to which the steel treads are attached, turned brittle and cracked. So each rubber pad had to be replaced with nylon, washed in by air.

All through the black days and nights, in the cold glare of headlights, the crews replaced the pads, unscrewing six bolts on every cleat, as many as 64 cleats to a track, in the numbing cold.

But some men seemed at home: Eskimo crewnmen David Thompson and John Snowshoe, for instance. Which is maybe a hint to the kinds of crews we'll need in the future, as the industry pushes deeper into the north.

Robert Collins
Petrochemical Chameleon

Acyronitrile has more images than a fun house mirror

If acrylonitrile were as difficult to utilize as it is to pronounce, Imperial wouldn’t be building Canada’s first plant dedicated to its production. However, its ability to tongue-tie doesn’t impair the chameleon-like qualities of this colorless, almost odorless liquid petrochemical. It’s pronounced ‘acr-nil-ron-ter-il’, with the accent on the fourth syllable. And it has more uses than syllables. When the $5 million Sarnia plant starts turning it out for Canada’s chemical companies late this year, anyone who runs a car, wears a sweater, opens a refrigerator, walks on ladies’ high-heeled shoes, taps a typewriter, travels with luggage or picks up a colored telephone is sooner or later bound to meet acrylonitrile.

Until now, Canada has been importing this chemical intermediate from U.S. manufacturers. Acrylonitrile is used to manufacture man-made fibres by Du Pont; ‘Orlon’, the synthetic fibre made from this versatile industrial chemical, is used in making sweaters. Polymer Corporation needs acrylonitrile to turn out a synthetic rubber which has oil resistant properties and finds wide use in many industries. Acrylonitrile is also used by the chemical industry to make a plastic called ‘saran’—a compound of acrylonitrile, butadiene and styrene, all petrochemicals.

Saran is the fair-haired boy of the plastics business. It’s tough, being able to take heat, hard knocks and chemical assaults unflinchingly. It’s also light but stable, and can hold color well without tarnishing. Like a half-dozen other plastics, it can be coated with metals, but it resists abrasion and corrosion better than its competitors. So it can be used in cars, not only in interiors, but also metal-coated for trim, door handles and car letters on exteriors.

Saran has been replacing leather luggage, rubber shoe heels, and metals and plastics in typewriter keys, refrigerator interiors and colored telephones. It has been used on push buttons of radio and TV sets, knobs for kitchen range timers and polishing items like faucets and fittings.

Acrylonitrile is not new. It was discovered in 1893 in France, but no one knew quite what to do with it until early in World War II when German companies had to provide oil-resistant rubbers for the war effort. Most of the first commercial acrylonitrile in the U.S. was made from acetylene and hydrogen cyanide. But when Sarnia’s plant opens this year, Imperial will use a method perfected five years ago by the Standard Oil Co. (Ohio), using ammonia and propylene, which are lower cost raw materials.

For an immigrant with an almost unpronounceable name, acrylonitrile should do all right in its new country. Imperial expects the acrylonitrile demand in Canada will increase because of expanding use of man-made fibres, plastics and synthetic rubber. Acrylic fibres are being used in all kinds of clothing, blankets, padding for rumpshakes and rugs and carpets. Some chemical companies are even working on a process using acrylonitrile in the manufacture of a form of nylon.

Now, if we can only remember to put the accent on the fourth syllable.

Bridget Henry

Modell of an acrylonitrile molecule. Formula CN₂H₄ = CHCN

AN ETERNITY OF CARBON

In the blinding flare of a star four billion years ago an atom of carbon was born, traveled through time, distance and form to become part of your body

by TOM ALDERMAN

Take one atom of carbon—one, for example, of the millions now lying in the cells of your body. That atom is older than the earth. You would not be alive today if it and others like it had not been born in a star, maybe four billion years ago. No life would exist without carbon—no humans, plants or animals. Nor would food, clothing or fuels like coal, natural gas and petroleum, all of which are derived from living matter. Carbon is the skeleton on which all life is fashioned.

Your atom traveled untold distances, and through many forms of existence, before it arrived in your framework. And long after you’re dead, it will take on other forms, find new functions as yet undreamed. It may never disappear.

In pure form, carbon exists as diamonds. But it can combine with other elements in fantastic variety. There are more than two million carbon compounds (called organic compounds), about one and one-half times the number formed by all the other elements combined (inorganic compounds). Carbon in its many forms is an indispensable part of such everyday products as nylon and gasoline, perfume and plastics, shoe polish, rayon and vinyl. And new compounds are being discovered every year. (For example, Du Pont scientists recently introduced Corflon, a complex of chemicals derived from crude oil, which is about 85 percent carbon, used mainly as a substitute for leather footwear.) Yet in all its forms, carbon makes up only about 0.01 percent by weight of the earth’s crust, about 0.03 percent by volume of the earth’s atmosphere, and only one-half of one percent of the weight of the living human body. Long before that carbon atom in your body came to earth, it was born—like other carbon atoms—in a young star. All atoms consist of three main kinds of elementary particles: protons, which are electrically positive; neutrons, electrically neutral; and electrons, electrically negative. Different kinds of atoms differ only in the number of these elementary particles that they contain. A young star is a mass of hot hydrogen atoms, each of which holds one proton and one electron. Because the star is so hot, these atoms move about and collide with each other with such force that some of the protons change into neutrons. A proton and a neutron then attach themselves to another proton and neutron, forming—with two electrons—an atom of helium.

After a few hundred million years, the star becomes almost all helium. The helium atoms collide—and form an atom of
carbon, which holds six protons, six neutrons and six electrons. Atoms of other heavier elements are also formed.

Soon after, crowded with heavy atoms, the star explodes. The carbon and other atoms scatter through space, and are caught up in other stars. New stars are born and die in this manner all the time.

Your carbon atom was part of the sun about four billion years ago, when the sun was a young star itself. Later a cosmic accident—scientists aren’t sure what happened—pulled huge masses of matter off the sun and away from its intense heat. Your carbon atom was part of that vast cloud of matter which, when it cooled, was the earth.

DIAMONDS FROM PEANUT BUTTER?

The earth’s carbon has since found various natural forms and, more recently, has been forced by man into many compounds. Under great heat and pressure, carbon turns into diamonds in the earth’s interior. Diamonds are the purest form of carbon, used not only as a girl’s best friend—but because they’re the hardest substance known—also by industry for polishing nearly everything from teeth to oil wells. A decade ago, researchers duplicated this natural feat by subjecting graphite, an almost pure form of carbon, to great heat and pressure in the presence of a catalyst. They came up with small man-made diamonds. Scientists even developed one batch of diamonds out of peanut butter.

But the carbon atom in your body was probably never in a diamond. The nearest you probably came was a bit of carbon in the soot of a fireplace or perhaps in a cigarette. Your body is made of a vast number of different kinds of carbon compounds, but mostly in the form of carbon dioxide, which you breathe out. It was once held in inhalation and now is being exhaled.

Life giving, death dealing

Carbon 14 is a man-made form of carbon which, because it rapidly disintegrates, is used as a tracer in research experiments. By following its disintegration, scientists can trace the action of carbon in the production of food in plants by photosynthesis. Carbon 14 is used in research into the causes of cancer. And because geologists know the exact rate of Carbon 14’s disintegration, they’re able to estimate the age of ancient rocks and geological formations by studying the state of Carbon 14 deposits formed naturally in prehistoric times.

Yet, while on the one hand carbon helps save lives and is indeed the very essence of life, it can also kill. Carbon monoxide, a colorless, odorless gas, created by the incomplete combustion of carbon, is perhaps the most lethal form of the element.

And long after we are dead, and the products we use today have been replaced by more advanced substitutes, the carbon atom will go on. Even if the earth is at last burned up by the sun, the carbon atom will float back into space to be swept up again into another star.

If your atom of carbon ever disappears it is most likely to do so inside of some star. Scientists have found that the carbon atom can only be broken apart in violent atomic collisions such as occur in the middle of stars, or in man-made accelerators. And then its protons, neutrons and electrons may be built into atoms of some other elements. Only then will the career of that atom which was once part of you, come to an end. Like you, it will have died as an individual. But it may still survive its death and even become part of the life of a yet undiscovered atom with a new identity.
When Helen Gagne, at 14 years of age the youngest member of the National Youth Orchestra, wracked a leg tendon that kept her from after-rehearsal swimming parties, she happily remarked 'I can use the extra time to practise.'

There lies part of the explanation for what some music critics call the phenomenon that is the National Youth Orchestra. The youngsters who belong to it are like three-year-old colts before their first race—all nerves, restless, eagerness to get started.

The NYO is the brainchild of Toronto conductor Walter Susskind and a body of Canadians who felt that talented young musicians should play in a symphony orchestra under professional conditions, thus ensuring a constant supply of first class players for our major symphony orchestras (23 members have so far become professionals). The orchestra is the first to play every major Canadian city between Charlottetown and Victoria, to enthusiastic praise from audience and music critics.

The first one-week session of the NYO began in late 1960, with a budget of $8,700. This year the session will last almost seven weeks, the budget close to $100,000. That first year there were 97 orchestra members, this year 106.

The music year for the youngsters (ages 14-24) got underway this year in January, when managing director Ezra Schabas auditioned players in 14 Canadian cities. Of the players chosen, this year about two-thirds will have played with the orchestra before. But they audition like newcomers.
The kids pay a $50 registration fee if they're accepted. All other expenses—tuition, travel expenses, board and lodging—are covered by the Canada Council, provinces of Ontario and Quebec, Metropolitan Toronto, private foundations, industry (including Imperial Oil), and individuals.

During the month of rehearsals in Toronto—the first concert will be on August 1 at Stratford, Ontario—the players face a training schedule that would make Bill Crothers blush. Some 12 hours a day will be spent rehearsing individually, in sections, in chamber music sessions and full orchestral rehearsals. Knots of students will be found talking, rehearsing and listening to each other on staircases, in dormitories, anywhere three or four people can play musical instruments. John Avison, 1968 conductor, said these kids are so eager to learn all we can teach them, and have such remarkable ability to absorb, that by the end of the day we're completely drained. But the youngsters set their alarm clocks early and start practising at 7 a.m. Kids like Terry Holowch, who traveled 500 miles every other week from Timmins, Ontario, to Toronto's Royal Conservatory of Music for his violin lessons. Or like David Watson, who takes his weekly French horn lesson after traveling from Dauphin to Winnipeg.

Put students like this together with teachers like Frederick Zimmermann, principal bass player of the New York Philharmonic and member of the faculty of the Juilliard School of Music, acknowledged by musicians as the best bass violin player in North America and possibly the best in the world,
POE!

Although wine connoisseurs may shudder, most Canadian visitors now use polyethylene stoppers instead of corks for their sparkling wines, including champagne. Even some French winemakers are now doing it with polystyrene cladding corks. The plastic stoppers are light, strong, don't splinter, are less expensive—and don't need a corkscrew.

FROM THE INSIDE OUT

New model cars in the U.S. average about 35 pounds of plastic in their make-up, a 15 percent increase over last year. Plastics are moving in on zinc, steel and aluminum. Because plastics can be easily shaped, they allow car stylists more design freedom. At present they're being used mainly in interiors, such as door panels and instrument clusters in dashboards. But they're starting to move under the hood and onto the exterior, in air ducts and plated door handles.

NOT AIR-BLOWN BUT USELESS

You can blow dents out of a plastic car being made now by an experimental U.S. auto manufacturer. It costs about $4,000 and only 2,000 have been made. The car body is moulded from modified ABS, a form of plastic containing acrylonitrile, butadiene and styrene, all crude oil derivatives. The body is a sandwich made of two skins, two structural layers, and a cellular core filled with nitrogen bubbles. When heated this material snaps back into its original shape—dents can be eliminated by using a 500 degree F hot air gun on them.

NOT CHEAP—BUT VERY REASONABLE

A recent study by the American Automobile Association shows that the average owner of a 1963 model car paid less for gasoline than he paid for his automobile insurance. This is explained partly by the low price of gasoline and its good performance. The study sets the figure for the average cost of operating a 1963 car for the first year at $1,140, with 54.2 percent of this cost attributed to depreciation, 12.8 percent to insurance, 11.5 percent to gasoline, 4.5 percent to oil and grease; the remaining 17 percent covers maintenance, accessories, taxes and licence fees.

CHACUN À Son Goût

In Canada it is an offence to leave the scene of an accident, but in India and Malaya, it's an offence if you don't. Motorists must not stop if they injure a pedestrian, but drive directly to the nearest police station.

MY MUMMY IS BETTER THAN YOUR MUMMY

Ancient Egyptian mummies were thought for centuries to be preserved primarily in asphalt, the oldest of all oil products. In fact, the word 'mummy' comes from 'mumias', an old Arabic-Syrian word meaning bitumen, the ancient word for asphalt. But recent research shows the asphalt-like preservative is actually resin of various types. It wasn't until some 300 BC that asphalt was used in mummification, and then only for mummies of the lower classes.

THE BEATS OF LEARNING

Plastic seating, so far confined indoors, has been venturing out to sports, concert and theatre stadiums in the U.S. Most plastic seating costs more than traditional painted wood, but with plastics (a crude oil derivative) there is no rotting, warping, chipping, color fading or splintering. Plastics, unlike wood, can also be moulded into form-fitting contours that allow for more comfort.

COMMEN

'We are witnessing today an expansion of knowledge, particularly in science, that is virtually exceeding our ability to digest. While this is most evident in the form of new products, communications, space travel, etc., the developments are equally startling in the fields of philosophy, psychology, and the social sciences in general. And yet we are in the difficult position that we cannot afford to let go of any of the old knowledge accumulated at such a slower pace over several centuries. Indeed, in many respects fundamental knowledge, even primitive knowledge, is increasing in importance rather than diminishing because of the multiplying effects of modern techniques.' W. O. Tait, author of the Engineering Society in Toronto, November 1964.