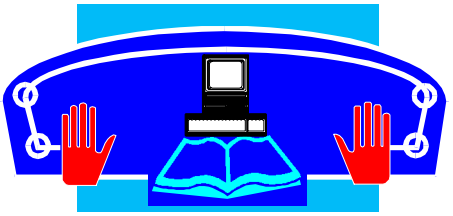

Journey To The Northwest Territories

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June 1979 June 1980

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GREENLAND TECHNICAL ORGANIZATION
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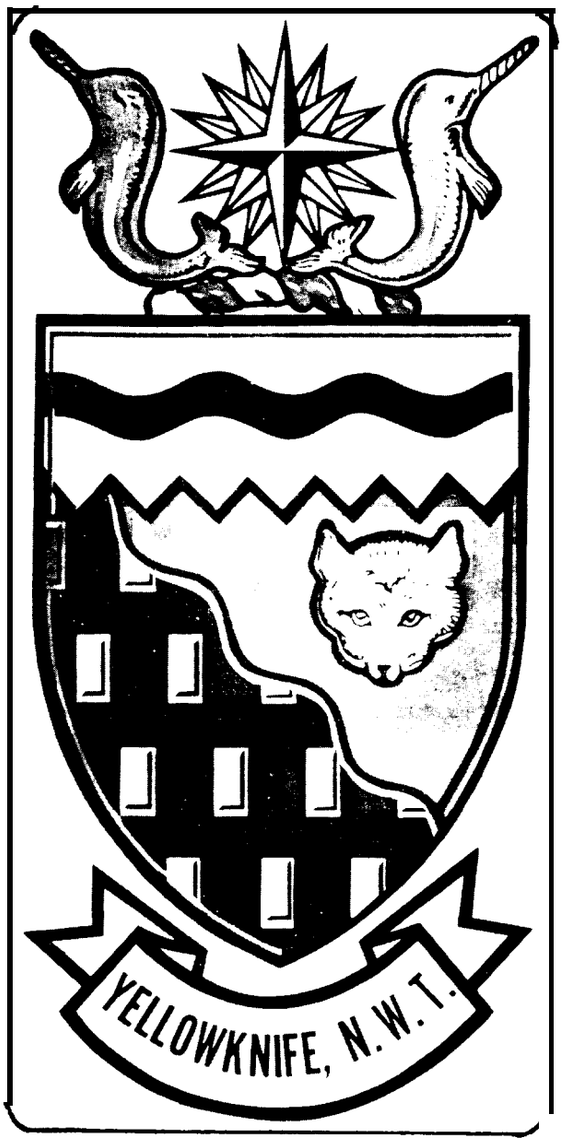

The NWT Coat of Arms is highly naturalistic.
On top, the North Star and-the whales hunted in the Arctic Ocean. Below that, a white field a blue wavy line symbolizing the Northwest Passage through the Arctic Ocean. The slanted undulating line across the shield represents the treeline. Below the treeline, the gold bars in a green field symbolize the mining industry, and above the treeline, a red field representing the mountainous areas and the fur-bearing animals.

JOURNEY TO THEN ORTHWEST TERRITORIES

In June 1979 we visited the Northwest Territories (NWT) in Canada as guests of the Territorial Government. Compared to previous tours of arctic regions we consider this trip, arranged for us by the Territorial Government, unique. On no other previous tour did we experience a program as varied, informative, and well carried out as the one arranged for us in the N.W.T.

We were flown from the Capital, Yellowknife, to forested Fort Simpson and Nahanni Butte area and to Fort Liard with its population of unusually independent Indians and with its homes almost hidden from each other by birch and spruce trees, and still built in the old traditional solid log construction technique.

We flew to Norman Wells whose oil wells have supplied the settlements along the Mackenzie River with oil for 60 years. To Fort Good Hope, the oldest settlement in the district, and with the most beautifully located and manicured dump we have ever seen. To the Inuit settlement Tuktoyaktuk whose original population to an increasing degree make their living by working at the radar station or at the nearby supply base for oil exploration in the Beaufort Sea. And - after a flight over the artificial islands where oil drilling takes place - to Inuvik, the Town with dreams as well as worried concerns about the population explosion likely to happen whenever oil production really starts.

And we were flown to Resolute Bay, the supply base for oil, gas and mineral exploration on the Arctic Islands. An ambitious plan for an arctic model town was about to be carried out here when the centre of priority for supply operations was moved southeast to the large airport of Nanisivik lead-zinc mine. This mining town, only a few years old, has been designed and constructed as a family town, intended to be attractive also to the local Inuit population. To Arctic Bay, almost entirely inhabited by Inuit, for whom hunting and fishing still is the mainstay - and finally to Frobisher Bay, the Town established during the war as a base for USAF's transit flights via Narssarssuaq and Keflavik to Europe. The Town is still characterized by the many temporary military structures remaining - far beyond their intended lifetime - and used for a variety of other purposes.

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The most significant impression gained from this trip is that conditions in N.W. T. are much different and better, compared to what we had imagined from what we had heard and read.

We were, for instance, surprised to learn that public expenditures in N.W.T. at least match expenditures in Greenland, and that they are aimed at the same goals: Education, health care, welfare - including housing, and technical services. After this trip we have been forced to revise our previous belief that the Danish undertaking in Greenland were unique in this World.

We observed that planning - both from an architectural and an engineering point of view - was carried out at a high professional level and with consideration for local conditions.

In regard to infrastructures (airports, roads, water supply, power supply, sewage systems, and telecommunications) N.W.T. is ahead of Greenland, mainly because such services are available in considerably smaller communities than is the case i Greenland. When it comes to air transport, N.W.T. is far ahead. On the other hand - all communities in Greenland may easily be reached by ship.

Our methods of construction in Greenland probably result in somewhat more substantial buildings than is the rule in N.W.T. We do, for instance, use concrete to a higher degree. The lighter construction in N.W.T., however, is a result of different philosophies. While our housing construction, for example, aims at housing with a useful life of between 33 and 50 years, a house in the N.W.T. is generally considered to have a life expectancy of about 20 years. This difference in attitude obviously lead to differences in construction methods.

It is also our impression that designers in N.W.T. are much more likely to try out new things than we are - and that they use their imagination to a higher degree. We have outstanding examples of very advanced construction, although we also have the feeling that the experiences gained by the experiments are not always fully used in successive projects. Canadians visiting Greenland do, on the other hand, also tend to find our buildings rather monotonous.

The economic base for developments in N.W.T. is, because of N.W.T.'s known natural resources, considerably better than in Greenland. The City of Yellowknife, with almost exactly the same population as Godthaab, appears much more metropolitan and reflects a considerably higher standard of living.

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We are deeply indebted to Commissioner John H. Parker for this profitable and inspiring experience, and we thank Paul Moody, Director for the Department of Public Works, for all the help and assistance provided by his Department, his staff and not least by himself during our stay in N.W.T. The visit to the many Towns and Settlements which D.P.W. had arranged, have - combined with conversations with local people - given us a very wide and varied set of impressions of activities in N.W.T.

We would particularly like to thank a Member of D.P.W.'s staff, the Danish born Architect, Hans O. Barfod, who accompanied us on most of the tour, who co-operatively attempted to provide answers for our endless stream of questions - and who, by the way, spent a part of his early career with GTO in Godthaab.

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This report, which is number 4 in a series of descriptions of conditions in Arctic regions, does not pretend to be an exhaustive study on N.W.T. The main emphasis has been laid on observations which we feel would be important to GTO's future work in Greenland.

During a short, subsequent visit to Yellowknife in the spring of 1980 we have had the opportunity to re-check and update the report. It became obvious that in the course of only one year the developments in the political, economical, and the resource-oriented fields had been so extensive that parts of the 1979 report already would have been rather out of date if they hadn't been revised. These are years of rapid changes in the Arctic regions.

Georg Lind Pedersen

Gunnar P. Rosendahl

Hans Olgaard

A. HOPES AND CONCERNS

"Canadian have for a long time considered the Yukon and the Northwest Territories in the context of Canada's future, and felt that Canada's future greatness was closely linked to the vast northern areas."

"Today thie is becoming a reality."

The above statement is quoted from the introduction to "Canadian North", iesued by the Research Institute of Northern Canada in 1977. The introduction continues:

"The increased interest in the northern areas will no doubt create problems. Development has its price, and many - both Indian, Inuit, and residents originating from southern Canada - fear that their territories may end up just being districts supplying energy and raw materials to satisfy the needs of the industrial giants in southern Canada."

"Development will bring prosperity and advantages to the residents of the Arctic but also difficulties. The Arctic is vulnerable. The balance of both the land itself and of the communities located there is easily disturbed, and irreparable damage may be inflicted if developments are not carried out in a responsible way."

These are hopes and concerns familiar to us in Greenland.

B. FURTRADERS , GOLDDIGGERS , MILITARY PERSONNEIL , CIVIL SERVANTS , AND PEOPLE INVOLVED IN RESOURCE EXPLORATION ARE THE IMMIGRANTS OF THE N.W.T.

The Northwest Territories have been populated by Indians and Inuit since about year 6000 B.C. when the glaciers receded from the present land areas. The Indians lived in the forested areas along the rivers while the Inuit inhabited the areas along the coast line, and this division of land has largely been maintained ever since. When the Europeans started exploring the northern part of Canada in the 16th century, about 20,000 Inuit lived in the area.

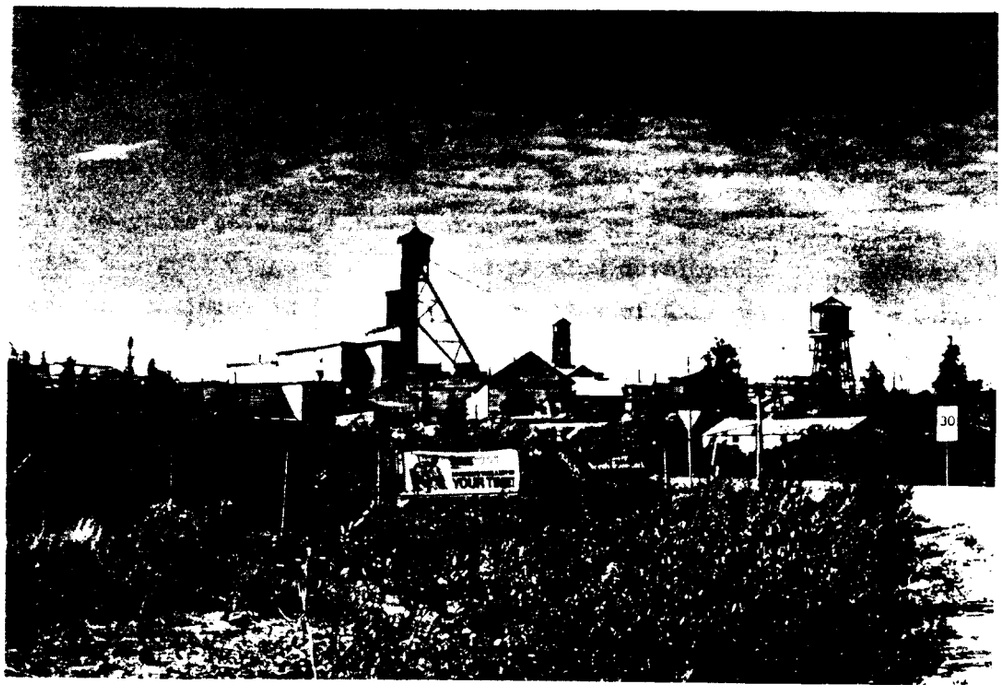
The influx of Europeans took place along two avenues and for two widely different purposes: The navigational explorers tried by sea to find the Northwest passage, and the furtraders of the Northwest and the Hudson's Bay Companies travelled into the land to purchase pelts.

The possibility of finding a Northwest passage to the orient was a favourite preoccupation of several European statesmen during the 16th and 17th centuries. The first explorer, Sir John Frobisher, left England in 1576 and arrived at Baffin Island in the east bay which now carries his name. It was also during that period that the Danish explorer, Jens Munk, carried out his famous journey which tragically terminated where the Churchill River flows into Hudson Bay. Most of the explorers had practically no contact with the native population.

The furtraders did, however, as during the later yeare of the 18th century they started to penetrate the land and established their trading stations - most often built as small forts which totally enclosed the stations behind protective wooden palisades. The many settlement names beginning with "Fort" - for instance Fort Simpson, Fort Smith, and Fort Liard - date back to that period. This commercially based immigration happened simultaneously with the Royal Greenland Trade establishing themselves in Greenland together with the church.

The furtrade led the Hudson's Bay Company people deep into the land to Great Slave Lake, and far north along the Mackenzie River to the Arctic Coast. While the name Great Slave Lake has an ominous ring to it, it derives quite innocently from the name of a tribe: The Slavey Indians.

A large scale immigration did, however, only take place after gold had been found in the Klondike Valley in the Yukon. In 1898 thousands of gold diggers found their way both across Canada and along the Pacific coast to



Prospectors on their way to the Klondike found gold near Yellowknife, which later became the Capital of the NWT. The mining industry is the most important source of income for the NWT, and the gold mines near Yellowknife from the foundations for the city's healthy economy.

The next boom is expected when the enormous oil and gas deposits in the North go into production. The solutions to the very complex problems related to native peoples' land claims are closely tied in with those projects.

Klondike. In the short time of 18 months they built Dawson City which with a population of 40,000 people became the largest City north of San Francisco. The gold diggers did, on their way to Klondike, find gold near Yellowknife which was later to become the Capital of N.W.T.

After a few years several firms took over the gold production in Klondike, and the gold diggers disappeared. A slow development had, however, started and continued during the first decades of this century. The Canadian Government gradually began to take an interest in the country's northern regions. A Territorial Government was established. The police, the famous Red-coats, were sent in. Geodetic and geological mapping was carried out.

World War II brought the north into focus once again. The 2450 km long Alaska Highway from Whitehorse in the Yukon to Fairbanks in Alaska was constructed in 1942 in the short time span of only 9 months. The Canol Pipeline from the oilfields of Norman Wells on the Mackenzie River to Whitehorse was completed at the same time. Both projects were intended to carry supplies to Alaska to make it possible to repel a threatening Japanese attack. Landing strips were constructed, weather stations built, and radar warning systems installed.

During the 1950's the Canadian Government started a program of concentrating the population from a large number of scattered settlements - usually in existing Indian or Inuit communities or close to military installations. The intent was to improve the public services for the native population. Health care, particularly the fight against tuberculosis, was given a" top priority. In Greenland the emphasis was also placed on health care during those years, and "Queen Ingrid's T.B. Sanatorium" - the present central hospital in Greenland - was opened in 1954.

The search for minerals has continued in N.W.T., and during the last couple of decades several mines have started production. For instance the zinc/lead mines at Pine Point and Nanisivik, the silver mine near Great Bear Lake, and the tungsten mine near the Yukon border.

The next boom in N.W.T. is expected when oil and gas production accelerates in the Mackenzie Delta and on the Arctic Islands.

The settlement of the increasingly complex Indian and Inuit land claims is closely tied in with the realization of those projects. In Alaska the construction of the "Trans Alyaskan Pipeline" resulted in the clarification of disputes between the state and the native groups and eventually

in 1971 the signing of the "Alaska Native Claims Settlement Act". In Greenland, N. W.T.'s other neighbor, similar disputes were settled in the process leading up to the introduction of Home Rule in 1979. Those events have not gone unnoticed in N.W.T.

N.W.T. was for a long time administered almost like a colony from Ottawa. Only as late as 1967 did the Territorial Government move to Yellowknife but it is still headed by a powerful Commissioner appointed by the Federal Government. The outcome of the election in the fall of 1979 was, however, not just a shift to a new generation. The new members also intend to provide a much stronger political input in N.W.T.'s governmental affair. Intensions which are already well on their way to realization.

c. N.W.T.'s LAND AREAS ARE 15 TIMES THOSE OF GREENLAND -AND FLAT

Canada is second in size only to the Soviet Union - and the Yukon and Northwest Territories combined constitute about 40% of Canada's total area. N.W.T. alone is 3.2 million km^2, compared to Greenland's 2.2 million km^2. Canada is in other words one and a half times as large as Greenland. As glaciers furthermore cover 9/10 of Greenland's total area compared to only modest glaciers in the very northern parts of N.W.T., we arrive at the result that the land areas of N.W.T. are about 15 times the size of Greenland's land areas. The population is more or less the same in both places. While we consider Greenland desolate, N.W.T. appears - like Siberia - even more so. Inhabited places are far between.

It is perhaps surprising that N.W.T. is not called the Northeast Territorities as it is located in the northeastern part of Canada. The explanation is historic and parochial. At one time Quebec was considered the center of Canada. Everything else was considered in relation to that center - and N.W.T. is located not only north but also west of Quebec.

With its enormous dimensions - both north-south and east-west - N.W.T. is an area cf great contrasts. It may roughly be described as an immense prairie district located between the Rocky Mountains to the west and the mountainous areas of Labrador and Baffin Island to the east. The prairie is a continuation of the large prairies stretching from the Mexican Gulf northward through U.S.A. and Canada. The prairie in the N.W.T. is dominated by the Mackenzie River, originating in the Great Slave Lake and meandering through its 1800 km course before entering the Arctic Ocean.

The mountains to the east are not particularly tall, seldom exceeding a few hundred metres. Only on the islands in the high arctic do they reach elevations of 3000 metres, and the rugged, mountainous landscape there reminds one of Greenland.

N.W.T. is, in other words, the flattest imaginable landscape, filled with lakes and rivers.

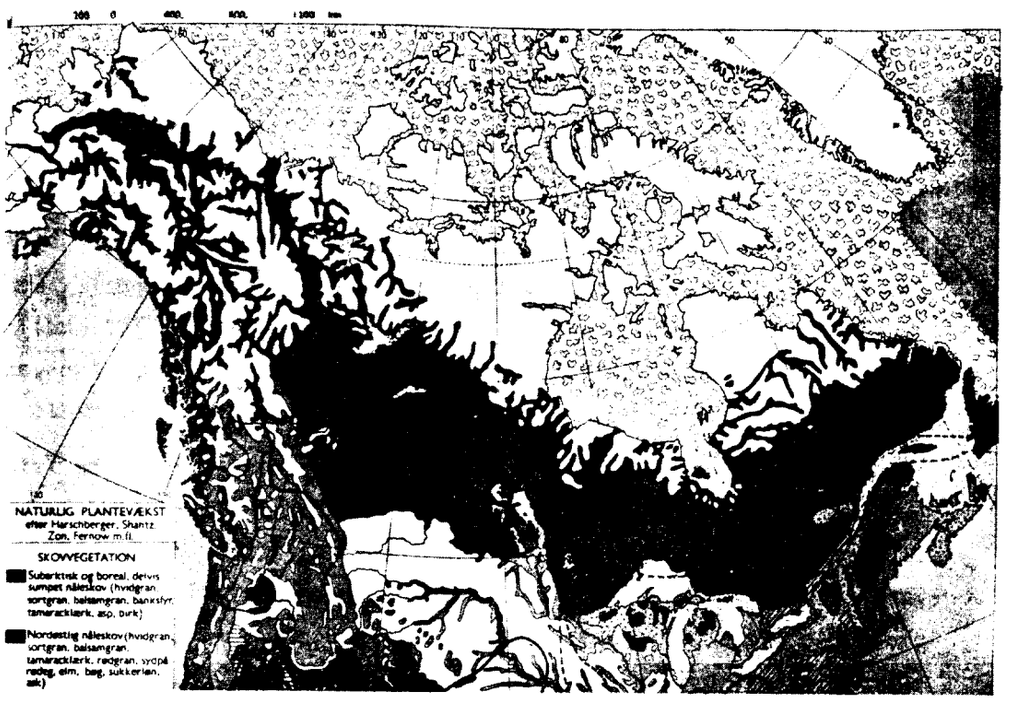
D. THERE IS PERMAFROST THROUGHOUT N.W.T.

Half the mainland of N.W. T. and all the Arctic Islands are located in the Arctic zone, with the remainder in the sub-arctic zone.

Arctic climate may be defined as a climate in which the mean temperature of the warmest month does not exceed 10° C. Below that temperate range, experience indicates that there is insufficient heat to sustain forests. All of Greenland is located in the Arctic zone - and has, as we know, no trees.

In the western part of N.W.T. the treeline extends all the way up to the Mackenzie Delta - to the Arctic Ocean and to the same latitude as the Disko Bay. From the delta this demarkation line between arctic and sub-arctic climates runs to the southeast through the N.W.T. and terminates in the province of Manitoba south of N.W.T. - Almost at the same latitude as Cape Farewell.

Permafrost is present in most parts of N.W.T., and south of the permafrost debarkation line one often finds areas of discontinuous permafrost. In the Mackenzie River delta may be found the famous permafrost-related phenomenon called Pingos. A pingo is an up to 50 m high hill covered by earth and vegetation and a mushy crater on top. The inside is one huge lump of ice. The Inuit have, through centuries, used the pingos as freezers. They dig a tunnel well into the core, excavate a large cave and use it for long term storage of meat, fish, blubber and fur. Standing inside the cave with its glittering ice crystals on walls, floors and ceilings, one feels trans-located to an ice palace from some fairy tale.



Half the mainland and all of the arctic islands of the NWT are located in the arctic zone -- the rest in the sub-arctic zone. The border between the two zones coincides with the treeline.

There is permafrost in most areas of the NWT -- also in the sub-arctic zone. In the delta of the Mackenzie River, may be found the famous arctic phenomenon, pingos.

E. SAME SIZE POPULATION AS GREENLAND BUT TEE EURO-CANADIANS HAVE COME TO STAY

The total population of N.W.T. is about 45,000. About 16,000 of those are Inuit, 7,000 status Indians (that is: Indians who through treaties have relinquished certain rights against certain privileges), 7,000 Metis (that is: racial mixtures of Indians and whites) and non-status Indians, and finally 15,000 Euro-Canadians. The three population groups are in other words of about equal size.

The total population is about the same as Greenland with its 50,000 people. Of those slightly more than 40,000 are Greenlanders while the rest are Dance. The Danes in Greenland, however, do not just constitute a minority group. It is also official policy that the Danes are to leave Greenland as the Greenlanders gradually take over the functions performed by the Danes. The Euro-Canadians in N.W.T. do, however, consider the land theirs as well, and "they intend to stay - on equal terms with the original native population groups.

F. THE LARGE DISTANCES

There are two conditions common to the otherwise very different arctic regions. The first one is well known: The low temperatures. The second one is less recognized: The long distances between settlements. This last condition is a decisive factor in regard to communication in the arctic.

1. The Airplane, TheMost Important Means Of Travelling

The airplane has opened up the N.W.T. - as it did Alaska. And flying still plays a most important role when it comes to transportation of passengers and - although to a lesser degree - cargo. No less than five airline companies maintain regular schedules in N.W.T. and service all but the smallest settlements. Small aircraft may be chartered anywhere. Many operate their own airplanes for recreational purposes - just like in Greenland one would own a pleasure boat.

N.W.T.'s thousands of lakes and rivers form landing strips for airplanes equipped with pontoons or skis. The flat landscape furthermore facilitates the construction of regular landing strips at very reasonable costs.

The recent opening of the first regular airport near a community (Nuuk, Godthaab) brings Greenland only to the threshold of this era.

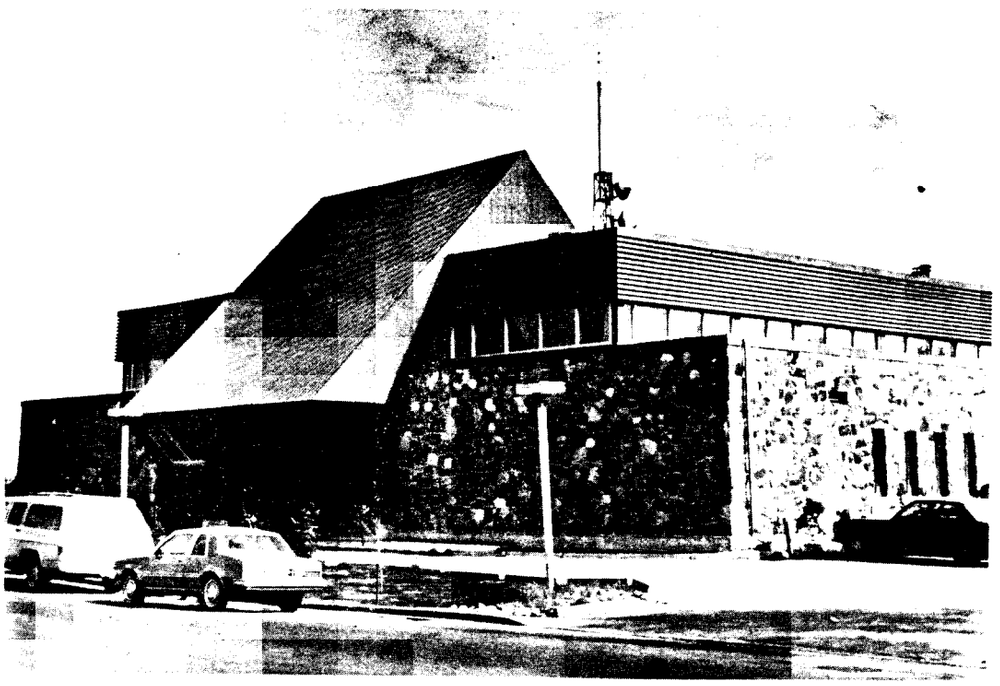
2. Cargo Transported By Rail, Rivers And Lakes

From a cargo transportation point of view one important link to southern Canada is the railroad line terminating at Hay River on the south shore of Great Slave Lake. The town of Hay River serves as a staging area for heavy goods and bulk cargo to the western and parts of the northern areas of N.W.T. At Hay River the cargo is transferred to barges which during the summer months carry it further on to communities along the Mackenzie River and as far as to some settlements along the Arctic Coast.

. One Single Road Leads Into N.W.T.

N.W.T. was connected to the road system in southern Canada about 20 years ago when the road leading north from Edmonton in the province of Alberta was extended to about 1600 km and pushed through to Yellowknife, with

Airplanes play an important role in transportation of passengers -- often combined with cargo.



The NWT is well covered by TV and radio -- thanks to transmissions via satellites. The Canadian Broadcasting Corporation produces local programming in Yellowknife.

the northern section of the road called the Mackenzie Highway. Where the read crosses the Mackenzie River, the traffic is handled by a ferry during the summer months. The road is closed for a period in the early winter when the ice prevents the ferry from operating and until such time when the ice is sufficiently strong to carry the traffic. In spring, when the ice breaks up, the road is again closed for a period of time.

Otherwise only very few roads link communities. During the winter, however, the flat landscape makes it possible to construct winter roads - temporary roads on top of snow and ice, levelled by bulldozers and snow-clearing equipment. Several communities receive their yearly supplies in wintertime via the winter roads.

The planning for roads follows the simple philosophy that roads are built where, compared to other means of transportation, they are economically feasible.

. Better T.V. And Radio Coverage Than In Greenland

Despite its enormous area and scattered population, N.W.T. is well covered with T.V. and radio. Satellite transmissions make this possible at a reasonable cost.

The Canadian Broadcasting Corporation (C.B.C.) Northern Service transmits its T.V. programs to towns and settlements through three channels on the ANIK-satellite. The programs are received by earth receiver stations which retransmit them so that they may be picked up by standard T.V. sets.

Apart from C.B.C. rs regular programs, Northern Service also provides several T.V. shows designed for the N.W.T. native populations, and therefore produced in the local languages. Some of the shows are produced by Native Communication Societies. C.B.C. in Yellowknife has recently opened up new T.V. studios where local programming is produced. The programs were earlier produced in Montreal.

In addition Yellowknife has a privately owned Cable T.V. station which - with a couple of days delay - re-broadcasts two programs taped in Edmonton.

C.B.C.'s Northern Service also provides radio programs for N.W.T. Three radio transmitters in Yellowknife, Frobisher Bay, and Inuvik are connected to relay stations to ensure that the programs - with the exception of very few localities - may be heard throughout the N.W.T. The radio stations operate 19 hours a day and in 10 different languages. Half of

the programs are locally produced while the rest are drawn from C. B.C. 's regular programs.

Several communities also have their own radio stations, operated by Native Communications Societies and broadcasting local programing.

The Canadian National Telecommunications and Bell Canada North operate telephone and telex networks eaoh in their part of N.W.T. All towns and by far the majority of the settlements have telephone connections to the rest of the world, either through regular telephone cables, microwave chains, or via satellite.

The radio, T.V. and telephone systems are at least as sophisticated as in Greenland where we have often had considerable reservations about the complexity of techniques we have utilized - and the coverage is considerably better than in Greenland.

G. TOURISM IS IMPORTANT

Tourism is the second largest source of revenue in N.W. T. Even though it is a distant second to the mining industry in terms of revenue, tourism does play a steadily increasing role in the economy of N.W.T., and the Territorial Government of course supports this development.

The possibilitiesof travelling, as well as the standard of service available for instance in several excellent hotels, are much better than in Greenland. Tourists may rent cars, canoes, and charter airplanes to go to hunting cabins, fishing camps or recreational areas in beautiful locations in the wilderness. Or the tourist may rent a canoe, have it strapped between the pontoons of a small airplane, and be flown out to one of numerous lakes or rivers. From there he may continue on his own down the river with a complete camping outfit in the canoe.

The production of home crafts of course has a close connection with tourism although a considerable part of the output is exported to southern Canada. The Canadian authorities have for a long time supported home crafts, trained producers, and organized production and sales. The arts and crafts of N.W.T. appear more varied in subject matter than those of Greenland, and more advanced - particularly in the field of graphic arts. The authorities, like KGH in Greenland, encourage producers through certain controls to maintain a quality-conscious attitude in their work.

H. FARMING DIMINISHING

The rather harsh climate and generally barren soil prevent farming to any large degree. There are, however, a few smaller farms near Fort Smith and Hay River in the southwestern parts of N.W.T. More farming was in fact done some years ago - before better transport facilities made it easier and cheaper to import farm products from the large farms in southern Canada and U.S.A.

The sheep farmers in Greenland face exactly the same problem. Mutton may be imported at a lower price than it costs to produce it in Greenland, with the result that the production now is subsidized. The sheep-farmers have recently stated that they would also be able to substantially contribute to the supply of certain vegetables provided some form of subsidies could be given to make the production competitive.

I. EXPLOITATION OF LARGE OIL AND GASFIELDS POSTPONED

1. Inuvik, Town Of Expectations

A few years ago Inuvik, near the Mackenzie River delta, expected a rapid growth from its present population of 3,000 to about 10,000. That was when plans were made to construct gas and oil pipelines from the fields in the delta, through the Mackenzie Valley, to connect with the pipeline system in southern Canada.

But the main street, Mackenzie Avenue, still looks like the streets we know from Western movies: A dusty or muddy street with no surface treatment and with boardwalks lifting pedestrians off the unpleasantness. And edged by low, two-storey wooden buildings, only interrupted by the white Roman Catholic church which dominates the main street - and for that matter the whole town. The curch is shaped like an overgrown - vastlyovergrown- igloo.

Inuvik prepared itself for a very rapid expsnsion. Large areas for new residential construction have been laid out with roads, water and sewer installations - but so far no buildings. The power plant has been extended to twice its former capacity. Very large industrial areas have been prepared. Anticipating heavy business, a number of firms offering industrial services moved in. Several have since left again.

When the Berger Commission in 1977 submitted its report expressing severe reservations about the pipeline project, the Government decided to postpone it and to slow down the exploration activities.

The Mayor of Inuvik feels that the oil crisis, which the Canadians take very seriously, will eventually change the attitude of the local population and force the Government to take a firmer stand. Inuvik takes it for granted that oil production will commence within a few years. The Mayor expressed a positive attitude to the pipeline project but also concern that the boom may be too sudden. Inuvik is still not quite prepared for large scale activities.

2. Norman Wells, The Old Oil Town

Oil production and construction of pipelines are not totally new to the N.W.T.

As early as in 1920 Imperial Oil has commenced oil production at Norman Wells. During World War II the oil from the borings at Norman Wells was led, as previously mentioned, by pipeline to Whitehorse in Yukon. The pipeline was closed, when the threat of a Japanese invasion was over, but the oil production at Norman Wells continued.

The production now goes entirely to the Northwest Territories and Yukon. The oil is shipped during the summer months. Over the six winter months, when the Mackenzie River is frozen, the production goes into storage tanks.

As an illustration for the current discussion on the original population's employment opportunity at oil wells and refineries, it is probably worthwhile noting that of about 100 families at Norman Wells, with work connected with the now long-established oil production there, only three of the families are Indian, the rest are Euro-Canadian. Up to the present time, Norman Wells is the only oil production plant in arctic Canada.

Though intensive explorations have been carried out all over the territory, no further possibilities have as yet been found for oil production on land. Flying over N.W.T.'s forested prairy, we noticed that the forests were criss-cross intersected with deforested belts, which we first thought were fire lanes. They are, in fact, seismic belts, i.e. belts bulldozed through the forests to make possible seismic measurements which may indicate exploitable oil or minerals.

Extensive reserves of oil and gas have, however, been found off-shore in the Mackenzie River Delta, in the Beaufort Sea, and in the Arctic Islands.

3* The Most Promising Oil And Gas Field In Canada

A few kilometers from the Inuit village of Tuktoyaktuk ("The place that looks like a reindeer") one finds Dome Petreolum Ltd.'s supply base for its drilling activities in the Beaufort Sea.

Tuk, as it is usually called by Euro-Canadians, was as late as into the 30's a well known whaling station, and a few of the slender boats used by the local population for whale hunting are stillsittingon the beach.

The whales were caught from those open boats in much the same way it was done during the whale hunting period in Greenland some 3-400 years ago. In Godhavn the last whale was caught that way in 1928.

In 1955 a radar warning station was built at Tuk. It was a link in the DEW-line which also extends across Greenland with 4 stations located on the stretch between Holsteinsborg and Angmagssalik. The population in Tuk eventually started to work at the radar station, and after the oil exploration got under way, practically everybody has been working as wage earners and pure money economy.

The discovery of the large gas and oil deposits at Prudhoe Bay, Alaska, in 1968, encouraged exploration activities in the Mackenzie Delta and in the Beaufort Sea. Imperial Oil first found oil in the delta in 1970. Other finds followed, and more than a hundred holes were drilled in the delta area. In 1973 the company started drilling from artificial islands in the ice-filled but shallow waters off the delta, and has since built about 20 artificial islands.

In 1976 Dome Petroleum arrived with 2 ice-reinforced drillships and started drilling through deeper waters in the Beaufort Sea. That was the same year the drillship "Pelican" drilled its first hole off the shores of Greenland. The results, however, were certainly different.

The exploratory drilling in the delta, and particularly under the Beaufort Sea, indicate that the area may develop into one of Canada's largest oil and gas producing fields - perhaps the largest.

Even if oil and gas are produced in several Canadian provinces, particularly in Alberta, Canada still needs to import oil. Dome Petroleum estimates that if production in the Beaufort Sea gets underway during the 1980's, Canada would be self-sufficient with regard to oil by 1990. This would reduce Canada's trade deficit and be of significant benefit to the nation.

When Dome Petroleum started exploratory drilling in 1976, it was only able to drill during the summer months in the very icy but calm Beaufort Sea. Dome Petroleum informed us that they had developed reinforcing of both drill ships and ice breaking supply vessels to the point where it is possible to continue drilling all year round. This would obviously be important when production eventually starts.

The company further stated that great attention was given to safety of operations in those difficult surroundings, as well as to protect the Arctic environment and to minimize the risks of oil spill. Should a spill

nevertheless happen, very sophisticated equipment is ready for collecting and mopping up the oil.

Dome employs more than 800 people half of whom work on the drill ships, while the other half work on the supply vessels, in the air transport crews and of the supply base.

Women play an important role in the operation, we were told, and each year the number of female employees increases, as does the number of different tasks they are hired to perform.

The importance of native people in the work force is also growing. More than 100 Inuit are presently employed. Dome intends to increase both the number as well as the level of training and education. The native employees are encouraged to attend training programs during the winter months to enable them to fill increasingly responsible positions.

The Beaufort Sea Community Advisory Committee performs an important dual function in the relationship between the Company and the local population, according to Dome. The Committee, whose members are appointed by the local community Councils, has frequent access to the drill sites. The Committee advises the company, particularly in matters relating to the local population's feelings about the operations, and also informs the local communities about the company's activities and about plans for the future.

At the same time the exploratory activities are carried out, the companies are, of course, in the process of planning for the transportation of the oil and gas whenever production starts. Already in the early 1970's applications were made to the government for permission to construct a gas pipeline down through the Mackenzie Valley to the province of Alberta where it would be connected to the existing gas distribution system supplying gas to the industrial areas of Canada and U.S.A. Many alternative plans for routes have since appeared. As the government delayed making any decisions in regard to the pipeline projects, other possibilities are presently being investigated - for instance the possibility of sea-lifting the products by ice-breaking tankers north and east around Alaska to harbors on the Canadian Pacific Coast.

4. The Canadian Government Must Solve The Political Problems Relating To The Native Populations Basic Land Claims

The application for permission to construct a gas pipeline primarily along the Mackenzie Valley, resulted in the Minister for Indian Affairs and

Northern Development, on behalf of the Government, appointing a Commission, which, like many other Commissions, generally is referred to by the name of its chairman: Mr. Justice Thomas R. Berger. The Commission was asked to investigate the social, environmental and economic effects of the intended pipeline project prior to the government stating its position regarding the project. The project design called for a heavy 48" diameter pipe - the same dimension used in the Trans Alyaskan Pipeline completed in 1977. That project, which cost about 9 billion dollars, is the largest privately financed project in the history of the U.S.A. It carries crude oil from Prudhoe Bay at the Beaufort Sea right across Alaska to the shipping terminal south of Anchorage.

Mr. Berger submitted his report on April 15, 1977. Its recommendations are contained in a long personal letter from Mr. Berger to the Minister, written in a bombastic, Anglo-Saxon rhetorical style. Some of the essential passages of the letter have been translated and reproduced below. Commissions investigations have revealed and thrown new light on the severe conflicts between the industrial development and the interests of the native population - conflicts that have parallels in Greenland.

- o -

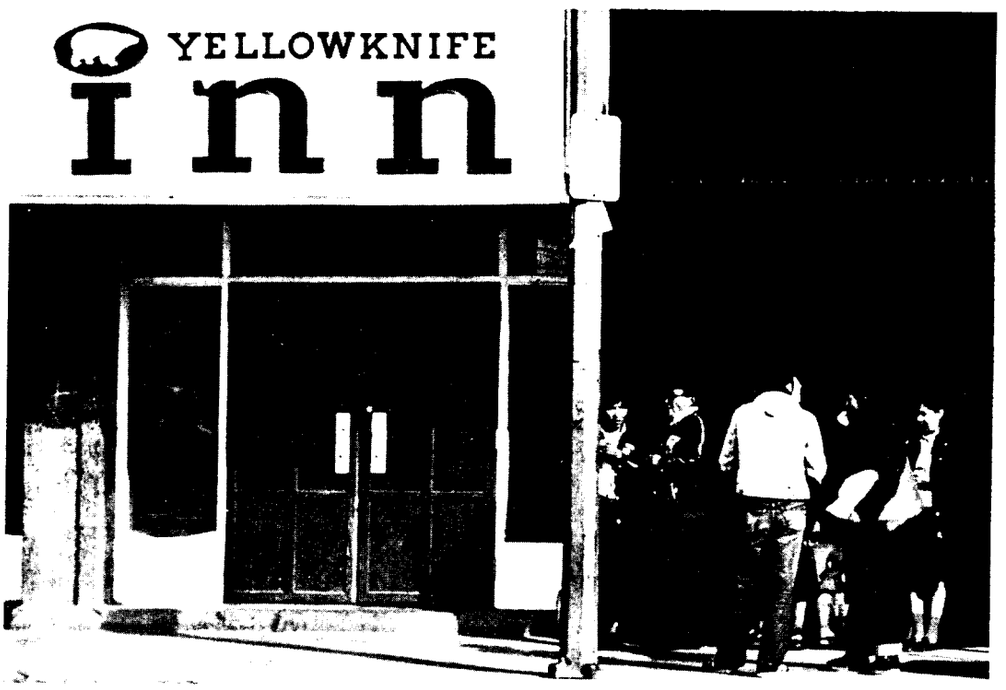
The Honorable Warren Allmand,
Minister of Indian Affairs and Northern Development.

Dear Mr. Allmand,

At the formal hearings of the inquiry in Yellowknife, I heard the evidence of 300 experts on northern conditions, northern environment and northern peoples. But, sitting in a hearing room in Yellowknife, it is easy to forget the real extent of the North. The Mackenzie Valley and the Western Arctic is a vast land where people of four races live, speaking seven different languages. To hear what they had to say, I took the Inquiry to 35 communities - from Sachs Harbour to Fort Smith, from Old Crow to Fort Franklin - to every city and town, village and settlement in the Mackenzie Valley and the Western Arctic. I listened to the evidence cf almost one thousand northerners.....

The pipeline represents the advance of the industrial system to the Arctic. The impact of the industrial system upon the native people has been the special concern of the Inquiry for one thing is certain: The impact of a

Inuvik prepared for fast expansion when oil production in the delta appeared imminent. The main street, however, still looks like the dusty streets of a western movie.



The Berger Commission pointed out the concerns of the native peoples that large pipeline projects may cause influx of southern workers, increased alcoholism, changes in the social pattern and loss of identity. The Government postponed decisions with regard to the projects.

pipeline will bear especially upon the native people. That is why I have been concerned that the native people should have an opportunity to speak to the Inquiry in their own villages, in their own languages, and i their own way. . . . . .

I have proceeded on the assumption that, in due course, the industrial system will require the gas and oil of the Western Arctic, and that they will have to be transported along the Mackenzie Valley to markets in the South. I have also proceeded, on the assumption that we intend to protect and preserve Canada's northern environment, and that, above all else, we intend to honour the legitimate claims and aspirations of the native people., ...

.....

The proposed natural gas pipeline is not to be considered in isolation. If a gas pipeline is built, an oil pipeline will follow. We must consider, then, the impact of a transportation corridor for two energy systems, a corridor that may eventually include roads and other transportation systems . . . . . .

A gas pipeline will be a major construction project across our northern territories, where it will be necessary to construct hundreds of miles of roads, wharves, warehouses, storage sites, airstrips just to build the pipeline. There will be 6,000 construction workers required to build the pipeline, and 1,200 more to build gas plants and gathering systems in the Mackenzie Delta. There will be innumerable aircraft, tractors, earth-movers, trucks and trailers. Indeed, the Arctic Gas project has been described as the greatist construction project , in terms of capital expenditure, ever contemplated by private enterprise . . . . . .

. . . . .

I recognize , of course, that the proposals of the pipeline companies are in a preliminary, conceptual stage, not in their final design stage. I recognize, too, that improvements will appear in the final design. But my responsibility is to assess the project proposals as they now stand. Given the uncertainties relating to design and construction, illustrated by the foregoing comments on frost heave and scheduling, and given the bearing they have on environmental impact and the enforcement of environmental standards, it seems to me unreasonable that the Government of Canada should give unqualified approval to a right-of-way or provide financial guarantees to the project without a convincing resolution of these concerns . . . . . .

. . . . . .

The Mackenzie Valley is a natural transportation route that has already seen several decades of industrial development. I have concluded that it is feasible, from an environmental point of view, to build a pipeline and to establish an energy corridor along the Mackenzie Valley . . . . . .

. ..0..

I believe that we can devise terms and conditions that allow a pipeline to be built and an energy corridor established along the Mackenzie River without significant losses to the wildlife. The construction of the pipeline has been justified mainly on the grounds that it would provide jobs for thousands of native people. The pipeline contractors and unions have, however, made it plain that native northerners are not qualified to hold down skilled positions in pipeline construction, and that they will be employed largely in unskilled and semi-skilled jobs. Once the pipeline is built, only about 250 people will be needed to operate it, Most of these jobs are of a technical nature and will have to be filled by qualified personnel from the South . . . . . .

It is an illusion to believe that the pipeline will solve the economic problems of the North. Its whole purpose is to deliver northern gas to homes and industries in the South. Indeed, rather than solving the North's economic problems, it may accentuate them. . . . . .

A great majority of the native people expressed their fears of what a pipeline would bring: An influx of construction workers, more alcoholism, tearing of the social fabric , injury to the land, and the loss of their identity as a people. They said that wage employment on the pipeline meant little or nothing compared to the social costs. I am convinced this fear is well founded . . . . . .

. . . . . .

Native people desire a settlement of native basic claims before a pipeline is built. They do not want a settlement - in a tradition of the treaties - that will extinguish their rights to the land. They want a settlement that will entrench their rights to the land and that will lay the foundations of native self-determination under the Constitution of Canada . . . . . .

The native people of the North are prepared to articulate their interests over a broad range of concerns. These concerns begin with the land but are not limited to it: They include land and land use, renewable and non-renewable resources, schools, health and social services, public order and, overarching all of these, the future shape and composition of political institutions in the North . . . . . .

. . . . . .

It will be for you and your colleagues, in negotiations with the native people, to determine the extent to which native claims can be acceded to, and to work out the way in which self-determination might be effected in the North, whether by the establishment of native institutions on a geographical basis or by the transfer of certain functions of the Government of Canada and the Government of the Northwest Territories to native institutions .....

The native people must be allowed a choice about their own future. If the pipeline is approved before a settlement of claims takes place, the future of the North - and the place of the native people in the North - will, in effect, have been decided for them . . . . . .

An increase in the white population in the wake of pipeline construction will entrench southern patterns of political, social and industrial development, will reduce the native people to a minority position, and will undermine their claim to selfdetermination . . . . . .

.....

In my opinion, a period of ten years will be required in the Mackenzie Valley and Western Arctic to settle native claims, and to establish the new institutions and new programs that a settlement will entail .....

If the native people are to achieve their goals, no pipeline can be built now. The native economy, which largely is based on hunting, fishing and trapping, will scarcely be affected by a delay. The mining industry will not be greatly affected. And the federal and territorial bureaucracies are not likely to decrease in size simply because the pipeline is not built now . . . . . .

A decision not to build a pipeline now would not necessarily bring an end to oil and gas exploration but might slow activities down. In the meantime the renewable resources may be developed - including a strengthening of the native economy - to enable native people to enter the industrial system without becoming completely dependent on it .....

An economy based on modernization of hunting, fishing and trapping, on efficient game and fisheries management, on small-scale enterprise, and on the orderly development of gas and oil resources over a period of years - this is no retreat into the past. The evidence I have heard has led me to the conclusion that such a program is the only one that makes sense . . . .

.....

I believe that, if you and your colleagues accept the recommendations I

am making, we can build a Mackenzie Valley pipeline at a time of our own choosing, along a route of our own choice. In time, it may after all, be possible to reconcile the urgent claims of northern native people with the future requirements of all Canadians for gas and oil.

Yours truly,
Thomas R. Berger

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The recommendations of the Berger Commission have obviously caused quite a stir in industrial circles and in the population in the N.W.T. - white as well as native. The immediate effects were that the government postponed any decision concerning the pipeline project and that exploration activities in the Mackenzie River Delta and in the Beaufort Sea slowed down. But the most important effect of the investigation is probably that it has revealed strong personal feelings, considerable social problems and a growing awareness in the native population.

The native populations resistance to the pipeline project, as expressed in the Berger report, appears, however, during the last couple of years to have diminished. The pipeline was a trump card in their efforts to force constitutional changes. Because of the well intended recommendations and their results, that advantage has now been eroded.

The consequences of the resistance and the reality of the situation are that nobody benefits from the recommendations. This is gradually being realized by a large part of the population who are looking for work and wages - and the situation is being re-evaluated.

Within the last few years additional oil finds have been located near Norman Wells. And once again plans have emerged to construct a smaller (12") pipeline from Norman Wells to the refineries in Alberta. The situation is at this time not very clear. Personal interests among the Indians who would benefit from the project compete with the long term political interests of the native organizations.

In August 1977, or just a few months after Mr. Berger submitted his report, Prime Minister Trudeau appointed Mr. C.M. Drury - a former Federal Minister for Public Works - as a one man Commission charged with the responsibility of investigating the possibilities of constitutional developments in the Northwest Territories, with the focal point being to define how the North-

west Territories, which presently has territorial status, gradually may evolve toward a normal provincial status. At the time of our visit Mr. Drury had concluded his work, and the publication of his recommendations, based on a very large number of formal and informal discussions with organizations, groups and persons, was imminent. There was a clear expectation that they would include an extensive decentralization of the Federal Governments present area of responsibility.

The Canadian Government must solve the political problems originating in the native peoples' basic claims, just as the corresponding problems have been solved in the two neighboring arctic countries, each in their own fundamentally different way. The government of the U.S.A. has settled in 1971 its disputes with the native people of Alaska by providing for self determination within certain geographically defined areas while the introduction of Home Rule in Greenland in 1979 provides for the transfer of certain political functions and responsibilities to all of Greenland.

In regard to natural resources, Greenland and Denmark have agreed to establish a joint Danish/Greenlandic board to control exploration and exploitation activities snd to ensure that the interests of both parties are looked after in the best possible way.

J. FIRMER PLANS FOR GOVERNMENT CAPITAL INVESTMENTS

During the many years the Canadian Government has carried out development work in N. W. T., it has of course through planning attempted to co-ordinate public expenditures. The capital planning process has, however, never been developed so systematically that it could, for instance, be used to essentially control the activities. And the plane have never been carried out with the same degree of consistency as we have done in Greenland.

In 1979 the Commissioner requested his Deputy Commissioner to initiate and supervise the development of firmer and more comprehensive planning for capital investments which for a 5-year period would co-ordinate public construction and investment activities. Both regional administration and local political authorities would be involved already at the initial planning stages - as they are in Greenland.

The planning would include all types of capital expenditures under the jurisdiction of the Territorial Government: Public housing, staff housing, tank farms, warehouses, schools and, to a certain degree, health facilities, and also road construction, water supply, and sewerage systems. Certain areas of capital construction, such as airport construction, defense installations, and telecommunications remain the responsibility of the Federal Government and will not be included in the plans which in other words will not be total plans for all public investments in N.W.T. And the Territorial Government will therefore not have the advantages we have had in Greenland by having all administrative and political authority centralized in one co-ordinating Department - which furthermore had a technical organization to carry out the plans.

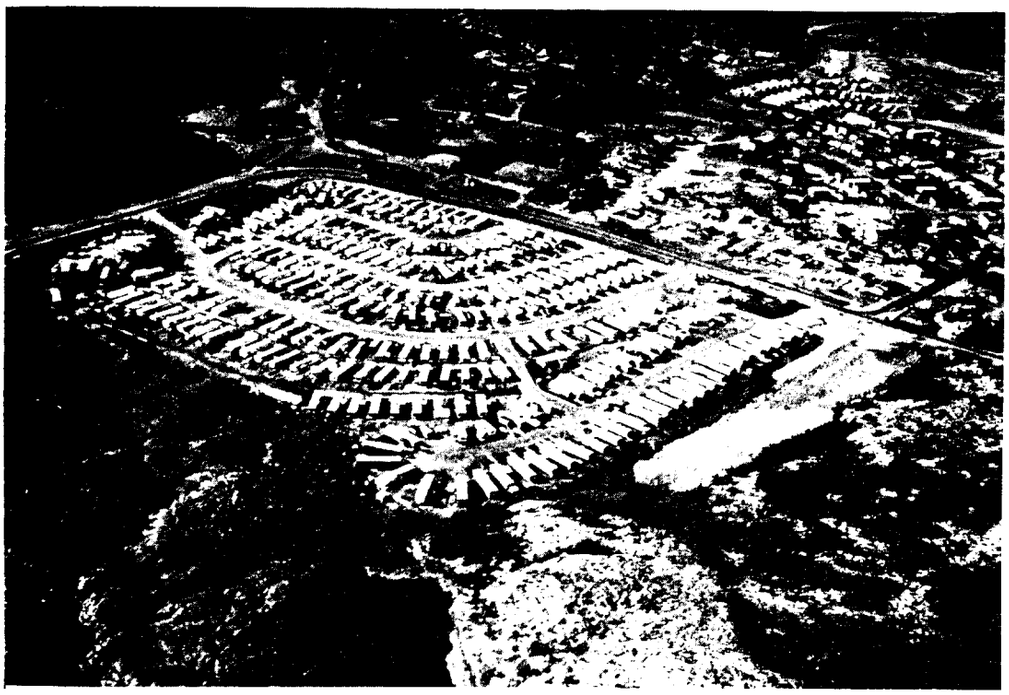
During the last 20 years the Greenland administration has maintained a centralized planning of developments through continuing 5-year Capital Investment Plans. The plans have been developed in the Department where the Greenland Council Secretariat has had the administrative responsibility for the planning while the political influence has been exercised by both Community Councils, the Greenland Council, and the Greenland Advisory Committee, which bcth at the beginning and at the conclusion of the planning cycles has provided overall political judgments.

The situation in N.W.T. corresponds to what sometimes has been suggested in regard to development work in Greenland: That the work should be decentralized and be the responsibility of the principal users - for instance

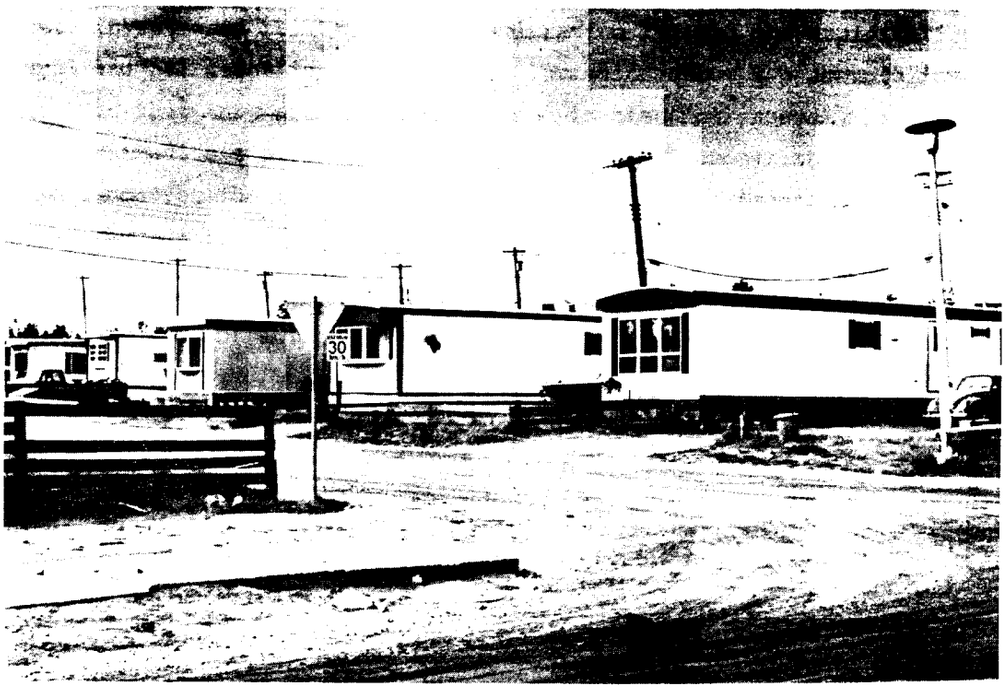
the Ministry of Education, Housing Ministry, Ministry of Cultural Affairs, the Ministry of Health, etc. - and that those authorities each do their own planning, with some of them requesting GTO to carry out the work and others preferring to do so themselves.

Despite this less than rigid planning, our impression is that the development work in N.W.T. has developed quite evenly over a broad front. No particular types of projects appear to have been favoured at the expense of others. We have, of course, not been able to form any opinion about any extra costs that may have resulted from carrying out the work without the benefits of co-ordinated overall planning.

The authorities in Yellowknife have expressed considerable interest in learning more about the planning methods employed by the Ministry for Greenland and GTO - as well as of the experiences gained.



Not only Denmark has been prepared to provide massive economic assistance in developing an arctic area -- Canada has done the same.



Considerable private funds are being invested in the NWT. Temporary solutions to housing problems in periods of hectic activities consists of prefabricated mobile homes imported from the south.

K. PUBLIC INVESTMENTS LARGER THAN IN GREENLAND

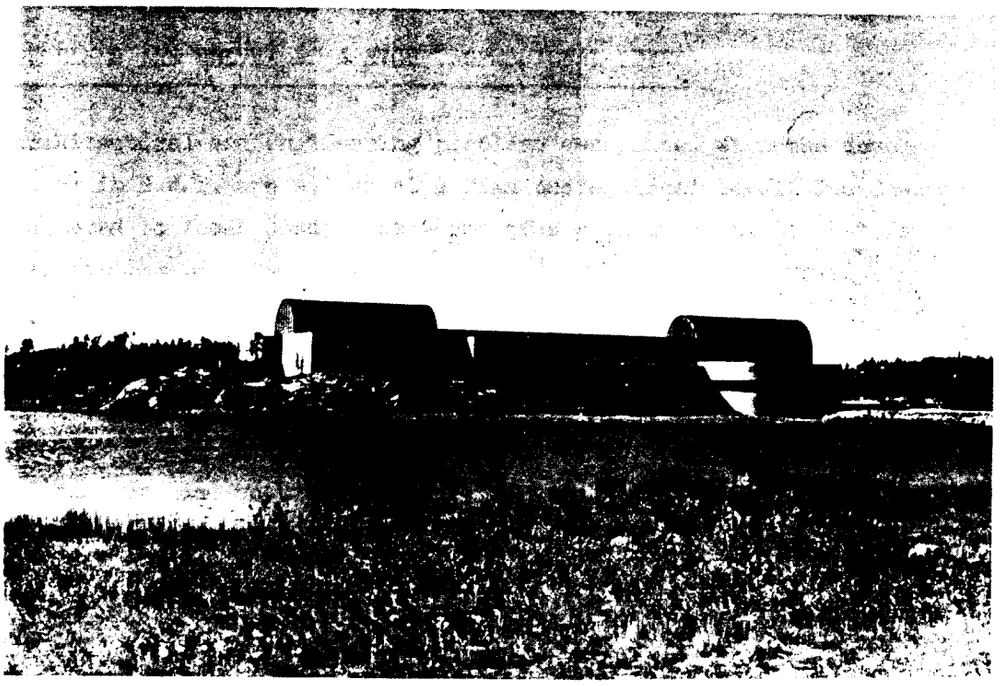
It was somewhat surprising to discover that public investments in N.W. T. are at least at the same level as in Greenland, and that, contrary to what is the case in Alaska, they are aimed at the same social, educational, health-oriented, and technical goals. We have found it necessary to thoroughly revise our impression that the development of Greenland has been unique in that a relatively small population (about 50,000) has received massive financial assistance in its development from Denmark. Canada has provided the same degree of assistance towards the development of N.W.T.

Because funds are channeled into N.W.T. in several different ways, it was not possible for us to assess exactly the scope of public investments in N.W.T. Most of the funds do, however, pass through the Territorial Government - in 1979 about 300 million Canadian dollars which in Danish currency would correspond to about 1.4 billion kroner - or very close to the Danish Greenland budget. Additional allocations - which do not pass through the Territorial Government - include funding for airports, defense installations, telecommunications systems, and, to a certain extent, health care.

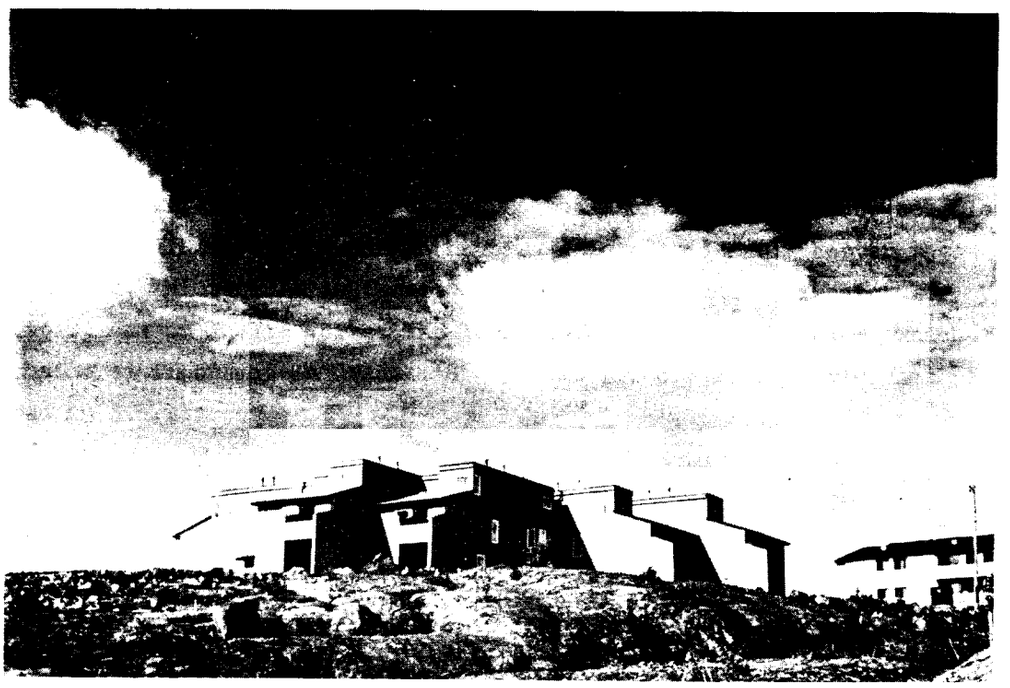
Beyond public funds, N.W.T. - unlike Greenland - benefits from large-scale private investments related to the exploration for and the exploitation of mineral and oil deposits. We have no information about the amounts involved other than that they are considerable. It is also not unusual that the private companies contribute directly to communities near their operations, for instance for the purposes of assisting in the construction and operation of recreational facilities.

Particularly in larger communities, significant private funds are also invested in the construction of housing. This is not the case in Greenland.

The efforts to develop N.W.T. started about 10 years after we started a similar undertaking in Greenland. In many ways the Canadianshave already gone as far as we have, and in some fields they have outdistanced us. This particularly applies to the infrastructure of communities: Airports, roads, power supply, and piped municipal services. While in Greenland we provide some or all of those services in communities beyond a certain size, they are often found in considerably smaller N.W.T. communities. In regard to air transport, N.W.T. is well ahead of us. In the context it should, however, be kept in mind that the conditions for sea transportation are better in Greenland, and also that it is much less expensive to construct landing strips in the flat terrains of the N.W.T. than it is in the rocky areas of Greenland.



Both architectural and engineering desings are at a high professional level in the NWT -- as, for instance, in this museum in Yellowknife.



Experiments in both private and public construction are being carried out to a much higher degree than we do in Greenland.

L. PROBLEMS ARE SOLVED AT A HIGH PROFESSIONAL LEVEL

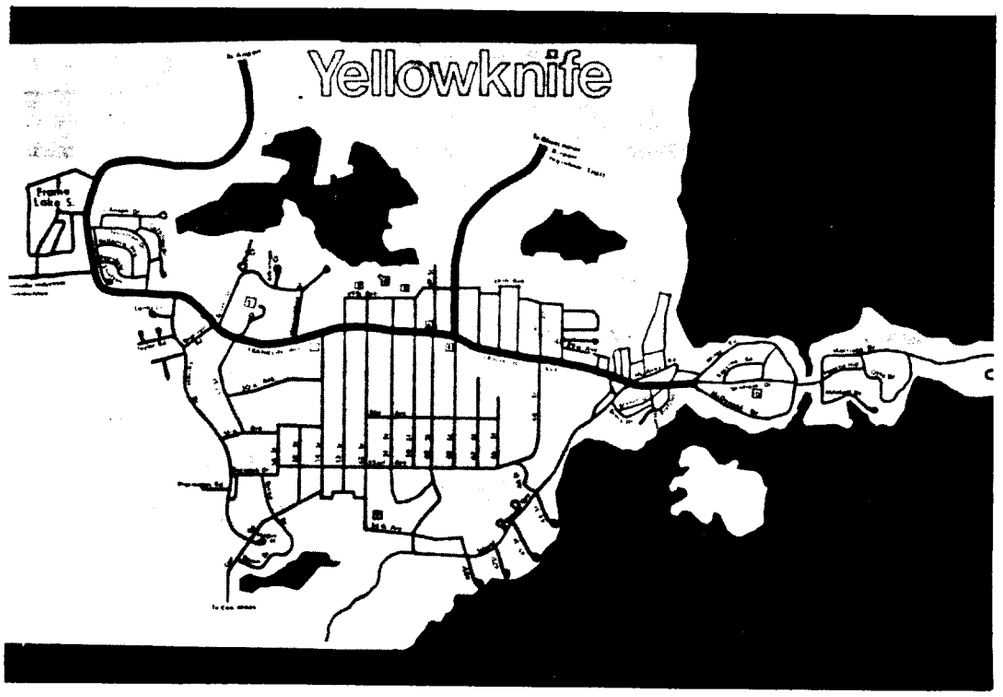
The architectural and engineering problems associated with the development work in N.W. T. are solved at a high professional level. The designs are adjusted to local conditions - and of a quality equal to that found in Greenland.

Construction in Greenland is generally more solid than in N.W.T. which is probably the reason for Canadians feeling that we build better than they do. The lighter construction in N.W.T. is, however, the result of a different philosophy. Houses, for instance, in Greenland - as in Denmark - are intended to have a useful life of between 33 and 50 years. A house is an investment for life. A house in N.W.T. is generally not expected to have a useful life beyond 15 - 20 years. Canadians are more concerned about re-sale values - the same considerations we would apply in purchasing a car. This difference in attitudes obviously leads to different approaches to construction.

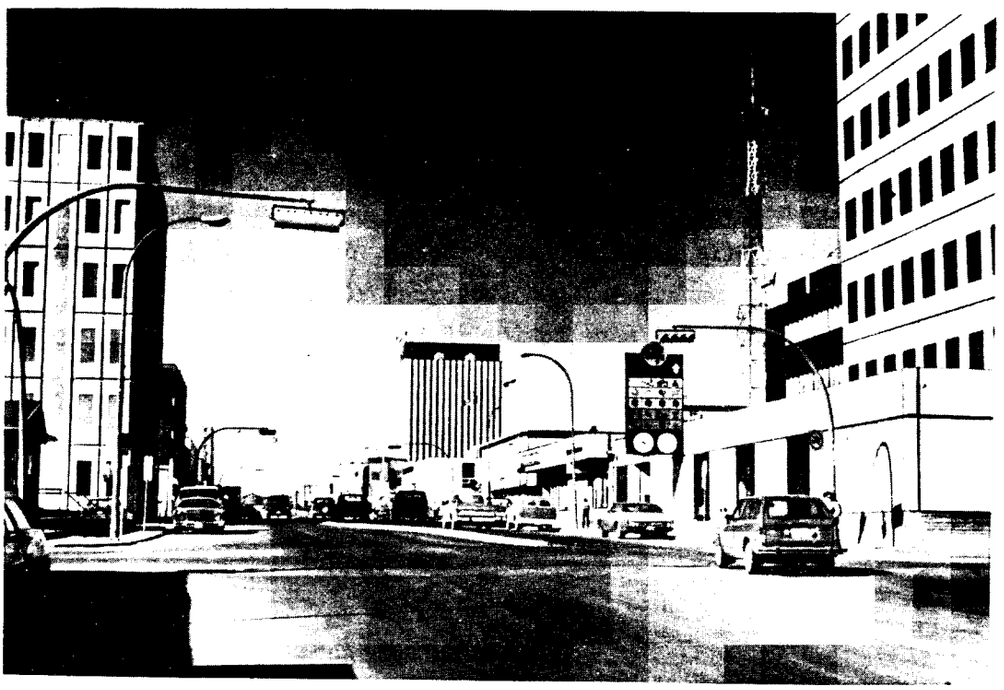
It is our impression that designers in N.W.T. are more likely to try new things than we are - and that they use their imagination to a higher degree. We saw outstanding examples of very advanced construction techniques, for instance two schools in Frobisher Bay, rowhouses in Resolute Bay, and a community center in Nanisivik. We have, however, the feeling that the experience gained by the experiments is not always applied in successive projects. It is not unusual to find pedestrian solutions to problems which have been expertly handled earlier and at other locations in N.W.T. .

The general maintenance of publicly owned buildings - for instance schools, hospitals, staffhouses, and public housing - is considerably better than in Greenland. Maintenance is carried out efficiently and professionally by the Department of Public Works. The landscaping around buildings - which is considered important in Greenland - is, on the other hand, somewhat neglected in N.W.T.

A City like Yellowknife, with almost the same population as Godthaab, appears far more cosmopolitan than Godthaab, and reflects a considerably higher standard of living - probably due to the fact that two of Canada's largest goldmines are located near the City and provide employment, directly or indirectly, to about half of the City's population. Another significant difference is that 90% of the population are Euro-Canadians. It is both evident, and also logical, that it is their lifestyle and habits, brought with them from southern Canada, which dominate.



Communities in the NWT are not planned to the same extent as in Greenland. The old Yellowknife was located on a small peninsula. Later the "New Town" was built in the traditional North American pattern.



Yellowknife is at the same latitude as Godthaab. It is also about the same size, but has a considerably more metropolitan apperance.

M. TOWNPLANNING HAS STARTED ONLY RECENTLY

The Communities in N.W. T. have not been planned to the same degree as communities in Greenland. Canadians observe that townplanning in Greenland appears better - probably as a result of us having started earlier and having been able to more vigorously carry out the plans.

N.W.T.'s houses and communities are much younger than GreenlandIs. Most of them have been created since W.W.II, and some are only a few years old. They therefore totally lack the ties with history which the old colonial structures add to the communities in Greenland - and which Canadians find so charming.

Most communities in N.W.T. appear to have grown mostly on their own. It adds to the variety that private enterprise is much more in evidence here than in Greenland. Certain communities have, however, been planned from the start. In Arctic Bay, which was first settled in the early 1960's, the houses are arranged in orderly rows, climbing up a slope. The houses are staggered in such a way that everybody has a view of the ocean. And the houses also, from the beach and up the slope, provide a chronological display of the governments developing housing assistance programs.

Today there are development plans for most of the N.W.T. communities beyond a certain size.

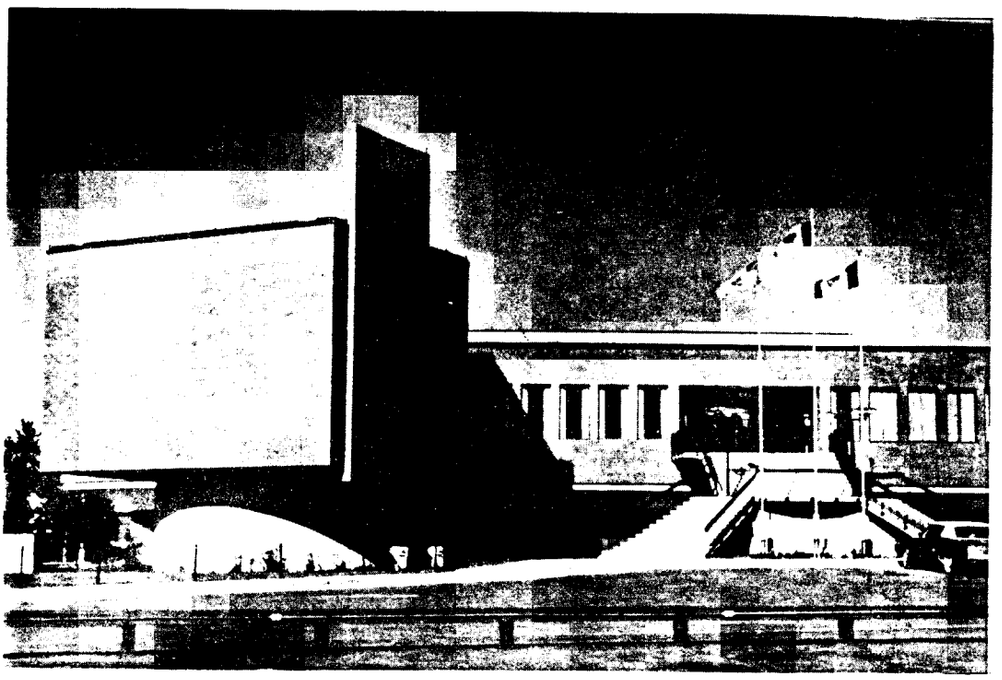
The planned communities of Greenland with their extensive areas of public housing units and apartment buildings - both of which are repeated from one community to the next with few modifications - are often viewed by Canadians as being almost too uniform. The Canadians also feel that the carefully planned and publicly supported housing programs reflect a higher degree of socialism in Denmark and Greenland than in Canada.

Town development in N.W.T. may perhaps best be described through a few characteristic examples.

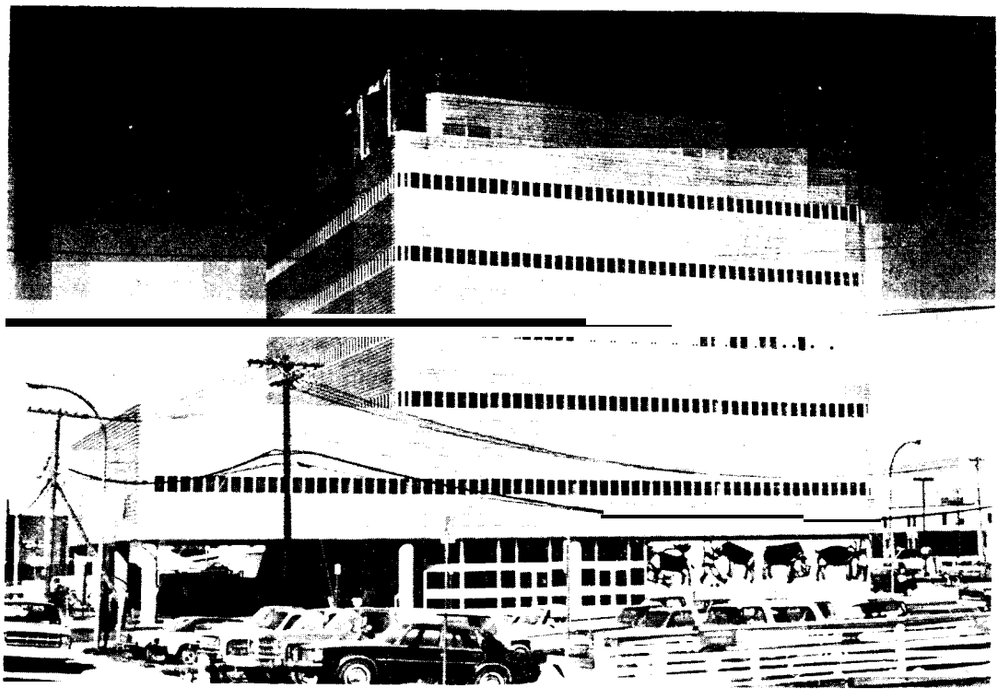
1. Yellowknife, A Mini Version Of A Canadian Metropolis

Yellowknife is named after an Indian tribe living in the area around the present City. They were able to produce pure copper from the natural deposits in the area, and used the metal for tools and weapons.

Yellowknife, which became the Capital of N.W.T. in 1967, has a population



Yellowknife City Hall.



Courthouse in Yellowknife.

Beyond the main street of Yellowknife, there are residential areas with detached housing.

And areas with duplexes.

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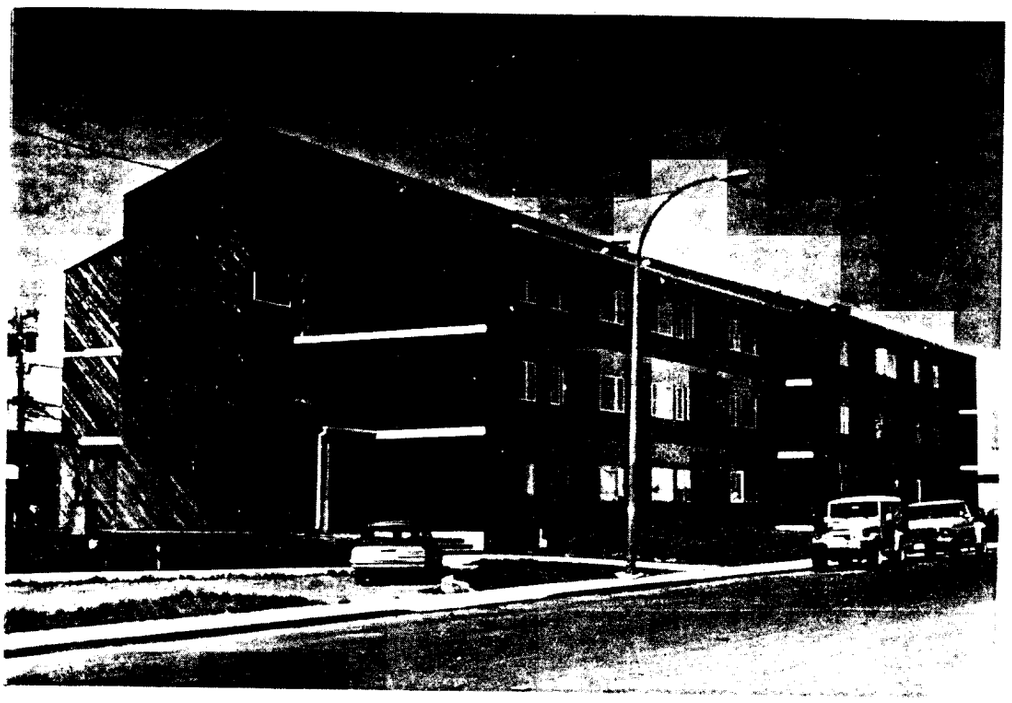
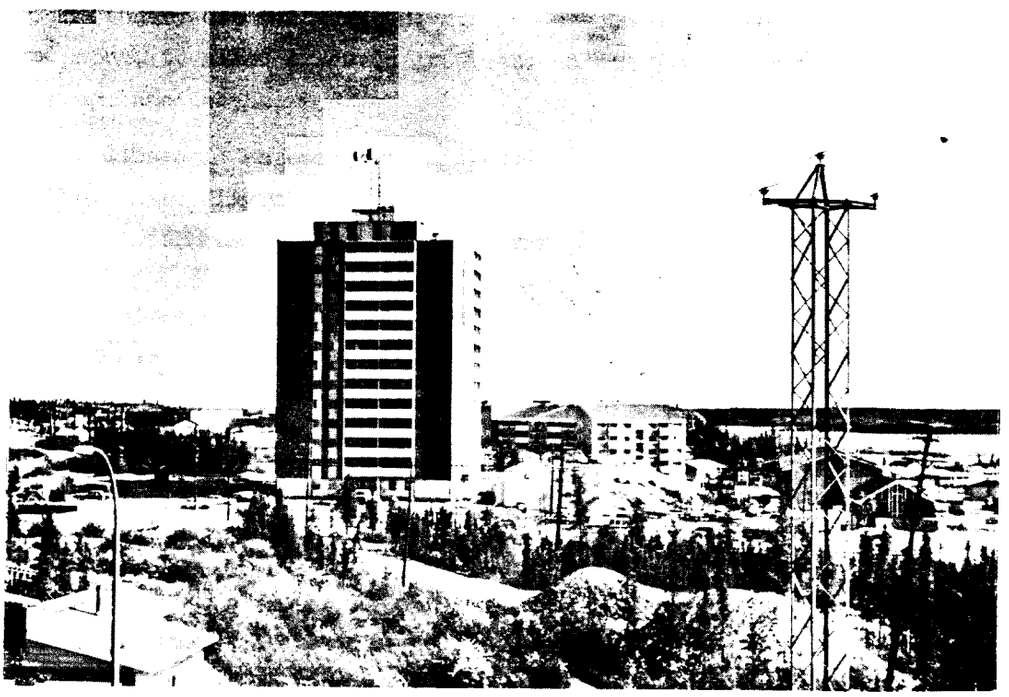


There are extensive areas with apartment buildings.



And Yellowknife has an apartment block as conspicuous as Godthaab's "Block p" -- although this one is vertical.

of about 10,000, about the same as Godthaab, but the City has, as mentioned before, a much more City-like appearance than the Capital of Greenland.

Yellowknife has a proper main street with sidewalks, traffic signals, tall office buildings up to about 10 floors, banks, shops - several of which are as stylish as anywhere in Canada - hotels, restaurants, cafeterias, etc. Beyond this main street are large and densely populated residential areas with apartment blocks, rowhouses, and detached houses with gardens - and of course the ubiquitous mobile homes. As is usually the case in North American cities, the roads serving the buildings are arranged in a rectangular network. The basic structure of the City is in other words quite simple. The main street is the central axis around which everything else is grouped in well organized units, each with their own characteristics.

Some of the buildings are, like the roads, placed rather rigidly on their sites, just as we used to do in Greenland. The newer buildings, however, in Yellowknife as well as Godthaab, are more varied and better adjusted to the terrain.

Yellowknife is, incidentally, located at about the same latitude as Godthaab, but has - contrary to Godthaab - a dry inland climate. Temperatures may in January dip below ÷40°C, and in July reach +30°C. The summers are warm enough to allow trees to grow, and on hot summer days people crowd the Long Lake beach.

While Godthaab is an open, village-like City, the citizens of Yellowknife consider their City more to be a mini version of a Canadian metropolis. Godthaab does, however, because of its terrain, offer a much more differentiated appearance.

Yellowknife was originally located on a small peninsula jutting into Great Slave Lake. When that peninsula became overcrowded, the "new town" described above was started at the "mainland" close to the peninsula. The new town was from the beginning planned in the traditional North American way - which is quite evident. It is fully equipped with roads, piped water, and sewer systems.

That wasn't the case in the old town which for a period of time went downhill and became a somewhat messy area, and the home for small industry, socially disadvantaged people - and hippies. The hilly peninsula, with its close access to water was, however, a potentially attractive resi-

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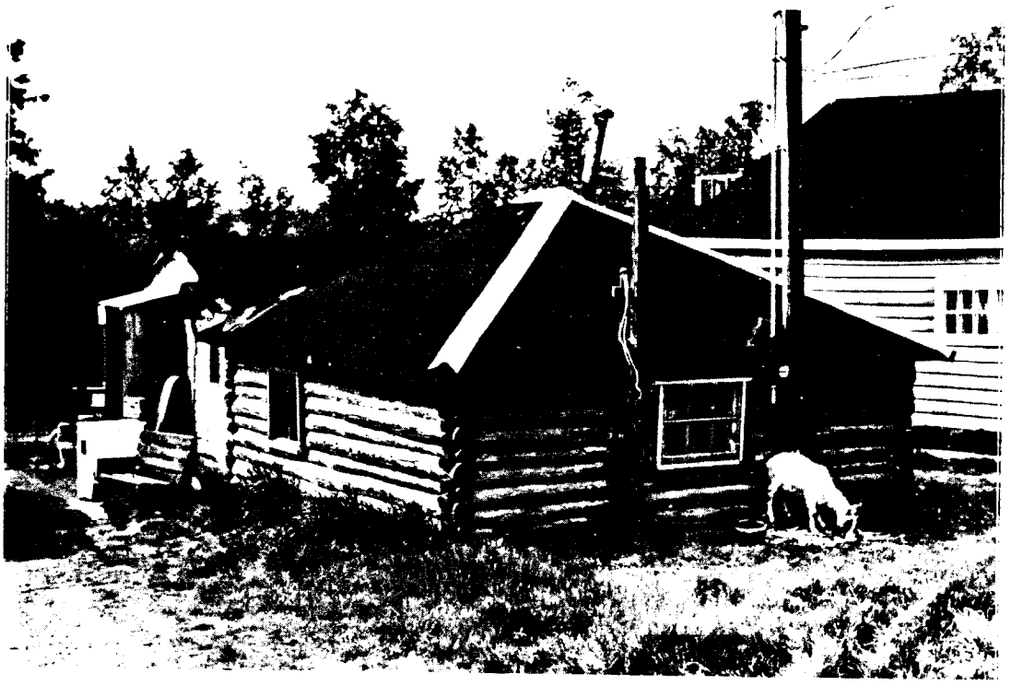
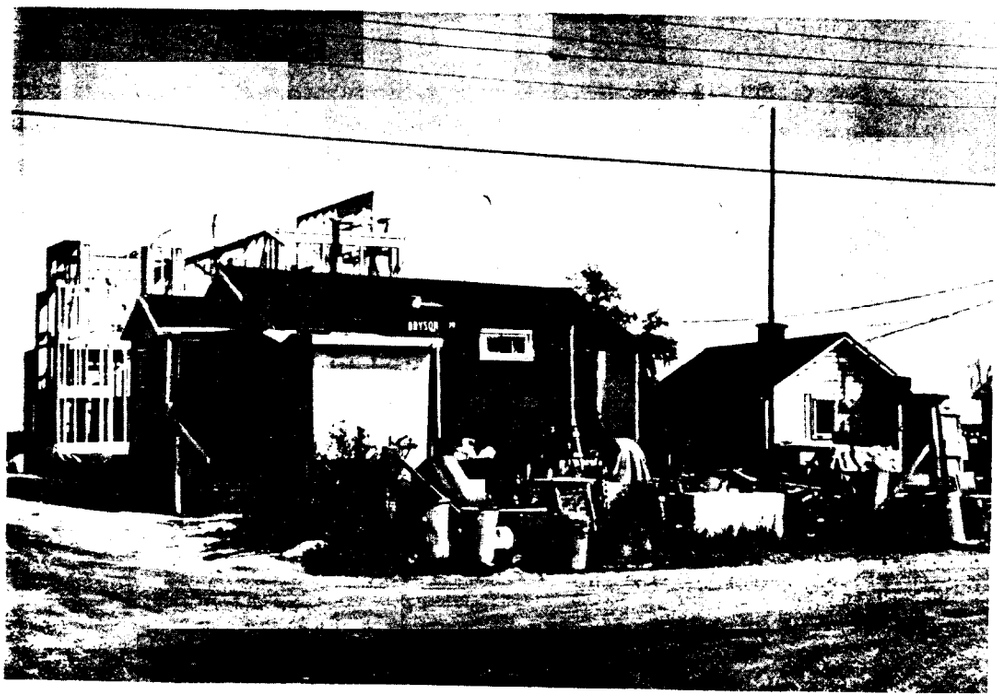
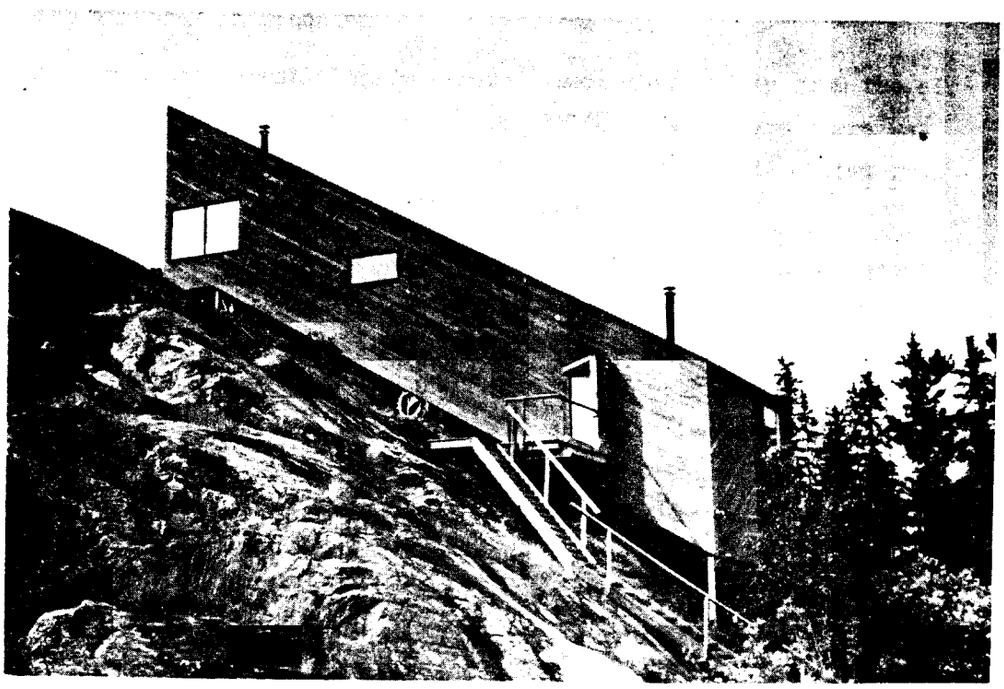


In the old town, only a few of the original log structures remain.

For a period of time, the old town deteriorated,



The rocky peninsula with its easy access to the lake is once again becoming an attractive residential area, and old houses are being modernized.



Or replaced by large, modern residences.

dential area, and the old shacks and cabins are now gradually being enlarged, modernized - or replaced by large, modern detached houses. Except for piped water supply during the summer months, the water and sewer services in the old town are provided by trucks.

2. Frobisher Bay, An Accidental Town

Several Greenlanders and Danes have, during the last several years, had the opportunity to visit Frobisher Bay, both as guests of the town and - less voluntarily - when weather prevented planes from landing at Søndre Strømfjord, and Frobisher Bay became the alternate destination. Visitors from Greenland usually express a less than favorable opinion of the visual aspects of Frobisher Bay which they find depressing and messy. This isn't quite fair - and the Mayor quickly cut off any possible critical remarks when he recieved us with the words: "Frobisher Bay is not a town it's an accident".

The town was started during W.W. II when the U.S. Airforce, at the bottom of the deep fiord, Frobisher Bay, found an area suitable for an airport, particularly intended as a stopover for military aircrafts on their way via Greenland (Narssarssuaq) and Iceland (Keflavik), to Europe. USAF built the airport and numerous wooden barracks of the military type we know well from the airbases in Greenland.

A small Inuit settlement already existed about three miles from the airport, and its population started to move to the base where there was employment, and money to be made. Eventually the airport developed into a town which today has a population of close to 3000.

USAF left long ago, and the operation of the airport, which no longer has any strategic importance, has been taken over by the Canadian Ministry of Transport. Many of the military structures are still in use: A three storey building, which once was staff quarters, is now used as residence for the boarding school. A storage and garage building has been converted to provide classrooms for vocational training. The former personnel barracks have become family residences, mostly for Inuit people. The barracks are worn and leaky, and the whole area is in need of renovation. The same applies to a number of rather primitive one-family houses built shortly after the war.

The town shows clear evidence of having grown on its own without any overall planning. The road system is confusing, and there is no actual town centre.

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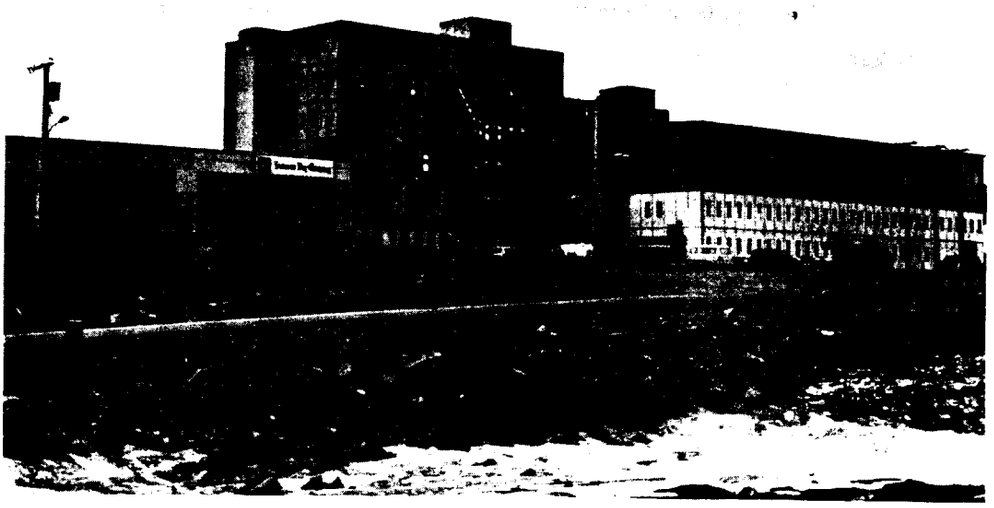
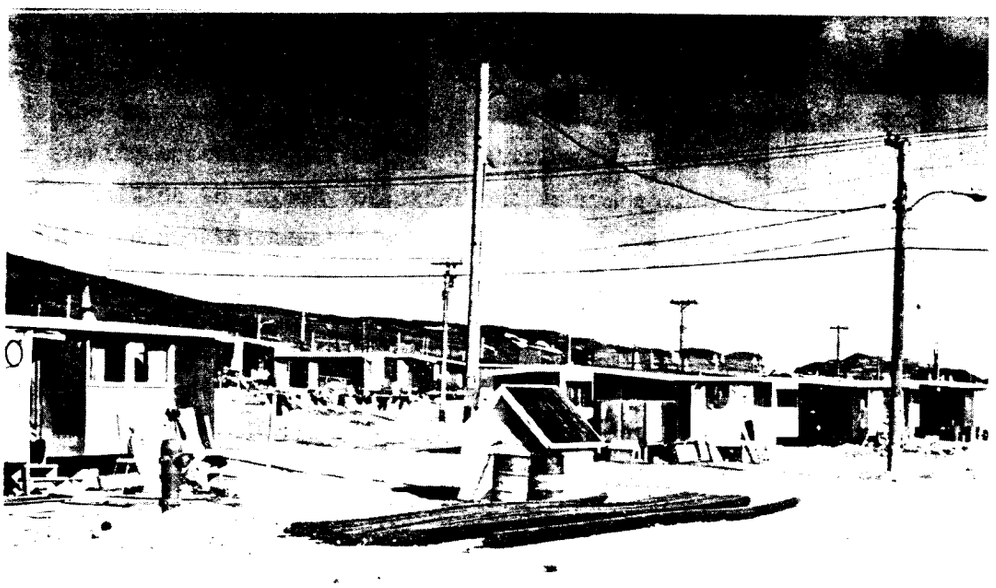


On a centrally-located tor in Frobisher Bay, this multipurpose structure contains hotel, cinema, shops, Offices, apartments, etc. It is commonly agreed that this particular experiment to have all those functions under one roof has failed.



While the state of maintenance in the NWT generally is good, the older and rather primitive housing districts in Frobisher Bay are unattractive.

An attempt to create a town center was made by erecting a multi-purpose structure on top of a rocky hill in the middle of the town. It consists of several tall buildings of different heights. The buildings are interconnected at ground floor level which also contains a shopping mall - and were at one time also connected by an enclosed corridor to a number of nearby rowhouses. The structure contains a hotel, a movie theatre (which had just been closed because of competition from television), two Hudson Bay Company stores, offices, apartments, a swimming pool, and a bowling alley which is now closed and converted into office space.

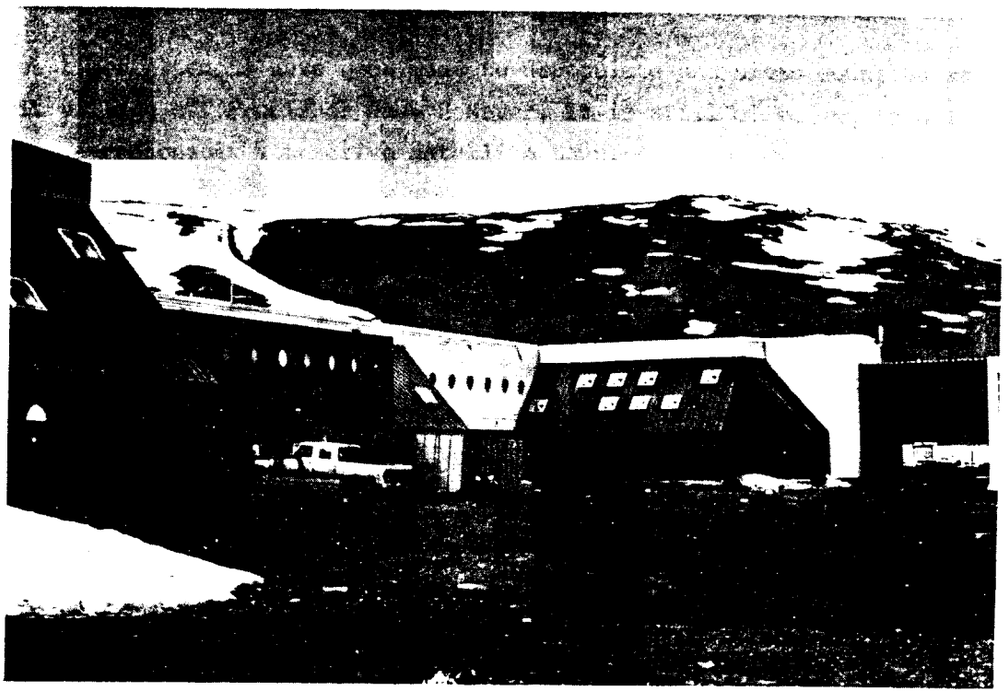
The corridor connecting the mall to the rowhouses developed, through neglect and vandalism, into a filthy eyescore, and has now been removed. The mall is also unattractive, and it has been suggested to demolish it as well. The local population shows little enthusiasm for this group of buildings which seems to repel people, rather than draw the community together. There is general agreement that this attempt to create an arctic multi-purpose building has failed.

A couple of other buildings have, however, managed very beautifully and successfully to combine several functions under one roof: A public school and a vocational school. Both are designed as enclosed, two-storey, multi-faceted structures with only a few round windows. The exterior consists of insulated, white, curved fibre glass elements which were manufactured locally. The unusual architecture makes the building look exotic - and perhaps evoking a certain degree of skepticism. Inside, however, they are spacious, exciting in layout, of excellent workmanship and - most important - both children and teachers were happy with them.

The town also has a combined town hall, a fire station, and an ice hockey rink of the same design.

The general state of maintenance at Frobisher Bay is conspicuously inferior to that of other towns - and this may also contribute towards the negative impression. Among other things, this is due to the fact that the town carries a load of a great number of provisional military buildings taken over for other purposes and thus gaining prolonged life.

The town has taken on Moshe Safdie, world-famous architect, known among other things for his "Habitat 67" building work at Montreal. He has worked out a town plan slum-clearing outmoded urban areas and linking the valuable part of the town so as to constitute a well-functioning whole.



In the new mining town Nanisivik, this multipurpose structure contains school, kindergarten, library, super-market, gymnasium, offices, nursing station, fire hall, and workshops. The building appears very successful.

The mining company carried out some experiments in their housing program. Their duplexes are elliptical and with domeshaped upper floors. The houses were said to be expensive and difficult to furnish.

Three times attempts have been made to depopulate and close down the small Inuit village off Frobisher Bay. However, it is still alive and is now becoming a reasonably attractive satellite town.

3. Nanisivik, A Family Town For Mine Workers

Nanisivik is a new town built in connection with a lead-zinc mine which started operating in 1977. The Canadian Government insisted that a town suitable for families be built, rather than the usual camp of barracks for single status employees. The intent was mainly to attempt to make the town and the mine attractive to the local Inuit workers.

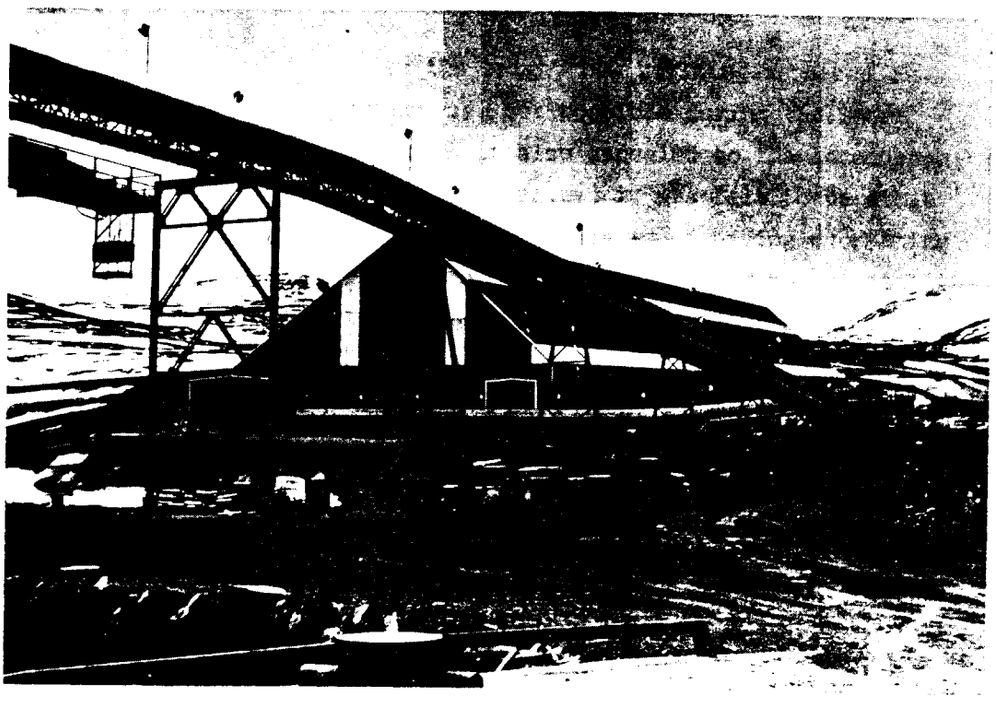
The residential part of the town consists of single family units, duplexes, and a few small blocks with housing for single people. The housing has been financed partly by the Government who built the standard public housing units for the local people, partly by the mining company who built the housing units for its own staff. The company has tried out a few different ideas in its housing programme. The structures for single housing have, for instance, sloping walls while the duplexes have elliptical floor plans with dome-shaped upper floors. Both types have proved to be expensive to build, and the tenants are dissatisfied with the irregular rooms which are difficult to furnish.

The houses appear to be located somewhat haphazardly in relation to each other, but the ring road around the town site makes it look both contained and varied.

As part of the town the mining company has, at the insistence of the Government, constructed a multi-purpose community center. The Government has subsidized some of the facilities in the center which architecturally is very distinguished, It consists of 4 two-story buildings which only at second floor levels are connected to each other. All the facilities in a sense are interconnected under the same roof while the separations at ground level let through light and air to the lower floors, as well as traffic around the individual buildings.

The center contains many facilities: A school, kindergarten, library, a Hudson Bay Company supermarket, gymnasium, swimming hall, government offices, nursing station, fireball and workshops.

Inside the building is spacious and beautiful, and materials and finishes are of high quality.



In Nanisivik, the mining company has gone to great lengths to ensure that the large technical structures appear attractive -- which is not the rule.

At Resolute Bay, conditions are cramped and sparse, as in most military camps. That also applies to the control tower of the busy airport.

From a professional point of view the bright new building appeared extremely attractive. It was, of course, not possible during the short 1 1/2 day visit to determine whether it also appealed to the local population - or if perhaps, by its cool disparity, it was felt to be a bit out of place. It certainly combined the advantages of having everything under one roof with the possibility of walking outdoors from one facility to the other, and did not give one the feeling of being closed in.

It should also be noted that the mining company has made a conscious effort to ensure that the large mining structures appear attractive. Normally mining structures consists of what will do a reasonable job at the lowest expense.

4. Resolute, A Closed Barrack Environment

In 1947 a weather station was established at Resolute Bay - with the added purpose of also showing the Canadian flag in that part of the country.

The ship transporting the construction materials was unable to reach its originally intended destination because of heavy ice, and it was decided to unload the materials at Resolute Bay. Not too many people today realise that Knud Rasmussents Thule began in much the same way. Knud Rasmussen, in 1910, intended to establish his trading station in the Inglefield Fjord where Thule (Qarnaq) is now located. He, too, was prevented by ice from reaching his destination and chose to locate the station at Dundas - which he named Thule.

Resolute is located on Cornwallis Island in the Arctic archipelago - at about the same latitude as Thule. Prior to the weather station the island had not been populated for centuries. It is a hostile location with hardly any vegetation, and with winter temperatures as low as +50° C. The place is also called Quarittuq which translates as: "The place with little sunshine".

During the early 1970's Resolute Bay became a very busy place. Because of its good landing strip, it became the support base for the oil and mineral exploration activities on the Arctic Islands.

Along the landing strip grew a town which contains of barracks hotels, a bar, mess halls, movie theatre, recreational facilities, a library, a small supermarket! etc. The town can house several hundred people. The barracks are interconnected, and one needs to go outside only to drive to one's place of work - usually only a few hundred metres away. Conditions inside are,

as in most military camps, rather spartan and tight. The barracks serve as an example of how repulsive a closed-in environment in the arctic can be when the dimensions are too small. As if in spite, the exteriors of the buildings are painted in vivid red, yellow, and green colors.

As part of the Governmentts efforts to demonstrate Canadian sovereignty over the Arctic Islands, several Inuit families were, in 1963, relocated from more southern settlements to Resolute Bay. They established themselves in a small community a few kilometers from the air base, on the coast south of the southern end of the airstrip, and made a living by hunting and fishing. As employment opportunities increased on the airbase, most of them eventually started working there, and hunting and fishing became secondary occupations.

5. New Resolute - Visions Of An Arctic Town

Because of the increasing exploration activities, the population of Resolute Bay was in the early 1970's expected to grow to 1200. Extensive construction was anticipated. In 1973 the Territorial Government built an entirely new town for both the Inuit and the Euro-Canadians. The air transport authorities were concerned about the congestion of buildings along the airstrip, and the Inuit village - which by then had grown to about 200 people - was troubled both by the noise from the many aircraft taking off and landing, as well as by snow drifting along the airstrip and being dumped on the community.

The Government retained Ralph Erskine, Swedish architect, for the project. He had previously been involved in projects in Canada's sub-arctic regions, and has an international reputation based on his buildings in northern Sweden. The parameters for the projects were ambitious. The new town would be a socially integrated community where the layout and design of the town would provide optimal protection against the harsh climate.

It was decided to locate the town some distance from the airbase, near the shore and on a slope naturally protected by Signal Hill. The view of the ocean was good, and the noise from the airport negligible.

The basic idea in the plan is that the town on three sides is protected by a "Wall" while it opens on to the south, to the view and to the ocean. The "wall" consists of comected structures which turn their backs to the wind and provide a degree of protection for the detached houses grouped at the center. The ring structure would contain a number of facilities:

Town center, hotel, apartments, and rowhouses. It would be possible to move indoors through a large part of the ring structure.

The areas of detached houses were first completed. All of the serviceable houses from the old settlement - as well as the school and the church - were moved to the new site, and the Inuit families determined the new location of their houses within the new town plan.

In 1976 10 rowhouses, the first stage of the ring structure, were constructed. In 1978 the Federal Government and the Territorial Government decided to postpone the rest of the project, partly because exploration activities in the Arctic, for political reasons, had dropped considerably, and partly because other and more conveniently located base centers - for instance Nanisivik - had developed.

When we visited the town, it had a population of only 130. Several houses were emty, among them 5 of the rowhouses. As the town was planned for about 1000 people, the infrastructure (roads, water, and sewerage systems, etc.) were obviously somewhat out of scale.

From an architectural point of view the rowhouses were well designed, and very Scandinavian - both inside and outside. The apartments, with a floor area of 110 m^2 over two floors, are of a high standard. They are, however, not popular with the Euro-Canadians who prefer the traditional bungalow type of houses with very open floor plans. The cool Scandinavian design seems out of place in this part of the world where the tastes often lean more toward gingerbread. We probably wouldn't feel too comfortable living in Canadian houses, either.

Seen with Danish eyes this is a structure of very high quality, outstanding and exciting architecture carried out with well considered details. But it is a strange bird in this environment.

The Resolute Bay project has, as mentioned, not been abandoned - only postponed. Whether it will ever be completed remains uncertain. It does not appear likely though, and the experience and knowledge that were to be gained from this ambitious project will probably never materialize.

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There are in N.W.T. several examples of attempts to gather as many facilities as possible under one roof. That's a philosophy we also encountered in several new towns in Sibiria. The more experienced authorities in Yellowknife remain sceptical about this approach, and experience in Green-

The New Town of Resolute Bay was intended to set new standards for arctic communities. After completion of ten housing units -- the first section of a protective perimeter structure -- the plans were postponed.

Habitat' 67 Montreal, with its enclosed protective environment, is not a model for an arctic city. Native people prefer to live in harmony with nature rather than fight it.

land also indicates that the philosophy in general is not valid. We thought at one time that towns in Greenland should form a protective enclosure around its citizens - with the great nature on the outside. This proved to be a typical European concept. The Greenlanders prefer open town plans and wide views - even at the cost of more exposure to the elements.

In Sibiria, the structures with their network of connecting corridors were designed for White Russians who had immigrated from milder climes. The Yakuts did not like this overly protective approach.

The stated preference of the Inuit families in Resolute Bay for occupying the open areas set off fcr detached housing, rather than units in the ring structure, points in the same direction. And, in an indirect way, so does the vandalism experienced in the Frobisher Bay malls. And, even if it was never stated outright, it was tacitly understood that the ring structure at Resolute Bay was generally intended to house Euro-Canadians coming up from the South.

The native peoples of the Arctic prefer to live their lives in harmony with the nature rather than fighting it.

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N. ACTIVITY STAGNATION CAUSED MIGRATION FROM N.W.T. 1979-80

When we were in the Northwest Territories in the Spring of 1979 the economic crisis was only beginning to make itself felt. There was still an air of activity and of optimism. In the Spring of 1980 the effects were noticeable. There was, however, no direct feeling of depression, but an atmosphere of apprehension and hesitancy.

The crisis in the Northwest Territories has its special background. It is principally due to a damping of activity in the field of oil exploration. The public budgets, however, are not reduced, and it is apparently more and more urgent that the political problems be resolved which spring from native claims for the rights to the land. As long as claims problems are not solved, the oil companies will not be able to further their projects: They do not know what conditions they must live up to, and they consequently wait to see what will happen.

Over the year 1979 the total population dropped by about 1.300. The drop was most strongly felt in Yellowknife where, within a year, more than 1000 of a teal population of 10.000 left the town.

As usual the crisis is first felt inside the field of building and, in the Northwest Territories taken as a whole, the activity in that field was halved over the course of 1979. In Yellowknife work inside building and construction has been both comprehensive and hectic over the last 10 years. Today, in the present apprehensive situation, building needs have not only been met, but exceeded. For the first time in many years there are houses for sale and flats to rent in Yellowknife. The contractors and their men from the southern provinces have left for home and only few and smaller houses are now under construction.

The big airline company, Wardair, which used to have quarters in Yellowknife, moved its men and machines south. - The reduced activity can no longer support their being stationed in Yellowknife. Another but smaller aviation company, earlier quartered in Yellowknife, went bankrupt.

The depression, however, is believed to be only a temporary matter. Activities are expected to commence again when the political situation has been clarified. It is expected that the energy crises and the deficit on the Canadian trade balance will press a solution through.

In spite of diminished accent on oil exploration, Dome Petroleum has new-

ly rapported big oil finds in the Beaufort Sea, Petro Canada has made further gas finds on the Arctic Islands, and Esso plans an appreciable increase in the present oil production at Norman Wells.

The exploitation of mineral deposits has, however, reached a record level and there has been hectic activity with mineral exploration. Thus Cominco has announced that it will now go on with its plans to establish a zinc/lead mine north of Resolute Bay. It has also been decided to re-open the Camlaren gold mine north of Yellowknife and 6 or 7 other deposits are becoming exploitable within a few years time. Some of these are of appreciable magnitude.

It therefore appears in the Northwest Territories that the exploitation of appreciable mineral, oil, and gas reserves is within sight, and that each of them should be able to boost the territory's economy significantly. Some will be so large and will give such a boom, that it will be difficult for the authorities to administer them in a way compatible with the home population obtaining full benefit from them.

o* THE POLITICAL AND ADMINISTRATIVE SYSTEM HAS CHANGED RAPIDLY DURING THE LAST 10-15 YEARS

Canada is a federation consisting of 10 provinces and two territories. (The Northwest Territories and the Yukon Territory). The Head of State is the British Queen who is represented in Canada by the Governor General.

The provinces enjoy a great degree of independence, and each has its own parliament and government. The Federal Government primarily concerns itself with defence policies and foreign policies as well as with tasks related to coordination between provinces and to the overall political direction of the Country.

The Territories were for a long time administered almost like colonies but the last 10-15 years have seen rapid developments in the political and administrative systems toward increasing independency for the Territories.

This process is not, as was the case in Greenland, primarily aimed at accommodating the aspirations of the native populations.

1. Since 1975 The Council Of The Northwest Territories Has Consisted Of Elected Members Only

The governing bodies in the N.W.T. include the Council of the N.W.T. (corresponding to Greenland's "Landsraad"), the Executive Committee, and the Commissioner.

The Commissioner is appointed by the Federal Minister of Indian Affairs and Northern Development and is a federal civil servant. He heads the administration in the N.W.T. according to guidelines from the Council or from the Federal Government. The Department of Indian Affairs and Northern Development occupies a central position in the Federal Government's relation to N.W.T. by supporting the efforts toward development of the N.W.T. as well as by coordinating all other federal bodies' activities in the territory. According to the N.W.T. Act the Territorial Government, in most areas, has responsibility and authority similar to those of a provincial government. There is, however, the significant difference that the authority of the Territorial Government hasbeen delegated from the federal parliament. The Federal Government still retains the power

to increase, decrease or totally withdraw any such delegated authority given to the Territorial Government as well as to change or restructure its governing and administrative systems.

The Council of the N.W.T. has, to all intents and purposes, legislative authority much at the ssme level as the Legislative Assemblies of the Canadian provinces, with the exception that all matters relating to exploitation of natural resources (not including wildlife resources) remains a federal responsibility.

The legislative authority has, in accordance with the N.W.T. Act, been transferred from the Federal Government to the "Commissioner in Council" which means that the Commissioner in conjunction with the Council may legislate within the areas for which authority has been delegated to the Territorial Government.

The Council of the N.W.T. is not new. The Council convened for the first time in 1877 at Fort Livingstone in Saskatchewan. In Greenland the community councils, established at the initiative of H.J. Rink, had at that time been functioning for 20 years, although the County Councils in North and South Greenland only were introduced as late as 1911.

The N.W.T. Council for many years led a quiet existence. In 1921, however, oil was found at Norman Wells, resulting in a revival of the interest in the North, and also in an expansion of the Council to 6 members. The members were appointed by the Federal Government and were in the beginning civil servants. Later, however, also people from the private sector with interest in and knowledge about the N.W.T. were appointed to the Council. But it was not until 1947 the first member residing in N.W.T. was appointed.

In 1951 the N.W.T. Act was substantially revised for the purpose of separating legislative and executive powers. The Commissioner, however, retained his position as chairman of the Council, and therefore was wearing two hats: He was the chairman of the Legislative Assembly as well as Head of the Administration charged with carrying out the Council's decisions. The Commissioner was not responsible to the Council but to the Federal Government. The same revisions to the Act also increased the membership of the Council to eight three of which were to be elected by the population of the N.W.T.

The situation in N.W.T. after the 1951 revisions was to a large degree comparable to that in Greenland up to 1967 when the Greenland Council had its first elected chairman.

The next significant constitutional changes in N.W.T. took place in 1966, and the changes were aimed at allowing the territories to gradually evolve toward provincial status.

Up till then practically all governmental and administrative bodies involved in N.W.T. were located in the south, among other places in the Cities of Ottawa and Edmonton. In 1967 the Council was moved to Yellowknife, and during the following years most of the administrative bodies, both Territorial and Federal, were gradually relocated to the N.W.T.

In 1970 the membership of the Council of the N.W.T. was increased to 14 of which 10 were elected in N.W.T. And in 1975 the first Council of 15 elected members convened. The Commissioner did, however, continue as Chairman of the Council.

The N.W.T. Act places the executive power with the Commissioner. In reality, however, the power rests with the Executive Committee consisting of the Commissioner, the Deputy Commissioner, the Assistant Commissioner, and three Council Members - in other" words the Executive Committee is composed of three civil servants and three elected members.

The Executive Committee meets once a week to discuss current affairs of importance. The process may be described as consultation as the final decisions still rest with the Commissioner. On a day-to-day basis the six members of the Executive Committee carry out their individual responsibilities within the Territorial Government framework. The three members appointed by Council presently supervise the departments responsible for Social Services, Education, Economic Development, and Tourism.

It should be added to the picture of the bodies governing and administrating N.W.T. that the Territorial Government maintains a regional administration with a regional director in each of the four regions into which N.W.T. is divided (Inuvik, Baffin, Fort Smith, and Keewatin). The Department of Public Works is also represented in the regions by regional engineers and in most towns and settlements - just like GTO. Something rather similar also applies to other departments. In certain cases the Territorial Government also handles the administration all the way out into the local communities, cf. the account below of local government at N.W.T.

2. The Political Developments During 1979 Indicate The Possibility Of Fundamental Changes In The Near Future

The above description of the constitutional development in N.W.T. brings us up to early 1979 - the time of our visit to the N.W.T. During 1979, however, further developments took place which appear to lead up to fundamental political and administrational changes within the next few years.

The Council of the N.W.T. convened in March 1979 for its last session prior to the election of a new Council. One point on the agenda was the preparation of a statement concerning the constitutional development in the N.W.T. The statement, which could be considered a testament from the dissolving Council, deals with a number of recommendations outlined below:

> that a truly responsible Territorial Government be established and also that the necessity of transfer to provincial status within 10 years be agreed to;
>
> that responsibility for the administration of land and natural resources be transferred to the Territorial Government immediately while the questions of actual ownership of land will be determined at the transfer to provincial status;
>
> that the Federal Government should accept that its "special responsibilities" would best be carried out by the Territorial-Government - in this connection it is maintained that the Federal Government and the Territorial Government should have equal status in decisions relating to native claims or rights;
>
> that the Executive Committee should in the future consist only of members of and be elected by the Council; and
>
> that the Commissioner be for the immediate future bound by decisions made by the Executive Committee unless this brings him in direct conflict with specific instructions from the Minister of Indian Affairs and Northern Development or from the Federal Government, and within four years the Commissioner's title should be changed to Lieutenant Governor (corresponding to the title of the senior federal civil servant in the provinces), and after that time he should be fully obligated by decisions made by the Executive Committee.

It was further stated that N.W.T. should remain united through the suggested period of development, and that decisions relating to a possible division of the Territories should be postponed until N.W.T. had obtained political equality with the rest of the country. It was also emphasized that efforts should be made to strengthen local government within the communities of the N.W.T.

In connection with the 1979 fall election, changes were made to enlarge the Council to twenty-two members. A large changeover of members had been predicted but the changes to the composition of the Council were even greater than expected. Out of the 22 members only 6 had been members of the previous Council. Fourteen of the Council members are now natives, and several of those have strong ties with various native organizations.

This probably, to some degree, explains why the anticipated political shift has also been more drastic than predicted. A contributing factor is that the new Council has a larger number of young members who have a better educational background than the members of previous Councils - and this applies both to Indians, Inuit, and Euro-Canadians. In fact it is the results of the improvements to the educational system which now begin to show, and in many ways the situation is parallel to the political shifts following the elections in Greenland in 1971 and 1975.

The new members, quite naturally, appear to be more aggressive than their predecessors, and also express their desires for a stronger political involvement in the administration. This work, as described above, has up to now been an area of activities generally controlled by the Commissioner and his staff. This situation is also clearly parallel to the relationship between the Governor and the Greenland Council prior to the introduction of Home Rule in Greenland.

The new Council immediately carried out a number of changes. The Council now, for instance, elects its own Chairman, and the Commissioner participates in Council meetings only with observer status (just like the status of the Rigsombudsmand in relation to the Greenland Council).

The Commissioner is, however, still the Chairman of the Executive Committee which has now been increased to 7 Members elected by and from the Council. The 7 Members (of which 5 are Euro-Canadians and 2 Indians) are now titled Ministers and have true political responsibility each for their branch of the administration. The Executive Committee has in fact assumed the nature of a government.

It would appear likely that the increased political awareness of both the Council and the Ministers will result in a severe curtailment of the considerable influence presently exercised by the Commissioner in his capacity as Chairman of the Executive Committee.

The new Council established already at its first session a clear change in political attitude - and a change of direction which perhaps was unexpected. The new Council decided not to feel itself bound by the previous Councilfs declarations relative to political and administrative development in N.W.T. The Council further stated that it would carefully consider all proposals regarding constitutional developments in N.W.T. - including, of course, the proposal submitted by the previous Council. Simultaneously, the support expressed by the previous Council in regard to principles for solution of problems relating to native claims was withdrawn.

As the first step towards defining a new starting point for the constitutional development, the Council struck a Committee with the purpose of "attempting to identify methods to further political unity between the peoples of N.W.T.". It was further stated that a division of the Territories would have to be regarded as a possibility, failing agreement on any other base.

Only the future can tell how successful this ambitious attempt to unify the three in themselves not very homogeneous groups of population will be, particularly in view of the wide differences in background and some differences in aspirations. It is worth mentioning that party politics is so far unknown in the Council where dicisions are made by general consensus - a method quite in line with the native populations! traditional decision-making process in matters of common interest.

3* Great Efforts Are Made To Develop Local Government In Northwest Territories Communities

The population in N.W.T. was up to very recently considerably more thinly distributed than was the case in Greenland. During the 1950's, however, a certain degree of concentration of the population started to take place. The background for this was, as described above, the need to improve the services offered to Indians and Inuit, particularly in the areas of health care and education.

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Today there are about 60 communities in N.W.T., the smallest with populations less than 100 and the largest with close to 4,000 citizens. In addition there is the Capital, Yellowknife, with a population of about 10,000 people.

In comparison with Greenland, northern Canada does not have a long tradition of local government in each community. Great efforts are made, however, to develop local government and to create a political and administrative system suitable for dealing with problems at a local level.

The communities in N.W.T. are divided into five categories: Settlement, Hamlet, Village, Town, and City, each with a progressively higher degree of self government. A community Council may decide whether it wishes to move another step up the ladder to a more highly developed self government, bearing in mind that this also means a decrease in the subsidies received from the Territorial Government.

The five categories may roughly be described as follows:

a. Settlement: This is the first step on the way to local government. The Settlement Council, which is elected by the local population, has advisory status only. It is empowered neither to issue by-laws or other regulations, nor to collect any form of taxes.

   Public services and activities are carried out by the Territorial Government which also absorbs the resulting costs. The Government provides an administrator (Settlement Manager) who heads the local administration. The Settlement Manager consults with the Council in all local matters, and the Council may in this way exert considerable influence.

b. Hamlet: The Hamlet Council has a much higher degree of both authority and responsibility but may not collect taxes. The Council hires its own staff to carry out the day-to-day administration. The Hamlet Council produces its own budget which, however, is subject to approval by the Territorial Government. Apart from the income gained by charges for public services, from renting facilities etc., the budget is financed by the Territorial Government.

c. Village: The Village Council has about the same authority and responsibility as the Hamlet Council. The Village Council is, however, entitled to impose taxes on fixed property. Budgets are produced by the Council, subject to approval by the Territorial Government.

d. Town : (Community with a population of between 2,000.4,000) - Town status represents the fully developed level of local government, and corresponds to the communal self government known in Greenland. The Town Council has full authority to issue by-laws and regulations concerning local matters, and the Council may collect taxes and produce its own independent budgets.

e. City: (presently only Yellowknife) - City status provides for much the same authority and responsibility as Town status. The City Council receives no subsidies or grants from the Territorial Government for activities under local jurisdiction. The Territorial Government does, however, also here maintain its responsibility in the form of grants for certain services, including education, police, and health care.

There are, as mentioned, more than 60 communities in N.W.T. at this time. Thirty (or about half) of those have settlement status while there are 15 hamlets, 2 villages, and one City (Yellowknife). In addition, about a dozen communities, generally very small in size and with small populations living traditionally off the land, exist with no formal local administration. A few communities based purely on mining fall into this category as well.

P. ATTEMPTS TO ACHIEVE UNITY BETWEEN ALL POPULATION GROUPS IN N. W.T .

As has been the case in other parts of the world, the political developments following W.W. II have resulted in a growing awareness among Canada's native population groups, particularly expressed in a desire to govern their own affairs and to maintain and develop their own identities.

One result of this has been the "land claims" - or demands for changes recognizing basic rights for Indians and Inuit as the original inhabitants of the land. The land claims include demands for certain identified areas to be turned over to the native groups but they go further. The Indians and Inuit also want to make it possible to establish a form of self government within the framework of the Canadian constitution, to plan their own future and ensure their positions as groups of people with their own identities in the Canadian society. Those problems have been dealt with earlier in the chapter describing the Berger Committees report.

The negotiations concerning the rights and demands of native peoples have taken place for a number of years now but so far it has not been possible to solve the very complex problems associated with meeting the demands. The recent agreements between governments and native peoples of Alaska and Greenland, the plans for oil and gas pipelines through N.W.T. from the Mackenzie Delta and from the arctic archipelago, and the increasing political awareness among the native people all add to the urgency for solutions.

Negotiations are presently proceeding with three organizations of Indian and Inuit people, each representing claims related to specific land areas.

a. The Committee for Original Peoples' Entitlement (COPE) represent the Inuit in the Mackenzie Delta and the Western Arctic.

   A couple of years ago the negotiations reached the stage where in October 1978 an agreement in principle was signed. It was implied that a final agreement would be reached within a year.

   Further negotiations did in fact take place during 1979 but with no significant progress toward a final agreement. The selection of the land area to be affected by the agreement was, however, made. Restrictions were introduced to prevent any disposition of the identified land area until final agreement between COPE and the Federal Government had been reached.

b. Inuit Tapirisat of Canada (ITC) represent the remainder of the Inuit population - those living in the northern and eastern N.W.T. ITC presented, ae early as the spring of 1976, a proposal which included claim to all land areas in the N.W.T. located north of the treeline. In addition, ITC seek compensation for past and future use of those areas which ITC consider the property of the Inuit people. The goal of ITC is to establish a self governing Inuit region called Nunavut (our land).

Uncertainties surrounding a number of points relating to the political and economic administration of the proposal resulted later in a temporary withdrawal of the proposal. Negotiations have resumed but so far without reaching any decisions.

c. The Indian Brotherhood (The Dene Nation), representing the Indians in N.W.T., submitted several years ago a proposal stating a set of principles regarding their claims and rights. The proposal was based on extensive research and included claim to substantial land areas in the Mackenzie district.

It soon became apparent that a number of disagreements existed between The Indian Brotherhood and The Metis Association, representing the halfbreed Indians. The Federal Government subsequently provided funding to both organizations, allowing each of them to carry out further research in support of their claims, while at the same time making it clear that only one agreement with all the native people in the Mackenzie district would be negotiated.

As late as in 1979 both the Indians and the Metis organizations stuck to their own versions of proposals and claims which in certain areas are overlapping and competitive, and only limited progress had been made in the efforts to reach an agreement acceptable to all the population groups of the Mackenzie district.

In connection with the native land claims, an interesting court case involving Inuit Tapirisat of Canada and the Hamlet of Baker Lake versus the Federal Government was recently concluded. The court determined that the Inuit have basic legal claims to certain land areas near Baker Lake, including the rights to fish and hunt, but did not make the Inuit "holders of surface rights". The exploration activities of mining companies - which had triggered the court action - were therefore allowed to continue.

Perhaps not too much importance should be attached to the results of a specific court case but the ease indicates that the questions relating to native peoples' claims are unlikely to be answered through the courts. Eventually, political decision will have to be made. It is difficult to believe that the native populations would be satisfied with just being allowed limited uses of the land areas they claim. Nothing short of full ownership is likely to be acceptable to them.

It is difficult to evaluate how the political shifts related to the 1979 Council of N.W.T. election will influence the negotiations with the native groups. On the surface there would appear to be certain conflicts between, on one hand the aspirations of the native peoples, and on the other the direction the Council seem to be establishing. So far both Inuit Tapirisat and The Dane Nation display a positive attitude in the negotiations attempting to reach understanding and agreement between the population groups of N.W.T.

Q. HOUSE BUILDING IN THE ARCTIC - WITH(7UT PAST TRADITIONS

A trip to N.W. T. leaves one with the impression that construction of houses has taken place only since 1950. Disregarding military installations, few buildings seem to have been erected before 1950. We were wondering whether one could locate any building in N.W.T. more than a hundred years old.

It was in the 1950's that the government started its policy of concentrating the population. Up to then, the natives in the eastern part of N.W.T. predominantly lived in houses constructed of sod or skin while in the western forested areas houses were generally log structures.

Today there are clear differences in housing from one community to the other, related to the composition of the population in each community.

1. Housing

At this time in N.W.T.'s historic development, the types and standards of housing obviously would be different in such communities as:

Yellowknife	with	13%	Indians	and	Inuit	and	87%	Euro-Canadians
Nanisivik	"	14%	"	"	"	"	86%	"
Inuvik	"	29%	"	"	"	"	71%	"
Frobisher Bay	"	60%	"	"	"	"	40%	"
Arctic Bay	"	95%	"	"	"	"	5%	"

The housing in Arctic Bay, for instance, is dominated by an Eskimo way of life, adjusted to an urban setting; while Yellowknife represents living habits imported from southern Canada, adjusted to an arctic setting.

In Arctic Bay, with its 95% native population, the various phases in the Governmentts housing policies are reflected. The social aims of those policies will be discussed later, with the following observations only referring to the visible results.

From the 1950's and up to the middle of the 1960's, houses for the natives were built in sizes ranging from 22.5 m^2 to 45 m^2. They were simple houses with only one room or with one living room and one bedroom, and the facilities were few.

The water was supplied by truck and stored in a tank - waste water was dumped on the ground - and there were chemical toilets. Both heating and cooking were taken care of by a stove. The standard is shown on fig. 1 and fig. 2 which show housing plans from 1963 and 1964. It is interesting

CHEMICAL TOILET
WATERTANK
KITCHENSINK
OIL-STOVE

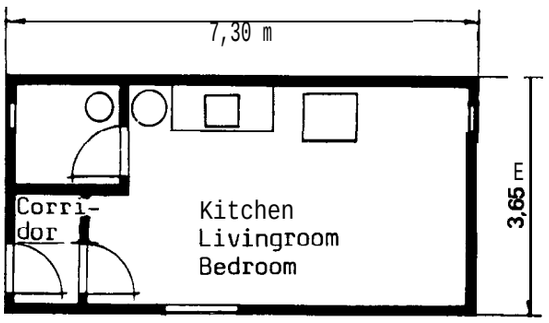


Fig. 1 - SINGLE FAMILYHOUSE 1963 - 1:100

OIL-STOVE
KITCHENSINK
WATERTANK 200 L
CHEMICAL TOILET

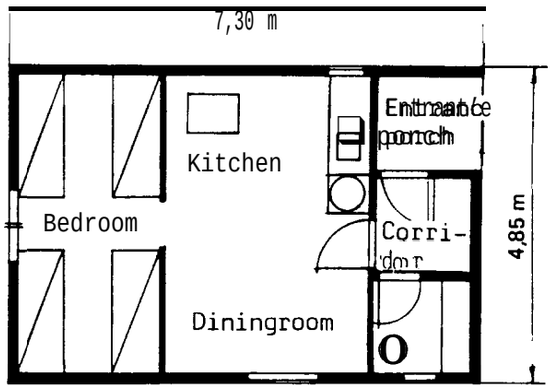


Fig. 2 - SINGLE FAMILYHOUSE 1965 - 1:100

BATHTUB
CHEMICAL TOILET
SINK
FURNACE
WATERTANK 200 L
OIL-STOVE

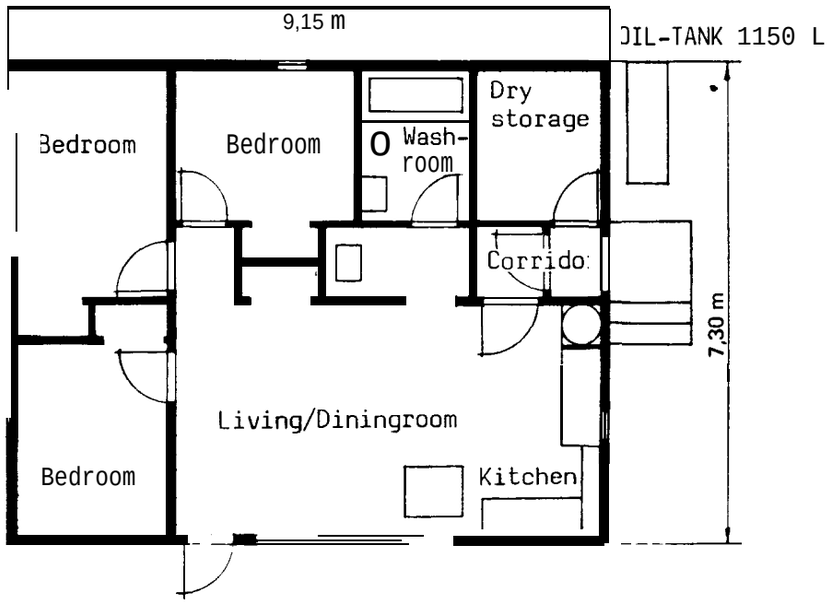


Fig. 3 - SINGLE FAMILYHOUSE 1968 - 1:100

that even a house as primitive as the latter has both an open and a closed porch. The entranoe to a house is considered important in N. W. T., as it is in Alaska,

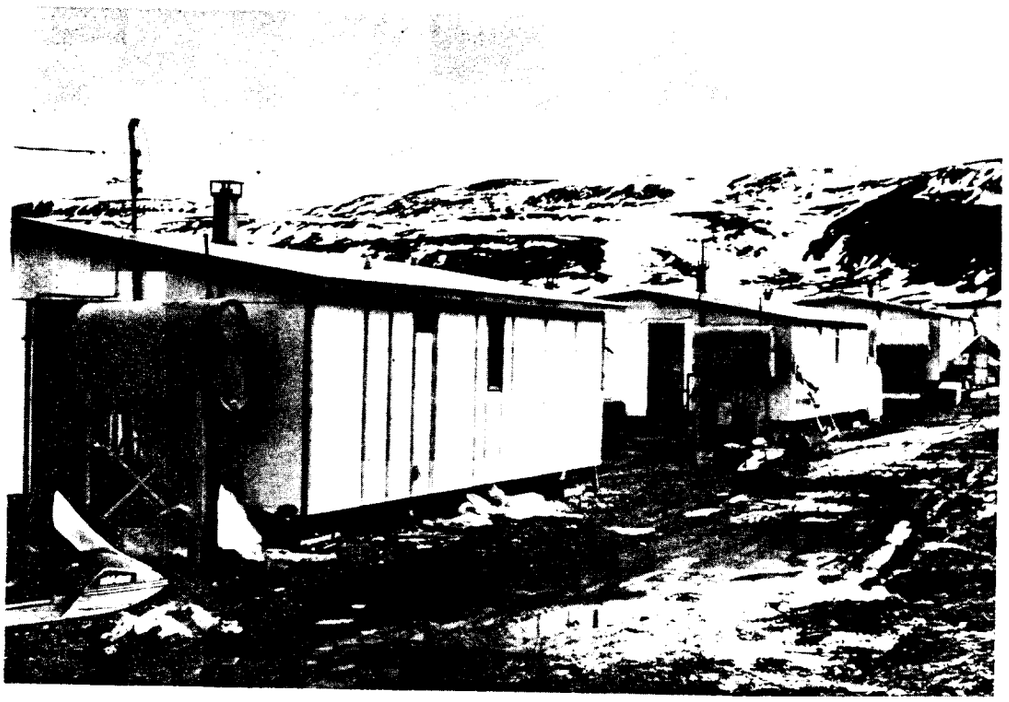
In 1965 report on the general health of the Inuit population caused housing policies to be revised and better methods of housing assistance to be introduced. This resulted in larger and better houses. Typical of that period were houses of about 60 m^2 with a living room and 3 bedrooms (see fig. 3). The plumbing was as before, although of abetter quality, and the public services in the area of water supply and the disposal of waste water and garbage were also improved. The houses were built in such a way that modern plumbing could be installed. Where pressurized water and sewer systems were in place, water closets could be installed. Most of the houses from that period were also built with oil fired hot air heating systems and hot air supply vents in each room.

From the early 1970's up to now the number of various house types available has proliferated. Several housing manufacturers in the south have shown an interest in this market which - because of the short construction season - is a natural one for prefab houses of all kinds. The variety of house-types available in the area of subsidized housing today suggests that standardized housing is a thing of the past. At the same time the differences between houses for the natives and for the Euro-Canadians are gradually diminishing. A similar development took place in Greenland in the early 1960's.

Many natives living in the larger communities have lately, to some degree, become accustomed to living in various forms of multiple housing. It is particularly in Yellowknife, Inuvik, and Frobisher Bay that the results of this development are seen. They have recognized the advantages of the comforts of a modern apartment: Running water, central heating, bath, water closets, washing machines, etc., and also realized that living in such an apartment is often less expensive than living in even a primitive detached house.

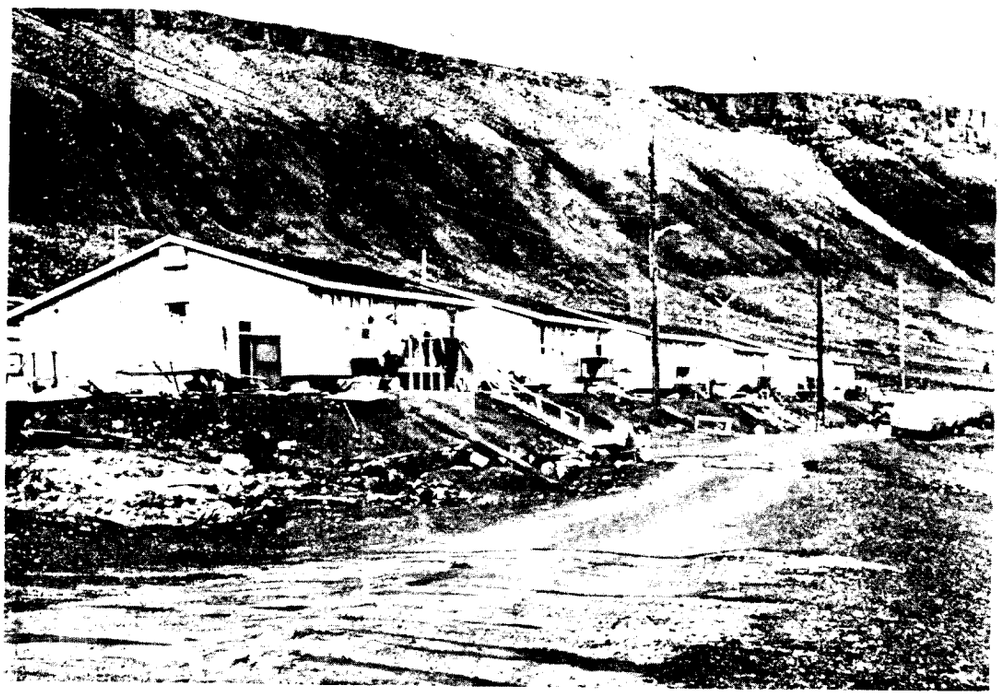
In Greenland the hunters and their families have an aversion to living in multiple family units - mainly because of their dog teams. This problem exists to a much lesser degree in N.W.T. where practically all dogs and sleds have been replaced by snowmobiles. This development has, on the other hand, resulted in the need for repair facilities and garages; and some rowhouses we saw in Frobisher Bay had been designed to respond to that need by having a large, unheated room in the ground floor where hunting and fish-

Arctic Bay is a medium size settlement at the same latitude as Upernavik. The houses in the community reflect the historic development of various housing assistance programs. These houses were built around 1960.



The population of Arctic Bay is about 350 and 95% of the population are Inuit. These houses (see floorplan figure 3) were built in the late 1960's.

In 1965, a report on general health was instrumental in causing improvements to the housing subsidy systems. The houses in Arctic Bay are one of the results.



The housing programs of the 1970's represents further improvements in the quality of housing. Structures, insulation and technical installations were all considerably improved. This group of houses is also located at Arctic Bay.

ing gear and a snowmobile could be stored and repaired - a solution which, incidentally, also helps alleviate permafrost problems.

The detached houses of the 1950's and 60's were simple frsme structures consisting of 2" x 4" studs covered inside and outside by 3/8" plywood and with a 10 cm mineral wool insulation. They were usually built on 4" x 4" mudsills on dry ground. This simple method of construction has now been superseded by more solid structures.

The demands for better insulation have increased considerably since the 1973 oil crisis, and insulation standards are now about the same as in Greenland. Exterior walls now have increased in thickness to allow 6" (15 cm) insulation.

Foundations are also the subject of more attention today. Where permafrost is a problem, the overburden is removed and a gravel pad installed. The house is then built on timber blocks resting on the gravel. The blocks are designed in such a way that it is possible by the use of wedges to adjust the floor elevations of the house in case there are - despite precautions - movements in the foundations.

We were wondering how houses built on foundations as described could be stable enough to resist being toppled by the wind. The explanation turned out to be that windforces are generally much lower than we encounter in Greenland. Only the areas facing the Davis Strait have winds comparable to those in Greenland, and in places like Frobisher Bay and Pangnirtung houses on that type of foundations are secured with guy wires.

The selection of materials used in housing appears to confirm that houses in N.W.T. are built with a shorter life expectancy than in Greenland. It is also evident that a far wider range of synthetic materials is available in N.W.T. - particularly materials based on plastics - and that they are used with enthusiasm.

Greenlanders and Danes visiting N.W.T. often notice that construction here appears less substantial than in Greenland. Single storey buildings often use timber foundations where in Greenland we would use concrete - several types of thin cladding are used in N.W.T. - wooden structures are flimsier in N.W.T., and several other components appear less solid. All this should, however, first of all be evaluated with the understanding that structures of the type described are aesumed to have an average life expectancy of from 15 - 20 years while in Greenland we expect from 30 to 50 years service for corresponding structures; secondly that wind forces - except for

certain eastern locations - are less than in Greenland.

In regard to the structural elements it should be noted that the lumber used is of considerably higher quality than Scandinavian lumber, that all lumber used in housing construction is fully dimensional and almost what we would consider acceptable for finishing work, and finally that there is a highly developed and refined tradition in North America for using wood to produce structural elements that may appear flimsy but have considerable rigidity. The structural frsmework of houses in N.W.T. is, considering the windloads they are designed for, probably as sturdy as houses in Greenland.

As mentioned earlier a considerable part of housing construction relies on elements prefabricated in southern Canada. This is obviously the cause of some concern in districts with a high rate of unemployment, and efforts are being made to have all or at least part of the prefabrication take place in those districts.

In Yellowknife, where 87% of the population is Euro-Canadian, the residential pattern appears to correspond to what one would find south of the 60th parallel. Housing ranges from apartment buildings to rowhouses and detached houses. There are several examples of beautifully designed rowhouse development in the almost international style we also know from Alaska and Greenland. The plan layout is also familiar: A large living room with kitchen and dining area at one end, and a number of bedrooms off a common hallway and the traditional - and as usual far too small - bathroom.

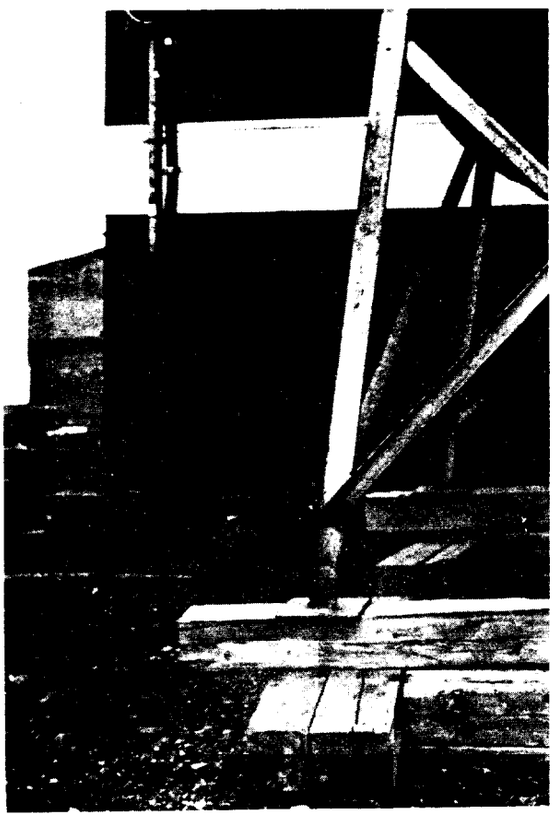
In rapidly growing Yellowknife one encounters, as in many other places on the continent, sections reserved for mobile homes. They are carefully planned residential areas, operated with sufficient discipline to prevent them from looking like desolated slum areas.

We should mention that traditional houses are still being built in the smaller Indian communities in the southwestern part of N.W.T. Unfortunately that very attractive type of structure is threatened by the present high energy costs and the resulting demands for better insulated houses, and the more easily heated prefabricated houses are gradually replacing the log houses.

2. Administration And Financing Of House Construction

The Northwest Territories Housing Corporation, which is a branch of the Territorial Government, is in principle responsible for carrying out

These rawhouses in Frobisher Bay are in many ways reminiscent of contemporary housing construction in Greenland. Insulation standards and choice of materials are almost the same. The high quality of lumber used in the NWT does, however, allow lighter and more elegant framing.



Foundations for houses are often quite primitive. This corner of a new house in Nanisivik rests, without anchorage, on a gravel pad with a system of wedges for height adjustments, if required. The trend is toward foundations on piles drilled into the permafrost.

public-supported housing construction. The Housing Corporation uses consultants for the design, and construction is normally handled by private contractors selected through a process of tendering.

The contractors may be local firms or firms from southern Canada. The local contractors presently handle close to half of the total housing construction program.

Relative to the discussions at the trade conference last May in Julianehåb, it is pertinent and interesting to notice that many of the local contractors are co-ops. The co-ops, which in many activities have gained strong positions in N.W.T. during the last decade or so, are often started and based on the initiative of a particular person. A number of years ago a priest in Igloolik started a co-op, and did it so well that he did in fact gradually became the top local general contractor. It is tempting to compare the example to that of the clergyman of a tiny village in Denmark who built a travel agency empire - complete with his own fleet of jet airliners.

A number of different housing programs with different types of financing are available in N.W.T. The overall intent of the program is to make it possible for anyone, indigent or well off, to obtain housing corresponding to his or her financial abilities.

In very general terms there are three types of programs:

a. The Housing programs for the needy are particularly intended to assist Indians and Inuit but also to a certain degree the Euro-Canadians. The main programs are the cost shared programs where construction costs are covered by loans available partly from the Housing Corporation and partly from Canada Mortgage and Housing Corporation (CMHC, a Federal Crown Corporation operating somewhat like our Credit Unions).

   Interest charges and repayments of loans to both the CMHC and the Territorial Housing Corporation are established according to regulations with social aims, and in such away that the rent will correspond to financial abilities. The cost shared programs, in other words, operate much like the housing assistance programs in Greenland.

   Projects are carried out by the N.W.T. Housing Corporation in consultation with local authorities who exercise considerable influence on the selection of the types of housing, and a more

limited influence on the number of units. As is the case in Greenland, the desires always exceed the means.

The local Housing Associations, which represent the N.W.T. Housing Corporation, distribute available housing according to needs and ability to pay. Based on their local knowledge, they are charged with the responsibility to ensure that best possible use is being made of the existing housing. They also collect the rent according to rules established by the N.W.T. Housing Corporation. The rent for a typical detached house is normally between $130 and $220 (600 - 1000 kr.) a month. The duties of the Housing Associations correspond quite closely to those carried out by the municipal housing offices in Greenland.

b. There are no particular housing programs for people able to look after themselves. They may, however, borrow from CMHC to partly pay the construction costs while the rest must be covered by bank loans or private funds. In those cases no subsidies are involved, and interests on loans are based on the current market rates.

c* Staff housing programs include housing made available to government employees. Construction of such housing is carried out by the government through the Housing Corporation, and rented to the employees at subsidized rates. The employees in effect receive a salary increase through the relatively low rents.

The government is attempting to gradually phase out the staff housing programs. A proposal presently under consideration suggests startingin communities where construction costs are at a reasonable level which in effect means communities with road access to southern Canada (Yellowknife, Hay River, Fort Smith, and others). The employees would be responsible for finding their own accommodation on the private market and in return would receive a housing assistance, which would be the same for all.

There are a number of problems associated with a plan of this nature, mainly because a number of employees come up from the south, only to stay for a relatively short time (as is the case with Danes in Greenland). It is therefore proposed that new employees would be able to rent government-owned accommodation for a specific, limited time after which time they would be responsible for providing their

own accommodation . either by renting or by building their own homes. The proposed plan includes clauses obligating the government to purchase an employees house - provided he is unable to sell it privately - when he leaves N.W.T. or is transferred to another location in N.W.T., and provided the house meets certain defined standards.

It is difficult to discuss construction costs in N.W.T., mainly because they vary so much from one location to the next. The variations are particularly caused by the fact that transportation costs (contrary to the case in Greenland) are not equalized. As a result there may well be a 100% difference between the costs in an easily accessible location and one situated, for instance, on one of the islands in the High Arctic.

In Yellowknife, which belongs to the group of easily accessible locations, the construction costs axe about 20 - 30% higher than in central Alberta. The wide differences between prices obviously make it difficult to quote meaningful examples of construction costs but a typical price for a 3-bedroom staffhouse in Yellowknife would be about $100.000 (D.kr. 5,000,000) while the corresponding costs for one of the Housing Corporation Public Housing unitsof about lOO m^2 would be about $60,000 (D.kr. 300,000).

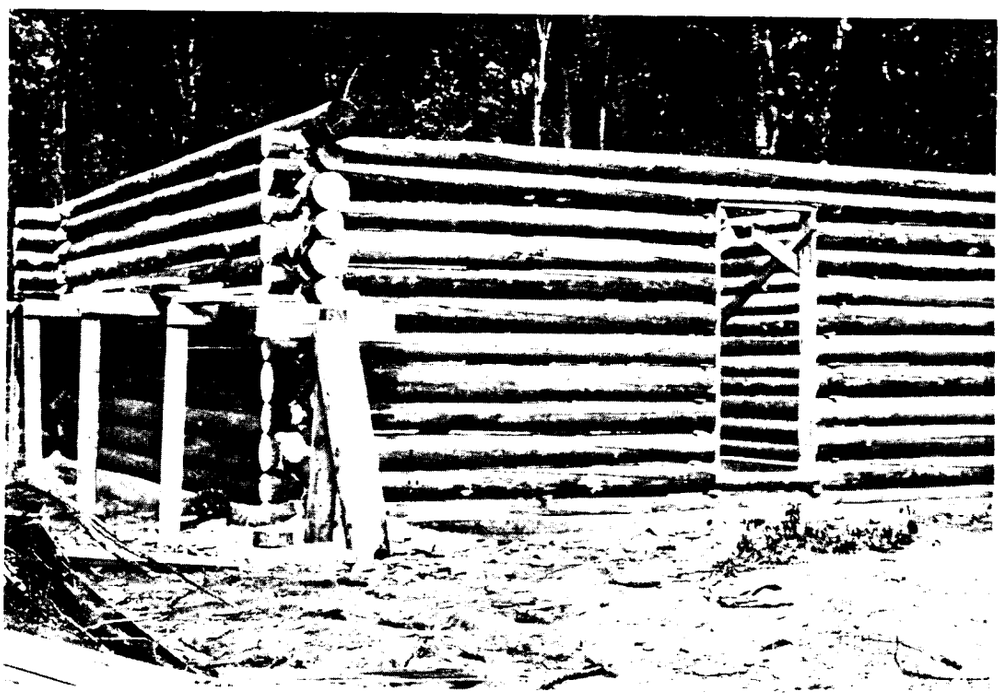
3. Other Types of Construction

Since W.W.II, extensive construction activities have taken place in N.W.T., involving among other things schools, hospitals, arenas,and other recreational structures, as well as offices and commercial buildings. One cannot help being impressed, particularly considering that most of those activities have occurred within the last 15 years.

We were delighted to see a number of structures which both from an architechtural and a technical point of view impressed us greatly - and which in our opinion are among the finest to be found today in arctic regions. We have already mentioned examples from Yellowknife, Nanisivik, and Frobisher Bay.

We did, on the other hand, feel a lack of unity in the planning of most communities. The town planning efforts up to now appear to have been of a rather theoretical nature and not sufficiently attuned to arctic realities. In certain communities, however, above-ground utilidors have result-

In the predominantly Indian communities in the southwestern part of the NWT, log houses are still being built -- often by the owners themselves.



The traditional, attractive log houses will probably -- and unfortunately -- soon be replaced by the more comfortable and better insulated, prefabricated frame structures.

ed in a firmer and more realistic planning, and Inuvik is a positive example of this.

A radical revision of earlier planning is now underway in several communities, and conscious efforts are being made to ensure unity between what exists and what will develop in the future. That was the case at least in Frobisher Bay, Nanisivik, and Resolute Bay.

From a technical point of view the individual structures do not appear to differ much from similar buildings anywhere else in North America. No special arctic architecture or arctic construction techniques appear to have developed. That is an observation that by and large also applies to Greenland.

In the area of foundations, however, a special technique has been developed in N.W.T. - and developed to the point of virtuosity. In Greenland we are usually able to use bedrock as foundation for our buildings. In N.W.T. the building sites in most cases consist of loose gravel a fact which presents considerable engineering problems.

The foundations for detached houses usually consist of mudsills on a gravel pad but larger structures need more sophisticated foundations which now as a rule consist of piles either driven or drilled into the ground. As engineers in Greenland, we are fully aware of the many problems associated with pile foundations in permafrost. Those problems appear to be under control in N.W.T. Special billing rigs have been developed for piling work, and the costs of piling are now so low that pile foundations even for houses are becoming increasingly common.

. Building Codes

Construction in N.W.T. is governed by a set of regulations that apply throughout Canada: The National Building Code - although as we understand it, the regulations are somewhat liberally interpreted in N.W.T. It seems to be tacitly recognized that the codes and regulations designed for and based on conditions in the more temperate zones have their shortcomings when applied to construction in N.W.T. with its unique cultural, physical, and technical circumstances. This situation places great demands on the judgment, sensitivity, and technical skills of the technicians carrying out construction programs in arctic regions, and it is doubtful whether it is, in the long run, acceptable. The authorities in N.W.T. recognize this and have initiated preparations for developing code amendments reflecting N.W.T.'s special situation.

R. WATER SUPPLY AND SEWAGE DISPOSAL IN ARCTIC TOWNS - AN ENGINEERING HEADACHE

The Canadian engineers consider water supply and sewage systems a considerable challenge. The problems are technically difficult - adding difficulties in evaluating the sociological and environmental consequences such activities may have. There is particular concern over the fact that moving to modern communities with piped water and sewage will result in drastic changes in the life pattern of the native peoples.

Up to the 1950's the people in the arctic lived a meager existence based on conditions dictated by nature, and lifestyles in harmony with the environment. At that time, as mentioned before, the search for and the exploration of oil, gas, and mineral deposits intensified. That resulted in a number of people moving in from the south - and the creation of arctic communities where people lived together in ways that were new to the native people. This higher concentration of people resulted in the need for water supply and sewage systems, partly because sanitary and environmental considerations made it necessary, but also because many of the immigrants from the south insisted on maintaining their former lifestyles whereever at all possible.

Canadian engineers eagerly accepted this challenge and have, by and large, become very familiar with the technical problems involved.

It is our impression that N.W.T. in the course of the last 15 years has developed an expertise in the area of municipal services which at least matches that of GTO's - after our 30 years of activities in Greenland. That expertise has been gained by carrying out many often quite large projects which also - by our standards - have been very well funded.

There are, however, still great differences in the standards from one community to the next. Cities like Yellowknife and Inuvik, where developments reflect that the populations are predominantly Euro-Canadians, enjoy water supply and sewer systems more sophisticated than one would find anywhere in Greenland. The services in a community like Arctic Bay, on the other hand, are at a level comparable to what one would find in a larger settlement in Greenland.

1. Water Supply

Throughout N.W.T. surface water is the source of supply of potable water,

and in most of the larger communities the water is filtered, chlorinated, and fluoridated. In few places are there any efforts made to raise the low pH value. In some localities where the water supply comes from rivers, great difficulties have been experienced in obtaining an acceptable quality of water in the summer time, due to the high content of suspended silt. In a few places it is necessary for a period of time to use distant lakes as a water source. A case in point is Inuvik.

As in Greenland hypochloride is generally used for the chlorinating process although gaseous chlorine is used in a few places; and, as is also the case in Greenland, we did meet operators of water supply systems who had the attitude that chlorinating was unnecessary and degraded the taste of the water.

In many places the water is fluoridated, and that appears to happen in a quite unceremonious fashion. The addition of the chemicals is done without exercising any extensive safety precautions. The fluoride content of the water is measured once a day, and operations reports are submitted to the health authorities once a week. Tests with water fluoridating are presently being carried out in Greenland at the urging of dentists who feel that the low fluoride content in the water is largely responsible for the low level of dental health. The tests mainly concentrate on safety measures related to the staff and their exposure to the chemicals, as well as on control measures to ensure proper and safe levels of fluoride content in the water. Those problems of safety are considered under control in N.W.T.

We observed that water in certain - even quite large - communities was distributed through a pipe system without any treatment. In Yellowknife the only treatment was chlorination using gaseous chlorine, and during the winter the water supply in Inuvik comes directly from the Mackenzie River with no treatment at all.

2. Water And Sewer Pipes

The methods of water distribution and the removal of waste water are as varied in N.W.T. as they are in Greenland. There are communities where each family must pick up their water pails - and dump the waste water outside their home. In other communities water is delivered by truck to each house, and wastewater pumped out by trucks from storage tanks at each house. We did, however, also visit communities where piped systems were installed methodically and with a technical sophistication so far unknown in Greenland.

For townplanning and aesthetic reasons the pipes are, whenever possible, placed underground - by digging or blasting. There are, however, areas of permafrost where frost heaving makes it technically difficult and economically prohibitive to install buried pipes. In those areas the pipes are installed above ground in pipe boxes - or "utilidors", as we often use also in Greenland.

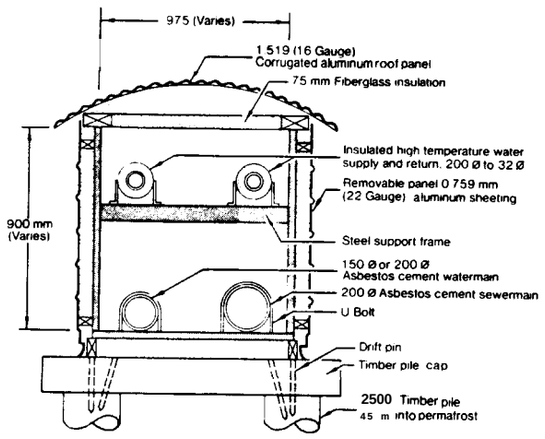
a. Inuvik is situated in such an area, and the town - with about 3,000 citizens - has very skilfully been built in such a way that practically all sections of the town are connected to above ground water and sewer pipes. Walking through the town one encounters a number of different types of utilidors. It is obvious that considerable experimentation has been going on through the years. There are utilidors built of aluminum sheets, steel sheets, and of plywood, and utilidors with circular cross-sections.

Functionally there are two types of utilidors used in Inuvik: One which contains water and sewer pipes as well as hot water pipes from the town's heating plant, and the other type with just water and sewer pipes. In the former type the pipes are protected from freezing by the heat radiating from the hot water pipe while frost protection in the latter is provided by heating the potable water in heat exchangers placed at intervals, and in addition by arranging the pipes in loops to have the water constantly circulating.

Many lessons have been learned by operating those systems. It has, for instance, become clear that frost protection by heating the interior of the utilidors through heat losses from the hot water pipes is difficult to control and therefore uneconomical while forced circulation and direct heating of the water pipe has turned out to be a reliable and economical method of providing frost protection. By meticulous planning of the pipe system and by careful choice of locations for circulation pumps and heat exchangers, the looped pipe system provides a practical solution to the problem of water distribution in arctic regions, according to Canadian engineers.

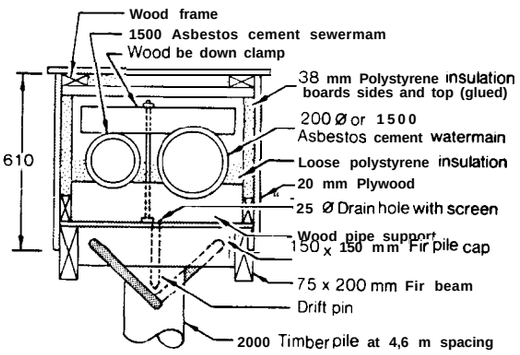
Inuvik demonstrates clearly that it is indeed possible, through proficient planning, to build even a large community in the arctic with above-ground pipe systems - and to make it work. We would even say that the firm delineation of the townscape provided by the utilidors adds a unique character and charm to the town.

CENTRAL HEATING LINES
WATER MAIN
SEWER MAIN



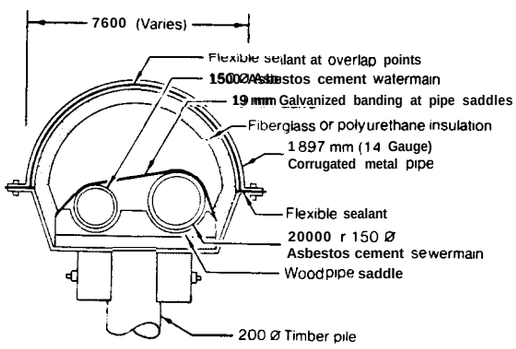
Utilidor with central heating lines. Inuvik, N W.T

SEWER MAIN
WATER MAIN



Plywood boxutilidor, Inuvik, N.W.T.

WATER MAIN
SEWER MAIN



CMP Utilidor, Inuvik, N.W T

TYPICAL EXAMPLES OF ABOVE-GROUND UTILIDORS AT INUVIK

It should be mentioned, though, that vandalism is a severe problem, and that much damage is caused by children playing on top of the utilidors.

The waste water is pumped to a lagoon where its organic content is oxidized and partly disintegrated before the outfall to the river. For aesthetic reasons the waste water is here - as in other locations in N.W.T. - passed through a grinder before it enters the lagoon.

b. Yellowknife is located in a zone of discontinuous permafrost. Permafrost is found practically anywhere the soil is undisturbed, and the active layer is about 3.0 m. The underground is solid rock partly covered by eskers. The depth to solid rock varies between 0 m and 30 m.

In Yellowknife the choice was to have water and sewer pipes buried in the ground - by digging or blasting - and it has not been without its problems. It has been necessary to protect the pipes from damages due to soil movements caused partly by disappearing permafrost and by penetrating seasonal frost - and also to protect the water in the pipes from freezing.

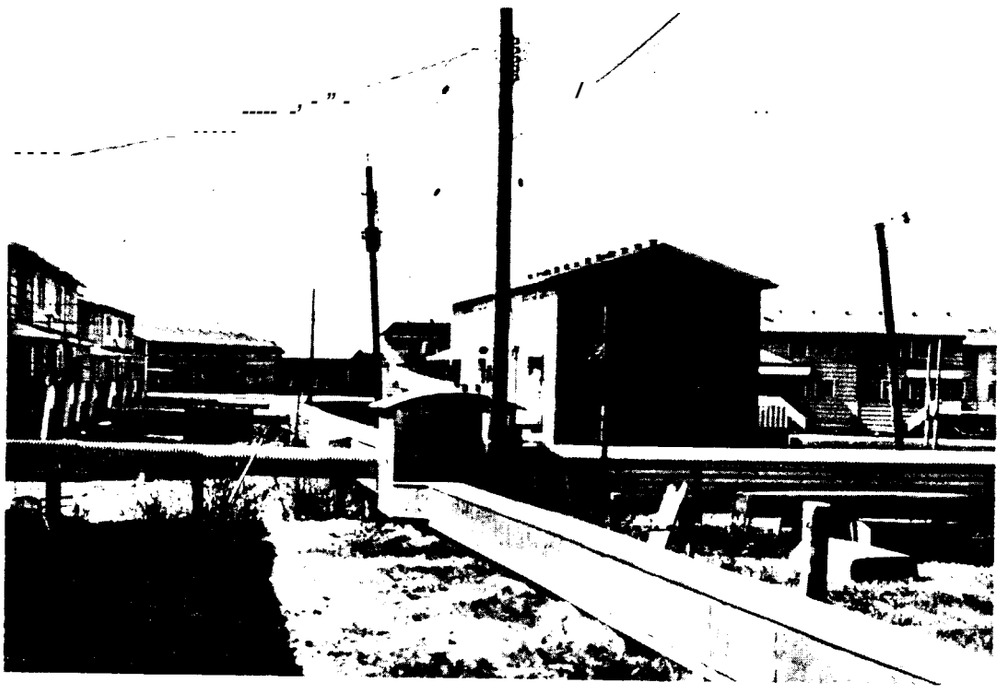
As in Inuvik rich experiences have been gained in the process. In order to protect the pipes from freezing, the network of pipes has been designed along the principles used in Inuvik: Loops with constantly circulating water, and circulation pumps and heating of the water during certain periods of the year. In addition an electronic monitoring system has been installed to optimize the economy and reliability, all carried out with great professional skill.

This description of piped services in Yellowknife applies to the New Town only. In Old Town the water supply is piped only during the summer months. In winter the water is delivered by truck to tanks at each house. The sewage disposal is all year round based on sewage holding tanks pumped out by trucks.

3. Garbage Disposal

Garbage collection and disposal were, in the communities we visited, handled in much the same way as in Greenland: The garbage is taken to dumps where every now and then it is covered by earth.

At Fort Good Hope - a community of about 400 people, and at about the same latitude as Holsteinsborg - we encountered the most beautiful and



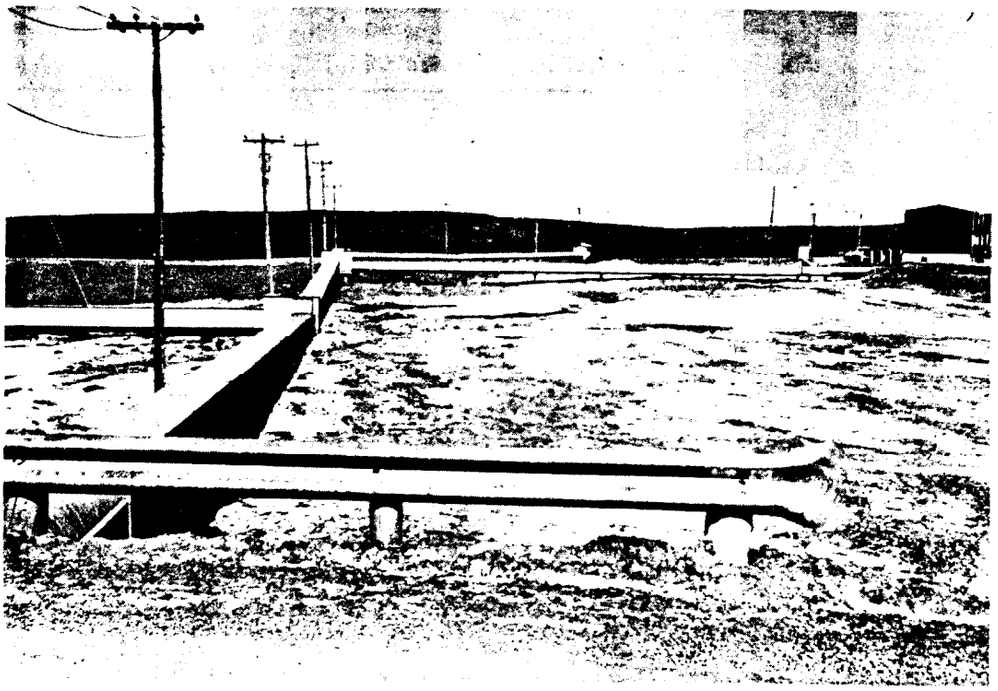
Inuvik is a town of about the same size as Egedesminde -- and also at about the same latitude. Water and sewer services are extended to practically all buildings in town, and a heating plant serves the central parts of the town.

All water and heating pipes in Inuvik are installed above ground and serve as proof that such a pipe system can function proberly even in the Arctic -- provided it is a properly designed, installed and maintained as is the case here.

well manicured dump we have ever seen. In a clearance in the forest three ditches had been dug in the gravelly ground, each about 3 m deep. Each of those ditches were used respectively for honey buckets, house. hold garbage, and general garbage. As each ditch filled up, it was covered with the gravel excavated by digging a new ditch.

. Design Manual on Cold Climate Utilities Delivery

The high technical standard of municipal services in N.W.T. is evident from a "Design Manual on Cold Climate Utilities", published in March, 1979. This manual has been produced by a committee of American and Canadian technicians involved in design and construction activities in Alaska, the Yukon and the Northwest Territories.



Inuvik prepared for rapid expansion. Large areas were provided with roads, water an sewer pipes, and electric power. Did we ever show that degree of foresight in site preparations in Greenland?

Probably the world's neatest and best manicured dump near Fort Good Hope. As each ditch is filled, it is covered by gravel from the next.

S. SUPPLY OF ELECTRICITY PROVIDED BY A CORPORATION

The production of electricity in practically all communities in N.W.T. is handled by a corporation: The Northern Canada Power Commission (NCPC) .

The Corporation also operates the major transmission lines in N.W.T., as well as heating plants, water supply, and sewage systems in some communities.

The NCPC is a Federal Crown Corporation, licensed to operate under special legislation. Within its jurisdiction the NCPC is authorized to determine requirements and to plan, build, and operate power plants. This jurisdiction includes not only N.W.T. but all Canadian Territory north of the 60th parallel - in other words also the Yukon Territory - as well as, and pending separate approval, other areas of Canada.

NCPC is intended to operate on regular business principles, and it has been determined that the Corporation must be economically viable within each rate zone, as defined by legislation. The rates charged must provide resources sufficient to cover interest on capital expenditures, repayments on loans, operating and maintenance costs, as well as to maintain cash reserves to meet unforeseen expenditures.

NCPC's head office is located in Edmonton, and in 1978 the total staff numbered 310 employees out of which 220 were operating staff located throughout the northern areas. About 50 of the latter group were natives. For comparison the power plant and water supply services in Greenland in 1978 had an operating staff of 226 employees out of which number 125 were residents of Greenland.

The power production in the communities is, as in Greenland, handled by diesel generators. In Inuvik they are supplemented by steam turbines tied into a heating plant.

In addition there are 4 hydro power plants: Twin Gorges, with a capacity of 22 MW, which supplies power to the communities and mines south of Great Slave Lake - and Snare Rapids (7 MW), Snare Falls (7 MW), and Snare Forks (10 MN), all three located to the nortvest of Yellowknife, and supplying power to the gold mines in the area as well as forming part of the power supply system for the City of Yellowknife.

NCPC is responsible for power distribution systems in 49 communities in

N.W.T. In Yellowknife, however, the corporation only produces the power while the distribution is handled by a local company.

It is interesting to compare the above described methods of administering the supply of electricity in N.W.T. with the deliberations of the Corn. mittee recently set up to propose future solutions for that very problem in Greenland. The Committee suggests in its recommendations that the operation as well as the construction of power plants should be carried out by the communities while also recognizing the need for common, centralized consultant services.

Tuktoyaktuk's supply of electricity comes from the power plant at Inuvik, through a 150 km long 69 kV transmission line pushed through the barren land og the Mackenzie River Delta. This transmission system, which is at about the same latitude as Jakobshavn, is of considerable interest to us. One of the problems facing us in the utilization of hydro power in Greenland is the construction of long transmission lines under severe arctic conditions.

Total electricity sales in N.W.T. amounted in 1978 to 353 GWh for a total revenue of 23.8 million dollars. The rate for industrial consumers was an average of 2.63 cent per kWh while rates for private consumers averaged 12.81 cent per kWh. Even though sales to the industry are in part based on inexpensive power from hydro power plants while the power to private consumers predominanttly comes from diesel plants, the difference between rates suggests a rate policy designed to support industry.

In comparison the rates in Greenland in 1978 to industry and private.consumers were respectively 12.5 cent and 16.0 cent per kWh - reflecting a rate policy with social aims.

The total production of N.W.T.'s heating plants (at Inuvik and Frobisher Bay) was in 1978 386 billion BTU, producing a revenue of 3.234 million $, or about 8.4 $ per million BTU at the plant. The corresponding rate in Greenland in 1978 was 23 $ per million BTU; this rate did, however, also include heat supplies to the consumer.

The planning of energy supplies is presently the subject of a review in N.W.T. - as it is in Greenland. It is realized that the days of diesel generation of electricity without recovery of the waste heat are gone. Coal as well as oil is being evaluated as fuel for steam operated plants producing both heat and electricity, and the possibilities of increasing the utilization of hydro power are being investigated. Even smaller basins

of water near communities are being considered and evaluated with in. creasing interest as is the case in Greenland.

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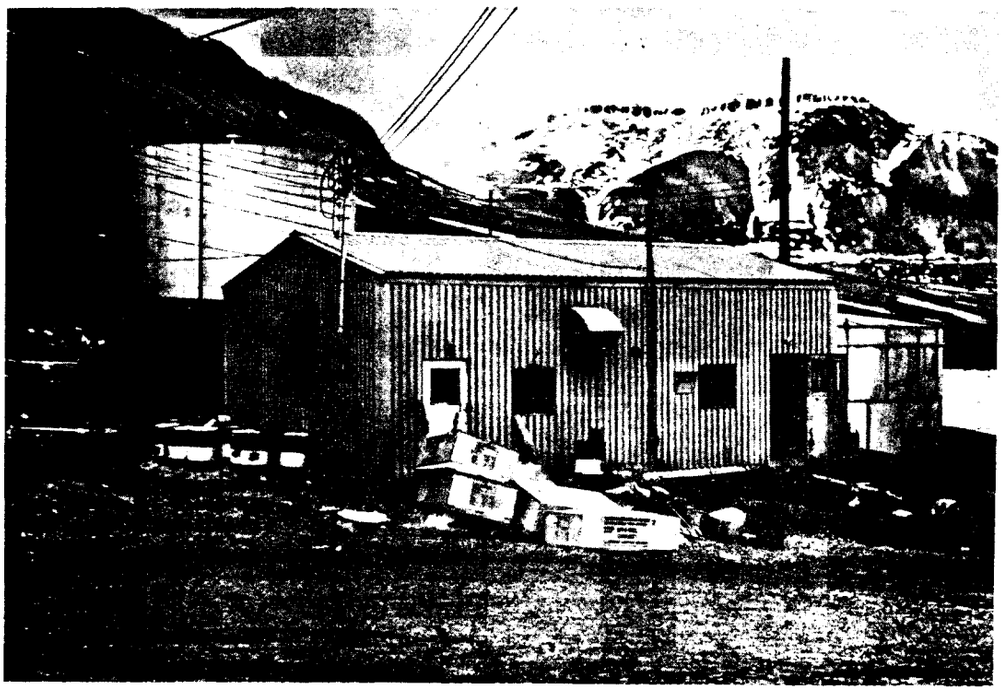

Northern Canada Power Commission provides electricity in practically all communities in the NWT. This 390 kW power plant, as well as most others, i diesel powered.

NCPC normally also looks after the electric power distribution. In Yellowknife, however, the distribution is handled by a local firm. Power distribution networks in the NWT are usually installed with no exaggerated concern for the visual impact on the townscape.