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THE MID-CANADA LINE

An address by the Minister of National Defence,
Mr. Ralph Campney to the Royal Canadian Army
Pay Corps Association.

I should like to speak to you tonight about the construction of the mid-Canada line which will extend from Labrador westward roughly following the 55th parallel when completed and which will form an integral part of the joint Canada-U.S. continental air defence system. Before doing so, however, perhaps a few words with respect to the whole system would be in order.

The four main elements in the integrated continental air defence system of North America are:

First, the Pinetree System, which ties in to the Canadian and United States air defence commands a basic radar warning and control system, and through extensive communication networks links up the Canadian and United States air interceptor forces.

Second, the mid-Canada line, an early warning line supplementing the Pinetree radar system.

Third, the Distant Early Warning or DEW line across the most northerly practicable part of North America.

Fourth, extensions down both flanks of the continent to prevent outflanking of the transcontinental network by hostile aircraft.

Planning of the system started some years ago, as soon as the thermonuclear threat began to take shape. It was realized at once that effective defensive steps to meet this threat would require the combined effort of both countries, that it would be costly and that its construction would be difficult.

We in Canada also recognized, as members of NATO, that beyond meeting the needs of defence at home it was our duty to assist in the provision of measures for the protection of the industrial potential of North America and of the retaliatory capacity of the United States Strategic Air Force, both of which are of the greatest importance as deterrents of aggression against the free world.

Of the four elements which I mentioned a moment ago, construction of the Pinetree radar system was tackled first. Part of it was constructed by Canada and part by the United States. In October, 1953, when the Pinetree system was becoming operational, a group of Canada-United States scientists and military advisers recommended that additional early warning capacity should be provided. After further consideration by the Chiefs of Staff of both countries, recommendations were made which led to the acceptance by Canada of the responsibility for financing, constructing and operating the

mid-Canada line, while the United States undertook to construct the DEW line, with Canada contributing such resources and assistance as could be made available. The United States also became responsible for the seaward extension down each flank of the continent.

Actually, as the work on the DEW line goes ahead, we have found that we could help out in many practical ways. Valuable assistance has been given to United States authorities by aircraft and ships of the R.C.A.F. and R.C.N. respectively and the Canadian Army, too, has helped out, especially through our base at Churchill, Manitoba. The Departments of Northern Affairs and National Resources and Transport have also assisted and, as you know, Canadian civilian air operators, contractors and industry generally have undertaken a good deal of the work in connection with specific DEW line sites.

Coming now to the mid-Canada line itself, this line is being constructed, as I have said, roughly along the 55th parallel and is, as you may imagine, a job of magnitude, fraught with great difficulties and new problems and accompanied by a good deal of hardship and discomfort.

When it was announced about a year ago that Canada had undertaken the construction of the mid-Canada line, the public, I think, fully understood that for security reasons very little could be said about it. This applied as well to its counterpart further north, the Distant Early Warning line or DEW line, being constructed by our southern neighbour, the United States.

As a matter of fact, for reasons of national and NATO security it will still be a good while before the full construction story of these lines can be unfolded in all their gripping, challenging detail of risk, improvisation and achievement.

It is, however, already clear that these two extensive achievements--as construction feats alone--will have an impact on the development of the Canadian North commensurate with that which the building of our transcontinental railway lines at the turn of the century had on the opening up of our Canadian West.

In establishing these protective and early warning lines to meet the threat of thermonuclear war, we are rolling back the map of Canada more rapidly and to a far greater degree than our people realize. We are pioneering the unknown. We are opening up the Canadian North.

As the job progresses, many of the unknowns which made the sub-Arctic so forbidding to all but the most venturesome are being steadily dispelled. The techniques required for successful living and working in the sub-Arctic are becoming known to more and more Canadians and gradually the North is yielding its air of mystery and haunting fear.

An approximate idea of the scope of the job may be formed from the fact that early this year it was estimated that about 170 million dollars would be required to provide the basic elements for getting the line into operation. That is enough money to build brand new modern housing along one side of a street well over 100 miles long. Over 1,200 men were at work on the line soon after it started and as the project goes forward, thousands of others are being employed across the country in workshops and in industrial and electronic plants.

Technically the mid-Canada line consists of a series of unit detection and warning stations with main stations at appropriate intervals extending from the Labrador Coast westward.

The unit detection stations will use equipment originally devised by a research team sponsored jointly by the Defence Research Board and McGill University -- hence the term sometimes used to describe it -- "McGill fence". This equipment is of an advanced type and in addition to its demonstrated performance, requires a minimum of attention and is much less expensive than previously known types.

A typical main station will consist of an administrative and operation building, personnel accommodation buildings, supply buildings, boiler and power plants, provision for inflammable stores, a garage and a hangar. All stations will have landing facilities for helicopters. Main stations will have special functions in relation to adjacent sections of the line, both as regards personnel and maintenance.

Throughout the full extent of the line a multi-channel communications network is being built and appropriate air-ground-air communications facilities are being provided.

The planning and organization of the construction of the vast undertaking known as the mid-Canada line has been, I think, a marvel of co-operation on the part of government departments and government and civilian agencies. It is, in fact, something of which the Canadian people should feel very proud. All these departments and agencies started from scratch, with very little knowledge or experience in this particular field to organize and develop an entirely new project in virtually unknown territory and under little known conditions. They are succeeding extremely well and the teamwork has been excellent.

The initial responsibility for planning and for development the overall requirements to bring the line to an operational state was given to the Royal Canadian Air Force. To take over the planning from the stage where the Canada-United States team left off, a special section was set up in the R.C.A.F. known as the Systems Engineering Group. This section assumed the responsibility for supervising the surveys and siting and for drawing up specifications in collaboration with the Defence Research Board, to enable work to be commenced.

Aircraft of the R.C.A.F.'s No. 408 Photographic Squadron with some assistance from civilian operators carried out nearly 8,000 miles of aerial photography and the photographing and mapping facilities of the R.C.A.F. and the Canadian Army Survey Branch were extensively used in planning the basic route of the line.

While all this was going on, the Department of Defence Production was studying the best means of constructing the line speedily and efficiently. In view of the nature of the project it was decided to utilize the resources of the Trans-Canada Telephone System to manage all phases of the construction operation. Trans-Canada designated the Bell Telephone Company of Canada to act as management contractor for them and a "special project division" of Bell was formed to actually carry out the task.

The fullest possible use was made of existing government agencies: Defence Research Board in initial development; Department of Defence Production for procurement of equipment; the inspection services of the Department of National Defence for carrying out tests and inspections of equipment; Defence Construction Limited for the placing and overseeing of all construction contracts and representatives of the chief treasury office of the Department of Finance for checking all accounts on a continuing basis. All these agencies and branches of government worked closely together, each in its respective field and provided a degree of teamwork that deserves high commendation.

In addition, assistance was provided by the Department of Northern Affairs and National Resources and by the Department of Transport especially as regards movement of materials by water in the Hudson's Bay area.

Invaluable co-operation has also been extended by all provincial governments and I should like to express our appreciation to each of them in that respect.

On the construction side, Defence Construction Limited is responsible, working in conjunction with the management contractor, for letting regional contracts to major contracting firms across Canada. These regional contractors in turn employ sub-contractors to carry out the bulk of the actual construction. Defence Construction Limited and the management contractor also provide the technical staff for direct on-site supervision and installation of special equipment.

Through the Department of Defence Production, contracts, frequently running into millions, are being awarded to all branches of Canadian electrical and electronic industry and to industries supplying building materials. I might note here that in many instances such contracts are concurrent with similar commitments to United States authorities in connection with their DEW line requirements. In the interests of economy and effectiveness the two countries are working closely together in that regard.

The responsibility for maintaining the many and varied phases of the line and co-ordinating it with the operation of the DEW line lies, of course, with the Department of National Defence and particularly the Royal Canadian Air Force under whose jurisdiction the mid-Canada line will be operated as an integral part of the air defence of the North American continent.

Construction of the mid-Canada line involves many difficulties. These vary with the nature of the terrain.

In the western provinces, where a certain degree of settlement has taken place, advantage can be taken of existing transportation facilities such as the railways to Dawson Creek and to Waterways and the airfield at Grand Prairie.

In the Hudson's Bay and James Bay areas the railways to Fort Churchill and Moosonee are also available as is water transport during the limited summer season. However, in much of this region muskeg abounds and the only practicable means of transportation--particularly for large amounts of heavy construction materials--is by tractor train during the winter months. A tractor train usually consists of one or two heavy caterpillar diesel tractors pulling up to twelve

large sleds, called "wannigans". A tractor train must carry its own bunking and messing quarters, workshop and fuel supply, which cuts down materially the amount of freight which it can carry. A tractor train can travel about two miles an hour over sea ice near the shore or over land where the surface is not too uneven.

The most difficult type of terrain from the point of view of transportation is, of course, the rugged deeply crevassed Quebec-Labrador area. Much of this area can be served only by air as other means would take much too long and would eventually probably cost a good deal more. Knob Lake, with its air and rail facilities, is proving invaluable as a construction base for this area.

The types of buildings too, vary according to the region. In the western and Hudson's Bay regions prefabricated steel structures with interior fibre board walls are being used, while in the Quebec-Labrador area, due to the prevalence of airlift as the means of transportation, light-weight prefabricated aluminum buildings will be installed.

The question of building foundations in the north presents many problems. In some areas ideal bases for buildings are provided by solid plateaus of ancient rock of the pre-Cambrian age. At such building sites, which are usually to be found where airlift of all materials is necessary, very little concrete is required for foundations, and the contractor's burden is lightened. But in other areas, where the top soil is deep and is subject to intense freeze-up and prolonged thawing, ordinary foundation construction procedure would be entirely ineffective. In such areas it has been found that pile construction must be used. The piles are sunk in holes made deep into the permafrost by high pressure steam jets. Similar techniques are required for anchoring towers. Towers themselves, to withstand the rigours of the climate in many areas, must be provided with special de-icing equipment.

Construction under the circumstances which obtain in the sub-Arctic has required new and very carefully worked out logistical planning. Caches of aviation gasoline, fuel oils and lubricants, stores of food and large quantities of building materials have to be delivered to the points where they are required -- well in advance of the time when they will be used -- and, in some cases, within a very short period when transportation is possible.

Some of the construction obstacles are less technical. At one of the locations in the Hudson's Bay region last August a field party found so many polar bears occupying the site that work could not be safely undertaken and had to be postponed for a time. Or again, towards the end of September, at the Knob Lake construction base, fire destroyed part of the contractor's camp including fourteen temporary construction huts, kitchen and messing accommodation. Such a loss is a major upset to the timing of any contract. It is doubly so in the far north, even though no equipment or essential materials for building the line was involved in this case. However, prompt steps were taken to offset the delay and it is felt that as a result timing of the work in this area can be maintained.

Wear and tear on construction equipment and on air transport is, of course, very high. For example, experience has shown that out of approximately ten helicopters or fixed



wing aircraft on a job in the sub-Arctic not more than six or seven can be counted on as being serviceable at any given time.

One of the matters in connection with the mid-Canada line still under consideration is the level of medical and hospital facilities which will be available to personnel manning the line. Senior officials of our department are now conferring with officials of the Department of Health and Welfare on the prospect of constructing several hospitals at two sites in the Hudson's Bay region. If constructed, these hospitals will be so located as to provide services to Eskimo and Indian communities in the area as well as to mid-Canada personnel.

It is very encouraging to note that to date progress on this vast construction project, in spite of all the hazards and difficulties, has been maintained at the planned rates. There is no reason to believe thus far that the line will not be finished on time though of course in a project of this type and magnitude new problems and new construction difficulties may intrude themselves at any time.

Last June I informed the House of Commons that as of May 31 of this year contracts to the extent of 32.6 million dollars had been let in connection with the mid-Canada line. By the end of August the total value of contracts let and committed exceeded 90 millions of dollars. At the present time the figure stands well over one hundred million dollars.

I have endeavoured in the short time at my disposal to give you a few of the highlights of what is involved in this great new unprecedented construction project now being carried out in our north country -- the mid-Canada early warning line. It is a wholly Canadian project as a research, financing and construction.

As I mentioned at the beginning, this line will form part of a vast, costly and extensive continental air defence system planned and developed jointly by ourselves and the United States -- for the better protection of us all.

To those who say that we in Canada should go it alone in this matter and to those who say we should let the United States take on the whole project, I would respectfully point out that the project is for the benefit of both countries and it is only due to the accident of geography that most of the installations must, of necessity, be on Canadian soil. Its purpose is for the joint defence of both countries and indeed, as I have already said, for the defence of NATO as well -- just as much so as anything being done in Europe itself. And that is why Canada and the United States have planned and undertaken the project jointly.

In that connection I would like to say how much I appreciate the close friendly co-operation, the sense of mutual understanding and common purpose which have characterized our relations with our neighbour throughout this matter. I sometimes think that if the same close and friendly relations generally which exist between our two countries could be universally applied in the field of international relations there would be no need for such projects as I have been discussing with you tonight. Unfortunately, as yet at any rate, we must all take this imperfect world as we find it. But at the same time we must do our best, in our time, to improve world relations and world conditions to the end that a third world war may be avoided -- a war which would almost certainly lead to the destruction of us all.