Canad. M. A. J.
Aug. 15, 1959, vol. 81

the lack of vision. He had a loose cough. The chest was clear to percussion and the breath sounds were bronchial in character with some expiratory rhonchi with coughing. The heart sounds were regular and the blood pressure was 140/70 mm. Hg. The eye examination revealed no light perception in the right eye while true light projection was present in the left eye. The right lens was cataractous and partially dislocated. The left lens was moderately opaque and a well-developed cataract was present. The intraocular pressure was 17 mm. Hg in the right eye and 23 mm. Hg in the left eye. No details of either retina could be observed ophthalmoscopically.

The cataract of the left eye was removed under local anæsthesia on December 7, 1957. Erythromycin, 500 mg., and sodium sulfisoxazole, 1 g., were administered 6-hourly preoperatively and for 48 hours postoperatively in order to prevent a postoperative endophthalmic infection. Phenobarbital, grain 1, was given by mouth one hour before the operation. Anæsthesia was obtained by local infiltration of 2% procaine in the retrobulbar space and in the region of the lateral canthus and eyelids. A conjunctival flap was prepared superiorly and three corneo-scleral sutures were pre-placed through a prepared corneo-scleral groove. The anterior chamber was entered with a keratome and the section extended with corneal scissors. A complete iridectomy was performed at 12 o'clock and the lens was removed with an erisophake without loss of vitreous. The patient withstood the procedure well but was somewhat noisy during the operation. The patient's head was elevated moderately after the operation and he was allowed out of bed the following morning. A small hæmorrhage was noted in the anterior chamber at the first dressing but this absorbed in a day or two. He was discharged to his home ten days after the operation, and the corneo-scleral sutures were removed on the 24th postoperative day. Six weeks after the operation, he was prescribed a spectacle lens for the left eye which provided him with 20/200 vision. A satisfactory refraction was difficult owing to his inability to speak English and the difficulty of carrying on a subjective refractive examination. At the last examination on March 16, 1959, the condition of the left eye remained satisfactory.

Although elective cataract surgery has become reasonably common in individuals in the 80's, and to a lesser extent in the early 90's, the successful removal of a cataract in a patient over 100 years of age seemed worth recording. The patient has had useful vision restored and has lived more than 15 months since his operation, giving him some measure of happiness and easing the burden of his care in his home from that of an aged person relatively helpless to that of an individual who has become relatively self-sufficient from the point of view of his personal care.

The author acknowledges the assistance of Dr. Thomas Geleff, Toronto, the patient's family physician who advised regarding his physical status before the operation.

REFERENCE

1. PARSONS, W. H., WHITAKER, H. T. AND HINTON, J. K.: *Ann. Surg.*, **143**: 845, 1956.

Special Article

MEDICAL OBSERVATIONS AND PROBLEMS IN THE CANADIAN ARCTIC*

OTTO SCHAEFER, M.D.,† *Edmonton, Alta.*

PART I

THE AUTHOR served four years as a field officer of the Indian and Northern Health Services in the Far North, two years at Aklavik on the Mackenzie delta and two years at Pangnirtung on Baffin Island. Participation in the "Eastern Arctic Patrols" of 1955 and 1957 provided him with additional opportunity to examine both clinically and radiologically large numbers of Eastern Arctic Eskimos. More recently work in the Charles Camsell Indian Hospital in Edmonton and a visit to the Coppermine area widened his experience with Eskimos of the Western and Central Arctic.

An attempt to summarize these experiences may be warranted for the following reasons:

(a) The growing importance of the Canadian North requires greater familiarity with health conditions there.

(b) Striking differences in distribution and course of diseases, as well as some peculiar physiological and pathological conditions and reactions, have been observed in native peoples of these regions. This has prompted a number of scientific expeditions and elaborate investigations of special problems, but general medical accounts and surveys by doctors who have worked on a year-round basis in the Arctic are lacking.

(c) Rapidly changing conditions in the North make it urgent to collect and publish such survey data, which may permit an evaluation of the impact of factors associated with civilization on the health of primitive peoples.

MEDICAL FACILITIES

Transportation is the key factor in any new development and activity in the Canadian North, and this is often a vital question for the few resident medical officers serving a native population scattered over vast areas of wild, trackless country. Two doctors, responsible for the Western Arctic Eskimos and the Indians and whites of the northern regions of the Mackenzie district and Yukon Territory, are resident in Aklavik; one in Chesterfield Inlet‡ covers the northwest coast and hinterland of Hudson Bay, and one in Pangnirtung cares for Baffinland and Hudson Strait Eskimos. Four mission hospitals in these three Arctic settlements range from the fairly well equipped 110-bed Anglican hospital in Aklavik to that with less than 20 beds (though often required to house many

*This paper expresses the personal views of the author, which are not necessarily shared by the Indian and Northern Health Services.

†Charles Camsell Indian Hospital, Edmonton.

‡Recently the Indian and Northern Health Services have withdrawn their medical officer from Chesterfield Inlet. A mining company doctor in Rankin Inlet now cares for part of this district's population.

more patients), lacking running water and central heating, in Pangnirtung, also operated by the Anglican Church. The two Roman Catholic hospitals in Aklavik and Chesterfield Inlet occupy a position, so far as size and equipment are concerned, intermediate between the two Anglican hospitals. The Indian and Northern Health Services have recently increased the number of nursing stations in the Arctic to ten. Besides these nurses, missionaries, R.C.M.P. and Hudson's Bay Co. personnel help most efficiently in emergencies as well as in carrying out public health programs and assisting in surveys.

At first I felt very frustrated on hearing emergency calls over the radio and often being unable to see the patients personally, for example during "break-up" and "freeze-up" periods, but soon learned to improvise according to conditions. Thus, we twice "fixed" fractured legs with the help of a practical R.C.M.P. sergeant and constable, instructed by radio transmitter. A memorable instance of medical teamwork took place in a small trading post on the Hudson Strait early in winter 1956-57, when a missionary, a Hudson's Bay Co. manager, a wise old Eskimo woman and a doctor, 500 miles distant at Pangnirtung, co-operated and removed manually the retained placenta from an almost fatally bleeding woman.

In the Western Arctic, we mostly used a small "Cessna", the only local charter plane available during those years. Within three years the bush pilot lost or had badly damaged two aircraft, which were being used by us for medical emergencies, by landing on rough sea-ice. Needless to say, one had to adjust oneself to delays of days or even weeks due to bad weather, engine trouble or other hazards while travelling by aircraft, boat or dog-team. However, after my two-year term at Pangnirtung and approximately 3000 miles of dog-team travel over the rough sea-ice and tide-ice of the Baffin Island coasts and across wild mountain passes to the Davis Strait, even the old Aklavik of 1953 and 1954 seemed in contrast like a modern metropolis.

Three examples may suffice to illustrate some of the difficult circumstances still prevailing in wide parts of the Eastern Arctic:

1. A man over 50, with a fractured neck of the femur, was brought to Pangnirtung in December 1955. The accident had happened whilst fishing in mountain lakes. Late freeze-up with much open sea-water and very little snow in the hills forced the party to travel a wide detour over indescribably rough, rocky terrain with the patient lashed for six days and nights to the sled in 20° F. below zero weather. When I saw his badly displaced fragments, I wondered how he had survived his agonizing journey.

2. In March 1956, a dog-team came racing into Pangnirtung from a camp 60 miles distant where a woman had suffered a severe hæmorrhage associated with an incomplete abortion. The patient had become unconscious and had been regarded as unfit for dog-sled transportation. I rapidly collected blood-grouping sera, transfusion bottles and gynæcological instruments and, with our own dog-team, raced to that camp. There, I grouped and cross-matched a number of Eskimos, transfused 1000 c.c. of blood into the unconscious patient and, after overcoming the shock, proceeded to evacuate the uterus. All these procedures took place in a small, crowded sealskin winter tent, where the low ceiling kept my back bent all the time and the only sources of light were a dim seal-oil lamp and my flashlight. Next day we wrapped our patient in my sleeping bag and several caribou skins, and then transported her to Pangnirtung in order to receive more blood and antibiotics.

3. In June 1956, a family arrived in Pangnirtung with an 18-month infant *in extremis* from meningitis after having travelled for a week from Hoare Bay across the snowfields, glaciers and, at that time of the year, the barren tundra and rocky gorges of Cumberland Peninsula and over the breaking ice of Kingnait fjord, where they had spent one anxious day and night on a drifting icefloe.

INFECTIOUS DISEASES

(a) *The Fight Against Tuberculosis*

Despite such and many other tremendous difficulties, which until quite recently were augmented in most regions by the animosity of the natives to all medical examinations, and in particular roentgenograms, outstanding success has rewarded the Indian and Northern Health Services for their often strenuous and hazardous work. Dwindling tribes and bands, whose mortality from *tuberculosis* alone exceeded, for years, the birth rate in many places, have now, almost everywhere in the Far North, made a remarkable recovery and are thriving again.

It is appropriate to acknowledge here the fundamental work done by the mission hospitals, for it was possible only with their help to isolate and treat active tuberculosis on a large scale at a time when the government had neither beds nor transportation available for all needs. We must also not forget, that, until a few years ago, discovery of advanced tuberculosis in Northern natives meant, in most cases, parting from their lands and peoples forever to wither away in a strange environment and with a disagreeable type of food. No wonder they fled over the hills in some places when our x-ray equipment was landed. The situation has improved greatly almost everywhere, but many old Indians and Eskimos are still more afraid of evacuation to the white man's land than of death, while they cheerfully accept hospitalization in their own country, where they can talk their own tongue, eat frozen fish, caribou and seal-meat and have visitors. Younger patients are much more eager to be evacuated, but their rehabilitation is usually much more difficult after returning from the South than after comparable periods in local mission hospitals.

There is, in my opinion, also in the future a definite place for mission and other small hospitals in the North, for treatment of all uncomplicated cases and in particular for old people, who do much better in their own environment. Patients requiring special investigations or special surgery should, however, be evacuated to better staffed and equipped southern centres.

The success of our antituberculosis campaign has been fast and dramatic in the Western Arctic

Canad. M. A. J.
Aug. 15, 1959, vol. 81

Fig. 1.—"Luta-kulu" eating a special treat: a cut of frozen caribou-ham. (Luta means doctor; kulu was the special suffix given to me by the Pangnirtung-Eskimos).

and Subarctic regions, where relatively good transport facilities for more than a decade have enabled us to survey almost the entire population once or twice yearly and to arrange speedy hospital admission for newly discovered active cases. The situation is much less satisfactory in the Eastern Arctic. How much remains to be done is illustrated by the fact that in 1955 and 1957, when I participated in the survey work, 5-10% of all Eskimos reached by the Eastern Arctic patrol had to be evacuated for active tuberculosis! The figures in 1956 appeared to be less alarming, but 1957 showed that our hopes of having also turned the tide in the Eastern Arctic were somewhat premature. A multitude of factors, however, may have contributed to this "relapse", such as:

(a) Large-scale uprooting of many Eskimo bands from their normal hunting life with its sufficient meat and fat diet, to become well-paid but poorly nourished "hang-around" workers at DEW-line and other development sites.

(b) The severe 1956-57 winter with associated poor hunting conditions.

(c) A series of viral epidemics due to more frequent contacts from "outside" and the consequent lowering of resistance.

How devastating the effect of a vicious circle of complex socio-economic and epidemiological factors may become in isolated groups of primitive peoples, too suddenly exposed to the full impact of our civilization, was demonstrated very recently by the fate of K., a small camp with about 40 Eskimos on the Davis Strait. This group, living very far from the next trading post and blessed with a nearby walrus breeding ground, had subsisted almost entirely on native food until three years ago and enjoyed better health than most Eskimos living nearer to trading posts. Then a DEW-line site was constructed on the promontory above their permanent camp. The noise of dynamite blasting, planes and helicopters drove the walrus herd from their nearby breeding ground. The Eskimos could not move out, for all good hunting areas in our district were overpopulated. At first they enjoyed all the interesting new changes. Several of their best hunters worked for the whites and spent their money freely on cigarettes, radios and record players. They changed rather suddenly from an almost pure meat (partly eaten raw) diet to a predominantly carbohydrate diet. Their dogs starved the next winter for want of walrus meat. No travelling inland in search of caribou or hunting on the sea-ice for seals was possible with the few weak dogs left. Just that winter the build-up of the DEW-line site was nearing completion; all Eskimos in the camp were laid off and, in a belated attempt to save their dignity, all handouts were stopped at a time when they were really needed. An unbroken series of virus epidemics spread along the DEW-line early in 1957, and hit our camp K. particularly hard, consuming the last resistance in a population living in precarious balance with the ubiquitous tuberculosis. We evacuated on clinical grounds alone, in the spring of 1957, five patients from this camp, and the first roentgen survey in the summer of 1957 took another nine suspected cases of active tuberculosis south for hospitalization. Measles, after the shipping season in the fall of 1957, killed several more. By late 1957, almost half of the people living in the spring of 1957 in camp K. were dead or evacuated south.

Such experiences help us to understand the histories of many Indian tribes, during the last few centuries in the south and during the last few decades in more remote areas like the North West Territories. When visiting some Indian settlements in the Northern part of the Mackenzie district, I noticed how remarkably few middle-aged persons were to be seen. The stereotyped answer to my enquiries was that "some 20-40 years ago, many people used to spit blood, and most babies and small children in those times died, many of them becoming stiff before death".

We may omit here the discussion of the question of pre-Columbian tuberculosis in the Americas and the disputed evidence for skeletal tuberculosis found in Incan graves. There is little doubt that tuberculosis became a problem for the North American Indians and Eskimos only after contact with white traders, trappers and whalers, i.e. only in the second half of the last century for the Canadian Arctic and Subarctic.

The deadly role of *measles and other virus epidemics* in decimation of the North American native is well known. Their impact was felt later—but often no less disastrously—in the Canadian Arctic, where in particular the Sadlermiut (original inhabitants of Southampton Island) and the Nunamiut (original inhabitants of the Mackenzie delta) were practically annihilated around the turn of the century by measles and consumption. Recent epidemics in different areas of the Canadian Arctic have shown a much lower mortality rate, with an

inverse relationship to accessibility, i.e. markedly higher figures in more remote places. Two factors seem to play a role in this development: (a) more extensive and earlier treatment of complications in accessible areas; (b) increasing immunological resistance in the more exposed populations at traffic centres. However, the emergence of natural resistance seems to depend greatly on adequate nutrition and a gradually increasing rate of exposure. Both these conditions were obviously not met in our example of camp K. on Davis Strait, but were fairly satisfactory in Aklavik and Ft. McPherson in the Mackenzie delta during the last couple of decades. Natural resistance has therefore become quite strong against virus diseases in the last-mentioned places. The same development is going on against tuberculosis, although much more slowly, as might be expected in such a chronic and insidious disease.

But the Eskimos and most of the Northern Woodland Indians still have a long way to go in order to acquire *immunological resistance* comparable to ours, which has been gradually developed over a period of centuries in more or less urbanized environments. I have observed several cases of rapidly developing caseous pneumonia immediately following non-specific pneumonia. There were, on the other hand, a number of older persons seen with extensive fibrosis and secondary bronchiectasis, who generally felt well, had no signs of tuberculous activity and were negative for acid-fast bacilli on routine sputum examinations. After "influenza" epidemics, these older people were often found to have a severe, productive cough. On frequent sputum examinations only a few tubercle bacilli were found. Immediate hospital admission was often impossible; when they were finally admitted to hospital after weeks or months, clinical and bacteriological examination was usually negative and roentgenologically a regression of their "nonspecific-specific" peribronchiectatic infiltrations was seen. These old people apparently live in a precarious balance with their tuberculosis, keeping it under control for years or even decades if living conditions are favourable, but never having sufficient immunological strength to heal the smouldering disease completely.

These older people are at present our main problem and obstacle in the fight for effective tuberculosis control in the North. So many of them show fibrosis and secondary bronchiectatic changes on their survey films that it is not possible to evacuate them all for more complete investigations involving planigraphy, bronchoscopy, etc. Quite apart from that, most of them would never agree to leave their country for the bewildering "white man's world" while not feeling ill at all. But they constitute a major potential source of new spread of tuberculosis which must be reckoned with for many years to come. We must, therefore, try to safeguard the younger people, particularly the children, by other methods. Routine BCG vaccination has been introduced by the Indian Health Services on many Indian reservations in Southern Canada. The general impression gathered regarding its value appears very favourable, although admittedly some other important factors of our stepped-up antituberculosis campaign came into effect at about the same time and make scientific evaluation impossible. In the Arctic and particularly in the Eastern Arctic, transportation difficulties have precluded any large-scale vaccination in the past. We vaccinated all infants seen during the Eastern Arctic Patrol in 1955, with BCG, and a few nursing stations with regular plane service have made a good start recently.

Systematic tuberculin testing of almost 300 school children in Aklavik (1953-54) showed more than 90% positive reactors by the age of 8 years in native children. Both mission schools showed higher percentages of positive reactors at corresponding ages than did the government day school. This was believed to be due to the fact that usually children of hospitalized or deceased tuberculous patients were sent to the mission residential schools, which also sheltered many children from the coast and from farther up the Mackenzie River. Indeed, I did not find a single tuberculin-negative child from Ft. Good Hope, Arctic Red River and Tuktoyaktuk, in the residential schools in Aklavik. In Pangnirtung in the Eastern Arctic, approximately 50 children of school and preschool age were tested in 1955-56 and all were found by age five and above to be positive reactors, which parallels fairly well other indications of the still much greater exposure hazard in the Eastern Arctic.

(b) *Prevailing Forms of Tuberculosis*

Regarding the *distribution of different manifestations* of tuberculosis, it appears remarkable that generalized tuberculosis in the acute forms (miliary and meningitic) as well as in the late, localized consequences of hæmatogenous spread (e.g. urogenital and skeletal) frequently occurs. Infection in early childhood and/or relatively low resistance may be the explanation for this. While the majority of these patients died before treatment became available, I have seen at least four cases of spontaneously healed spinal (Pott's), two hip-joint and one knee-joint tuberculosis, all healed with minor functional defects without any treatment and clinically inactive. I found an Eskimo woman in Pangnirtung, Baffin Island, who had had miliary calcifications on her lung films since 1948. I am inclined to interpret this as spontaneously healed miliary tuberculosis in view of her environmental, family and personal history, all bearing plenty of evidence for other forms of tuberculosis. I am, however, aware of the now prevailing concept in America, that spontaneously healing miliary pulmonary tuberculosis does not exist and that all such miliary calcifications are due to healed benign forms of histoplasmosis. No histoplasmosis has yet been described in northern regions of Canada. Clarification of this question is not only of scientific interest but may be also of some practical importance. I have therefore suggested histoplasmosis skin testing in Pangnirtung as well as other areas in the North.

As is typical with tuberculous infections during childhood, a high incidence of *cervical tuberculous adenitis* was observed. Many children and adults with tuberculous neck scarring and/or discharging sinuses later developed active pulmonary, urogenital or skeletal tuberculosis, which is not the

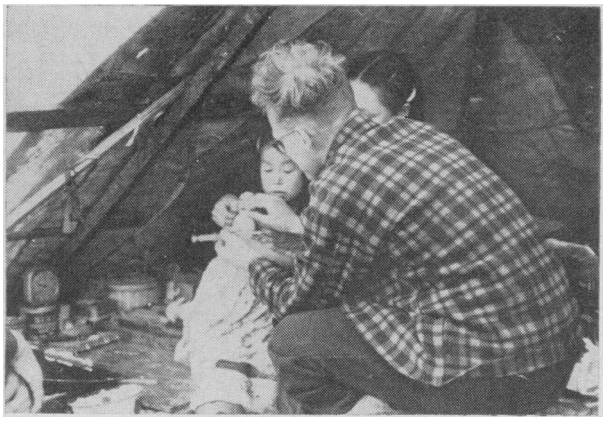

Fig. 2. — Doing immunization work in a sealskin tent. See the "invasion" of our civilization into the stone-age tent: the clock standing on the tobacco can behind the burning seal-oil lamp. (The Cumberland Sound is the last region where the art of making sealskin tents is known. The most difficult part of it is the "splitting" of the skins for the translucent front part of the tent.)

usual experience with such "hyperergic" forms of tuberculosis in the South. No cases of lupus vulgaris or Boeck's sarcoid were seen.

Phlyctenular kerato-conjunctivitis is frequently seen in Eskimo and Indian children, and accordingly a high percentage of adults show residual corneal opacities. Lack of vitamin A, trauma by wind and glare, and viral and bacillary eye infections have been blamed in turn for the prevalence of conjunctiva and corneal eye lesions in the North, and most younger doctors and nurses, when first encountering this condition, accept such explanations and seem unaware of the close relationship of tuberculosis and phlyctenular eye disease. I have seen active phlyctenular kerato-conjunctivitis in Eskimo and Indians occurring only in the neighbourhood of cases with bacillary (open) pulmonary tuberculosis. The condition occurs only in highly sensitized (hyperergic) children or young adults, who often show neck scarring with active or healed tuberculous adenitis. Very strong tuberculin reactions to fractions of normal doses are the rule. An allergic reaction of the conjunctiva to antigens derived from tubercle bacilli and contained in dust or otherwise reaching the eye seems the likely pathological basis for phlyctenular kerato-conjunctivitis in Indians and Eskimos. The knowledge of these relations is of great practical importance. If they are treated symptomatically for "spring-glare conjunctivitis" or "infected eyes" only, severe corneal opacities may develop, resulting sometimes in almost complete blindness. Many examples of this can be seen in the North and on Indian reservations, some of them happening even in recent years. The second point, deserving more emphasis, is that any fresh case of phlyctenular eye disease amongst Indian and Eskimos must be a signal for an all-out search for a source of tubercle bacilli in the environment. Great care must be taken that the child with the eye lesion does not suffer any further exposure to tuberculous antigens.

A few examples from the Mackenzie district and from the Eastern Arctic will show the consistent relationship between the incidence of active phlyctenular eye disease and open pulmonary tuberculosis in native communities lacking any other common factors like prevalence of storms, glare or nutritional deficiencies. During the years 1953 and 1954 we found new cases of phlyctenular eye disease only in Ft. Good Hope, Ft. Franklin and Tuktoyaktuk. These settlements, two Indian and one Eskimo, had quite different ways of life, different climate, landscape and nutrition, but they had in common that most of our newly discovered cases of advanced tuberculosis came from there. It was similar in the Eastern Arctic, and I remember vividly the contrast seen in the last three settlements examined during the Eastern Arctic Patrol 1957: in Frobisher Bay and Lake Harbour, where around 8% of the chest films were considered suspicious of active tuberculosis, active phlyctenular eye disease was seen, but there was none in Wakeham Bay, where all chest films were found negative. Indeed, every single new case of active phlyctenular kerato-conjunctivitis which I saw in 1955-57 led us to the discovery of open pulmonary tuberculosis in the family or neighbourhood soon thereafter. Leer[1] has recently reported similar findings from Alaska.

The bovine type of tuberculosis naturally does not exist in the Far North, but this only partly explains the fact that *abdominal tuberculosis*, like ileo-cæcal and mesenteric tuberculosis or generalized tuberculous peritonitis, is rarely if ever seen in the Arctic. Considering the many advanced pulmonary cases with strongly positive gastric washings, I expected secondary abdominal cases but did not find a single one. Tuberculous endometritis, salpingitis and localized pelvic peritonitis have been seen in several instances in the Eastern and Western Arctic, and may well be more frequent than they are actually diagnosed.

Though tuberculosis still dominates medical activity in the North, other diseases are receiving increasing attention. Meningitis due to *H. influenzæ* can pose great difficulties in the differential diagnosis from tuberculous meningitis. I have diagnosed and treated eight cases of tuberculous meningitis, six cases of *H. influenzæ* meningitis and one of *D. pneumoniæ* meningitis whilst in the Arctic. This peculiar susceptibility to *H. influenzæ* infection may be explained by the poor nutrition and low resistance of some children around the trading posts and the nowadays frequent epidemics of upper respiratory infection there, with secondary invasion by *H. influenzæ*. The slow onset of clinical symptoms and a similar cell count in the beginning can make differentiation very difficult.

(c) *Parasites*

We have learned through the work of Miller[2] and Meltzer *et al.*[3] that *echinococcosis* (*hydatid disease*) is frequently encountered in Indians and Eskimos of Northwestern Canada, and this has to be considered in the differential diagnosis of pulmonary tuberculosis. Indeed, a major portion of the Eskimos and Indians tested in the Mackenzie and Keewatin districts were found to react positively to the Casoni test. This is not surprising if one considers that sled dogs are often fed the raw entrails of moose and caribou, which often contain the hydatid cysts. The natives, particularly their children, live intimately with these sled dogs, which may harbour mature worms and pass echinococcus

eggs. On the Arctic islands the multiloculated form of echinococcosis is prevalent, which has its natural reservoir in the fox-vole cycle.[4] Skin-testing for *trichinosis* was reported to be positive in 40% of Eskimos tested in Alaska[5] and in the Canadian Central Arctic.[6] In 1948-49, Kuitunen-Ekbaum[7] found that in Southampton Island and the Hudson Strait area more than half of the polar bears examined and a few sled dogs, but none of the sea-mammals, were infested with trichinosis. In later reports, however, Kuitunen[8] and others have also incriminated walrus. Outbreaks of trichinosis-like epidemics after consumption of polar bear or walrus meat have been reported in several instances from the Hudson Strait, and once from the Davis Strait area in recent years.

During routine examinations of school children in Aklavik an almost complete absence of *Ascaris lumbricoides* was noticed, while oxyuriasis was found to be prevalent. I was impressed by a peculiar regional and racial distribution of *fish tapeworm infestation.* At the R.C. residential school, where I first made this observation, the children come from either Indian settlements along the banks of the Mackenzie or from Eskimo camps in the northern part of the Mackenzie delta or from the Arctic coast. Most of the Indian schoolchildren and hospital patients showed evidence of fish tapeworm infestation, while Eskimos were rarely found to harbour them. Indians smoke and dry great quantities of fish in summertime and like to eat it that way, while Eskimos eat fish frozen or boiled, but never smoked. We know that deep freezing kills other larval states of worm parasites like trichinæ and similar cysts. Smoking and drying, on the other hand, does not.

Skin parasites, such as head and body lice and scabies, are naturally prevalent and their treatment under camp conditions is a great problem. Impetigo due to secondary scratch infections is common. Other skin diseases, such as psoriasis and eczema, were never seen in Eskimos, while atopic dermatitis is not infrequently met with in Indians.

(d) *Bacterial and Viral Epidemics*

Many of the main scourges of mankind, like malaria, leprosy or rickettsial diseases, are not found in the Arctic. I discovered, however, three cases of *typhoid fever* in Pangnirtung, in one of which transportation facilities allowed serological confirmation. The sources of infection of these sporadic cases were likely carriers, still present from a large proved typhoid fever epidemic, which killed more than 10% of the Cumberland Sound population in one year in 1941-42. Smaller outbreaks of typhoid fever have been reported from the Alaskan and Canadian Arctic.

During the Eastern Arctic Patrol 1955, we found clinical evidence that 20-30 years ago a *poliomyelitis* epidemic hit camps on the north coast of Quebec, in particular around Sugluk. The polio epidemic ravaging the west coast of Hudson Bay around Chesterfield Inlet 10 years ago is well remembered, and was fully investigated by our Services.

Measles, German measles and a series of *adeno-viral and Coxsackie* infections have swept in recent years through wide areas of the Arctic with a high incidence of complications. I was particularly impressed by an unusually high incidence of *orchitis* in adults, 7-10 days after the initial phase of the infection. During an epidemic of pleurodynia in the fall of 1956, about half of the diseased adult males in the Pangnirtung district developed orchitis, mostly unilateral. In spring 1957, an adeno-viral epidemic with many bronchopneumonic complications occurred, and again orchitis appeared in roughly one-third of the adult males involved. Orchitis has been described as a complication of pleurodynia, although the incidence was usually much lower than in our epidemic, but has not yet been described as a complication of epidemics caused by adeno-viruses. The spring epidemic of 1957, spreading through most of Baffin Island, was, however, clearly identified as caused by adeno-viruses by (1) a blood sample I had occasion to send to Ottawa from a man just recovered of pharyngeal fever and orchitis, showing a 1:64 titre against APC-virus; (2) by high levels of antibodies to adeno-viruses found in blood samples collected in summer 1957 in Baffin Island by Hildes[9] with a significantly higher incidence in communities most severely stricken by the epidemic in spring 1957.

Part II, dealing with nutrition, diseases of civilization, malignancies, and congenital and traumatic diseases, will be published in the issue of September 1. The references for Parts I and II will be printed at the end of Part II.

POVERTY, PICA AND POISONING

Of 333 children living in an old, congested, low-income area of Baltimore, Md., investigation by Bradley and Bessman (*Pub. Health Rep.*, 73: 467, 1958) showed that 44.4% had abnormal blood lead values of 0.05 mg. % and higher. Apparently the source of lead was paint chewed from surfaces or swallowed after flaking off.

Pica as a factor was indicated by the following evidence. A history of pica was found in 69.6% of the children. Infants under 10 months of age did not show abnormal blood lead values. These were found in increasing incidence, however, in the group from 10 months of age to the end of the third year. This corresponds to the period when the child is confined to the home, has greater need for oral gratification, and has fewer other interests. Data from current studies of blood lead values in children of different socio-economic strata suggest that the mean values are higher in the lower group than in the middle and upper groups.

That this disease is essentially environmental is indicated by certain contributing factors. In this area the lead-containing paint used on the homes many years ago is now flaking from the surfaces. There appears to be widespread ignorance or disregard of the danger from ingestion of these particles. Many parents still regard pica as a harmless habit. Poor home conditions, together with indifference of parents, provide opportunity for ingestion of toxic material.

This study emphasizes the need for physicians to be constantly alert to the symptoms of lead poisoning in children. It also draws attention to the advisability of preventive measures through co-operative efforts of physicians, nurses and social workers of municipal health and welfare departments.