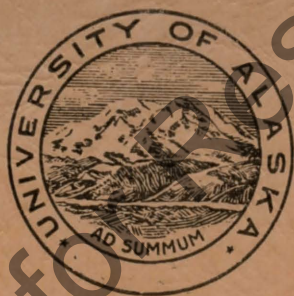


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***Folk Medicine and Hygiene
Lower Kuskokwim and Nunivak-Nelson
Island Areas***

By Margaret Lantis

Not for Resale

FOLK MEDICINE AND HYGIENE
 LOWER KUSKOKWIM AND NUNIVAK-NELSON ISLAND AREAS
 MARGARET LANTIS

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FOLK MEDICINE AND HYGIENE LOWER KUSKOKWIM AND NUNIVAK-NELSON ISLAND AREAS

MARGARET LANTIS

I. INTRODUCTION¹

In contrast to the large amount written about Eskimo shamans' journeys to capture and bring back the wandering soul of a seriously ill person, little has been written about the *materia medica* of Alaskan Eskimos and the practice of doctoring by laymen. Here, therefore, we shall try to fill part of this gap in Alaskan ethnography, extending investigations well started by others.

Much information has become available recently on the Aleuts' extensive medicinal use of plants, their remarkable knowledge of anatomy, and the sources and applications of that knowledge (Bank, 1953; Marsh and Laughlin, 1956). For a locality some distance north but still within Southwest Alaska, viz. the Lower Kuskokwim, Oswalt has provided an ethnobotany including some medical usage (1957). Jumping to the northern extremity of Alaska, we learn from a recent report on the Barrow area about its very limited pharmacopeia (Spencer, 1959). Despite such differences, due largely to obvious differences in range and abundance of flora, there still are common types of curing worth investigating throughout West Alaska. Such techniques as blood-letting, massage, and application of animal products, especially animal oils, are not dependent on climate and ecological zone as are the plants.

Folk medicine is worth investigation everywhere, but today it is most interesting in the region that the public health agencies call "the Bethel Triangle": a fan-shaped area from the lower side of Norton Sound or from the Yukon Delta, to the Bethel area, including neighboring villages like Tuluksak, to Goodnews Bay below the Kuskokwim River mouth. Here were, in the 1950's, the greatest concentration of Eskimo population in Alaska, the greatest health problems, and the

¹Portions of this paper were presented to the Ninth Alaskan Science Conference, sponsored by the Alaska Division, American Association for the Advancement of Science, College, Alaska, September 1958.

Appreciation is herewith expressed to the following people for assistance in the field work: Mr. Paul Winsor, Alaska Commissioner of Health and Welfare, formerly Assistant Area Director, Bureau of Indian Affairs; the BIA teachers of all villages covered in this report; Bethel area public health nurses of the Alaska Department of Health; personnel, in Anchorage and Bethel, of the Division of Indian Health and of the Arctic Health Research Center, Public Health Service. Thanks are given also to various individuals who identified or analyzed plants, as indicated in the text and Appendix B. Special gratitude is due Professor L. L. Hammerich, Copenhagen, for his help with the linguistics and for supplying a vocabulary. The Division of Indian Health is thanked gratefully for its financial assistance received through the Arctic Health Research Center. Also thanked are Reverend and Mrs. Michael, Moravian missionaries at Kwinhagak.

least acculturated villages. Culturally isolated until recently, with a weak economy and in most villages poorly stocked stores, limiting the purchase of patent medicines, here are the villages where one expects the old practices to be at least still known and possibly still in force.

The information in this report was obtained in the southwest part of the Bethel Triangle and in two villages on the tundra, between the Yukon and Kuskokwim Rivers, which have been closely linked culturally and personally with the Lower Kuskokwim communities included here. Kasigluk, Nunapitchuk, and Eek were visited in March 1955 and Kwinhagak, Tununak (Nelson Island) and Mekoryuk (Nunivak Island) in December 1955. Longer visits to Nunivak, 1939-40 and 1946, had already provided some of the data, including plant identification and anatomical terms. A more complete and accurate anatomical vocabulary was obtained by Professor L. L. Hammerich of Copenhagen, who made linguistic studies on the Island in 1950 and 1953. He kindly made the vocabulary available for publication with this paper.

Finally, in 1959 a man who had grown up in Nunapitchuk, then had lived much of his adult life in Tuntutuliak on the Lower Kuskokwim, was interviewed while temporarily in Anchorage. He provided a vocabulary and a few notes on doctoring. (See Appendix A.)

The winter visits to Nelson Island and the Kuskokwim precluded gathering plants for identification; moreover, by March villagers no longer had much left of the plant supply stored for winter use. On the other hand, there was an advantage in that most residents, especially the elders, were at home in the winter villages when the visits were made. It was possible to talk to all individuals—middle-aged and elderly people—recommended as having a good knowledge of old-time doctoring, and most of them responded freely. (For list of informants in 1955, see Appendix A.)

The area covered, unless specified otherwise, is that of the Lower Kuskokwim and adjacent tundra. Supplementary data from Tununak and Mekoryuk are identified as such, although they belong, on the basis of present communication and of most of their old culture, in the Bethel Triangle. This is not, then, a "distribution study" or "comparative study."

Since the information for all villages except Mekoryuk was obtained incidental to studies in the Village Sanitation Program of the Arctic Health Research Center, Public Health Service, U.S. Department of Health, Education, and Welfare, time could not be spent to probe the limits of knowledge, but most of the symptoms treated with home remedies, the major types of remedies, and something of the people's attitudes and knowledge regarding causes of disease were obtained. Certainly more of this last should be ascertained in future research.

The main subject covered herein is generally called rational medicine, in this case incipient or rudimentary rational medicine. The treatment was and still is, where home remedies are used, material rather than spiritual or psychological. Eskimos, in the types of ailments that we are dealing with, treated symptoms rather than diseases, as in

the medicine practiced by most of the world until the past century. People tried to relieve pain, reduce swelling, and heal sores. The shaman, on the other hand, treated disease as his people understood it. He tried to diagnose and deal with such basic causes of illness as witchcraft or the intrusion of an evil spirit into the patient's body. Where the patient and his relatives needed more than anything else a convincing diagnosis and reassurance regarding course of the disease, to reduce the mystery and relieve a generalized anxiety, the shaman was most effective. Where, on the other hand, the patient had a cut hand or a sore throat or an aching knee—in other words where there was a focal infection or a clearly localized symptom and usually not what we would call a systemic disease—the people relied on experienced laymen and themselves.

Kuskokwim Eskimos had no special practitioners or formal apprenticeship. Any older person, man or woman, might develop a reputation as an herbalist or as an expert in handling the lancet in blood-letting. The men seemed to be more experienced in the latter, while the women more often gathered plants and prepared teas. In the case of a difficult birth or perhaps of constipation or a child with sores in the mouth, an older woman known for success in doctoring would be called in first. Then, if she was not successful and the illness or delay in delivery became serious, a shaman would try to help, combining spiritual and material methods.

Despite the use of a few simple divinatory techniques (chiefly scrying) for diagnosis and prognosis, these people did not have a highly organized system of diagnosis and treatment. Eskimo people, at least in Southwest Alaska, seem to have been pragmatic in explaining and dealing with accidents and minor illnesses and stoical in accepting the suffering that these entailed. They turned to the spirit world and shamanistic techniques only in those cases where strong, generalized and often well-justified fear was aroused without any practical means of dealing with the disease or its attendant anxiety.

Although people claimed, as we shall see, that before Caucasians moved into their area they did not have so much illness, hence did not need much medicine, still they had characteristic threats to physical well-being, both recognized and unrecognized. Among the former were accidents, death in childbirth, and infant death. Eskimo religion reflected these prevailing dangers: People who died a violent death, including death in childbirth or by murder or suicide, had a pleasant afterlife; those who died quietly of old age and debility had an afterlife that was not punishing but, on the other hand, it was not rewarding. The soul simply went down under the ground to a dark, rather dreary world or went up to the sky into the first of a series of heavens until it would be reborn. (There were minor variations in belief from one locality to another.)

The uncertainty of the child's early life showed in the fact that parents did not make elaborate preparations for the infant until after his birth, even until it became clear that he would survive the first few days.

Many cultural practices that were potentially dangerous were, of course, not recognized as such, for example behavior that would inadvertently convey the eggs or larvae of intestinal parasites: eating meat that was not cooked thoroughly or sharpening a knife on a boot sole before cutting up meat—not unknown in older States and not so long ago—or stretching and pulling a fox skin with one's teeth.

Before White settlement, this area had both the "soul-loss" and "intrusion" theories of disease. Of the two, the concept of an intrusive agent in the patient's body best fits the "germ theory," and probably survives in a confused association with the latter. The shaman's methods of extracting the disease agent, however, have disappeared or are practiced secretly. Shamanism truly seems to have almost disappeared. One must remember that the Moravians have been working in the Lower Kuskokwim valley for 75 years while the Russian Orthodox Church is even older in the Bethel area. (Current explanations of disease are presented in Sections V and VI.) on "Prevention of Illness."

The reader cannot be assured that all villages in the southern half of the Bethel Triangle still believe and use the curing techniques described here, since families and villages are changing differentially. The public health worker and scientist alike must ascertain individually what still is known and practiced, pertinent to his own interest.

In judging the effectiveness of the medication native to the area, one should proceed cautiously. Home doctoring was not all magic or "superstition"—there are indications that a few of the agents used are organically therapeutic—nor was it so effective as many anthropologists like to believe regarding folk practice. Pharmacological research, too long neglected, is now receiving the effort and financial support that it deserves. Anthropologists, by their long-term residence in remote areas and their knowledge of local custom, can give great help in the search for "new" drugs. The steps are (1) to learn materials and techniques, (2) how and when they are or were applied; and this order will be followed here.

Then we shall expand our view to include traditional practices intended to make people strong and to prevent illness, not merely to cure. In order to present and to encourage others to present as a *functional whole* the Eskimo cultural data pertinent to health, a few suggestions regarding unintentional health protection are given. In other words, various segments of the culture, as well as we can reconstruct them and their effects, must have lowered the chances of illness, especially from communicable diseases. Other parts of the culture, of course, facilitated communication of disease.

Finally, in a kind of epilogue, ideas and attitudes toward disease that have been born from recent experience are presented.

Once one begins to study not merely techniques of doctoring but "culture and health," it is hard to decide the limits of their interrelations. In this paper, some questions for which we wish we had answers must be left unanswered, awaiting on one hand more laboratory work and on the other hand more ethnographic field work.

II. TYPES OF MEDICATION AND PRINCIPLES OF CURING

In this section, only examples are described and discussed. For a complete list of uses of the various curing techniques, the reader is referred to Section III.

Medicinal Plants

In range of therapy and in geographic range, the most widely used plant was *Artemisia tilesii*. The heated leaves of this plant, related to the sagebrushes, would be applied, for example, to relieve pain in a joint. Whereas in the Unalakleet-Shaktolik area this plant was an almost universal remedy, being used for gas pains and having other internal as well as external application (communication from Mrs. May Ivanoff), in the area of our present study other plants might be used.

An organic chemist, Dr. Werner Herz of Florida State University, recently isolated from Unalakleet specimens of *A. tilesii* a chemical which "appeared to be new" and which he named "artilesin." Specimens from Palmer, in contrast, "gave very little artilesin" and a batch from St. Lawrence Island yielded none. A batch from Noatak appeared very promising but because the crude extract could not be purified immediately, as were the others, it was not comparable.

These differences should warn anthropologists not to generalize regarding the chemical composition and efficacy of a plant, on specimens from only one locality. As Dr. Herz says, "Certainly time of collection, soil condition, etc., could influence the chemical composition." According to Dr. Heller, "the medicinal uses on St. Lawrence Island differ somewhat from those on the mainland." This could be based on phylogenetic differences in the plant (although all specimens were thought to be of the same species) or environmental differences or on the customs peculiar to the various localities. (Personal communication from Dr. Herz.)

Artilesin so far has been tested only on tumors (see p. 18) but should be tested for other uses.

On Nunivak Island, several plants were used for various types of stomach ache and intestinal discomfort. The flowers of *Sedum roseum*, stem and leaves of *Ledum decumbens* (Labrador tea), leaves of *Epilobium angustifolium* (fireweed), *Dryopteris austriaca* (a fern), or *Betula exilis* (a birch) might be boiled to make a medicine that was at least comforting if it did not eradicate the cause of symptoms. (See p. 14.) As Dr. Herz has informed the author, one of the constituents of *Betula* leaves is methyl salicylate, commonly known as oil of wintergreen or oil of gaultheria, widely taken internally in small amounts for about the same purpose as salicylic acid.

A probably more effective usage involved willow bark and willow leaves, since the willow (*Salix* sp.) is known to contain the principal component of aspirin: salicylic acid. From the bark one can get salicin, from which in turn the more effective salicylic acid is derived. (Today, aspirin is made synthetically.) Even though local people got only small amounts of this chemical, they must have obtained some small analgesic and antipyretic relief. In one of the Kuskokwim villages, for example, an old lady said that for relief of sore throat a person should gargle a liquid obtained by boiling both inner and outer willow

bark. In some other cases, however, only the inner bark was used, for example for sores in the mouth.

For lung hemorrhage, willow leaves or bark were cooked to make a strong liquor that the patient should drink in the morning before eating. Evidently, this was done regularly instead of only once following the hemoptysis.

Since, in most parts of the area covered and possibly in all, willow leaves were at one time eaten as food, it may have been that even the small doses of the drug that were obtained by frequent eating of the leaves in spring provided some protection against arthritis and/or respiratory disease, but this is speculation at this point. (See p. 43 regarding willow as a protective food.)

The most interesting usage involves fungi and possibly lichens. Two men, one at Kasigluk, the other at Eek, described a fungus that grows on tree trunks—the latter specified a dying or dead tree—which they used for ailments of the digestive tract. In both places, a few pieces of the fungus were boiled to make a medicine that the patient was required to drink. The Eek man said, "Make it pretty strong, almost as strong as black coffee." He explained that this was a laxative, while the Kasigluk man said only that he gave this medicine when a person had a "stomach ache." (The fungus has been identified by Dr. John A. Stevenson, Plant Industry Station, U.S. Department of Agriculture, as *Poria obliqua*, formerly called *Fomes igniarius*. The fungus that is still given the latter name also was obtained, in a Bethel store. It is traded, under the name kuma'hak (Oswalt) or kuma'kak (Lantis), and used in the Bethel area by burning it and mixing the ashes with tobacco to make a chewing quid. For more information on its trade and use, see Oswalt, p. 33, and for data on dietary and medicinal uses of a lichen, see pp. 21 and 30.)

One man in the Eek-Kwinhagak area said that he used the "yellow stuff," evidently the spores, from "puff balls that grow under trees" for burns, sores and cuts. Until these plants have been collected in considerable quantities and tested—difficult tasks in both field and laboratory—we can only speculate that the Eskimo people of this area may have found genuinely therapeutic drugs. We cannot assume the efficacy of these plants nor can we deny it. Sometimes lay people think that a drug is good simply because it is aromatic or tastes bitter. On the other hand, the "puff balls" may even have controlled infection. Although the number is not large, enough good drugs have come from folk medicine in recent years to justify our being alert to local possibilities.

For snow blindness, two types of medicine were mentioned again and again: cranberry juice or, alternatively, tobacco juice. Since the latter may have been available (from Siberia) before European settlement but surely was not an ancient remedy, it is likely that the cranberry juice was the aboriginal medicine. Its astringent properties might assist in controlling inflammation of the eyes.

A different kind of plant usage was the following use of resin. One middle-aged man, who has lived on both the tundra and the

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Lower Kuskokwim, said that on a large wound people would put leaf tobacco, then would wrap it with skin ("today they use cloth"), but on a small cut they might put resin, aNaXo'yux, taken from either a green tree or driftwood. The cut then would be wrapped with skin. Since a bandage was applied, at least according to one of the three people who cited this treatment, evidently the tree sap was not used like collodion, simply to cover and close the wound, but was considered a healing agent. In the light of modern ideas of aerating a wound, this treatment is more questionable than many other local practices. Of course, one should actually see the treatment: whether or how much the resin was heated and how thickly it was spread.

Edward T. Price, in a study of 148 U.S. medicinal plants used commercially in the present century, of "More than a thousand American plants [that] have been used medicinally either in aboriginal times or later," found that "More than two-thirds of all the medicinal species are herbaceous." "Roots outnumber herbs two to one among Indian uses, but the reverse is true of European introductions" (1960, pp. 4,6). The Alaskan Eskimos, medicinal plants and their uses apparently resemble the European more than the Indian, for ecological reasons. On Dr. Price's list, "The non-flowering plants . . . are weakly represented, one fern (*Dryopteris marginalis*) in more than a hundred species" in Gray's Manual of Botany. Conifers are strong (5 out of 25), monocotyledons weak (about one used, of every 80 species), but the largest gap occurs in the grasses, with only one species in medicinal demand. "Most of the medicinal plants are dicotyledons," with the greatest concentrations in the Ranunculaceae (crowfoot or buttercup), Compositae (sunflower), and Labiatae (mint) families (1960, p.7). It would be interesting to compare West Alaskan ethnobotany with the North European.

In regard to type of benefit sought, these drugs or supposed drugs were used in most cases to relieve pain, to reduce swelling, and, in the case of sores and wounds, to control infection and facilitate healing. Except for the medicine used to control lung hemorrhage, the objective was not to stop the flow of blood. This was handled by other means.

Use of Body Parts and Products

Human blood, saliva, nasal secretion, urine, milk, and animal fats, flesh, castor, and blood were used. The most commonly applied was human urine. Unlike the medication from plant sources, the mammalian products were used to stop bleeding, among other usages. One man said that he put urine on wounds to stop bleeding; a man in a neighboring village said that he washed a sore with urine. The purpose apparently was not merely to control bleeding but to control any secretion. (The ammonia in the urine from a healthy person might help cleanse and control suppuration.) One informant said that if there is a deep cut with much bleeding from the wound, the foot, hand, or other part of the body affected should be immersed in a tub of fresh urine.

Nunivakers 20 years ago said that one should put seal blood or human nasal secretion (blood?) on a burn and then warm it. This was said to be a very good remedy for burns. When most of the mainlanders, questioned more recently, said that they did not know of any medicine for a burn, one cannot help wondering whether they did know of some remedy but, thinking that Whites would regard it as

"nasty," simply would not state it. It may have been that on Nunivak Island and elsewhere a person would make his nose bleed and use the human blood if he had no seal blood on hand. Certainly blood from the nasal passages was used on other occasions. In the Lower Kuskokwim area, for sores in an infant's mouth, its mother would make her nose bleed and let the blood drip into the child's mouth.

The only person who mentioned human milk was an elderly woman at Tununak, Nelson Island, who recommended it for snow blindness. Tununak people evidently did not pierce the eyelid to relieve snow blindness, as in the inland villages. This woman mentioned, as an alternative treatment, washing the eyes with fresh urine. A man in Eek said that in olden times the shaman might lick the eyes to cure any kind of eye trouble.

From the viewpoint of modern medicine, it may develop that the most important application of mammalian products was the use of oils from both land and sea animals. A medication that is at least promising is the use of rancid seal oil, fox grease, or other animal fat. The rancid oil contains a chemical, heptaldehyde, that in Canadian studies seemed to control breast cancer. (The work by Lawton et al, q.v., was undertaken in an effort to account for the low incidence of breast cancer in Canadian Eskimos.) No one knows whether heptaldehyde also can control skin cancer or at least can heal a sore that might otherwise persist and prove malignant.

Although most Eskimos and Aleuts when questioned say only that they put duck oil, bear grease, or some other animal fat on sores and wounds, it develops on closer questioning that the fat must be rancid. One woman in Akiachuk, a village near Bethel, who had come from Kipnuk in the area under present review, gave this information in convincing circumstances. When she was asked whether she ever put plants on sores—no animal fats were mentioned—she stated vigorously that she did not use plants but very "strong" seal oil. She said that this was very good for healing sores. A woman at Tununak specified that fox grease should be used although seal oil was available locally. In reference to wounds and sores, any one of several types of animal fat might be stressed by any one of the informants.

Instructions regarding treatment of wounds were given variously as follows:

Put seal oil or duck oil on a cut and bind it with skin.

Put soft yellow moss soaked in seal oil on a wound and wrap it with skin.

For a deep cut, for example by an ax, stuff into the wound moss that has been soaked in rancid seal oil. (The informant voluntarily specified that rancid oil should be used.)

(Animal fat was not the only medication for wounds. See p. 19 regarding alternative treatment.)

For earache, respondents almost universally said, "Pour warm seal oil in the ears." Lacking seal oil, one could use fish oil, and one woman cited it as the more common treatment since seal oil was not available to the inland villages. In this case, rancid seal oil was not specified

although it might have been used in the natural course of events if only old oil were available.

For "stomach trouble" there was a variety of medications. Seal oil, fish oil, a medicine made by boiling *Artemisia tilesii*, mentioned earlier, or occasionally human urine might be taken. Actually it seems that when people were talking about relief of stomach ache and gas pains, they had in mind the taking of a laxative, since both seal oil and urine were considered to be good laxatives. (The former was used more often, it would seem.) It was specified that after the patient drank oil he should not eat anything for a while, evidently for ritual rather than medical reasons.

The beaver castor (perineal gland) seems to have been a widely-used source of medicine. In villages not covered by this report, other Public Health Service employees have learned of its presumed efficacy. Among our informants, only one man (from the west side of the River) mentioned it. He said that for sore throat one should chew and swallow little pieces of the part (gland) of the beaver that was called alo'katakx, evidently the castor. He said that if one's throat is dry and feels raw, alo'katakx will make it feel moist. Although he obtained his own by trapping farther up the valley, this item was traded, too, an indication of the demand for it. (See p. 23.) An alternative animal product used for sore throat, mentioned by this and other informants, was dried meat of weasel which, like the castor, was simply chewed and swallowed.

Use of Minerals and Miscellaneous Products

In contrast with the above, minerals were used rarely. A man in a tundra village said that for a chest pain not associated with pneumonia or tuberculosis he would rub on the chest "a red mineral from the mountains" and would have the patient swallow a little of it. He did not have any specimens so that the mineral could not be identified but from the description it sounded like the commonly used ochre.

Ocean water was used occasionally; for example, it might be drunk to relieve constipation. But more commonly used in the tundra villages, of necessity, was whitefish oil or the liquid from boiled stink-fish.

Lime obtained by burning shells was used for sores in the mouth. As an alternative, the ashes of burned squirrels' tails might be placed on the sore. Ashes were placed on the umbilicus of an infant to heal the stump of the cord and occasionally in other circumstances would be used as a drying and healing agent.

There was apparently no basic system explaining the use of these organic or inorganic substances. In other words, there seemed to be no magical or logical premises of replacing fluids of the body or of using opposites, for example hot and cold, oiling and drying, inner and outer. The medication was used on a pragmatic basis and it is possible that most of the items did serve the purposes for which they were intended, although the active agent was diluted in combination with other chemicals in such fluids as seal oil, human urine, and ocean water. And, of course, there always was the possibility of incidental contaminants.

Even with all these caveats, it still must be remembered that because of the possibility of extraneous substances we must not throw out the essentials. Useful drugs have been found in folk medicine in other parts of the world and one or more may be found in the folk medicine of West Alaska.

Thermal Treatment

Unusually high temperatures seem to have been thought more dangerous than unusually low ones. Despite the common use of the sweatbath, people did not casually accept high temperatures. Part of the enjoyment of a sweatbath seems to have been the control of an exciting condition, much as people in our society enjoy fast driving in a car. They still do it even though they know it is dangerous.

The principal use of heat was in treatment of arthritis. One man said that a hot stone would be put in a damp cloth or hot ashes in a wet cloth and the latter rubbed over the site of the pain. Others mentioned simply hot water, and today a hot water bag or hot cloths are used. We have mentioned already the use of the plant *Artemisia* which would be heated before application. For generalized aches and pains, sitting by the fire and other uses of heat were recommended.

The principal use of snow or ice was to stop nose-bleed. Snow or anything cold would be held in the mouth.

On the mainland as on Nunivak Island, it was thought that in a case of near-drowning the person should be warmed from the inside. In other words, the Eskimo people did not and still do not believe in wrapping up the person and seeking to warm him rapidly. The patient would be placed face down and his back lifted so that water would drain out of him. Then he simply would be allowed to warm slowly.

Also, in the lower Kuskokwim area as on Nunivak Island, a fever and a flushed face were feared. Until quite recently a child that became feverish and was red in the face from prolonged coughing or crying would be taken outdoors and some or all of its clothing removed in order to cool it. One man said that the body of a feverish person should be rubbed with seal oil; another said that the patient should drink the seal oil or fish oil. Since seal oil was considered, at least by some people, a good laxative, perhaps it was taken in order to eliminate the cause of the fever. Rubbing with seal oil may have been done simply to soothe the patient. People evidently did not feel at all sure of themselves in dealing with chill and fever. Since in this area a chill usually came from some obvious experience, in other words, its etiology was external and identifiable, whereas fever more often would come from an internal and, to these people, mysterious cause, one can understand the fear of fever. Also people were inured to cold but not to heat except in connection with crowding and dancing in the great ceremonials and the sweatbath. In these, both origin and end of condition could be seen whereas in illness neither origin nor end was known.

Use of Acupuncture and Blood-letting

Despite the Eskimos' and Aleuts' fear of flow of blood (because in the aboriginal religious system, at least in some localities, it was thought that the soul might flow out), nevertheless bleeding was practiced to relieve congestion, real or supposed. To relieve the discomfort of a joint that ached and was swollen, a needle or more frequently a stone knife kept specifically for this purpose was used to pierce the skin over the affected joint, in any part of the body. The practitioner did not suck out anything, he simply let the wound bleed for a short time. The instrument used, whether a needle or a sharp stone knife, was a special one and the person who attempted curing by this method also was a man with much experience in the technique. Nearly every informant said that one had to be careful not to allow too much blood to flow but how much was "too much" could not be stated. It seemed likely that little blood was lost. The knife, for example, pierced the fleshy part of the leg just above the knee, there being no attempt to stick the lancet directly into the joint. On Nunivak Island the skin immediately above the joint was pinched up and held tightly and then a small hole punched through the fold of skin from one side to the other. Occasionally, the lancet was stuck straight into the flesh, especially in the case of painful or swollen knees. To stop the bleeding, the skin simply was pressed together. There was neither intentional nor unintentional sterilization of the instruments.

Only one person, a man in one of the tundra villages, mentioned the possibility of opening a vein. He said that for pain in the region of the heart, the left arm should be tied tightly above the elbow and then a vein pierced for bleeding, as is done today for blood donations although he did not know about this. The informant stressed that in the old days only a few people ever had heart trouble and that this treatment would be undertaken rarely.

More common conditions requiring blood-letting according to the local system of therapy were headache and snow blindness. In both, a throbbing sensation and the bloodshot eyes of snow blindness certainly would suggest to medically uneducated people an advantage in drawing blood. In some cases, for headache a very small incision was made; in others, a rather long incision might be made. To stop bleeding, the edges of the incision were pressed together. (For details of technique, see pp. 21-22.)

In a case of snow blindness the upper eyelid would be pulled out and its underside cut. A couple of people said that the skin between the eyes might be pinched and an incision made through the fold of skin from one side to the other. Another person said that one should scratch the upper eyelid along the eyelashes, allowing it to bleed. Bleeding was said to be a quick remedy for snow blindness.

The bleeding was an alternative to use of tobacco juice or cranberry juice, that is, it was not used in conjunction with the plant juices. The variation in treatment and medication was not from village to village but from individual to individual within a village, the patient apparently

having a choice. Or it may have been that he would try one and if that did not help, he would try the other.

Fumigation

This was mentioned by only one person whereas in protohistoric time fumigation seems to have been used rather widely in southwest Alaska. Several early explorers and visitors described it (Lantis, 1947, p. 109).

Techniques Not Used in Curing or Prevention in Recent Times

Not used were fumigation as a general purifier without reference to a specific patient; tattooing (people were tattooed as a preventive but not for curing); bathing in cold water to become strong (as practiced anciently by Aleuts, Athabaskans around Cook Inlet and the Tlingits); sweatbathing except to make one feel refreshed and cleaner; antidotes for poison; medicine to assist fertility. No one was asked directly whether there were any old-time medicines to prevent conception. There does seem to have been some medication to facilitate bleeding, perhaps for purposes of abortion, but this was not stated clearly enough to be reported here. These matters should be investigated further.

III. TECHNIQUES OF CURING AND MATERIA MEDICA, BY TYPE OF AILMENT

Since for many ailments more than one kind of treatment was known, a presentation of our information in terms only of each type of treatment does not show how much was available and brought to bear in each illness. In case the reader wants to know the "curing" for any specific symptom, the data are here arranged according to symptoms treated.

This section refers to self-doctoring and layman's doctoring only. In pre-Christian times, if the home remedies failed, then the shaman would be called to help. Today the field hospital is called by radiophone, sometimes immediately, sometimes only after treatment of the following kind has failed. In other cases, the patient recovers so that no outsider knows of the illness or its therapy.

Pain in Joints

The common and probably older remedy on Nelson and Nunivak Islands as well as the Kuskokwim was blood-letting. A special needle or more frequently a stone knife was used to pierce the skin over the painful joint, in any part of the body, as already described.

An alternative treatment involved application of heat. One man said that a hot stone would be put in a damp cloth or hot ashes in a wet cloth, then rubbed over the site of the pain. Others mentioned simply hot water, and today a hot-water bag or hot cloths are used. Before cloth was available, people would apply the heated leaves of the plant *Artemisia tilesii*. An elderly couple at Kasigluk described the ancient practice of putting hot rocks into water in a wooden bowl.

The plants thought good for pain (which were not identified but probably were *Artemisia*) were placed on the knees and the steaming bowl was placed under the knees. The steam was thought to do the work, with the leaves apparently serving as a mild medicinal cover of the joint.

Today a hot rock in a piece of cloth may be placed over the seat of any ache or pain, not only those in the joints, or the patient merely sits with the ailing part near the fire. Also *Artemisia* may be used as a general medicine applied externally or internally.

Pain in Chest

Chest pains usually were treated as part of the curing of tuberculosis or other respiratory ailment having such well known symptoms as hemoptysis and dyspnea. Occasionally, however, there might be a chest pain not associated with pneumonia or tuberculosis and certainly for such cases, possibly for others, a "red mineral from the mountains" was rubbed on the chest and a little was swallowed, according to a Nunapitchuk man. He was the only one to mention this remedy. The mineral probably was a commonly used ochre.

Digestive Tract Ailments:

1. Gas Pains, "Stomach Ache"

As one might expect, there was not, in treatment of gas in the stomach or intestines or other "stomach trouble," the unanimity of treatment that we found in cases of swollen or painful joints. The treatment for stomach ache was internal, with the patient drinking seal oil, fish oil, a medicine made by boiling *Artemisia*, or occasionally human urine. The use of a fungus has been described already (p. 6). Only one person mentioned that ocean water might be drunk for constipation or a "belly ache." One man stipulated that for gas in the stomach, one should boil not fresh fish but stink-fish, then one should drink the juice. Another person stipulated that one should drink whitefish oil. Seal oil was the most nearly universal remedy but probably was not always available to the tundra villages.

One man described a treatment that may be more modern. Others either did not mention it all or specifically denied it when questioned. A middle-aged man at Eek who had worked at the school said that to relieve gas pains one should heat a stone, wrap it in a wet cloth and put it on the upper abdomen to make the patient sweat.

A woman at Eek and an elderly man at Kasigluk were the only two who said that the patient should drink urine. Perhaps others hesitated to mention this because of the Caucasian prejudice against its use.

Oswalt added, for Napaskiak, false camomile (*Matricaria suaveolens*) seed-heads—for either indigestion or a cold!—prepared as follows: they were gathered in fall and dried for winter, then, as needed, cooked in water (1957, pp. 22-23). The European use of *M. chamomilla* as a fever-reducing herb gives a historical hint, although not scientific evidence, to explain the use of this related species.

Nunivak people disclaimed use of plants as remedies for stomach ache but they did use several plants for a refreshing or a warming drink. (It is likely that these were thought to have some medicinal properties, too.) These plants were boiled rather than steeped, hence one cannot say accurately that a tea was prepared. The term is used loosely here. Flowers of *Rhodiola rosea*, the stem and leaves of *Ledum decumbens* (Labrador tea), leaves of *Epilobium angustifolium*, the fern *Dryopteris austriaca*, or leaves of the birch, *Betula exilis*, might be used.

2. Constipation

Like the man from Nunachuk, an Eek man said that he used a growth on the trunk of a dying or dead tree as a medicine for intestinal troubles, specifically as a laxative or just as a beverage to make one feel better internally. This fungus was cut up and boiled to make a "pretty strong" brew. (See p. 6.) It was called *ku'qudit*. As on Nunivak, a plural form was used for any medicine made from plants.

The more common remedy, mentioned not only by this informant but by nearly everyone else who was questioned, was seal oil or fish oil. A Nunapitchuk man added that after the patient drank oil, he should not eat for a while. Although in general discussion the people did not specify that a laxative was intended, one elderly man originally from Napaskiak said that men's urine was taken for this purpose and one elderly woman also mentioned it. It seems likely that the others who cited either urine or seal oil as a remedy for gas pains had in mind actually a remedy for constipation.

Another person mentioned "Hudson Bay tea," referring to the plant more commonly called "Labrador tea." Also cited was a tea made from the leaves of "a plant with yellow flowers that grows along rivers." From its description and Eskimo name, *taqa'xpit* (Eek) it seems certain that the marsh marigold, *Caltha palustris*, was referred to.

Only one person described a magical type of therapy. He said that the plant used in making Hudson Bay tea could be burned instead of being drunk. The leaves were burned and then the "charcoal" waved around the sick person, finally thrown away. The patient thus was fumigated and the illness thrown away with the plant remains. (For the same usage at Napaskiak, see Oswalt, 1957, p. 32). Since *Ledum decumbens* or closely related species undoubtedly was meant here, one can assume that its strong odor, which most people regard as pleasant and refreshing, would account for its use as a fumigant.

Today, castor oil (*oleumricini*) and epsom salt (magnesium sulphate) and other laxatives given by the teachers are widely used. One man said that the missionaries who came to Kwinhagak from their headquarters upriver in the 1890s gave the villagers castor oil for every ailment. As he remembered conditions in his boyhood, people were not often constipated but the missionaries prescribed a laxative on all occasions. The village was not introduced to the use of epsom salt until much later.

3. Diarrhea

Most of the older people volunteered the opinion that diarrhea was not common "in the old days" and that it occurs much more often

today. A Russian Orthodox priest, who speaks Eskimo and knows his villages very well, agreed that diarrhea has become more common in recent years, while constipation still is not much of a problem. In Kasigluk, for example, he knew of only one person, an old man, who took oil for constipation fairly regularly. (Regarding actual occurrence of diarrhea and its causes, see Fournelle et al.)

Various plants have been and are used as remedies. One person prescribed eating salmonberries (*Rubus* sp.). Another prescribed eating moss, apparently sphagnum. Still another said that cranberries (*Vaccinium* sp.) should be boiled thoroughly and the liquor drunk by the patient or, today, strong commercial tea should be taken. For infants' diarrhea, an old woman who grew up in the now abandoned village, Akulurak, said that she cooked the "arrow-shaped leaves of a plant that grows in ponds," probably marsh marigold. The mushy cooked leaves were fed to the infant. ("The raw leaves contain a poison 'helleborin.' It is destroyed on cooking." Heller, 1953, p. 19.)

Only one man, an elderly person who had lived all his life on the tundra, mentioned fish oil in this connection although in his locality it was the remedy cited for nearly every ailment.

In Napaskiak, according to Oswalt, "As a cure for severe cases of diarrhea, the leaves and stems [of soursdock] were cooked in water and given to the sick person before any other food in the morning and again at night; . . ." (1957, p. 24).

The old people claimed that they did not see any regularity in the periods when diarrhea was or is common, although one person did say that young children seemed to have it more frequently when at fish-camp than in the winter village. Although various causes were cited, such as drinking too much tea or eating certain of the less prized fish, nevertheless no one seemed very sure of his explanation.

4. Intestinal Worms

All five of the older people questioned on this subject said that they knew no home remedy. One man had heard that there was an old-time method of cure but did not know what it was. (He may have referred to a medicinal plant that he could not identify or, more likely, may have had in mind shamanistic practice that he was unwilling to talk about.) Another man said that a shaman could cure people of worms but was not sure how he did it.

People said either that they did not know how one got intestinal parasites or else they were hazy, saying for example, "Sometimes people get worms when they eat pike but maybe they get them some other way, too." No one seemed much concerned. (When they referred to "worms," they usually meant pinworms (*Enterobius vermicularis*).)

At Mekoryuk on Nunivak Island, the same nonchalant response was received. One mother with several small children, one of the most progressive young women and a good housekeeper, shrugged her shoulders and said, "All kids have worms." There was the same reaction when men were asked about worms or diarrhea in dogs. The common

answer was that the dogs always have diarrhea when eating sculpins, or some other fish considered undesirable.

Worms that settle in other organs than intestines were not mentioned since these people would have little or no opportunity to see the cysts formed, much less identify their cause as a worm. The species of such parasites that occur in this region are the small tapeworm, *Echinococcus granulosus*, not *E. multilocularis* which is fatal, that usually infects the liver, occasionally the brain or lung, and *Trichinella spiralis*, a round-worm that infects muscles. The intestinal parasites are the pinworm mentioned above and several species of fish tapeworm, *Diphyllobothrium* spp., the exact number not yet known.

5. Poisoning and Swallowing Foreign Objects

Surprisingly, five people questioned on the subject of poisoning by food or other matter claimed that this almost never occurred and they could not give examples of it. Botulism occurs under anaerobic conditions, as when uncooked food is stored in a tightly closed seal-poke. In 1959, after our field study, there were two episodes of botulism in Alaska, one at Hooper and Scammon Bays not far north of our area. In each episode there was one death, with several others seriously ill in the northern locality. There was laboratory confirmation that the source of the organism, *Clostridium botulinum*, was "whale flipper" preserved in seal oil. (Information from Alaska Department of Health and Welfare.)

Two men at Eek said that they could not recall any cases of people getting sick after eating seal, walrus, or caribou, also that they never had heard of any such sickness as was described in an effort to find out whether there had been trichinosis. (It is more difficult for a layman to identify than the usual "food poisoning"; besides, I may have described it inadequately. Finally, it seems to be more rare in Alaska than in the Eastern Canadian Arctic and in Greenland.) Since no walrus have been killed in this area (Eek-Kwinhagak) since 1933 and the domestic reindeer have been gone for several years, the principal animal that might be a danger is the seal.

These informants said that a seal liver that has long fissures will make one sick, while the flesh of the same animal is all right. Eek and Kwinhagak folk will not eat liver that has large cracks. They could not describe any other condition of animal liver that they regarded as dangerous.

Villages farther inland on the tundra do not have access to shellfish but these two villages can get mussels and clams. Neither kind of shellfish ever had made people ill, so informants claimed, although it must be admitted that they were not questioned closely regarding seasonality. Nunivakers said that mussels are not poisonous in any season, that they are eaten at any time. The only time that the people were observed eating mussels, however, was in the autumn. (North of our area, Unalakleet Eskimos say that they do not eat these shellfish in the summer.)

No one volunteered information on the poison water hemlock (*Cicuta* sp.) that has caused at least four deaths along the east side of Bering Sea within the past ten years, and the interviewer did not

ask about it specifically. It has been learned subsequently that Eskimos recognize the plant, especially its root, as a strong poison, but sometimes young children eat it without their elders' knowledge. Napaskiak people regard the roots of groundsel and of water hemlock (*Senecio congestus* var. *palustris* L., Fern. and *Cicuta mackenziana* Raup) as poisonous, but not monkshood (*Aconitum delphinifolium* DC.), according to Oswalt (1957, pp. 21, 34-35).

As an emetic when, for example, a child has swallowed something accidentally, people give lukewarm water, put the child on his back, rub the upper part of his abdomen, then turn him over and stick a feather or a finger down his throat to make him vomit.

Sores in Mouth

These were treated differently from external sores and there was remarkable unanimity regarding the best treatment. Of seven people who discussed this symptom, five said that willow bark was used. They varied, however, in their description of the handling of the bark, actually the bast or underbark rather than the outer bark. Some said that one chewed the inner bark, others that one cooked it in a little water and then put the juice in one's mouth. Another said that the willow bast was placed directly on the sore. A man from one of the tundra villages added that near the Kuskokwim river one could obtain a different kind of wood (cottonwood?) for the same purpose. On Nunivak Island, the medicine for sore mouth was not willow bast but willow leaves. The person with sores in his mouth chewed the leaves of *Salix fuscescens reducta* or *S. pulchra*. Since various parts of the willow plant have salicylic acid, the benefit obtained may have been principally its analgesic property. It would be interesting to have tests made of the inner bark to ascertain how much of this valuable drug was available in these methods of treatment.

The two other remedies were the following:

"Put ashes of burned squirrels' tails or clam shells on the sores." The lime from the shells is an obvious agent for drying a sore but just what could be obtained from the ashes of a squirrel tail, other than carbon, this writer cannot say.

"Let blood drip in a child's mouth." For sores in an infant's mouth, its mother would make her nose bleed and let the blood drip in its mouth. To be sure that it would reach the exact site of the sore, probably she smeared the blood inside the child's mouth.

The Eskimo informants and the author so completely took for granted the rarity of dental caries "in the old days" that dental troubles never were mentioned, a regrettable oversight.

Boils, Sores, and Other Local Infection

One elderly couple said that after a boil suppurates naturally, cotton from the "cotton-grass" (*Eriophorum russeolum* or *E. scheuchzeri*) is put on it. Another said that the soft undercoat of any fur would be placed on the boil to collect the pus.

One man said that brown soap would be placed on the boil and

covered with a piece of skin. There was no suggestion that in the old days, before soap was known, anything was used in order to "draw" the boil or that it would be lanced.

One elderly man seemed to understand the interpreter's explanation of the word, nevertheless he said that boils were caused by bumblebees.

An infection, perhaps developing from a small cut, was opened to "let out the pus." It was said that sometimes an incision to the bone would be made if the focal infection seemed serious. Apparently the wound then was treated like other wounds and sores.

External sores were treated differently from sores in the mouth and other cavities and passages. One man described a "puff-ball" containing a yellow powder that he sprinkled on a sore, then covered with a skin bandage. The fungus spores that he evidently was describing may have had real medicinal properties.

An elderly man said that he washed a sore with urine. The original or the exact purpose of this may be indicated by the statement of a man in a neighboring village who said that urine was put on wounds to stop bleeding. On the other hand, it may have been used simply to cleanse the sore.

The interesting use of rancid seal oil, fox grease or other animal fat has been discussed in Section II. (See p. 8.) It may be that the use of "strong" animal fats by many people through many generations was realistic.

As stated already, any one informant might prefer any one of the several types of animal fat. For example, a woman at Tununak on Nelson Island specified that fox grease should be used although seal oil was available in her locality. It would require chemical and clinical tests to decide the objective reasonableness of such preferences. The medicinal that was favored in the area of Norton Sound, Seward Peninsula and Kotzebue Sound for sores that resisted healing, viz. *Artemisia tilesii*, may have been used in this southern area too, although no statement of its use was obtained.

An extract of specimens of this plant obtained at Unalakleet has been tested recently by the Cancer Chemotherapy National Service Center of the National Institutes of Health (Public Health Service) on three types of tumor in mice, with negative results, that is, it did not control tumor growth. (Personal communication from Chief of Center.)

Of four other species of *Artemisia*, from Nevada, tested at the School of Pharmacology, University of Minnesota, one (*A. tridentata*) showed "moderate" effect as a bactericidal agent against ten varied bacteria and as a chemotherapeutic agent against pneumococcus infections in mice. The other three had only "slight" effect. One should note that, of 109 plant species in this test, only 11 showed more than moderate results in one or both types of test, that is, were rated "significant" (Train et al, 1957, pp. 108-117).

Wounds

People gave more specific and detailed explanation of the treatment of wounds than of sores, perhaps because wounds were more common

or more frightening, especially to people who have known nothing about cancer. Instructions regarding treatment were given by various informants as follows:

1. Put seal oil or duck oil on a cut and bind it with skin.
2. Put soft yellow moss soaked in seal oil on a wound and wrap it with skin.
3. For a deep cut, for example by an ax, stuff into the wound moss that has been soaked in rancid seal oil. (The informant voluntarily specified that rancid oil should be used.) If there is much bleeding, put the foot, arm or other part of the body into fresh urine. This was the only means used in the old days to stop bleeding. In other words, a tourniquet was not used. Then the moss soaked in oil should be placed on the wound. For an arrow point or bullet in the flesh, open the wound further if necessary and pull out the bullet with homemade wooden tweezers. Do not try to sew up the wound or put anything on it.
4. After stopping the bleeding by using warm urine, pick up tree gum with a stick and place it on the wound. A tourniquet is not used and the wound is not sewed. (One man added, though, that the wound should be bound with animal skin.)
5. Any kind of skin may be used for a bandage, and a little glove for a single finger can be made and worn for a wound on the hand.
6. Put tobacco leaves on a cut to stop bleeding, then put tree gum on it. A tourniquet may be used for a bad wound.
7. Place willow "cotton" on a cut. (This may be a substitute for moss. The man who mentioned willow cotton, a quite elderly man at Eek, probably had in mind cotton soaked in oil but did not specify this. He said simply that cotton was placed on the cut, evidently as an absorbent.)

One man who had shot himself in the hand in two different accidents told what he had done. In the lesser of the two accidents, he had put fox oil on the finger stump. In the more serious accident, he had gone to Bethel for treatment by a physician. Now both wounds were healed; on his right hand one finger was missing and another finger crooked. On the left hand, the little finger was deformed and the tip missing. He had not had serious infection from either accident, he claimed.

Today people generally go to the field hospital if weather permits and transportation is available. When isolated by weather, e.g. when a man is out on his trapline, people may resort to the old treatment.

On Nunivak Island, it has been customary to put seal oil on a cut, then wrap the wound with a piece of skin. Local instructions direct that if the wound is large, it should be sewed with human hair. On a large jagged wound, one should put dry sphagnum moss with seal oil, then bind it with a strip of clean intestine casing used as a bandage and held in place with a grass string. The bandage should not be twisted

but merely wrapped snugly. If the wound is on arm or leg, one should bind the limb above the wound to stop bleeding. (The use of a tourniquet may be an innovation although this information was obtained nearly twenty years ago, at a time when Nunivakers had learned very little of modern care in case of accident.)

Fractures and Sprains

For a sprained ankle, a knife made of a bird's wing-bone was used to cut the ankle, presumably to reduce swelling. (The informant did not give details.) No remedy for sprains of other parts of the body was suggested.

The older couple interviewed at Kasigluk said that wooden splints were used on a broken leg, but the Nunivak technique for a broken arm or leg probably was the old one. On the Island, a person thought competent in such things would try to put the bones in place, then would wrap the limb with a piece of hard tough skin to serve as a cast. It was said in 1939-40 that the use of splints was known but that the technique of wrapping was the customary and preferred one.

Burns

The man who said that he used "yellow stuff" from puff-balls "that grow under trees" used it also for burns, covering the medication with a skin bandage.

One man said that a little seal oil should be put on a burn and then the burned area placed near heat again even though it pained. Another mentioned the more modern remedy of bicarbonate of soda. Two of the oldest men questioned, in two different villages, said that they did not know of any "medicine" for a burn. One specifically denied that oil was used. In view of the serious burns that do occur in this area, the lack of remedies is surprising.

The best explanation of the seeming ignorance is that the old remedy probably was something now considered "nasty." Nunivakers who had been questioned about such things several years earlier when they were less self-conscious about their old practices said that one should put seal blood or human nasal secretion on a burn and then warm it. This was said to be a very good remedy. It may have been that a person would make his nose bleed and use human blood instead of seal blood on the burn.

Fever and Chill, Exposure and Drowning

Probably in pre-European times a fever was treated by shamanistic power instead of home remedies, the most likely explanation for the meagerness of the latter. One man said that one should rub with seal oil the body of a feverish person; another said that the patient should drink seal oil or fish oil. Others said they knew of no remedy.

If the Lower Kuskokwim people had the same attitude as Nunivakers, they feared heating of the body, a flushed face, and a fever: Overheating was feared more than over-chilling. Until quite recently, a child that seemed feverish and was red in the face from prolonged

crying or coughing during whooping-cough would be taken outdoors and some or all of its clothing removed in order to cool it.

Nunivakers believed also that one should not heat the body quickly after a near-drowning or over-exposure to cold; the body should warm slowly and from the inside. A man at Eek who had been reared in Napaskiak farther up the river gave the same prescription for drowning as a Nunivaker would give: one should lift the back of the person, let his head hang down so that the water would drain out of him. He should not be wrapped up immediately but warmed slowly. It is bad for people if they are heated quickly after being chilled.

Snow Blindness and Other Ailments of the Eyes

People tried in the old days to prevent snow blindness by using wooden goggles or a wooden visor. Today, they wear dark glasses.

If snow blindness did occur, the common treatment was with a medicine although, for serious cases and for people with courage, bleeding might be practiced in order to relieve the distended blood vessels. One man said that he would pull out the upper eyelid and cut its under side. Another said that one should pierce through the skin over the bridge of the nose and should pierce the inside of the eyelid near the nose. Bleeding was supposed to be a quick remedy.

Two types of medicine were mentioned again and again: cranberry juice or alternatively tobacco juice. As already stated, it seems likely that cranberry juice was the aboriginal medicine. One elderly person, near the Kuskokwim mouth, said that the local Scottish trader had taught the village to make strong tea, let it cool until lukewarm, then put cloths soaked in tea over the eyes. The informant said that this "helped." A couple of people said that one might put salt water in the eyes. It was not clear whether this was solely for snow blindness or for any eye ailment.

A couple of people in the Kasigluk-Nunapitchuk locality had slightly different versions of the bleeding technique. One man said that he did not cut the eyelids but pinched up the skin between the eyes and cut through it from one side to the other. Another person said that one should scratch the upper eyelid along the eyelashes and allow it to bleed. Both knew about the use of tobacco juice but always gave it as an alternative to blood-letting, not to be used in conjunction with it.

The elderly woman at Tununak who was questioned had a different treatment. She recommended human milk for snow blindness. This woman said that people in her village did not pierce the eyelid as in the inland villages.

She said that one could wash the eyes with urine. This seems to have been a general remedy, not specific for snow blindness. To remove the crust that sometimes forms on the edge of the eyelid, one should put sugar in the eyes or lay a hair lengthwise across them. This was not simply laid on the outside of the eye but rather was put on the cornea under the eyelid. The rationale for this was explained by a man in Eek who said that old people with cataracts would use

the human hair to irritate the eye and presumably rub off the growth. Salt water or cranberry juice might be used as an irritant. This would help some people but would make other people's eye condition worse. It was recognized that there really was no cure for the blindness of the elderly.

Another man in Eek said that formerly the shaman would lick the patient's eyeballs to cure any eye trouble.

Here and in the tundra villages, the opinion was expressed that formerly only old people had "eye trouble." Few children had the eye disease (phlyctenular keratoconjunctivitis) that they now have.

Old men and women in former times often had watery eyes, probably due to smoke from open fires. They would put cotton from willow or cotton-grass ("Alaska cotton"), *Eriophorum russeolum*, into the corners of their eyes, simply to absorb the fluid. No cure was available.

Headache

Eight people in the Lower Kuskokwim tundra area and the one person interviewed at Tununak showed remarkable unanimity regarding treatment for this symptom. Not only did they all cite the same remedy but they did not suggest any additional or alternative therapy. The remedy for a severe headache was bleeding. There was, however, a little variation in the site and technique of blood-letting. The older men said that a stone knife should be used. An elderly woman, on the other hand, said that a special small steel lancet was required.

Three people described how the stone knife was used to pierce the skin of the temple and then was worked laterally under the skin. In other words, a very small incision was made, yet the objective seemed to be blood-letting. Another kind of incision cited by three or four people was a rather long one on the median line above the forehead. This incision along the sagittal line probably would be made right to the bone. One man said that the patient could do this himself or have another person do it. The wound would be allowed to bleed for a little while and then the two edges would be pressed together to stop bleeding. No one specified that urine would be used for this purpose, but since it had been mentioned elsewhere as a clotting agent, perhaps it was used in this connection also.

One elderly man on the mainland said that when he was a boy he had not heard of headaches but now many people seemed to have headache. In contrast, a man approaching middle age who had grown up in the same area said that about 1920, when he was a boy in Nunachuk, people often had severe headaches. He never had heard that constipation or any other condition was associated with the headache. He could not remember hearing of any explanation, and he did not know what was done to relieve the headache except bleeding as described by the old people.

The woman at Tununak said that the scalp would be pierced with a big needle. She did not know about use of a knife.

Although Nunivakers were not at all reluctant to tell about

piercing or cutting for purposes of bleeding, they did not mention this treatment for headache. They said that one should put cold rocks against the head, and no other remedy was given.

Respiratory Tract Ailments:

1. *Nosebleed*

Snow or ice is held in the mouth. On Nunivak Island people specified that as the snow melts, one should keep adding more. In the old days, the medicine man would suck hard on the back of the patient's neck to pull in the blood if the hemorrhage did not respond to the snow treatment.

2. *Earache*

There was even more agreement regarding treatment for this. Everyone said, "Pour warm seal oil in the ears." Lacking seal oil, one could use fish oil, and one woman gave it as the common medicine. Although not stated that rancid oil was required, it may have been used, nevertheless.

3. *Sore Throat*

Of six people questioned about this, two said that they did not know any cure for sore throat; three, from different villages, said that one should use weasel meat and one of these mentioned also beaver castor, while the sixth said that one should gargle a liquid from boiled willow bark. The old lady who mentioned this last specified that both inner and outer bark should be used. The dried meat of the weasel (one man specified the "white weasel" or ermine) was simply chewed and swallowed, as was the beaver castor.

As mentioned before, willow must be accepted as possibly an effective medicine. The castor must be, too, since the bitter secretion in the beaver's perineal gland formerly was used in Western medical practice as a stimulant and anti-spasmodic. Possibly, it relieved sore throat by stimulating the flow of saliva and other secretions and by relaxing the throat. Regarding the weasel meat, however, one can at least suspect a magical explanation. Since the weasel is a long sinuous animal that can slip through an opening easily, it may have been thought originally that this quality would be imparted so that food and drink would slip down the throat without hurting. Although one never should jump to conclusions about such things, still it is difficult to see what properties weasel flesh would have that the meat of related animals would not possess.

4. *General Respiratory Illness*

On this subject, it was difficult to talk objectively because the Eskimo people's frustration in handling these diseases, especially tuberculosis, and their resentment against the Whites for having brought them had to be expressed. Nearly everyone said that people did not have colds, tuberculosis, influenza, whooping-cough, or other ailments that they classed together, until the White people settled among them.

Fear and frustration showed not only in statements regarding the increase of illness but also in regard to the treatment described. Several said that the only old-time remedy was to drink seal oil, otherwise one just had to take the sickness as it came. The oil evidently was used partly for relief of a cough and partly as a general healing agent. It usually was mentioned in connection with coughing. (At Napaskiak, green spruce needles, *Picea glauca* (Moench.) Voss, were boiled in water to make a cough medicine or in spring the raw needles were chewed for the same purpose [Oswalt, 1957, p. 29].)

For difficulty in breathing, probably in a child patient, one might try to clean the patient's throat with a bird's wing. One elderly woman said that when she was young, people did not have dyspnea since they did not have advanced tuberculosis and in fact she thought there was not much T.B. of any degree.

A man said that, when he was young, people were more accustomed to the cold and did not suffer the effects of changing temperatures. Although they did burn wood on an open hearth in the house, they did not keep a fire burning constantly. And he thought that people did not have pneumonia then.

People more often than today would eat dried meat or fish dipped in seal oil or fish oil without having any cooked food. In the underground houses, if need be, they could go for considerable periods without any artificial heat. It is interesting that the villagers connected the cultural change with a health change. Even one of the younger men said that when he was a boy living in an isolated tundra village, as late as 1920, he knew of only a few cases of pulmonary tuberculosis.

Unlike most of the older men, one old man said there was tuberculosis in his boyhood, but only the older people seemed to have it. It may have been, however, that children died without the disease being recognized.

Nunivak people, unfortunately, were not questioned so closely regarding tuberculosis as were the mainlanders. They did have one medicine that they considered good: flowers of stonecrop (*Sedum roseum*), eaten raw. (See Appendix B.)

On the mainland, for lung hemorrhage, willow leaves or bark were cooked to make a strong liquor that the patient should drink in the morning before eating. It would seem that this was done regularly, although this point is not certain. The Tununak informant said that one should boil a certain plant, not willow, and drink the liquid. Since she was visited in a December when there was more than the usual amount of snow for this area, it was impossible to get specimens of the plant. She may have been talking about the *Artemisia* that in the Unalakleet area was used for hemoptysis.

Another elderly woman who seemed to know quite a lot about the old-time medicine was asked what causes tuberculosis. She said that she did not know. The other people did not give such a clear-cut answer and in most cases were not asked directly but from their discussion of tuberculosis it seemed certain that they did not know, except that it was something communicated from one person to another. The

Whites had brought it and had given it to the Eskimos. Their knowledge as to how it could be conveyed depended upon the amount of modern instruction they had received from teachers and nurses. The elderly people, of course, had had little communication with either because of the language barrier.

Heart Disease

A list of symptoms that might be associated with heart disease was described to two informants in Eek, for example, pain in the region of the heart and the left arm, extreme faintness, difficulty in breathing not associated with pneumonia or TB, a bluish color, especially in children, and also not associated with respiratory illness, anything unusual in the heartbeat when a person was not excited or working hard. These men said that they could not recall any cases of elderly people or others having the symptoms. They volunteered that pregnant women occasionally would feel faint and have difficulty in breathing.

In Tununak, however, the symptoms were recognized, as the village contained clinically diagnosed cardiac cases.

The Eek-Kwinhagak informants could not cite any treatment for faintness or difficulty and pain in breathing. At Kasigluk, however, there was an indigenous remedy. For pain in the region of the heart, the left arm should be tied tightly above the elbow and then a vein (median basilic vein?) in the bend of the elbow pierced for bleeding. At the same time, those who told of this stressed that only a few people ever had heart trouble in the old days and that such bleeding from a vein was rare.

Kidney and Bladder Symptoms

No diuretic was known. One man, with more formal education than others questioned, said that one should put hot packs on the abdomen in a case of retention of urine. This condition did not occur often, though, in the Kwinhagak area about which he spoke. In the Nelson Island-Nunivak area, on the other hand, dysuria seemed to occur rather often. Nevertheless, no remedy could be cited.

Backache

In view of the high incidence, compared with the U. S. Caucasian population, of cracked vertebrae ("neural arch defects") of the lower back among Alaskan Eskimos in past generations (Stewart, 1953) and possibly in the present, it would seem that backache would be mentioned and that there would be a regimen of therapy. Except for pregnant women and women with little children, who would tire from carrying the children and doing heavy work, backache was not often mentioned. Perhaps it was taken for granted and was not considered urgent or dangerous.

One couple at Kasigluk had heard of someone from the Coast who pierced a man's joints with a needle in order to relieve backache, therapy which they regarded as strange. They did not know any other treatment. One woman instructed that leaves and stems of a plant called

ka'yana'xoaq (not identified because no specimen available) should be boiled and placed on the back at the site of the pain.

Insanity

For any strange behavior, not explicable by the religious experiences that laymen and shamans alike might have, the shaman was called in to try to bring the individual back to normal. Laymen did not know much about such methods.

Rabies

The symptoms of rabies seemed to be known in general, not in details; further, it was known that both wild animals and dogs could be rabid and a threat to man. In recent years, an effort has been made by public health workers and others to instruct villagers regarding the safe handling of the carcass of an animal thought rabid that has died or been shot, the prompt reporting of human exposure, and safe packing and shipping of the animal's head to the Public Health Service for a rabies test. In 1955, not all of this had yet penetrated the villages studied. The usual reaction in a rabies scare was simply to shoot the dog or fox (the animals generally cited) and bury its carcass and probably report human exposure. Since dogs were affected rarely and, according to reports, there had been no human cases in these villages, rabies was not of such great concern as distemper. It was reported to the Department of Welfare that in 1954-55 twenty dogs had died at Kwinhagak of a disease thought to be distemper. In the winter of 1955-56, that epidemic still was being discussed, fearfully, since a distemper epidemic can cause serious economic loss.

Anemia

Informants were not asked about weakness or a pallid color apart from diseases like tuberculosis, which was unfortunate, since by 1955 it had been found by the Arctic Health Research Center that in the villages west of Bethel a mild chronic anemia is common, especially among women. It was found later, by measurement of hemoglobin levels of 280 subjects in one village at intervals throughout a year, that there was a precipitous drop (1.4 gm) in hemoglobin during the spring, followed by a slow rise during the summer (0.4) and fall (0.3 gm). "These changes were consistent in both sexes and at all ages." (Personal communication from Dr. Edward Scott.)

According to Oswalt, weakness—whether from anemia or an acute illness is not stated—is treated at Napaskiak as follows: The arctic kidney lichen (*Nephroma arcticum* L., Tross.), called kus'koak, cooked in water, was fed to a person to make him strong and was said to be very effective (Oswalt, 1957, p. 30). Also, a person in "poor general health" could eat cotton-grass stems raw in order to regain good health (p. 27). Cotton-grass was low in ascorbic acid, according to Rodahl (1952, p. 10), but may have provided something else.

Some of the Nunivak teas seemed to be tonics. For example, the leaves of Labrador tea had the highest ascorbic acid content, except for rose hips, of all Alaskan plants tested by Rodahl (1952, p. 10).

How much of the vitamin remained in the boiled liquid is not known, but in using this plant, Eskimos were at least on the right track.

IV. GROWTH AND REPRODUCTION

Folk medicine, like "modern" medicine, included more than doctoring after symptoms became apparent: it included prevention of disease and accident. Formerly, both shamans and laymen, by appeals to their protecting spirits and by use of songs, amulets, and masks that had been revealed in dreams and visions, sought protection. These were used especially in situations of uncertainty or stress, for example when hunting large game or during prolonged bad weather when food was short and people weakened. There were other means, however, that everyone used routinely.

Childhood, Puberty and Fertility

Some of the requirements of children belonged not only in the category of good habits or discipline or training but also had magico-religious meaning. One principle was that a thing done at a crucial moment in one's development, especially a thing done at the first of a series of events, would establish the form for subsequent events and behavior. How this principle worked will become apparent in the examples. Although most of the practices pertained to future success as a hunter, some were thought to give the young person protection from accident and disease. The chief concern regarding a boy related to his life as a hunter. The anxiety regarding girls pertained to their fertility, health, and ability to work hard.

A mother, for example, saved the first bird killed by her young son. She skinned the little bird, and the skin was honored in the next Bladder Festival (festival for animals' souls). At the time that the boy caught the bird, probably with a slingshot, his family gave food to the old people of the village or to their hunting partners. The boy might be only four or five years old, but he was started on his career as a future hunter, and the short prayers of the elders on his behalf, the bits of food given to the spirits at the time of the little feast in his honor, all were designed to protect him and give him strength and success in his future career.

A young person still may be honored, in a more secular way, by inviting friends or relatives to the home for a meal or by distributing the catch if it is a large animal; and many mothers surreptitiously save the skin of "the first little bird." Whereas there formerly was the idea of honoring the animal as well as the young hunter and of appealing to the game animals to come to the hunter and not to hurt him, today this meaning of the custom is changing or is lost altogether. Rather, it is more accurate to say that both the final objective and the magico-religious means of attaining it remain, but the intermediaries have changed. Today, prayers in whatever Christian church the village contains and, if it is a Catholic church, the wearing of religious medals are substitutes for the old prayers and amulets in the animistic religion. More recently, entirely new techniques have been added, in the form

of diphtheria-pertussis-tetanus, smallpox, and poliomyelitis immunizations, which are given routinely everywhere, and izoniazid (INH) which is given to some families in the Bethel Triangle to test its efficacy in preventing development of active tuberculosis and to individuals in T.B. therapy. (This is an orally administered drug.)

The preventive injections are scheduled by public health nurse and teacher, are administered by the former, and are virtually out of local control. The drugs, on the other hand, are left for administration by the family under the guidance of a local "chemotherapy aide." The drugs have proved culturally as well as medicinally effective, in that villagers have taken responsibility and fitted pill-taking into their system of self-care.

It must be remembered, though, that vaccines and drugs are seen as chiefly negative: they prevent sickness. While the principal drug used in tuberculosis chemotherapy and chemoprophylaxis is thought locally—and realistically—to be positive in that it improves appetite and morale, still there is no adequate substitute, so far, for the old techniques of making a person strong, a hard and effective worker, and well acclimated to his environment.

Elderly informants said that in the old days adults treated children very strictly. Boys and girls could not whisper or play in the kazgi, the ceremonial house. In the family home, boys and girls of about six to fourteen years were kept separate, not allowed to play games together, although they could play together outdoors. Little children were treated very indulgently, but from the age of five or six onward, the taboos and demands on children became increasingly severe. A boy was taken from his mother when about eight years old and lived thereafter in the men's ceremonial house where he received his education. (The Nuniyak boy went to live in the kazgi at five or six years.)

As soon as a child could eat solid food regularly, he or she was given his own wooden dish. There were different shapes for the two sexes, and different sizes according to owner's age. A little boy's dish would be only three or four inches in length whereas a man's would be six or eight inches or more. Each dish was supposed to have a design commemorating some event in the family history, which served also to identify its individual ownership. One person never ate from another person's food dish. At the end of a meal, a dish would be wiped out with dry grass and set aside—one elderly informant specified that the dish was turned upside down in its proper place out of reach of young children—until the next meal. Thus, although dishes were not washed, people did avoid communication of disease by eating-utensils, since each person had his own knife, too. Although there was no reluctance to dip into a common vessel with one's fingers, to get a piece of meat or fish, this was not the customary way of eating here, in contrast with customs on the Arctic Coast. These people had a full range of ladles, spoons and dippers, and the portions were ladled out of the cooking pot into individual dishes; or oil would be poured into each person's dish and then he would dip dried fish or other food into the oil.

In the tundra villages there was expressed strongly the idea that young people could and should be kept healthy by strict discipline regarding eating and drinking. In the old days children could never drink much tea and were allowed to drink water only at certain times: They could not drink immediately after eating fish oil or seal oil. They were urged to rest after eating and then when they got up they would be allowed to drink a little water. The water was kept covered or out of reach so that children could not help themselves. Whenever it was stated that children were not given much food or water, it was added that they were especially denied water. The only liquid that a child could take after eating seal oil or fish oil would be fish broth. Boys especially were trained to do without water because it was thought that they would run better on the trail if they were not full of fluid.

Young people also were not allowed to lie around during the day and were encouraged to get along with as little sleep at night as possible.

The older people volunteered that when they were young, parents were more strict than they are today in this type of children's discipline. Also, it was supposed to continue in adulthood, becoming a matter of habit and self-discipline. (Even though people often exaggerate the conditions of their childhood, there does seem to have been a change, especially in regard to the denial of water to children.)

Although the custom regarding drinking water was based partly on religion and magic—for example, there seems to have been an application of the belief that things of the land and sea should be kept separate—nevertheless the effect may have been entirely realistic and not magical. The principal good was in reducing the opportunity to ingest organisms that could cause disease. Also, in a relatively dried-out body, there would have been reduction of sweating and chilling, important in a cold climate.

Even though adolescent boys had to observe certain food taboos in connection with their first catch of seal or other important game animal, the requirements seem to have been not so extensive in type or time as were those for girls at first menstruation. A girl was not placed in a separate hut as was done in most of Southwest Alaska in pre-European time but was kept by herself in a corner of the family house. She sat in a corner of the sleeping bench, quiet, shy, and industrious. She was given no water to drink for ten days. Her boots were removed, and she was not allowed to go outdoors during the ten-day period, according to one of the older women at Eek. When she did leave the house, she had to wear her parka with the hood up over her head and the ruff shading her face no matter what was the weather. A belt was tied around her hips, with a piece of fish hanging from it on one side and ashes in a little sack or pocket at the other side. During the ten-day period, she could not eat any fresh fish—only food from the preceding year—and she could not pick up the food in her hands. She had to use a spoon, and later if she went out to gather berries or eggs, she had to use a ladle. Even after the ten days, she could not dip water. Others had to dip water for

her and she had to drink through a drinking tube. She was, however, allowed to eat seal oil during the ritual period. Although this was not stated, she probably was not allowed to dip seal oil or handle seal oil containers.

For a long, rather indefinite period, a girl had to wear her parka outdoors, always with the ruff shading her eyes, and she could not walk without boots indoors or outdoors, even in summer. Another woman added that not only was she proscribed from eating raw fish but also she could not eat birds, which, of course, would have been fresh food since in this area birds usually were not dried or preserved.

A string was not tied around her joints as has been recorded for an earlier period but the girl was tattooed. The adolescent girl was tattooed on her joints so that she would not have headache or stiffness of the joints. She was tattooed on the outside of the waist, inside the knees, on the instep, the temple, and the chin. From the description given by one woman, it seemed that she might also have been tattooed at the angle of the jaw. Human hair covered with charcoal was used for the tattooing, which for women was done by stitching under the skin. Men, who had much less tattooing, perhaps only on the back of the hand, used the pricking rather than sewing technique, according to one informant.

The reasoning for all this was the familiar one, described for other areas many times previously. Not only was the girl thought to be in a special state, an uncleanness, but also she had to be protected from supernatural influences to which she was susceptible. Since the menstrual flow would be dangerous to a man's power as a hunter and also was offensive to the Supernatural, the girl could not touch important products of nature, such as water and seal oil, her bare feet could not touch the ground, and the fur ruff on her parka hood shaded her face so that Sila, the great Spirit of the Universe, and other great deities of the upper air would not see her. Some of these requirements and taboos would have to be observed at each monthly period and following childbirth throughout the woman's productive life.

Other requirements were intended to symbolize her adulthood, the responsibilities and skills of maturity. The girl, for example, might have to weave baskets or sew new boots while in puberty seclusion. All of this was somewhat mystically connected with her general well-being and her fertility, as well as setting the pattern for her adult life.

Despite differences in details, the same basic beliefs were held by Nelson Island and Nunivak Island people. (See Lantis, 1946, pp. 224-227.)

Surreptitiously, some of the above still is practiced in conservative Eskimo villages. The taboos probably do no harm and they do some good, simply by giving the older people the feeling that one is not taking chances or "tempting Providence" regarding the young person's entire adult life.

Pregnancy, Childbirth, and the Care of the Newborn

Instead of combining data from all informants on any one topic, the complete account by each interviewee will be given separately, with explanatory comments or suggestions.

1. The woman who was said to be the oldest in Eek gave the following directions for proper care. (That young women in the 1950's followed all these instructions from their elders is to be doubted. Learning exactly what they did would require separate study.)

A pregnant woman was told to eat all her food at meals and not eat snacks later. She should never eat leftovers. (This probably was done so that the birth would be complete, not prolonged, and without sequelae.) If a pregnant woman awakened during the night, she should get up and go out of the house immediately, presumably to relieve herself. Then she could sleep late if she wished to. If at any time she started out of the house, she could not turn back. She had to go outdoors through the storm passage, then come back all the way. This definitely was done to facilitate the birth. A woman should not pull an arm inside her parka as people sometimes do to warm themselves. She should have both arms through the parka sleeves. She should not chew spruce gum during pregnancy. (Oswalt adds, from Napaskiak, that she must not chew commercial gum, either [1957, p. 29].) All such requirements were intended to help the fetus slip out easily, difficulty of birth apparently being the chief fear. There seemed to be no requirements to prevent miscarriage.

A woman could go hunting or go around hunting-places. This contradicts the taboos in much of West Alaska in protohistoric time. It is likely, despite current statements, that although women could hunt rabbits and ptarmigan, there were taboos regarding their approaching or handling the men's hunting gear.

For delivery, a woman customarily would lie on her left side with left elbow pressing into the abdomen, left leg extended and right leg bent. The infant would be wrapped up loosely, not dressed. As soon as the mother could sit up, she would begin to make a parka for the infant, of rabbit or fox with the fur to be worn on the inside. Baby socks were made of ptarmigan skins or duck skins. Boots were long, reaching to the infant's thighs. The cord would have been cut with a stone knife by the women who assisted the mother and it was saved as an amulet to protect the child. The afterbirth was buried.

A primipara was told to remove her parka to suckle the infant even when outdoors. She could not put the baby under her parka to nurse or bring out the breast. She was never allowed to nurse the child when lying down. After subsequent births, she could do any of these things.

The child did not have a diaper comparable with modern diapers. Soft plants that grow on the edge of the beach were placed under and behind the infant, largely to protect him and the mother if he had diarrhea. Women, from having served as nursemaids during their girlhood, even their childhood, would have learned, by the time they

became mothers, how to anticipate a child's needs. The infant would be picked up quickly and held away from the bed, over a wooden urine tube to urinate. It was thought that an infant should never be allowed to urinate in bed even if wearing a diaper.

Soon after the delivery, the mother's ears, nose and lips should be pierced for ornaments. This was done by some old person who was not a relative. Long white hair from under the throat of reindeer was placed in the holes at first, then gradually thicker objects were put in the holes to enlarge them.

The infant was named for any relative who had died recently. Food and water given the child were thought to be food and drink for the deceased soul. (This idea of the child reincarnating a deceased relative is a combination of two concepts or perhaps can be said to be midway between the concept on Nunivak Island and that of North Alaskan Eskimos. Formerly, Nunivakers preferred to name a child for a living or a deceased close relative, from affection and the desire to continue a name; while the northerners named a child for a recently deceased person, kin or non-kin.) If an infant was born with an erupted tooth, people thought this was a sign that an old person had been reborn.

The infant was suckled pretty much on demand. (There certainly was no idea of a schedule of feeding.) The infant was nursed as long as the mother was lactating, which might be three or four years. Even while the child still was receiving some milk, he would start taking solid food premasticated by the mother. She might feed him fish soup, chewed fish, and cooked liver.

It is difficult to reconstruct ancient feeding practices. It appears that the child received some seal oil, "Eskimo ice-cream" (oil, snow, and dried fish or berries whipped together), and other soft foods during a considerable period while still being occasionally nursed at the breast. The latter was done to keep the child quiet as much as to feed him.

2. A middle-aged woman in Eek who had grown up in the now-abandoned village of Apokak and whose husband was from Akulurak (on the Kuskokwim, not Akulurak on the Yukon) gave some supplementary information: If a woman had long difficult labor, the midwife would tie a band around her upper abdomen and press down to force the birth or, without the band, would "squeeze her." This informant did not say what was done if the woman still could not deliver. Information was obtained from others that in very difficult cases a shaman would be called in to use a combination of such forcing methods and spiritual power. Sometimes all techniques failed and the woman died in childbirth.

For a few days after delivery, until she was able to get up and go about her work, a woman had to lie on her side and keep her legs together, extended. A prescribed ritual period was not given by these informants. Early writers on neighboring areas, however, said that the woman had to lie quietly and observe the taboos for four or five days, depending on the sex of the infant: four days for a male, five

to be doubted since early observers consistently mentioned requirements of this sort.) Immediately after delivery, for each of her first three pregnancies, a woman would be helped to go out and walk around outdoors. Then she could lie down again and stay in bed three or four days. Soon after the delivery, that is, within a few days, the mother's ears, nose and lips were pierced. (This custom differed from that on Nunivak Island where the ears and possibly also the nose and lower lip would be pierced in childhood, even as early as four or five years.)

According to the Kasigluk woman, after the newborn's cord had been tied with fine sinew string and pounded clinkers or ashes had been placed on the stump, the infant was wiped off and wrapped up. No band was fastened around his abdomen.

The first food for an infant besides milk, or possibly the first food of any kind although this seems unlikely, was cooked fish liver mashed or premasticated.

5. The Kasigluk husband and wife who were interviewed added a few items, chiefly pertaining to care of the infant.

One item not fully explained was the following: To make a pregnant woman bleed, one should use a short plant that has yellow flowers. Unfortunately, specimens could not be obtained for identification. (Although the purpose was not explained, it is possible that abortion was the motive. Because children and others were present, the informants were not questioned closely.)

This couple had heard of people on some island who knew how to perform a Caesarean and who stitched the incision with human hair. Since folktales about such operations have been recorded in Southwest Alaska, it is likely that this story was a myth.

Clothing for the infant was made as soon as possible after delivery. Babies' parkas were made of the skins of "black ducks," probably brant. Boots were made of bird skins, and also diapers, which were placed with the feathers on the inside. The infant's feces could be scraped off the smooth oily feathers. Moss or other absorbent material was not placed in the diaper. In response to a question regarding use of puppy skins, this man and women said that people made mittens but not infants' clothing of puppy skins. (The latter was done on Nunivak Island.)

The first solid food for an infant, given when the child was very young was premasticated fish liver. Some people preferred blackfish, others whitefish liver. The infant also was given whitefish oil, which was the preferred type of oil available in the tundra villages.

6. An older man in Nunapitchuk who was questioned about medicines said that he knew of none to facilitate delivery. In case of prolonged labor, a strong man or woman would lock his or her arms around the parturient's waist and press down. This usually was effective.

It is interesting that difficult delivery was so often mentioned voluntarily. This seems to contradict the supposition that women who do not live in a complex culture and who get a lot of outdoor exercise rarely have prolonged or difficult delivery. Probably an obstetrician

should try to ascertain the proportion of difficult deliveries and their causes in this region.

None of the women mentioned post-partum damage. If conditions in this area are like those on St. Lawrence Island (according to morbidity reports obtained by the Arctic Health Research Center), there is injury to the reproductive organs, the women suffering discomfort without seeking relief, since they consider this their lot.

No one was asked or volunteered information on contraceptives. Although no formal study has been made in the Bethel Triangle, the pregnancy rate seems to have been high. Whether the rate of foetal loss has been high compared with that of Caucasian women of the same economic level is unknown. (On St. Lawrence Island, 102 women, 18 or more years old, reported in 1955 to local female recorders, chiefly midwives(?), that 634 pregnancies had resulted in 523 live births. Of the latter number, 125 children had died before age 6 and another 105 were still in the 1-6 year bracket. Thus a full count of those surviving early childhood was not yet possible. [From Arctic Health Research Center files.]

On Nunivak Island there were no professional midwives. The attitude of all the older women was that a woman did not anticipate difficulty and that she helped herself as much as possible. Her mother usually gave whatever assistance was needed. For an older woman whose mother might be dead, her sister or sister-in-law stood by to take the baby and cut the cord. No one position was required for delivery. The women voluntarily listed these: on the knees, sitting, squatting, lying on the back. The woman's abdomen was not bound, no one pressed down on her abdomen or in any other way tried to force the birth. The woman might push against a hard object at her back; that was all. Most women did not have long labor and did not bleed excessively. For the occasional difficult birth or hemorrhage there were no practical medicines. A male or female shaman would be called in, and he would give the woman an amulet, probably sing and try to assist her manually. There was no set procedure for such emergencies.

The umbilical cord was tied with thread and laid toward and in the moss of the diaper. No band was put around the belly. When the cord sloughed off, it was thrown away, not saved and used as a charm (a statement to be doubted). The afterbirth was wrapped in grass and thrown in a hole. A baby that died or was killed soon after birth or a stillborn child was immediately disposed of: placed in a hole or an old house pit. (Today, of course, it is given a funeral and burial.)

The baby was soon washed with water but not oiled. At no time was circumcision or other operation of the genitals performed. The diaper consisted of soft dry sphagnum moss in a scraped and softened piece of sealskin or section of a sea-mammal stomach—the section would retain its curved or bowl shape—that was not wrapped around the child but in which the child sat. This combination was clean, since the soiled moss could be thrown away, and apparently not constrictive or uncomfortable. For her personal napkins the woman used soft basket grass that was gathered when it was two years old: the limp, gray, very dead-looking grass.

The baby might be just wrapped up at first; but within a few days a tiny parka was made (none made before the birth), consisting usually of two eider skins, feathers on the inside. After the baby's feet and legs were wrapped with soft grass, real boots were put on. The soles and tops were crimped and stitched like those of adults, but they were somewhat softer, being made from an old seal poke that was saturated with oil or from fur or birdskins with the feathers on the inside. They were no ankle-length booties or low moccasins but boots which were as long as comfortably possible. Babies' parkas in pre-contact times might be made of caribou fawn, eider, cormorant, or murre, but in recent years they usually have been made of reindeer fawn or puppy fur. Boys in addition had close-fitting squirrel-skin caps, tied under the chin.

During the first three days the mother ate nothing hot, and apparently the baby had nothing at all unless it was a little fish broth. It was not given any of the colostrum, women said, but this is to be doubted. The mother ate cooked tomcod livers if they were available or warmed dock leaves that had been in storage. During the first ten days she might have a little dried fish, but definitely no seal oil until the end of ten days. On the third day the baby was given the breast.

For the first child, its father did not go hunting or work in the kazgi for three days, at the end of which time he gave a sweatbath for the men of his kazgi. At the birth of subsequent children, there were no taboos for him. The mother at the end of three days, or as soon as she was able, went outdoors and washed her hair and face. Her whole body was not bathed, neither soon after delivery nor at the end of the taboo period. She had the same restrictions and requirements as a girl at first menstruation; she had her own dishes and anciently may have had her own cooking utensils also. However, she did not have to stay in a special hut, at least not in recent generations. When she went outdoors, she had to keep her hood up over her head and face, and could not look around, had to wear mittens, could not go near kayaks, hunting gear, and the beach. She did not have to use a drinking tube or special head-scratcher. (Everyone owned a long-handled back-scratcher, anyway.) She washed her hair every five days for the total period of twenty days. After twenty days, she was free, which meant that she could have intercourse, as far as religious sanctions were concerned. (For additional information, see Lantis, 1946, p. 224.)

Today, here as elsewhere, the well-illustrated "Manual for Alaska's Midwives," prepared and distributed by the Alaska Department of Health and Welfare, is more or less followed, and commercial cotton diapers, nursing bottles, baby powder, and as many other items as families can afford are purchased and used. Any problems of pregnancy and childbirth are discussed with the field hospital physicians by radiophone. From having been, as late as 1940, one of the least accessible villages, even Mekoryuk on Nunivak Island has become now quite accessible. But in conservative families a few of the old ways continue along with the new.

No matter what kind of explanation was given, several practices seem to have been materially and rationally good: for example, putting ashes on the umbilicus. This probably was the most nearly sterile material available. Giving fish liver to the infant provided a good vitamin supplement to the mother's milk. When few or even no young adults had tuberculosis (the disease may have been introduced after the Discovery: no one on present evidence can make a definite statement on this), the premastication was not likely to be harmful. Finally, keeping children from drinking water helped protect them against enteric diseases, while many of the other practices, from a health standpoint, were merely harmless.

Regarding the communication of tuberculosis, one can add that the bacillus has recently been demonstrated to be air-borne, so that in crowded one-room houses there would be massive contagion, even without direct mouth-to-mouth transfer of the germ.

In this chapter, we have departed from our general objective of presenting rational medicine and have included some magical practices. This has been done because "magic" and "medicine" were so interwoven in past times that it is hard to separate them and because, in many instances, the same principles underlay both. In regard to puberty, pregnancy, perinatal care, and care of the young child, one sees non-shamanistic "preventive medicine" in its fullest development. Things were done, such as isolating the menstruant, to protect both the individual and the community. In regard to children, protection of the individual was emphasized, yet here, also, welfare of family and community was considered. Anciently it was thought that the soul of some elder reincarnated in the infant, if not treated properly, might be angered and seek retribution. In other words, when one looks at the principle rather than the practice, one finds a rule that is basic to modern public health and welfare: The individual must be cared for, to safeguard the community.

V. PREVENTION OF DISEASE

There are two types of prevention: intentional and unintentional or inadvertent. The deliberate efforts to prevent illness are especially worth knowing in that they show the people's recognition of some of the principles important in prevention, even though the practices, utilizing magic and religion, may not have been effective. Many of the customs of everyday living evidently were unintentionally more effective than some of those directed consciously toward maintaining health. Hence, both are worth knowing.

Intentional Prevention

Religion and Magic: The rules of behavior pertaining to childbirth, already cited, illustrate both imitative and sympathetic magic: as an example of the former type, the pregnant woman going all the way through the underground passage from the house without turning back (to facilitate delivery) and, as example of the latter, burying

the placenta instead of burning it (to avoid causing mother or infant to burn with fever).

Behavior following a death was intended chiefly to avert action by the deceased's soul or by the spirit that had caused the death, either of which might inflict more illness as punishment or merely in spiteful revenge, but also to avoid contamination.

The principle of contagion is illustrated best by the taboos enforced on women when "unclean," requiring isolation, concealment of face, hands, and feet, and special disposal of a woman's body products. Fumigation of a sick person and his house was based partly on the fear of contagion. While the active agents that were thought to be communicable from one person to another were different from the ones feared today, the principles of action were not so different.

Building Strength: Exercise and physical discipline not only were taught but, if we can believe the old folks, were sternly enforced on children and young adults, while sweatbathing was an additional means of keeping fit and also a physical test for adult males. Young men and occasionally girls competed in footraces and kayak races and other tests besides doing a lot of hard physical work and undergoing the discipline already cited: control of eating, drinking, and sleeping. Sexual intercourse also was forbidden during ritual periods as it was thought contaminating.

Sanitation: Although avoiding contact with spiritual uncleanness, such as the disease-causing agent that the shaman would extract from a patient, was the aboriginal concept of sanitation, there were some practices that came closer to modern concepts. The disposal of diaper material has been mentioned. Other customs related to spitting. In the Eek-Kwinhagak area and in fact all the coastal villages of this region, the dirt floors of communal house and family house were covered with coarse, dry grass, not mats but simply a thick covering of loose grass. People used to spit into this grass as they sat on the side benches, there being no stools, and their boot soles might pick up the spittle as they entered or left the house. The condition was not so bad as it sounds, however, as the grass was removed about twice a month. (There were no weeks but the lunar months were observed.) Also, young children did not play on this floor but on the wide benches. During the day, the fur bedding was rolled up and pushed back against the wall, leaving a grass-mat cover on the bench, which people tried to keep clean. (On Nunivak Island, the walls too were covered with matting, at least in the permanent winter houses.) We have seen already the care taken to prevent an infant's soiling bedding and bench.

On Nunivak Island, old cracked pottery dishes or old wooden dishes generously lined with dry grass were used as spittoons, especially by the older men who chewed snuff or plug tobacco. Periodically, the grass was disposed of in some hole away from the house.

The degree of cleanliness achieved by the sweatbath cannot be gauged since we do not know how often the bath was taken or how much urine and water were used, three generations ago. Certainly, the tundra villages did not have enough fuel for the weekly bath that

many villages in the Bethel area now expect, nor did they have the custom.

Unlike the Aleuts, people here did not squat over an old-style lamp for sweating or curing; and sweatbaths formerly were not taken as a cure or a preventive. However, the sweatbath that was taken for social and ceremonial purposes or simply to make one feel refreshed and cleaner may have relieved incidentally some of the men's aches and pains. (Women in pre-European times were not included, but today in a few villages, for example Napaskiak, they are allowed.) One person said that if a person was fatigued, a sweatbath would make him feel much better. (See Lantis, 1947, pp. 107-109, on ceremonial cleansing.)

At Napaskiak, the plant used as a switch during the sweatbath was the old standby, *Artemisia tilesii*. For fragrance, false camomile plants (*Matricaria suaveolens*) were placed in the water container. Napaskiak has a true steam-bath whereas the coastal villages had and some still have the dry-heat bath. (Oswalt, 1957, pp. 23 and 33.)

As a factor in sanitation—or lack of it—one should remember that, as with the "Finnish bath," the bather anciently would roll in snow or, in summer, jump in the river after the sweatbath, a practice that the old men said never hurt them. This was not so rugged as one might think, since the body was so hot that it would warm the water it touched.

Lacking knowledge of soap-making, Eskimos used the best available cleansing agent: boys' urine, which was saved for the purpose. The ammonia in urine is especially good for removing oil, and with the oil it removed miscellaneous dirt, including organisms. We do not know its effectiveness exactly, however. It would be interesting to run tests to see whether common local organisms, for example the larvae of parasitic worms, survive in urine. Certainly the urine of healthy people is itself sterile.

In the Lower Kuskokwim area, the type of large coarse mats that Nunivakers formerly used regularly and still use occasionally to cover drying fish, to protect them from rain and blowflies, was not seen anywhere. A man who knew the villages of this area well said that he did not know of any people who put mats on the drying fish. A woman would examine the dried fish and would cut out any blowfly eggs before storing the fish for winter. If the fish had been dried in sunlight, it would have dried before the eggs could hatch. If the air was moist, sunlight weak, and fish slow in drying, then there would be maggots in the fish. This was something that the people feared and that women were expected to prevent. A woman was not a good housekeeper and did not provide well for her family if she permitted maggots in the dried fish or dried meat.

Regarding housing in relation to sanitation, an Eek woman gave the following description. In the days when people lived in underground houses, the latter were built as close together as the terrain would permit. If the ground was low and marshy, then the villagers had to spread out. Each person tried to build his house on ground that was

dry and as high as obtainable at the site. People would empty their wooden urine tubs in one designated place in order to keep the village clean. Since villages were small and houses close together, no one had to go far in order to reach this dumping place away from the houses.

She described also the type of house that people built in the spring sealing camp. They used to dig out a snowdrift along the coast so that snow formed the walls, then a driftwood frame was placed across them to support a roof of matting. There was no lining for the snow walls. The informant was questioned specifically regarding the possibility of using matting as lining for the walls and she maintained that none was used. So little heat was used in these houses, apparently, that the walls did not melt. At the end of the sealing season the mats and wooden frame would be saved, but the snow house, of course, was abandoned and ultimately would be washed out to sea. This practice helped ensure cleanliness, whereas today the tents and more permanent structures are too expensive to be abandoned and for a while—no one knows how long—may remain contaminated.

Body Protection: To prevent snow-blindness, men wore a wooden visor or wooden goggles with only a horizontal slit for vision. To prevent discomfort and cutting of the hand when carving, they wore (at least on Nunivak Island) leather finger guards on thumb and forefinger. To prevent wetting and chilling, men and women wore oil-soaked "water boots" and raincoats made of sea-mammal intestine casing. To protect the foot, a fresh dry grass insole was worn inside a boot of any kind. To keep head and ears warm (as well as for decoration), men and boys, the latter especially, wore fur bonnet-shaped caps that could be tied under the chin, while the women's long, thick, braided hair gave them some protection. And of course there was a great variety of fur, birdskin and fishskin clothing, sometimes combined with woven-grass mitten liners and socks, to keep the body warm and dry. Clothing was kept loose, never constrictive, to prevent collection of moisture which in turn would facilitate frostbite.

Inadvertent Prevention

While individual dishes were used for the sake of cleanliness and convenience to some extent, a strong reason for their use seems to have been family symbolism in the designs that they bore and in the fact that children's dishes were made by respected, older male relatives. Thus, whatever physical protection was received was largely accidental.

Like the usage pertaining to the wooden dishes, and perhaps also the crude pottery cups that these people made anciently, several of the means of (probable) accidental prophylaxis have been described in other connections: drinking little water; using urine to wash furs, women's hair and men's bodies, the last in connection with sweatbathing; and housing.

Mobility: It appears that these people were more mobile than they are now. Although they liked to stay as long as possible in the large community houses (*kazgis*) of the winter villages, which were

more suitable for ceremonies and large work projects (making harpoons, drums, ribs of the skinboats, for example) than were houses and kazgis in the camps, nevertheless they did have to move to other sites through an annual cycle of hunting and fishing. Without school, clinic, church to hold people in one place and without expensive house construction and furniture, homes could be shifted, houses torn down and rebuilt much more easily than today. Thus ground that had become contaminated with human and dog wastes would be abandoned even though this was seldom the reason for moving.

Especially in tundra areas with poor drainage, the underground (i.e. semi-subterranean) house would become very damp about June and would even have water standing on the floor. A family not only moved out of the winter house into a skin tent or brush hut, it probably would remove the roof from the house to dry it out.

Instead of concentrating in large villages of 150 to 350 people, as Alaskan Eskimos tend to do now, there were many small settlements containing 35 to 75. Such dispersal of the population reduced contagion, at least for some diseases and for long periods. But when a disease organism did enter the area, people had no immunity. Even during and after the great days of whaling and the Gold Rush, the large delta area south of the Yukon had the old distribution and was otherwise little affected since both historical movements passed by this region and quickly moved on to Seward Peninsula and the Arctic Coast. Even reindeer-herding, maintained here from approximately 1920 to 1945, brought in only an occasional Federal inspector and did not change fundamentally the old hunting-fishing cycle. (This was one of the principal reasons why reindeer herding failed.) The big question raised by the above situation cannot be answered now: While isolation did not give, in the long run, protection against diseases like diphtheria and measles, did it give, as the author suspects, protection against the upper respiratory infections, in both short and long run? If people were generally in good condition, from a combination of factors involving food, clothing, and infrequency of debilitating minor infections, were they better able to cope with the serious disease organisms that occasionally did come their way? It does appear that, a generation ago, chronic ear infection was less common.

The Eek people used to have more driftwood than they have today, hence could build better storehouses, could use more wood for fuel, and so forth. The current has shifted to the west side of the Kuskokwim, carrying the driftwood to the west instead of the east coast of the river mouth. There is considerable evidence that whole villages moved in prehistoric and early historic time because of just such changes. A slough would silt up, a fire would burn over the young trees and good berry patches, or the current would change, making driftwood hard to get and the river too shallow for salmon. Today, because of the investment in permanent structures—the typical house is a one or two-room gable-roofed building above ground, made of commercial lumber—such a move is much more difficult. This increases the problems of sanitation. On the other hand, it justifies expenditure of time and money on pumps and other

projects to improve water supply and waste disposal. These are not likely to be abandoned so quickly as they would have been two generations ago.

Dogs: The favorable factors—that these villages evidently had few dogs three generations ago, that the dogs roamed freely instead of being tethered in one spot for years, with consequent contamination of the ground with worms, that when cold and hungry they would eat human feces, thus serving as scavengers—must be balanced against another factor: Untethered dogs had greater opportunity to eat small mammals from which they might get worms, which they would pass on to humans in turn. The dogs could and probably often did—and still do, occasionally—acquire parasites from rabbits and other animals that they caught. Then people handling dog fur, which might be used for ornament on garments, and handling the dogs either as pack animals or draft animals, would be exposed to the same parasites. (Man is not a host for the hookworm of Alaskan dogs, but both man and dog in the Lower Kuskokwim area have fish tapeworm, *Diphyllobothrium* sp.) Since today the entrails of various game animals are fed to the dogs, it seems likely that there is at least as much opportunity for the dogs to get intestinal parasites now as there was “in the old days” and possibly more opportunity.

Water Supply and Storage: Mainlanders who had to use or preferred to use river water watched the tidal rise and fall of the big river and its tributaries, since the tide runs far inland over this flat country, and would dip water in the slack interval. This still is done when people stay in fishcamps along the Kuskokwim. Carved wooden buckets and dippers formerly were used, while Nunivakers, besides these, had leather buckets and dippers with greater capacity than the wooden ones. Some villages today, as anciently, keep what they call “a well” open in the thick ice covering the river through which they dip water all winter. Villages along the coast or the tundra sloughs, without a spring such as Tununak has, would cut lake ice with long ivory chisels, bring it to the village on sleds and store it on top the sod house roof or elsewhere supposedly out of reach of dogs. It was not difficult, however, for a dog to climb on such a roof and lie beside the ice. (The author has observed this several times.)

Today, through instruction by sanitation aides, who are local men trained and supervised by the state health department, the villages are learning to use covered water containers, usually made of iron oil-drums. Instruction regarding chlorination of the water, however, is evidently not so easily complied with. Obtaining and storing potable water was and is one of the biggest problems in the Bethel Triangle.

Formerly, the best protection was, therefore, the practice of drinking as little as possible, done not for sanitation but for other reasons. When there were no cloth garments, towels, or bedding to be washed, and food utensils were no more than occasionally rinsed as water was being dipped from river or lake, not much water was needed. Moreover, there was not the kind of communication of disease that occurs today when the whole family uses one towel for a week and

when the day's dishes for a household of six or more people are washed in about three quarts of water. Three generations ago, the people of this area had clay pots, used for cooking such things as fish soups, greens, and fowl. The pots were scoured with a piece of skin dipped in ashes; later a cloth rag was substituted for the skin. From the condition of pots discovered by archaeology—they were crude and rough—it appears unlikely that they were thoroughly scoured. These were succeeded by iron cooking pots and later by granite-ware and aluminum.

Using things that require washing but having insufficient water and soap for it, one may be in a worse situation than when having no water but not being burdened with things that require it. This is a splendid example of the danger of getting a new culture complex without the means of maintaining it.

Food and Preparation of Food: This was an important means of health protection, but the kind of interviewing done for this small study could not give quantitative data on diet. It could yield only miscellaneous items on protective foods and suggestions regarding the changes from a period approximately fifty years ago to the present. The following two items are examples.

A middle-aged woman at Eek denied that salt water or seaweed was used in cooking. She said that until people started buying commercial salt, they did not use any salt. (Even so, they probably got, in their diet, the essential amount, according to a personal communication from Dr. Edward Scott, Chief, Biochemistry and Nutrition Section, Arctic Health Research Center.) On Nunivak Island, in contrast, half salt water, half fresh water would be used for cooking; and the people ate seaweed, which yielded a valuable organic compound. Current studies at the Biochemical Research Laboratory, Children's Hospital Research Foundation, Washington, D.C., show that all the red sessile seaweeds thus far tested yield sulfated polysaccharides, among which one, carrageenin, seems especially effective in inhibiting peptic ulcer. While the amount of seaweed eaten by Bering Sea Eskimos may not have been large enough to give full protection, one favorable factor is that cooking does not destroy the essential chemical: "The cooking of seaweed is without effect upon the anti-peptic action of carrageenin and others of this family of sulfated polysaccharides." (Personal communication from John C. Houck, Laboratory Director, on data to be published in *Gastroenterology*.)

Kelp, common name for the large brown seaweeds most often used commercially, provides nitrogen, sodium, potassium, chlorine, calcium, and small amounts of other minerals. While the seaweeds of Bering Sea are not known so well, they undoubtedly have a similar mineral content. (See Heller, 1953, pp. 140-143, regarding use of seaweed on the Pacific Coast of Alaska.)

Another protective food has been mentioned already: young willow leaves, which were eaten in early summer. Rodahl found that the arctic willow and ground birch are sources of ascorbic acid (vitamin C) and that the latter is also an important source of thiamine (vitamin

B1). Willow was found to remain relatively rich in vitamin C all winter. (Rodahl, 1945, p. 248; 1952, p. 13; 1955, pp. 274-275.) Porsild has pointed out that these can be obtained by eating the contents of the caribou rumen and the ptarmigan crop (1953, p. 20). Eskimos farther north were more dependent on such sources of plant food, but in our area people could get their willow leaves fresh and direct. One man specified that they often were mixed with fish eggs. Eek people apparently did not eat many other greens. Sourdock, a source of vitamin C, did not seem to be the year-round staple that it was on Nunivak Island and on the mainland coast north of Nelson and Nunivak Islands. Whereas a middle-aged man at Eek denied that people used to put dock leaves or other greens in pits in the ground as a means of storage for winter use, informants at Kasigluk said that greens were placed in pits in the summer and left until freeze-up. Then they were removed and apparently kept in wooden storage dishes or other vessels for winter use. Since Kasigluk has deep snowdrifts, it may have been impractical to use pits as the coastal people have done. Two kinds of greens were stored in the ground in this fashion and were cooked, with or without previous storage, in fact often cooked together: na'k.at and koa'x'it. The second must have been sourdock, indicated by its description and Eskimo name.

Other protective foods, good not so much for calories as for minerals, vitamins and a few other chemicals, were bone and marrow, entrails, brains, eyes, various glands, skin (of beluga), and other parts of the game animals that these villages had no reluctance to eat. Bird eggs were available only during the nesting season, since they were not stored, but fish eggs were dried and stored in large quantity.

In the villages at the mouth of the Kuskokwim, formerly most food was eaten raw. Reindeer meat and seal meat and in fact all meats were dipped in hot water but were not really cooked as they are today. If a woman in preparing fresh fish or in cutting fish to be dried found worms, she merely threw away the fish entrails and worms, not the flesh. The women thought that sometimes a person gets worms from eating pike but did not mention any other fish as a common source of intestinal parasites. As we have seen, people in this locality did not have any medicine for worms. The woman who said that formerly most food was eaten raw volunteered the opinion that women today do not know how to cook food properly. Some do not cook meats enough; others cook the meat too "done." The purposes of cooking were (1) to increase palatability, for example of tough fowl and the larger freshly-caught fish (in winter, most stored fish was eaten either dried or frozen), and (2) to provide a hot food, but not for health reasons.

Under aboriginal conditions, not many foods were obtained by trade. People were dependent upon the food that they could hunt, trap, or collect themselves, except seal oil. It was prized, not merely as a food but as the best single maintainer of good health. Especially those living on or near the coast said that they just did not feel well when they had no seal oil. Tundra villagers, when they went to fish camps on the Kuskokwim, would meet people from the coastal villages

bringing seal oil for trade. This is still done, although the high price of oil and the small quantity of it relative to the population to be fed make it impossible for every family to have enough to last the winter. Of necessity, some inland people had to use whitefish oil and now commercial fats as a partial substitute. It may have been that many years ago the tundra people, when going near or to the coast, would catch their own seals or would have an opportunity to trade with many different people and not merely the few who today journey up the Kuskokwim from Nunivak, bringing oil.

One woman pointed out that because the various families from any one winter village scattered to different fish camps for the summer, they had different contacts. Thus they not only had different opportunities to get food by trade besides variation in their own fishing and hunting—some families went to the Yukon while others went to the Kuskokwim for their staple, salmon—but also they were exposed differently to disease. Although in the old days probably all mainlanders eventually would be exposed to an epidemic, it might hit families at different times: some when their general physical condition was good, others when it was poor.

At the time of this study, in the Lower Kuskokwim area the Indian Bureau teachers at all the villages were urging their people to eat local greens and berries. The teacher's wife (of part-Eskimo ancestry) at Eek reported she not only urged the women to gather green plants but also gathered them for storage, herself, especially the "wild rhubarb" (*Polygonum alaskanum* or *P. viviparum*?). Despite her example, the women did not get enough plants for winter storage and she could not obtain a satisfactory explanation of their disinterest. One explanation may have been simply lack of energy. There was much tuberculosis in the village then and the people were not doing more than was necessary to maintain life. There seemed to have been also a loss of morale and expenditure of effort on the old skills. Finally, the young people especially, here as in many other villages, had come to regard their traditional foods with shame, as tasting too "strong" or being too messy, or too much work to obtain and store. They wanted to buy the new commercially-processed foods, which are an inadequate substitute because too expensive and too hard to store and, although they do provide calories, deficient in the essential vitamins formerly obtained from the "country foods." The example of Caucasians who will discover that sourdock is as good as canned spinach or turnip greens is much needed.

It is fruitless to speculate further regarding the relationship between diet and disease; it is best to wait for completion of a detailed field and laboratory study of nutrition in some of the villages in the Bethel Triangle, being made by the Arctic Health Research Center, Public Health Service.

General: Although studies of heart disease have been made in West Alaskan villages by the Arctic Aeromedical Laboratory and the Arctic Health Research Center, results are not yet ready for publication. It is not known, therefore, whether the supposition of infrequent heart

disease among Alaskan Eskimos is correct. If it is, their unhurried, unpressed tempo of life, except in physical emergencies, and their regular physical work (plus the small intake of salt?) are the most likely favorable factors. One pertinent aspect of their culture is instruction of young people regarding the natural world and "human nature." Until now, by anecdote, example, and experience, young people have been given the knowledge, confidence, and self-reliance to prevent panic, even under severe tests of being set adrift in an open boat or on an ice-floe or being required to perform in unfamiliar situations in White society.

Miss Carrighar, a naturalist who has worked closely and sympathetically with Eskimos, especially in the Norton Sound-Seward Peninsula area, has tried to find the basis of "their poise, their relaxed attitude." "To love them and toughen them: apparently that is the way that an Eskimo parent forms, molds, his child into a good adult." She says further that Eskimos "are cautious about getting out of emotional balance" (1958, pp. 124-125). The Kuskokwim people, too, seem to strive consciously for a calm self-control, not a desperate self-control that raises blood-pressure. In contrast with such preparation to meet the requirements of their environment, Eskimos unfortunately never were prepared for mysterious epidemics in which many died, and these have panicked the villages.

A generation ago, "maintaining poise" would not have been emphasized, perhaps not even included, in a study of aboriginal health care; but today we value more highly behavior that then might have been called "stolid," "slow," or "uncompetitive." Preventing heart disease and peptic ulcer—if indeed these are or were rare—is an enviable accomplishment. Eskimo culture manifestly was weak in medical repair. For the congenital heart defect that modern surgery so brilliantly rectifies, people like the Eskimos had no remedy, and infant mortality undoubtedly was high. But for the person who was born normal, his culture apparently did remarkably well in keeping him normal.

VI. CURRENT IDEAS REGARDING DISEASE AND DEATH

Knowledge of and Attitudes Toward Disease

The Lower Kuskokwim area has experienced several epidemics with serious effects. These, plus the generally poor state of health (see Appendix C), have made the people resentful—even angry—about their misfortune. One man said that in the late 1890's there was a big epidemic that killed whole households. He never had heard what kind of sickness this was, and since he was born just about the time of the epidemic or was a young child, he could not describe it from personal observation. However, he had heard his elders tell about the devastation. Villages were not abandoned immediately, but after a few years people drifted to the bigger villages from the settlements where only a few had survived.

The wife of a Moravian missionary has told, in her personal history of the church's experiences on the Kuskokwim, of "The Great Sickness" of 1900. Dr. Romig, medical missionary, and his family started upriver to take the decennial census.

"The party proceeded and soon met a boat which had come over from the Yukon. The men in it were ill. They had chills with pain and fever. They reported sickness at other villages. Reaching Ougavik, Dr. Romig discovered that there an epidemic of influenza was well advanced. Although he at once ministered to the sick, in a short time scarcely anyone could be about. His family caught the malady, and his boatmen as well.

"After ten days he determined upon the return trip. The men were so weak that they had difficulty in launching the row boats. They traveled toward Bethel only to find that with sweeping suddenness the people, all of them, were sick or dying . . . Prostrate forms lay about upon pallets or even on the beach where they had crept down to the water's edge for water or for food. In the tents babies were crying at dead mothers' breasts. There were feeble calls for water from sick children while mothers and fathers, too weak to move, looked on with agony . . .

"At Bethel, in the adjacent villages, on the tundra, everywhere it was the same. At Quinhagak, Helper Neck, the Eskimo man who, even at that time was regarded as a bulwark of Christianity, nearly succumbed to the disease. At his station the shamans claimed that the trader had imported the sickness with his goods. They also said that the mission doctor had sent the wrong medicines, and for that they threatened to burn the mission houses. In many instances the living were too weak to bury the dead, the tents and hovels merely being razed over the corpses lying beneath. Prowling dogs ate at dead bodies while from the foothills came the long drawn-out eerie calls telling that wolves were near.

"To add to the misery there was the incessant rainfall—the cold, wet rain and mist of the Northland. Tents and roofs leaked. There was no place to dry clothing; the mud floors of the igloos became quagmires, the tundra a sponge. When the epidemic had spent itself it was estimated that only fifty percent of the people were left. At Bethel there were fifty-seven deaths, and while the overall deaths were impossible to estimate, between Bethel and Ougavik alone they numbered 212. And the people were destitute. There was very little game and but little strength to hunt. The government sent relief to the people on the Yukon, but when an appeal was made for the Kuskokwim the Department of the Interior did nothing. Nineteen hundred—the year of the Great Sickness: to this day events are reckoned from that date." (Schwalbe, 1951, pp. 84-85)

In about 1905, there was an epidemic that was like influenza, according to the man quoted above. At any rate, he was sure that it was not measles. (He was about eight years old at the time. He insisted that there had been two epidemics, seven or eight years apart.) There was no teacher or missionary in his area then and the people did not have any medicine except seal oil, which they drank. The village in which he was living at that time, Akulurak, has now been abandoned and the village, Apokak, down the river between Eek and Kwinhagak, was abandoned a few years after this epidemic of flu-like disease.

Another man described an epidemic of something like influenza in Akulurak, evidently a later one and quite probably the big epidemic of 1918-19. He did not know the date and could not tell exactly when the village was abandoned. He could not remember any serious epidemic

of measles, although the villages had experienced this disease at various times.

A woman at Kasigluk did remember well the measles epidemic of 1902-03 that affected all west Alaska so seriously. She said that she was then about 14 years old. Shamans were called on to treat the patients, but this woman did not know what they did. It is interesting that even though there were missionaries on the Kuskokwim at the time, they were not called upon, so far as she could remember. But she did remember that the people turned to the shamans.

The few eyewitness accounts of this measles epidemic as it affected villages on Seward Peninsula—and probably also affected them in this area—tell of the tragedies within families and the disorganization of communities, but in my interviews through interpreters, little of this came through. While descriptions of individual effects were not given, the general effects of these experiences during and immediately following epidemics show in statements given below.

In the tundra villages and in the villages at the mouth of the Kuskokwim, people told of the measles epidemic of 1938-39. One man said that, as he remembered it, eight or nine people died in Kwinhagak. The epidemic hit that village in the spring when people were not traveling. If it had occurred during either winter or summer travel, he thought the epidemic would have been more serious. Nunivak Island, for example, was not affected by this epidemic since the Island was completely isolated from the mainland for about five months during the winter and spring. In 1942, however, it was struck hard by measles, from which 12 adults and 11 children died, in a population not exceeding 250.

Although it was difficult, I tried to describe the symptoms of poliomyelitis, chiefly the muscular effects, to see whether anyone would report an epidemic of illness like this. One elderly Eek man, who was questioned particularly, said that he never had heard of such an epidemic among children or adults or of people who were paralyzed following an illness, except one child who might have had the disease the preceding fall. This child had been taken to the Bethel Hospital. Recent studies indicate that poliomyelitis is endemic and probably is experienced in a mild form. On the other hand, some of the mysterious deaths of infants may be due to undiagnosed poliomyelitis.

The statement was made again and again that there was very little sickness in the old days. One man said that when he was a boy people did not have worms and seldom had colds and very few had tuberculosis. He stated repeatedly that illness came with the white people. He did not use a strong tone; he spoke quietly and mildly, but the content of his talk expressed resentment. He was an old-style Eskimo, chewing black leaf tobacco and living in a manner that is considered quite dirty by modern young Eskimos.

Even the "progressive" Eskimos, who try to keep good houses in the modern manner, said that illness is due to the changes that white people have brought. Two men expressing the opinion of Eek elders said that illness is due to change in diet, especially their eating

so much flour and sugar, and in their clothing. Many do not wear sealskin trousers and the long fur mittens that they formerly wore. These men had noticed that recently after men had been out trapping and hunting they often came home with heavy colds.

A woman at Kasigluk, who had lived also in one of the Kuskokwim River villages, said that when she was young, people did not get colds or tuberculosis. They had diarrhea occasionally but not nearly so often as today. She had no idea why it is more common now unless it might be due to the large quantity of tea that people drink. She had not noticed any regularity in the season for diarrhea except that young children seem to have it at fish camp.

An old man at Kasigluk who had grown up at Kwethluk said at least three times that there was not much sickness in "the old days." Children did not have whooping cough; people did not have the present eye troubles and were not blind except the very old people, and in general people were much healthier. When he was asked about relative amounts of food, he said that he had heard of people who ran out of food during his boyhood but his family always had food.

There was a Russian Orthodox mission at Kwethluk even in his earliest boyhood—he thought himself the oldest man in Kasigluk—but most people did not obtain medicine from the mission; only a few families asked the mission for medicine. The missionaries did not try to treat illness or give medicine, but people did buy some from the store. When asked what he thought is causing the present increased illness, he said that perhaps it is from smoking so much. (He may have said this because of Moravian and other mission teaching.)

Another Kasigluk man, a shaman who had grown up in Nunachuk, agreed that there is much more illness today, but he would not express any opinion as to the cause of increase.

A man in Nunapitchuk commented that people did not have pneumonia when he was a young man. He thought that Eskimos were more accustomed to cold, as they did not have stoves and seldom had heat in the houses. They wore their parkas all the time. Although people occasionally had diarrhea "in the old days," it did not occur so often. When he was asked his opinion regarding the cause of present increase in sickness, he said he thought it was due to new foods, especially flour and sugar. His evidence was the fact that young people's teeth are no good now. When he was young, everyone had good teeth.

We have seen already that in the course of discussion of specific diseases people gave various cultural changes as explanation of present poor health in the Lower Kuskokwim area. They mentioned the drinking of water as well as tea, with implied criticism of young people for not observing the old taboos and not maintaining self-discipline. Implications regarding type and location of houses and waste disposal also were evident.

In Eek there was considerable discontent regarding drainage from the graveyard and the spot where human wastes were dumped. Both were beside a lake that was drained by a swale through the village between two groups of houses. People thought that current

illnesses were due to poor drainage and to the direction of drainage. Pups and children walked through this low place in the village and undoubtedly did track human waste into the houses. The various explanations of disease that were phrased so clearly in this village may have been expressed initially by the Eskimo-speaking teachers. The three principal types of explanation were change in diet, change in clothing, and direct contamination by means of open drainage through the village.

Not everyone could be so specific, however. One man in Eek did not talk easily and laughed frequently in an embarrassed, cynical way. He expressed resentment against whites for bringing illness although he could not say just how this had been done. No effort was made to refute his statement. Whether he felt the old fear of the magical effect of talking about illness—the idea that talking about disease will bring it—is not known.²

There did not appear to be a general feeling that the increased illness was a punishment, although some patients, according to an Alaska psychologist, have thought that they individually were being punished. While the hostility to Whites and their innovations was not socially or culturally healthy, it probably was psychologically healthier than would have been a strong feeling of guilt associated with illness. The worst effect seemed to be a feeling of confusion and helplessness. Although the old home remedies still were used occasionally, there was some uncertainty and shame regarding their use, especially among the young people. And although the new ways could not be avoided, there was also uncertainty regarding their effects. Fortunately, despite their resentment against the newcomers for having brought diseases new to the area or, at least, for bringing in epidemic diseases more frequently, the people of the Kuskokwim have been willing to give a practical trial to the new therapy. The most convincing programs have been the hospitalization and the home chemotherapy for tuberculosis. These two programs have saved lives. The care given emergency cases, such as burns and gunshot wounds, also has saved lives. As itinerant nursing services become more frequent and regular in the remote villages, people see the effects of the immunization program which they also have accepted, in some cases simply because they dared not oppose the nurse and physician, in other cases accepted on faith. In any event, they are willing to cooperate to give the new things a trial while reserving final judgment on them.

In some communities there does seem to have been a change regarding anxiety about oneself. The people seem more hypochondriac:

²This interviewer made no effort to defend Caucasians in this connection. I agreed with the villagers that many of the changes have been bad; however, we cannot return to the old way of living entirely although some things from the old life can be kept. It is because we recognize the present poor health that so many people are trying to find out just what the illnesses are, how they are caused and what we can do to reduce them. This of course was not said in such succinct form. I tried to express sympathy and, in general, agreement with the viewpoint stated so frankly by the older people.

They complain about themselves and seek attention from medical personnel even when they have been assured that all has been done for them that the personnel can do. People from more traditional villages still complain little and are reluctant to describe their symptoms or even to present themselves as patients. Where the change has occurred, it is a more superficial one than most people think. There seems to have been considerable anxiety under aboriginal conditions but this was repressed. People presented a cheerful exterior, concealing even from themselves the full extent of their self-concern. It may be hard on hospital personnel but it probably is better for the patients that today they are willing to tell their fears and discuss their symptoms.

Death and Concepts of the Soul

There has been much change in treatment of the dead. Yet, because of the lack of morticians, the villagers themselves still must prepare the body and dispose of it fairly quickly; and since several of the villages lack a resident missionary, they conduct the funeral. In Kasigluk and Nunipitchuk, families are Moravian (Protestant) or Russian Orthodox Catholic. Kwinhagak and Eek are Moravian; Tununak is Roman Catholic; and the Nunivak villages are Evangelical Covenant, a fundamentalist sect that often is attributed to the Lutheran Church, although separate. Interment is new, but the use of a box coffin is not entirely new. Mainland Eskimos had learned this element of culture from Indians farther up the river and, like the Indians, they placed the coffin on posts and erected carved and painted grave-posts. Nunivakers, on the other hand, did not begin making plank coffins until after the Whites' arrival. It is likely that on the mainland, too, anciently the body was wrapped in a bundle, placed on the ground or in a shallow grave, then covered with stones and whalebones and heavy pieces of wood so that foxes and other predators could not get at the corpse. In any case, without considering all the historical details, we can see that death and the deceased were not kept apart from the living, not remote from children's experience, for example. People lived, in this sense, close to death. (See Lantis, 1946, pp. 227-229, regarding Nunivak disposal of skulls in the open and other funerary customs.)

Some psychiatrists and psychologists say that this is a healthier situation and a better preparation for the shock of death in the family than is the modern American practice of removing the body immediately instead of its being washed and dressed by the family and neighbors. The whole modern complex surrounding death and disposal of a body is intended to protect the survivors' emotions, no matter what it really does. The old Eskimo practice was intended to protect the survivors chiefly against illness or other physical misfortune, while beliefs regarding reincarnation assuaged the emotions. For example, the body formerly was removed through the skylight smoke-hole of the underground house or through a hole opened in the wall. This and several other requirements were intended to keep the soul of the deceased from finding its way back to torment the people.

On the Lower Kuskokwim, a woman after her infant had died would tie a string around her waist so that she would be invisible

and the great World Eye would not bring more illness to her and her family. A man, after death of one of his children, would throw ashes to the four cardinal directions when he went hunting on the sea, so that the ashes would get in the Eye of the World and it would not see him and bring more misfortune. Implicit here was the (ancient?) idea that illness might be a punishment by Sila, the great Being of the Universe, who had seen some infraction of taboo by the family or village. (This idea of illness as a punishment for wrongdoing undoubtedly was reinforced by Christianity.)

The next step was to protect the whole community from loss of its livelihood. A family that had lost a member, for example, would not go fishing when fish were scarce or at the beginning of a fish run since they, contaminated by the death, might drive away the fish. The family would wait until there was a large run of fish. Although informants in the present study were not asked about such matters since this was peripheral to the main subject, there undoubtedly were many such taboos intended to prevent offense to the greater deities and the natural forces on which man depended. (Regarding other beliefs, see p. 3.)

The soul was thought to be sensitive and unpredictable. It was because of the vagaries of the human soul that baby clothes were not made before the child's birth. The family wanted to be sure before making the clothes that the child was born safely and that the reincarnated soul would stay with the child. Today, most of the women, especially the young women, make complete "layettes" for the babies. Some women, though, still may not prepare the layette until after the child's birth. If a woman is asked why she is reluctant to prepare these things ahead of time, she may be unable to answer. The old religious rationale is weak or has disappeared but there still may be a feeling, an emotion, about preparation for childbirth that is hard to express. This is sustained by the high infant mortality and the realistic observation that the infant may not live beyond the first few days or first month. People who are as insecure as these people reluctantly take chances in breaking either the old or the new rules. (See Appendix C.)

The concept of individual punishment after death is new. The missionaries seem to have presented such a clear, even lurid picture of hell that their Eskimo communicants look forward with anxiety to punishment after death rather than in life. (For examples, see Carrighar, pp. 182-183.) By confession, suffering, church attendance, and good works as defined by the missionary, people seek to avoid purgatory.

Suicide, according to the aboriginal value system, was an honorable death, and until now suicides have not been uncommon, especially in a traditional group like the Nuniwagamiut. In other words, people sought death when personal honor or the welfare of the community required it. And they accepted death when it occurred, from whatever cause.

In the 1950's, attitudes are not so clear-cut. Some individuals' fear of a punishing afterlife probably gives extra incentive to care of health, yet such people are likely to be neurotic and suffer illness anyway. While one can learn rather easily the content of old belief and practice

relating to health, the important functional combinations of old and new, which are variable, are not so easy to learn. They require clinical study, to reveal *when* and *why* one type of treatment is undertaken rather than another. Although only the *what* of home doctoring is given here, one must not forget these more important questions.

VII. CONCLUSION

Eskimos have had at least 5000 years in which to learn the potentialities of their arctic and sub-arctic environment. Although no one knows how long they have lived in the Yukon-Kuskokwim Delta, a span of at least three millenia can be assumed. It is not surprising, therefore, that they have learned the practical uses of beaver castor, willow leaves and bark, rancid seal oil, and human urine. Most of the explorers and early settlers understood and accepted such home remedies because they had their own equivalents.

In the first half of this century there came a widespread revulsion against anything not produced by modern science and technology and not "sanitary." While the efforts poured into improvement of sanitation and into the synthesizing of drugs was good, in the United States this went to an extreme—probably inevitable—of rejecting everything that had preceded "modern medicine." Because Alaskan home doctoring was part of a cultural complex that included some magic and shamanism, the whole thing was derided by most incoming Caucasian teachers, whether teachers of religion, public health, or the three R's. The situation in medical care was much like that in one of our villages where a former missionary forbade the people ever to make their wooden dishes because a few of the designs painted inside the bowls represented a dwarf-spirit or some other guardian spirit. (This village is again producing wooden dishes but for sale to tourists, not for home use and not made with the old conscientiousness.) Eskimos were asked to discriminate between the "good" and "bad" in the new culture offered them—between, for example, canned fruit juices and home brew—yet it must be admitted that among the Whites there seldom was a similar discrimination between the good and bad in the traditional local culture.

Here as elsewhere, the parts of the culture that guarded health, whether by design or inadvertence, were more valuable than those intended to restore health after accident or disease. The latter were not entirely worthless, but before the epidemics of new diseases, the curing practices affected only an occasional person whereas the protective food and clothing benefited everyone. The entire complex including "hygiene" as well as "medicine" must be studied, therefore. In this report, the former has been only outlined while the latter has been given in detail. This difference is due largely to the nature of the data and difficulty of getting it and should not be taken to indicate relative importance of hygiene and medicine. One can ask people how they assisted healing of a wound and how they prevented snow-blindness but cannot so productively ask them how they prevented

gastric ulcers and heart disease. (We do not mean to imply that they accomplished all these.)

Internal ailments of locally unknown etiology might be home-treated first by giving the patient seal oil or one of the "teas". Such ailments as severe headache, snow blindness, and rheumatism also might be self-treated; then if the condition persisted, an older man, either shaman or layman, who was experienced in blood-letting, would be called in to give that treatment. Finally, for any especially resistant, frightening or incapacitating condition, a shaman would be asked to intervene, and treatment would shift from medicine to religion.

What occurred at home before the spectacular shamanic performance has been too often overlooked by explorer and ethnographer alike. Since we know that the Aleuts and Pacific Eskimos had an unusual knowledge of anatomy and that Eskimos generally are close observers, experimental, and pragmatic, it should be no surprise that those of West and Southwest Alaska made good use of natural products in their environment—although of course they overlooked some possibilities—in treating the sick. (This subject provides an example of the distinction that must be made between the Arctic and Subarctic Eskimos, the latter's culture not qualitatively but quantitatively different: They had a richer flora and larger plants to use as medicines or as protective foods.) Their folk medicine should have been studied long before this.

Home doctoring now appears to this observer fuller and more effective than it did on first acquaintance with this region. One still must say, however, that Eskimos seem to have had no medical system, either intellectually or professionally, and that their strength lay in keeping well rather than in getting well. Fortunately, when they lived in relative isolation and had an adequate "native diet" and there was a quiet rugged elimination of the physically unfit, doctoring probably was not urgent for so many people as it has become since the Caucasian conquest.

The new medicine—modern rational medicine, professionally administered—has been accepted remarkably well, especially in view of the Kuskokwim Eskimos' resentment against the Whites for bringing devastating new diseases. The principal reasons for this acceptance have been alluded to: 1) There was neither an organized system of ideas as a basis for doctoring nor an organized profession of curers to oppose the new practitioners and their germ theory. 2) These Eskimos do not like to argue, to resist openly; they tend to be passive and accepting, especially when dealing with people who are self-confident, determined, and wealthy by Eskimo standards, hence the ambivalent acceptance by a people not yet fully understanding or fully convinced, yet not daring to oppose the new therapy. 3) They are pragmatic, willing to try new techniques and to accept their results rationally. 4) They recognize their great need. The historical factors of disease and death in sudden epidemic proportions and of demoralization of the survivors caused a questioning or sometimes a full loss of confidence in both old and new systems of doctoring, from which the area covered in this report is only now recovering. The villagers realize consciously that, no

matter who or what caused their present poor physical state, they do need help. If treated with respect, for their belief in some principles of health that are fundamental in both the old and the new cultures, their willingness to try the new, and their considerable knowledge of practical medicine entirely apart from "witch-doctoring," the Lower Kuskokwim and Nelson-Nunivak Island areas should respond even better than they already do to current public health and hospital practice.

Not for Resale

Not for Resale

APPENDIX A

Informants

Eek

- 3-22-55 Henry Roberts, interpreter for all following Eek people; reared and lived much of adult life at Kwinhagak; wife and children living there then; Moravian lay preacher.
William Alexie, middle-aged, employed at school as handyman; had grown up in Eek area but in exactly which village was not ascertained.
Emma Wuya (Uyax); middle-aged; excellent housekeeper and seamstress; from lower Kuskokwim-Eek area but did not learn which village. Husband and good provider, with good foresight.
David Foster, over 65 years, somewhat decrepit; same area; father of Emma.
- 3-23-55 Roland White, middle-aged; grew up in Akulurak.
Joshua Joshua, elderly; grew up in Napaskiak.
Mary (Mrs. George) Green; early middle age; grew up in Apokak; husband from Akulurak.
- 3-24-55 Nellie Reed, said to be oldest woman in village, probably late 60's; grew up in Akulurak.

Kasigluk

- 3-24-55 Sophie Guest was interpreter for all Kasigluk informants.
Anna Tinker, one of oldest, possibly oldest woman; mother of Sophie Guest; grew up in Napakiak.
Wassily and Olinka Brink; probably in late 50's or early 60's; from Nunachuk, formerly a larger village. (Only 4 or 5 families there now.)
- 3-25-55 Wassilie Kiartorluk, "old man"; uncle to Pavila family, grew up in Kwethluk, not regarded as a local man.
Nicholai Nicholas, late middle age; formerly shaman; grew up in Nunachuk.
- 3-28-55 Charlie Guest, ordained Russian Orthodox priest, in 30's. Originally from Nunachuk. No interpreter.

Nunapitchuk

- 3-27-55, middle-aged man, still vigorous; grew up in Chokfaktolik. Interpreter, Elena Nick.
- 9-1-59 Willie Moon Wasselie, 49 years old; grew to adulthood in Nunapitchuk, lived in Tuntutuliak since marriage. Because of much time spent in camps in the Bethel area and other factors, seemed to belong more to the Middle Kuskokwim than to Tuntutuliak at the Kuskokwim mouth. Interviewed when a patient in the USPHS Hospital, Anchorage. No interpreter.

Tununak

Ca.

12-17-55 Anastasia Albert, about 58 years old. Interpreter, Rita Pitka.

Nunivak Island

1939-40 Because so many informants, all life-time residents on the
1946 Island, were used, it seems unnecessary to identify them in-
1955-56 dividually.

Not for Resale

APPENDIX B

Edible and Medicinal Plants, Nunivak Island, with Latin, English, and Eskimo Names (Nunivak Dialect), and Local Uses

These plants were collected by Lantis, 1939-40, within three miles of Mekoryuk village and identification provided by the University of California Herbarium, Berkeley, 1940-41. Information on plant use was obtained from several elderly Eskimos on the Island.

Plants listed by Oswalt (1957) as used by Napaskiak Eskimos (see map), although possibly not used the same as on Nunivak Island, are indicated by (O). Those described by Heller (1953) for other parts of Alaska and by Porsild (1953) for the Arctic, generally, are indicated by (H) and (P) respectively. The reader is referred especially to Heller's publication for the most comprehensive information on edible and on poisonous plants but not those used only medicinally.

(The author's original system of spelling the Eskimo names is used here without trying to reconcile it with Prof. Hammerich's system. (See Appendix D.) The principal difference is that X and G (r) have not been distinguished. The ɣ is used for both, generally for the voiced phoneme (G) in this pair.)

Pedicularis lanata, woolly fernweed or lousewort. Not used, according to author's informants. (Now that comparable material from other Eskimos is available, Nunivakers should be questioned again, and more extensively.) (H) (P)

Pedicularis oedri Vahl?, fernweed. Not used. (Porsild lists other species.)

Epilobium latifolium L., northern fireweed or broad-leaved willow-herb. Not used. (H) (P)

E. angustifolium L., fireweed, čit'kax.¹ Leaves boiled for tea. Leaves eaten occasionally, when tender. (H) (O)

Polygonum viviparum L., wild rhubarb, an•agoču'noax. Root eaten raw in summer. Not stored. (H) (Porsild gives a different species.)

Rumex articus,² dock, čiwa's•ax. Leaves boiled and eaten in summer. For winter use, parboiled; formerly stored in pits in the ground or in large wooden storage dishes; frozen. When taken from storage, to make soup, are cooked with salmon eggs and any kind of dried fish (or fresh fish?) or salmon eggs and seal oil or simply boiled with a little seal oil; or chopped and beaten up with fish and seal oil. Most abundantly used plant food except possibly crowberries. (H) (O) (P)

¹In each case, the Eskimo name is given in the singular although Nunivakers usually refer to the plant in the plural.

²Species identification provided by Peter Stettenheim, Michigan State University, who also collected and recorded use of some of these plants on Nunivak, 1954.

Petasites gracilis Britt., coltsfoot. Not used. (Porsild gives a different species.)

Senecio pseudo-arnica?, ragwort or fleabane?, ko'xoyu'x-oax. Leaves and sometimes stem boiled with fresh fish in late summer. Also stored with dock leaves, and eaten with them. (Oswalt and Porsild list *S. congestus*. Napaskiak informants told Oswalt that the root is poisonous. See Oswalt, pp. 34-35.)

Artemisia vulgaris L. ssp. *tilerii* (Ledeb.) Hall, sagebrush. Not used? (O)

Caltha palustris L. ssp. *asarifolia* DC., marsh marigold, wi'vilux. Stem and leaves, in spring while tender, cooked with seal oil or seal flippers. Also in spring, whole plant eaten raw, rarely. (Ssp. given by Heller for the Bering Sea coast is *arctica*.) (O) (P)

Rhodiola rosea L. or *Sedum roseum* L. Scop., stonecrop or rosewort, ča'kiax. Flowers boiled in water to make tea, not necessarily for medicine, just as a drink. Stettenheim recorded the name as ča'yux and the use as follows: flowers eaten raw, said to be good for tuberculosis. (H) (P)

Angelica lucida L., wild celery, iki'tux. Stalk peeled, eaten raw in early summer. (H) (P)

Ligusticum hultenii Fern., wild parsnip, čiuga'Xax or tuxkai'yux. When plant first sprouts, roots eaten raw, dipped in seal oil or without oil. Leaves and stems boiled and eaten as greens before plant gets large and strong in late summer, when considered mildly poisonous. (H)

Ammodenia (or *Arenaria*) *peplodes* L. Rupr., var. *major* (Hook.) Piper, sea purslane or sea-beach sandwort, tuku'tixax. In late summer, greens boiled slightly, then fish eggs and seal oil added. Also greens stored with dock leaves for winter. (H) (P)

Taraxacum sp., dandelion. Not used. (H) (O) (P)

Saxifraga nelsoniana D. Don, saxifrage. Not used.) Heller and Porsild
S. bracteata D. Don. Not used.) give other species.

Salix fuscescens reducta Ball, willow, pa'l•i ("cotton").³ Leaves chewed to treat sore mouth, not eaten. Old men put willow cotton or "Alaska cotton" (cotton-grass) in inner corner of eye, if have watery sore eyes. (Oswalt gives another species as having medicinal use.)

S. pulchra Chamisso, ki'xmi'x-oax. Flower eaten raw. Most Nunivakers denied ever eating willow leaves, but one old woman said leaves were soaked in seal oil and eaten with dried fish. (T) (O) (P)

S. reticulata L. Not used.

S. ovalifolia cyclophylla (Rydberg) Ball. Not used.

The region covered in this paper contained several species of willow — a total of at least six — with two to four in any one

³Nunivak willows were identified by Carleton R. Ball.

locality. One species would be used medicinally in one village, a different species in another village.

Claytonia arctica Adams?, spring beauty. Not used. (Heller and Porsild give other species.)

Ledum decumbens (Ait.) Lodd., Labrador tea, ai'yu. Stem and leaves boiled for tea. (H) (O) (P)

Oxyria digyna, sourgrass, kuli's•tax. Cooked with seal oil or with sugar, or leaves eaten raw. (H) (P)

Empetrum nigrum L., crowberry, pa'unaxo'tax. Berries eaten fresh or stored and used in "Eskimo ice-cream" during the winter. Ice-cream: berries, seal oil, reindeer tallow, snow, sometimes salmon eggs. (H) (O) (P)

Rubus chamaemorus L., salmonberry, a'tsax. Eaten fresh, or stored with "blueberries" and crowberries or stored alone, for winter. Put in a seal-poke without being cooked. Used in ice-cream or with seal oil and sugar. (H) (O) (P)

Vaccinium vitis idaea L., var. *minus* Lodd., mountain cranberry, tuma'-xəlix. Gathered mostly in spring after berries have remained under snow all winter. Eaten fresh. (Stettenheim reports *V. oxycoccus*.) (H) (O) (P)

Arctous or *Arctostaphylos alpina* L. Niedzn., Alpine bearberry, ga'v•alix? Bearberries eaten fresh. (H) (O) (P)

Dryopteris austriaca (Jacq.) Woynar, fern, s•to'xkax. Fronds put in boiling water and boiled long time, to make tea. (H) (O)

Ranunculus pallasii Schlecht., Pallas buttercup, (young:) agôlu'hoax, (mature:) pi'nasga's•ax. In spring, roots and young shoots boiled, then seal oil poured over them; or shoots boiled in seal-meat soup. In late summer, cooked with dock leaves. (H) (Oswalt lists a different species.)

Hippuris vulgaris L., mare's tail, taya'xo. In autumn (chiefly September) stems and leaves cooked with seal blubber and salmon eggs. One informant said plants are collected just before ponds freeze, leaves and stems chopped up, cooked, then beaten with salmon eggs and seal blubber. In spring when plant floats on ponds, it is gathered, cooked in seal-meat soup. (H) (O)

Betula exilis, Sukatch., birch, čupu'xaxôtət (pl.). Leaves boiled to make a tea. (Porsild refers to use of ground birch but does not list the species.)

Webera nutans Hedw., moss, ke'agən•ax. In spring, seal meat is boiled with moss, for soup. Moss sometimes mixed with seal oil and fish eggs. (Since none of the other authors, two of whom are botanists, mentioned the use of moss for food, this information from Nunivak should be verified by others.)

Sedge (Sp?), pa'knəx. Root and lower part of stem eaten raw. Leaves peeled off, not eaten, only the basal stem eaten. (H)

Seaweed (sp?). Eaten raw or in fish soup. (H)

(Not collected:) wild cabbage, *inu'kit* (pl?) Usually eaten raw, occasionally boiled; or stored with dock leaves for winter use. (May be the same as "little cabbages," *Parrya nudicaulis* L., Regel, illustrated by Heller.)

Other plants, not used for food, were collected. The full list can be seen in Lantis, 1946, Appendix 2.

Not for Resale

APPENDIX C

Morbidity, Mortality, and Birth Data, Bethel Service Area

While epidemics of infectious diseases such as measles and mumps undoubtedly occurred rarely before the Discovery, it is likely that "certain diseases of early infancy," malformations, accidents, and perhaps pneumonia occurred among children as frequently in prehistoric as in historic time. Certainly, 50 to 75 years ago, in the period that the old people had in mind when they talked about curing "in the old days," the list of ailments of all ages that people had to cope with was almost exactly the same as the present one. (They were better off in one respect: the infrequency of dental caries.) Diphtheria, whooping-cough (pertussis), and tuberculosis have been brought under control within the past five years, tuberculosis not yet prevented as pertussis can be but its disabling effects and fatal outcome prevented, so that the people are returning to their earlier condition. The following tables, prepared by the Arctic Health Research Center, Public Health Service, in cooperation with the Alaska Department of Health and Welfare, are given to show the most common diseases in our area, according to available records. Especially for infant deaths, it must be understood that the records are not exact or complete although in the past five years there has been improvement in both respects.

The region included in Tables 1-4 is the service area of the Public Health Service (Division of Indian Health) field hospital in Bethel, largest village of the Lower Yukon and Lower Kuskokwim Rivers. The area includes all of the Bethel, Wade Hampton and Kuskokwim Recording Districts, plus eight villages (if the two villages on Nunivak Island are considered as one, otherwise nine) in other recording districts. Total estimated population of the Bethel Service Unit, used for all years presented in these tables, was 10,187: 9,658 native (Eskimo and Indian) and 529 non-native (Caucasian). All villages of the present study are included in the Bethel Service Unit.

TABLE 1

SELECTED MORBIDITY REPORTING—BETHEL SERVICE UNIT—ALL RACES

Disease	1958	1957	1957-1958	Total
	Number	Number	Number	Rank
Influenza	6	850	856	1
Tuberculosis (All Types)	138	277	415	2
Mumps	6	258	264	3
Chickenpox	108	45	153	4
Measles	148	1	149	5
Diarrhea	0	89	89	6
German Measles	80	7	87	7
Gonorrhea	50	34	84	8
Pneumonia	37	36	73	9
Upper Respiratory Infection	3	68	71	10

TABLE 2

DEATHS BY CAUSE GROUP, AND AGE, BETHEL UNIT, 1956-1957-1958
COMBINED

(By Residence)⁴

A. NATIVE BY AGE IN YEARS

CAUSE	Total	Under							55 &
		1	1-4	5-14	15-24	25-34	35-44	45-54	Over
ALL CAUSES	349	175	35	15	15	19	14	11	65
Influenza & Pneumonia	55	38	8	1		1		1	6
Certain Diseases of Early Infancy	43	43							
Ill-defined	37	26	1		2	1			7
Tuberculosis	34	4	4	1	2	5	3	4	11
Accidents	31	2	4	8	8	4	3	1	1
Other Infectious Diseases	26	14	9	2		1			
Other Respiratory	23	15	3		1				4
Heart	19	1					4	1	13
Gastritis & Enteritis	17	17							
Cancer	16	1	1	1		2	2	2	7
Vascular Lesions	8						1	1	6
Inflammatory Diseases of Central Nervous System	7	4	3						
Congenital Malformation	6	6							
Other Degenerative Diseases	6	2	1			1			2
Maternal	3				1	1			1
Homicide	3		1	1	1				
Suicide	2								2
Alcoholism	2					1	1		
All Other Causes	11	2		1		2		1	5

B. NON-NATIVE BY AGE IN YEARS

CAUSE	Total	Under							55 &
		1	1-4	5-14	15-24	25-34	35-44	45-54	Over
ALL CAUSES	25	1			2	3	4	3	12
Vascular Lesions	2								2
Cancer	2							2	
Heart	6								6
Influenza & Pneumonia	3	1							2
Suicide	3						2		1
All Other	1								1
Accidents	8				2	3	2	1	

⁴This means that the deceased's residence was in the Bethel Service Area although death may have occurred elsewhere.

TABLE 3

INFANT DEATHS PER 1000 LIVE BIRTHS, BY AGE GROUP AND CAUSE, U.S. INDIAN, 1953-1955 AVERAGE; BETHEL SERVICE UNIT NATIVES (ESKIMO AND INDIAN), 1956-1958 AVERAGE; AND U.S. ALL RACES, 1954

CAUSE OF DEATH	Infant deaths per 1000 live births					
	U.S. Indian		Bethel Natives		U.S. All Races	
	Under 28 days	28 days-11 months	Under 1 month	1 month-11 months	Under 28 days	28 days-11 months
ALL DEATHS	22.8	43.8	50.1	93.4	19.1	7.5
Certain Diseases of						
Early Infancy ⁵	17.1	2.4	31.2	4.2	15.4	0.4
Influenza & Pneumonia	0.1	14.4	1.7	29.5	0.0	2.1
Other Respiratory	0.3	1.5	2.5	9.8	0.2	0.4
Gastritis & Enteritis	0.0	11.2	0.0	14.0	0.0	0.9
Congenital Malformation	2.3	1.9	4.9	0.0	2.4	1.4
Tuberculosis (All Types)	0.0	0.9	0.0	3.2	0.0	0.0
Other Infectious Diseases	0.3	2.9	0.7	10.6	0.1	0.4
Accidents	0.7	2.0	0.0	1.7	0.2	0.7
Ill-Defined	1.3	3.6	6.6	14.7	0.3	0.3
All Other	0.7	3.0	2.5	5.7	0.5	0.9

Table 4, also pertaining to the Bethel Service Unit, shows that many births still occur in the home rather than the hospital. In fact, since most of the hospital births occurred in the families of Bethel and near-Bethel residents, it can be assumed that in the outlying villages delivery in the home still is the rule.

TABLE 4

DATA ON BIRTHS—BETHEL SERVICE UNIT—1958 (By Occurrence)

Event	Native		Non-Native	
	Number	Percent	Number	Percent
Total births	385	100.0	12	100.0
Births having medical pre-natal care	207	53.8	10	83.3
Births having no medical pre-natal care	178	46.2	2	16.7
Births in hospital	200	51.9	11	91.7
Births not in hospital	185	48.1	1	8.3
Total births at home	185	100.0	1	100.0
Births at home attended by M.D., R.N., or Midwife	69	37.3	0	0.0
Births at home unattended by M.D., R.N., or Midwife	116	62.7	1	100.0

Of the mainland villages covered in this paper, Kwinhagak has the fullest record of births and deaths, with age at death. At the time that the data on folk medicine were obtained at Kwinhagak, vital statistics also were secured, through the kindness of the Moravian missionaries who had served the village for more than 20 years.

⁵This category includes birth injuries, post-natal asphyxia and atelectasis, pneumonia of newborn, diarrhea of newborn, other infections of newborn, ill-defined diseases peculiar to early infancy, including nutritional maladjustment, immaturity, with mention of any other subsidiary condition, immaturity unqualified, and other specified diseases of early infancy.

TABLE 5

Births and Deaths. Kwinhagak, 1946-55, as of December 1, 1955

Total Village Population, This Date: 240

	Year					10 Yr. In-crease				
	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955
Births, No.	16	7	11	19	7	13	13	16	13	7
Deaths, No.	10	6	20	3	13	12	4	12	11	3
Balance	6	1	-9	16	-6	1	9	4	2	28
Age at Death:										
Under 1 year	1	1	1	1	5	1		6	2	3
(Age in months)	(1)	(10)	(11)	(10)	(6)	(8)		(2 @ 1)	(1)	(-2)
					(2 @ 8)			(2 @ 4)	(-2)	(6)
					(9)			(6)		(10)
					(11)			(7)		
					2			3		
1 year										
2 years		1	5				1	1		
3 years			1		1					
4 years			3							
5 years	1	1	1							
6-10 years		1								
11-15 years							1			
16-20 years					1	1		1		
21-25 years		1	1				1		1	
26-30 years	2		1			1			1	
31-35 years			1	1	1	4			1	
36-40 years										
41-45 years									2	
46-50 years	1		1					1		
51-55 years						1				
56-60 years			1			1			1	
61-65 years			2		1				1	
66-70 years	3	1			1					
71-75 years	1		1	1	1	3	1		1	
76-80 years			1						1	
80- years	1									
Total	10	6	20	3	13	12	4	12	11	3

APPENDIX D

VOCABULARIES OF HEALTH AND ANATOMY

Phonetic system of the Nunivak dialect, according to L. L. Hammerich, Copenhagen (personal communication, 1954):

"The language of Nunivak has two proper vowels, a and the indistinct vowel ə.

"There are two half-vowels (i.e. vowels which may even have the function of consonants), namely i, without distinction of meaning sometimes pronounced e, in consonantic function y (i.e. as in Engl. yes); and u, without distinction of meaning sometimes pronounced o, in consonantic function w (sometimes pronounced v or, under special conditions, f).

"Regarding the vowels it should be added that there are two diphthongs, ai and au, but both of them are apt to be monophthongized and pronounced as a long a.

"Most of the consonants proper can be divided up according to their place of articulation, and subdivided according to their way of articulation.

Place of Articulation	Way of Articulation		Nasal
	Stop	Fricative	
postvelar	q	X r [G]	N
velar	k	x g	
palatal	č		
dental	t		n
labial	p		m

"Outside these divisions we have one liquid, in two forms, voiced and unvoiced: l and L. And a sibilant, in four forms: s and š, z and ž; sometimes even combined with a preceding t: ts.

"The vowels a i u and the consonants q k t p X r x g f l L, the nasals n m and the sibilants may all be short or long. The indistinct vowel ə and the consonantic y and w are only short; č is long. Stress hits a long syllable, but the last syllable of the word is apt to be weak.

"The most difficult and at the same time most characteristic sounds are the postvelar consonants. The q is a stop like k, but pronounced more backwards in the mouth; it is essential to distinguish it from k. The X is the corresponding fricative, pronounced like the ch of Scottish loch 'lake'; r is quite different from Engl. r: it is in fact the same sound as X, only voiced and weaker, and is mostly found between vowels.

"The k is pronounced like French k (without breathing); the corresponding fricative x lies in the pronunciation between ch in German lächeln and ch in German lachen (not so far backwards as X); g is quite different from Engl. g: it is in fact the same sound as x, only voiced and weaker, and is mostly found between vowels. The corresponding nasal N is exactly the same sound as in English before k or g, as in think, finger.

"The č is the same sound as Engl. ch in church; n and m are like the English sounds, too; t and p are pronounced like French t and

p (without breathing). The l, too, is more like the French than the Engl. l; and the L is the corresponding voiceless sound, best known from Welsh, where it is written ll. The sibilants are as in English: s as in mass, š as sh in mash, z as in razor, and ž as in leisure."

I. Miscellaneous Nunivak Expressions Relating to Health

(recorded independently by Hammerich and Lantis):

1. How are you? častun a:Xčit-qa how/do you go/(interrog.)⁶
(contraction of ayaXčit?)
2. How do you feel? častun ayóXčit-qa how/do you feel like/(interrog.)
3. I am well, or, čanaGí:tua nothing is with me (lit.,
There is nothing wrong with me. anything is not)
4. (She) is pregnant. aqsálioX (or (she has) big belly
áqsalioX?)
5. I do not feel well. ayoqúčika piniá:toX my feeling of myself, or,
(or, pini:toX?) my self consciousness/
is not fine, or, is bad
6. I am sick. kixčíúxtua
7. It hurts. áNqiXtoX
8. I have (a) toothache. kxučíkua
9. Person with physical defect. apquč:ix
10. He is dead. toqúmaLGia

Approximations in English:

1. How are you? chástun ákcheetka?⁷
2. How do you feel? chástun ayókcheetka?
3. I am well. chanagheétua
4. She is pregnant. aksáliokh
5. I do not feel well. ayokú'cheeka peneéatokh
6. I am sick. kikhcheéükhtúa
7. It hurts. ángkikhtokh
8. I have a toothache. khúcheékua
9. Person with defect. ápkúchikh
10. He is dead. tokú'mahlgheea

⁶The system of recording and the explanatory notes for this and the following lists are Hammerich's.

⁷English approximations are Lantis's.

II. Western Eskimo Terms for Human Anatomy, from Two Dialects:

	Nunivak Dialect (Mekoryuk)		Lower Kuskokwim Dialect (Kasigluk- Tuntutuliak)
	Hammerich	Lantis	Lantis
1. head	qami':qoX ⁸ nasqoX ⁹	kami'qoX na'skoX	kame'aqoX na'skoX
2. top of head	kaNəX	ka'Nix	—
3. brain	əLqoX	i'LkoX	pa'tax
4. face	čauma/LəX/ča:- ma/LəX	čaoma'LaX	ki'naX
5. forehead	qauX	qaox	qaowax
6. eye	i: (sing.) i:gix (du.) i:git (pl.)	i: i:Git	i: qavalunaox
7. eyebrow	qa:vəlut ¹⁰	qa'valut	qavalunaox
8. nose	qəN:aX	qaNaX	qana'q
9. cheek	uLu'aX/uLu'gaX (sing.) uLu'gix (du.)	uLu'GaX uLu'Gix	uLu'wix (sing.?)
10. beard	u:Nit (pl. tant.)	u'Nit	—
11. ear	čiun (sing.) čiutix (du.) čiutit (pl.)	čiu'n čiu'tit	čiu'n čiu'tit
12. mouth	qanəX	qa'n:aX	qa'naX
13. upper lip	qule'Xfix	kula'Xfix	kLux
14. lower lip	qəziaX/qəzeX qəziax (du.)	kisi'ax	—
15. jaw	agəloq:oX	—	—
16. tongue	ulu	u'lu	alu'Nan
17. tooth	kxun/xun (sing.) kxutix (du.) kxutit (pl.)	qun qu'tit	qun qu'tit
18. neck	uya':qut (pl. tant.)	uya':qut	wiya'qut
19. throat (trachea and larynx)	toqLux	to'Lu	—

⁸Probably originally a taboo-word, meaning something like 'top-end of—'.⁹The old Eskimo word (Greenland niarqoq), well known on Nelson Island and in Bethel, but, in my impression, seldom used on Nunivak.¹⁰Plurale tantum (word of plural form, but used also with the meaning of the singular).

20. esophagus	igəɫax	i'gəɫax	i'Giya'Gax
21. stomach	anəGutaX	a'n:aGo'tax	anaGa'tax, or, a'ksagox (see "abdomen")
22. intestine, gut	—	i'Glin:aLux	qalu't (pl.)
23. large intestine, gut	qilu (sing.) qiLux (du.) qiLut (pl.)	ki'Luax	—
24. bladder	naka'čux	naka'čux	naka'čux
25. kidney	taXtux	ta'xtux	ta'xtu
26. liver	təNux	ti'Nux	ti'Nuq
27. urine	təqu'x	taqo'x	qox
28. excrement	anaX	anaG	ana'x
29. heart	uNu':wan ¹¹	—	i'xčagox
30. lungs	La:Gau'tit ¹²	—	puXtao'tit
31. blood vessel	taqəX (sing.) taXqət (pl.)	ta'Xqət	—
32. blood	aux	aox	a'ok (a'oq?)
33. fat	tun:u ¹³	tunu'Gənix	oqo'q
34. back: whole	—	qami'XLux	—
35. back: upper	—	ko'qa	kami'xlux
36. back: lower	kuyax/kuigax (pl. tant.) ("loin")	naqo'Gonax (see No. 37)	kuga'x
37. waist	naqo':Gunax	—	—
38. backbone	—	kwigawi'ulux (from kui'gax?)	—
39. scapula	k(ə)xa':yix	kxa(i)':ix	kLa'qax
40. rib	ina':Gun	ina'Gon	tuli'mat (pl.)
41. clavicle	qutux	qo't:u'x	otu'k
42. chest/ breastbone	qatəgat/qatəgit	qa'tgat	ka'tgit
43. female breast	mu:gix	mo'gix	a'max
44. abdomen	akšix/aqšix/ aqšaqox ¹⁴	a'Xsix	a'qsi'q

¹¹Expressed as 'means of life' or 'source of life' (uNu':wa); approximately the same in all Eskimo dialects.

¹²Expressed as 'breathing-machine' (La: 'air, breath, atmosphere, weather, world, spirit, sense'); originally a taboo word.

¹³tunu 'back' (of anything), tun:u 'back of reindeer, fat of back of reindeer, any fat'.

¹⁴Nelson Island anGutaq 'abdomen'. See Nunivak anəGutaX 'stomach'.

45. buttock	nuloX (sing.) nuLux (du.)	nuLu'x	kuga'x (see No. 36)
46. thigh	quxtoqaX	qu'xto'qax	igumqa'NiaX
47. hip	məč'a'NqaX	—	—
48. penis/ genital	učux (sing.)	u'čux	—
49. vulva	uč:ux (du.)	u'čux	—
50. testicle (ball)	bi'gu iNčux (du.) (‘nosebeads’)	—	—
51. shoulder	tuyəx	tu'yix	tu'ž'a'
52. upper arm	agəlu'gnəX ¹⁵	axLi'nəx	či'kpik
53. elbow	iku':yəx	igu'yəx	či'Nu'n
54. forearm/ wrist	taGa':yanəX	taya'GanəX	—
55. arm	taL:eX	ta'L:ix	taLi'
56. hand	una':tit (pl. tant.)	una'tit	una'tit
57. knuckle	čuxa'xaX/čuxa':X	čuGa'm- ku'yux (čuXa'm- ku'yaX ? - lit., back of fingers)	uzugo'naGat (pl.)
58. joint/finger joint	napnəX (sing.) napnəx (du.) napnət (pl.)	— na'pnət	—
59. nail (finger or toe)	čətu'x	s(ə)tux	s(ə)toq
60. finger	(none)	čuGa'GaX	taka'X
61. first finger	təkəX ¹⁶	tixki'x	(taka'X?)
62. second finger	qəgoX (lit., ‘one high up’)	—	agu'lipaq
63. third finger	iki':lip:ix	—	tu'Nik
64. little finger	iqi'LqoX	—	i'LqoX
65. thumb	kuməlu ¹⁷	ku'malux	ku'malux/a'ya
66. leg	iGu/iXu	iGu'	e'Go/e'Gu
67. knee	čisqoX	či'sqoX	či'sqoX
68. ankle	čiNi:LeX	čiNi'xan	čiNi'Lqax

¹⁵Probably rather ‘intermediate space’, which meaning is indicated in Asiatic Eskimo. Nelson Island has agəloq ‘cross-beam’. See No. 15.

¹⁶Sometimes replaced by the taboo word tək'i'niun ‘means to reach something’.

¹⁷In the same way the old word kuməlu is very often replaced by the taboo word naNəneX ‘the end’ (it comes last in counting).

69. ankle-bone	—	kama'Nan	kama'Nax
70. calf	naka'č̣uGənaX	naka'č̣u-Gunəq	—
71. foot	tuku'L:əgit (pl. t.) ¹⁸	tuku'tLeGət	i't(ə)gat (see No 72)
72. toe	itəx	—	—
73. big toe	aNan: aqu'yoX	aNanaqo'yux	putu'qox
74. heel	kitNix	kitNi'x	ki'tnix
75. limb/ extremity	ipit/ipiat (pl.) (lit., fingers/toes)	i'pit	—
76. head-hair	qiu'qLit (pl. tant.)	kio'Lit	nuyə't
77. hair	nuyat (pl. tant.)	nu'yət	nuyə't
78. body-hair	məLqoX	—	—
79. skin	qəčix	qač'i'x	ami'q
80. eye-lashes	qəm:əGiat		
81. corner of the mouth	iq:ix (sing.) iXqix (du.)		
82. chin	taməlu		
83. canine tooth	tuloGuyi':gix		
84. gum	iNkix/əNkix		
85. palate	qila':gaX		
86. uvula	ulu':Nūya:X (lit., 'little tongue')		
87. body/trunk	t(ə)ma'		
88. nipple	mul:ax		
89. diaphragm	čapo':Gaun		
90. navel/umbilical cord	qaLa':č̣eX		
91. bile	č̣uNa		
92. anus	itəX		
93. palm (of hand)	(ə)t:u'məx		
94. outer edge of hand	aG(ə)wit		
95. sole (of foot)	aloX		
96. shin/tibia	kana':gax		
97. muscle/ muscular strength	kayu		

¹⁸Again a taboo word, meaning 'those which are kicking or trampling'.

III. Eskimo Terms Pertaining to Illness, Health, and Curing, Lower Kuskokwim Dialect, Recorded by Lantis at Eek and Kwinhagak:

1. Sickness	na'Lun
2. Curing	i'noGo ¹⁹
3. Strong	pini'Galuni
4. Is well, has good health (is lively)	sGa'n:aqluni (or—Luni?)
5. Headache	kami'akiqluni
6. Sore eyes	ili'qluni
7. Snow-blindness	ini'Giluni ²⁰
8. Blindness	čikmi'Geluni (or—Giluni?)
9. Sore mouth	čaLakaya'Galuni
10. Sore throat	iGi'aGi'qluni
11. Tuberculosis (spitting blood)	aogomax-a'pkočax ²¹
12. Cough	koza'q
13. Whooping-cough (lit., continued coughing)	aoGo'Gaya gax
14. Stomach ache	ilu'liqluni
15. Constipation	ana'xčikana'ni
16. Diarrhea	ana'Galuni
17. Worms	go'mat (pl.)
18. Dysuria	kosč'i'gana'ni
19. Backache	tunu'liqluni
20. Swelling	pu'v:aluni
21. Paralyzed (lit., cannot move)	pa'qsčiGana'ni
22. Lame	tusi'Luni
23. Pain in joint	u'suguni'qluni
24. Cut	kili'n:aq
25. Burn	u'naq
26. Pox scars	ka'GaGit (pl.)
27. Boil	ani'Noq
28. Sores	pu'pi't (pl.)
29. Measles	a'n:aqit (pl.)
30. Rabies? (lit., eating mud)	nuna'toqluni
31. Childbirth	miGi'liNo'qvoluni
32. Stone knife for bleeding	Lin (or LiN?)

¹⁹In the Nunivak dialect, this word refers to a protective animal-spirit. In the Lower Kuskokwim dialect, it may refer to the power to cure, connoting a spiritual power.

²⁰The unaccented vowel following G perhaps should be the indistinct phoneme ɔ or could be two different phonemes. The actual pronunciation was recorded, no matter what the pronunciation should have been.

²¹The second part of this word sounds like the English expression "up-chuck" for "vomit" and may have been adopted locally.

IV. Miscellaneous Eskimo Expressions Pertaining to Illness and Curing, Lower-Middle Kuskokwim Dialect, Recorded by Lantis at Akiachuk:

- | | |
|---|---|
| 1. (He, she) is sick; being sick | na:Lu'luni |
| 2. (He, she) is weak | pini'nani |
| 3. Germs eating up lungs | čisi'nkLuni (should be
čisi'nqluni?) |
| 4. Spitting blood | ana'xpituluni |
| 5. Resting | ma'xanu'naxčič'kaluni (—
čiq'luni?) |
| 6. Occupational therapy (lit., they
work (?)) | čali'ktut |
| 7. Hospital (lit., strength coming
back (?)) | yu'NčaGovik |

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NOTES AND NEWS

ARCHAEOLOGICAL WORK NEAR MAGADAN

It is becoming increasingly evident that Alaska's prehistory has been closely bound up with that of northeastern Siberia since the very earliest times. Happily, the broad outlines of the last 4000 years of human occupation on the western shores of Bering Sea are beginning to emerge, thanks to the postwar activities of our Soviet colleagues in this remote (for them) area. But one crucial region has remained largely a mystery: the north coast of the Okhotsk Sea, along which ran the main route to and from the New World, and where were located the southern outposts of that maritime world which had its center in the Bering Sea.

Very recently, the few unpublished investigations carried out here through 1955 were briefly summarized for us in English (Okladnikov, 1958, pp. 545-548). However, we have learned that further excavations were conducted in 1956 by the Magadan Regional Museum, and since these have been reported only in a rather obscure Russian source, some information regarding them may be welcome. It is to be regretted that we still have no illustration of any of this material.

A. V. Beliaeva and G. A. Pytliakov (1958), working in the Ol'skii district east of Magadan, located 17 prehistoric settlements containing a total of 207 houses, plus 3 cemeteries with 34 group burials. Over 3000 specimens were recovered. All of these sites belonged to one rather distinctive culture, similar to that found by A. P. Okladnikov in 1946 on the Koni Peninsula and near Atargan in the same district. Complete excavation of one house at the Bogurchan site was carried out, with partial excavation of others at two sites near the modern settlements of Atargan and Sivuch. Two burials were also opened on Three Brothers Cape, and two more in Astronomic Bay. All the sites are located on the coast near stream mouths in favorable spots for a marine economy based on fish, sea mammals and molluscs. Settlements typically consist of 2 to 12 houses placed very close together. The houses form high mounds with a depression in the center and are covered with tall dense grass. The sites are well preserved except where they have been eroded by the sea.

Th stone artifacts are chiefly of "macrolithic" type: almond-shaped axes with lenticular cross-section, made of slate by percussion techniques with only rarely a polished cutting edge; massive slate whaling harpoon heads; and occasional leaf-shaped slate arrow points with fine retouch. There are also microlithic chalcedony fragments, probably used as side blades. The bone inventory is much more extensive, the raw material being chiefly whale vertebrae or ribs. There are two types of arrow points: one is elongated and square in section, the other (less common) is rhombic in shape with rectangular section. There are also bows, harpoons with 4 barbs, line hole and open socket, and sundry implements (shovels, long-toothed combs for processing grasses, etc.). Pottery is abundant, the overwhelming majority being thin-walled hemispherical vessels with a smooth, recurved rim, 15-25

cm. in top diameter. The entire exterior surface is very often covered with check-stamping; occasional specimens are decorated with pea-like protuberances or applique strips.

The deep midden deposits indicate long occupancy of these sites. Food remains are primarily of sea mammals, plus fish, molluscs and waterfowl. Judging by the house excavated at Bogurchan, the dwellings were probably hemispherical, with walls and roof of poles and whale ribs supported by central posts which were inclined outwards. The exterior was covered with earth. There was a smoke hole, and an entrance facing the sea. In the center of the house is a hearth composed of large stones and slabs set on edge. In close proximity to the houses are numerous storage pits.

The burials are very unusual, being placed in fissures in the cliff or among large rocks, in locations difficult of access but not far from the settlement. The burials are covered over first with stones and then with poles. The first grave to be opened contained 7 skeletons of both sexes, their heads oriented in various directions. There were three males (aged 55, 35 and 23), two females (50 and 40), and a child of six. The remaining skeleton was not sufficiently preserved for identification. There were no grave goods, and no positive proof of association with the site. The second burial opened consisted of two compartments with two skeletons in each, and artifacts resembling those of the adjacent settlement. The third was a single burial with similar materials. Burial No. 4 contained five skeletons. The artifacts included four miniature stone whaling harpoons and frosted glass beads which in the opinion of A. P. Okladnikov date from the 17th century.

This maritime culture of the Magadan area is regarded as being very similar to that of the historic Koryak, especially as regards house type, and local tradition points in the same direction, although the region was no longer occupied by the Koryak in post-contact times. But physical anthropologists who have examined the crania from the first burial report that the individuals resemble Yukagir or Lamut rather than Koryak. In any case, it is agreed that the culture immediately preceded the Russian penetration of the Okhotsk coast and is thus perhaps best labelled protohistoric.

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SALVAGE ARCHAEOLOGY AT CAPE THOMPSON, ALASKA

During the past summer, in conjunction with a general biological and ecological survey of the region, the United States Atomic Energy Commission subsidized and supported an archaeological survey of the vicinity of Ogotoruk Creek which is just south of Cape Thompson. It is at this location that the AEC plans one of its first public demonstrations of the peaceful applications of nuclear energy as part of its overall program, Operation Plowshare. Project Chariot, as it is called, will if carried through, seek to obtain data on the multiple underground detonation of nuclear devices for the construction of harbor and other facilities where the removal of enormous quantities of earth is required. Included as part of the ecological studies being made by the University of Alaska, is a program in human ecology being carried out at the village of Kivalina, 45 miles south of the test site. A similar study is being made by a private contractor at Point Hope, 26 miles north. The practical aspect of all these studies will be to assess the "biological cost" of the experiment.

Contract for the archaeological work was negotiated between the Atomic Energy Commission and the University of Alaska. The project was supervised by the undersigned. Occupational remains were very recent and rather sparse. Thus, despite the fact that only a month was spent in the field owing to the lateness at which the decision to finance was made, a good, representative sample of the archaeological material present was obtained. The results of this work will perhaps be related at some latter date.

This marks the first time that the Atomic Energy Commission has had occasion to finance archaeological salvage on public lands. They thus join those other government and private agencies who are supporting this much needed work. For its recognition of the benefit to science, and for the enlightened spirit of public responsibility so shown, the AEC is to be most highly commended.

F.H.W.

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