Arctic Pharmacognosia

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ABSTRACT. Studies into the history of native uses of local plant materials for medicine have often provided significant insight into the structure and achievements of their culture. In addition, the documentation of such practices has frequently led to the discovery of important new pharmaceutical products and procedures. Literature on this subject is briefly reviewed, representing initial research into the history and chemistry of pharmacologically-exploited arctic natural products, particularly those of Alaska.

RÉSUMÉ. *Pharmacognose arctique.* L'étude de l'histoire des usages indigènes de plantes locales en médecine donne souvent un aperçu significatif de la structure et des réussites de ces cultures. De plus, la documentation sur ces pratiques a souvent conduit à la découverte d'importants produits ou procédés pharmaceutiques nouveaux. L'auteur passe brièvement en revue la littérature pertinente, ce qui représente une première recherche sur l'histoire et la chimie des produits arctiques naturels utilisés en pharmacologie, particulièrement en ce qui concerne l'Alaska.

РЕЗЮМЕ. *Арктическая фармакогнозия.* Изучение истории использования туземцами местных растительных материалов для медицинских целей зачастую позволяет получить новую информацию о структуре и достижениях их культуры. Кроме того, документы, касающиеся практики такого рода, нередко приводят к открытию новых важных фармакологических продуктов и процессов. В статье даётся обзор литературы по этому вопросу, отражающий начальную стадию исследований истории и химии использования естественных продуктов Арктики для фармакологических целей, в особенности в районе Аляски.

INTRODUCTION

Although numerous important medicinal compounds have been discovered through the careful investigation of native cultures, the *materia medica* of the arctic native is relatively unknown. Owing to the semi-nomadic nature of the aboriginal Alaskans, it is improbable that any plants were cultivated before the advent of the European. Although their most reliable source of food was fish and game, plants of certain kinds were eagerly sought at different times of the year and were used for such purposes as food, medicine, handicraft and fuel.

ESKIMO PHARMACOGNOSY

Early arctic expeditions noted a few instances of herbal medicines or ceremonial use of natural products among the north Alaskan Eskimos (Spencer 1959, p. 328) and the Copper Eskimos of central Canada (Jenness 1922, p. 191). Eskimos of Western Greenland have been found to use herbs, and Labrador Eskimos use kelp (seaweed) and twigs of rosemary as drugs (Ackerknecht 1948, p. 920). However, most observers expressed a belief that Eskimos, in particular, had no knowledge of herbs or roots to combat or relieve sickness (Whittaker 1937, p. 115).

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The St. Lawrence Island Eskimos used at least three plants for medicinal purposes. The long tap roots of some of the species of wild sweet potato allied to *Potentilla hyparctica* Malte have a strong medicinal taste and are occasionally eaten. Some Eskimos consider the roots to have medicinal value. Wild celery, *Angelica lucida* L. (Eskimo: "Tepplook"), is considered to be useful in the treatment of most illnesses and feeling of malaise. The Eskimos believe it is desirable to eat a small piece of the root each day as preventative medicine. Also, *Valeriana capitata* Pall (Eskimo: "Ahseukpuk") is used as a medicine for stomach troubles (Young and Hall 1969, p. 49).

At Nunivak Island, a meagre pharmacopeia was reported by Lantis (1946, p. 202). Leaves of *Salix rotundifolia* Trautv. or *Salix pulchra* Chamisso were chewed for "sore mouth." The effectiveness of this remedy is presumably due to the well known analgesic, salicin, which is generally obtained from hot water extracts of ground willow leaves and bark. "Tea was made from several plants, separately, just for a refreshing or warming drink." Although the Eskimos claimed that these were not used medicinally, they may have been so used long ago. Flowers of *Sedum rosea* (L.) Scop., stem and leaves of *Ledum decumbens* (Ait.) Lodd. were brewed into a tea with reputed medicinal value among the Eskimos of the northern Bering Sea. It was also noted that "plants of *Achillea borealis* Bong. are dried and made into an infusion that has medicinal qualities. *Artemisia* sp. is also dried and used for medicine. It may be prepared as an infusion for colds, or the powdered plant may be made into poultices for injuries or swellings. An infusion made of needles of White Spruce, *Picea canadensis* (Mill.)B.S.P. [*P. glanca* (Moench) Voss] is used as medicine for all purposes. The resin is applied to wounds or chewed for pleasure. Its distribution is limited to Norton Sound and inland regions" (Anderson 1939, p. 716).

More recent studies have been made on the *materia medica* of the lower Kuskokwim and Nunivak Island Eskimos by Lantis (1959, p. 5) and Oswalt (1957, pp. 30-1). They were found to have a highly organized system of diagnosis and treatment. A number of medicinal plants were used, and Lantis (1959, p. 6) reports:

> "The most interesting usage involves fungi and possible 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 ignarius*. 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 is used in the Bethel area by burning it and mixing the ashes with tobacco to make a chewing quid.)"

The dried basidiomycetous fungus is generally burned to a white ash in a can, such as a coffee can, and mixed with chewing tobacco. Smaller specimens may

be burned and fed to the dogs to make them run faster. Some Eskimos have been known to simply mash the fungus and chew it. Smoke from the burning or smoldering fungus has also been reported as effective in driving away mosquitos (Anderson 1972).

The Chugach Eskimo also employed a few simple medical and surgical methods.

> "An especially potent remedy when one was 'sick all over' (scurvy?) was made of spruce roots ground to a fine powder and cooked three days into a sort of soup or paste. Sore eyes were cured with applications of wet tea leaves, or by bleeding at the root of the nose or at the temples, ear-ache by applications of hot leaves of a certain plant. For sore throats a decoction of the leaves of highbush cranberries, *Viburnum pauciflorum*, was used as a gargle. Frostbite and cuts were treated with hot pitch, and burns with an application of ashes of devilclub, salmon berries, and burnt dog's excrements. The water lily — including root, stalk, leaves, and flower — was burnt, reduced to powder and used for open wounds, skin afflictions, etc. The pulverized root of the northern yarrow was put on boils. For constipation they would drink decoctions of monkeyflower, fireweed, wild rhubarb or nettle roots, and for diarrhea charcoal mixed with water. A woman would also drink a decoction of fireweed in order to stimulate the milk secretion" (Birket-Smith 1953, pp. 116-17).

In several areas along the western coast of Alaska, *Artemisia tilesii* Ledeb. finds significant use as a medicinal plant. Werner Herz (Herz and Ueda 1961, p. 1139) of Florida State University has reported the isolation of three sesquiterpene lactones from specimens of *Artemisia tilesii* collected around Unalakleet. It is used as an antitumor agent, among other things, by the natives of Unalakleet, and as a fever and infection inhibitor by the natives of Aniak, further south along the Kuskokwim River. The plant is apparently not used medicinally on St. Lawrence Island and material collected there in the summer of 1958 did not yield crystalline substances (Herz and Ueda 1961, p. 1139). There are several cases where a single species is used for different purposes in different regions of Alaska and this is likely to be correlated with chemical variation. Since the more complex compounds will probably be the result of complicated biosynthetic pathways, these differences could indicate genetic variation to substantiate taxonomic distinction of what are now considered poorly defined species or sub-species.

ALEUT PHARMACOGNOSY

The Aleuts demonstrated a remarkable knowledge of human anatomy and had developed an ethnobotany which allowed them to attempt a rational form of medicine (Marsh and Laughlin 1956, pp. 38-54). Their ethnobotany has not been studied in detail and is largely known through scattered reports of early Russian explorers (Veniaminov 1840) and a few more recent botanical expeditions (Bank 1951, 1952, 1956). The Aleuts apparently had an intimate knowledge of the use of herbs in the treatment of illness. Oceredin and Popov (Coxe 1781, p. 173) wrote of the Aleuts of the Fox Islands, "whenever they are wounded in any

encounter or bruised by any accident, they apply a sort of yellow root to the wound, and fast for some time. When their head achs (sic), they open a vein in that part with a stone lance." Baked roots were used for swellings and rheumatic pains, bitter concoctions for fevers, and astringent herbs for diarrhoeas. The leaves of a species of dandelion, *Taraxacum officinale* Weber, were steamed or wilted and applied to indolent ulcers (Turner 1886, p. 70). Similar treatments were applied to sore throats and stomach aches (Alexander 1949, p. 1036).

More recently, Bank (1952, pp. 425-28) reported that:

"They still use the aromatic yarrow *Achillea borealis*, for example, for treatment of chest and muscular pains. Yarrow is also said to give some aid, when crushed and placed over a bleeding wound, in bringing about clotting. Fox oil, derived from the rendered fatty portions of newly killed foxes, is a favorite cure-all for skin lesions and itches. An infusion made from *Matricaria matricarioides* is frequently used by Aleut elders for gas pains and general stomach disorders. The root of *Geum calthifolium*, the leaves of *Conioselinum gmilini* and *Angelica lucida*, and the root of *Plantago macrocarpa* are all employed occasionally in tonics. Leaves of the cow parsnip *Heracleum lanatum* and of *Artemisia unalaskensis* are sometimes heated and placed over sore muscles and minor cuts. The leaves of *Geranium erianthum* are boiled in water, which is then used both as a tea and as a gargle. A number of other plants find occasional medicinal use in the Aleut household when the local teacher is not at hand. For the most part these plants grow near the villages and do not necessitate any major trek inland when the need arises for employing them.

"A list of the chief ingredients in native medicines formerly or still used by the Aleuts includes:

Yarrow, *Achillea borealis*. An infusion was made from the leaves and taken as a cure for stomach and throat pains, also for colds. In post-Russian times it was thought to be especially good for consumptives. Even today, the leaves are plucked, rolled between the palms, and placed over open cuts as a coagulant. Leaves are also crushed and stuffed into the nostrils, for nosebleed.

Matricaria matricarioides. This plant was greatly used by Aleuts and Russians alike as a cure-all. It was thought that an infusion of the leaves was good for stomach pains, especially for gas on the stomach. The infusion was also quite beneficial as a laxative. Today, the Nikolskians rely upon this plant as a tonic.

Artemisia unalaskensis aleutica. This plant was heated over hot stones and used as a switch to beat the part of the body where pain was felt. A few older Aleuts, particularly rheumatic individuals, still use the plant as a switch during steam baths. It was heated and used as a poultice, and sometimes the leaves were boiled in water for a tonic which was thought especially beneficial for dying persons.

Pondweed, *Menyanthes trifoliata*. Modern Nikolskians remember that the roots of this plant were a powerful ingredient in a tonic. They say that it was especially valuable for gas pains, constipation, and rheumatism.

Pond scum. The scum is believed by modern Aleuts to be especially good in the treatment of eye troubles. It is gathered and used for bathing the sore or inflamed parts. The oils are more often used than the actual algae.

Avens, *Geum calthifolium.* The roots are boiled, and the infusion is drunk as a tonic for colds and sore throat. The Aleuts once used the leaves on sores that refused to heal naturally, placing the wet or boiled leaves over the wounds and binding them in place. It was thought that the plant helped to dry out the sore and aided scab formation.

Umbelliferae. Much used in the past in tonics for colds and in soothing drinks for sore throats were: cow parsnip, *Heracleum lanatum;* wild parsnip, *Angelica lucida;* and hemlock parsley, *Conioselinum gmelini.* Wild parsnip leaves were also used as a poultice, and the older natives would slice the roots into two parts, heat the halves, and place them over the area of the body that hurt. If the pain was deep within the body, merely placing the heated roots over the skin in the general region was supposed to bring relief.

Ragwort, *Senecio pseudo-arnica.* The leaves are gathered when the plant is in flower. They are placed directly over cuts and boils to aid in drainage.

Clubmoss, *Lycopodium clavatum.* After delivery of a baby, the mother, if she is in pain, is given an infusion of this plant to drink.

Rumex acetosella. The leaves are steamed and placed over a wart, or over bruised skin.

Leptarrhena pyrolifolia. The leaves used to be brewed, and the infusion was taken internally in the treatment of sickness such as influenza.

Iris, *Iris setosa.* The root is boiled in water, and the infusion taken as a laxative.

Geranium erianthum. The leaves are used in a gargle for sore throat.

Anemone, *Anemone narcissiflora* var. *villosissima.* The root is boiled until all of the juice is extracted and the juice is then given to patients suffering from hemorrhage.

Plantago macrocarpa. The root is boiled in water, and the infusion is used as a tonic.

Reindeer moss, *Cladonia spp.* One informant said that this plant is used as a tea for internal chest pains. It is also said that hunters who are climbing hills eat it in order to maintain their wind."

However, according to the notes and letters of Father Ivan Veniaminov (Hrdlička 1945, p. 175) who lived among the Aleuts and the natives of Sitka from 1824 to 1833, the natives did not consider their medicine men as well trained as in the past. The Aleut practice, whereby the medicine men autopsied their slaves in order to determine the cause of death, was discontinued with the arrival of the Russians. As a result, the medicine men no longer understood the diseases as well and their treatment was not as effective. Father Veniaminov wrote:

"The Aleut medicine men in former times were famed for their knowledge. In order to more properly learn the internal parts of man, they used to open

dead serfs or killed enemies. Even I had a chance to see several old Russians who had lauded them to the limit."

The Aleut medicine men

". . . used also various grasses and roots in their treatment of diseases. Now these are forgotten, for the reason that the Russians, not being able to differentiate the mysteries of their medical knowledge from Shamanism, prohibited everything, calling it sinful. Some of the Aleuts however still know some of the old means and procedures, but from fear they secrete this from the Russians.

"In older wounds, outside of diet, they use for the cleansing and livining of the flesh warm fish oil, or the fat of any of the terrestrial mammals; especially useful they say is the fat from the skull bones of the foxes. Deep wounds they dust with parched powdered teeth, covering the hole with a fresh skin of a mouse.

"Swellings and rheumatic pains they cure with various poultices and ointments or they lay over them certain baked and hot roots.

"Cases of fever they cured with concoctions of bitter plants, guarding the patient at the same time from outside air.

"In diarrhea they used astringent roots and at such times the food of the patient was the root 'makarsa.'

"In both varieties of 'consumption' aside of using some vegetable remedies, they lanced the patient from both sides with stone points. But this operation was performed only by the most able medicine men, for here was necessary a thorough knowledge of where and how deep to lance, and how much 'air' to leave out, for otherwise the internal parts could be damaged; or if all the 'air' were left out the patient could be sent to the other world. This cure was also used in internal pains, as well as in ordinary colic, as the very best, especially in the latter case; and as I have been assured by such patients themselves with astonishing success, so that a person almost dying in the morning, towards the evening, after the operation, became altogether well."

INDIAN PHARMACOGNOSY

The Tanaina Indians near Anchorage have used several kinds of plants as herbal remedies. Such plants as nettle, *Urtica lyallii* Wats; coltsfoot, *Petasites palmatus* (Ait.) Gray; sage bush, *Artemisia tilesii;* and spruce gum have been used in treatment of diseases from rheumatism to tuberculosis (Osgood 1937, p. 116). Those at Susitna have used the root of the cow parsnip, *Heracleum lanatum* Michx., as a medicine (Herron 1901, p. 75).

Several references to medical practices among the Eyak Indians of the Copper River were noted by de Laguna (Birket-Smith and de Laguna 1938, pp. 204, 228).

"The old woman who lived with Kai practiced medicine. Abercrombie saw her doctoring the cuts of children with some kind of poultice made from fresh roots which she crushed together between two stones. The paste seemed to sting for the children would suck in their breath with the pain, though they

were too Spartan to cry. Abercrombie had cut his leg on a rusty nail and the old woman offered to help him. On top of the poultice or mash, she made a bandage of certain green leaves, tied about the wythes. These fell off in two days, leaving the cut covered with a scab like that produced by 'Newskin.' The wound itself was healed within a week. Dr. Robinson was of the opinion that the mash made from the root acted as a disinfectant. Pete Johnson told Abercrombie that the old woman used to cook medicine for internal use . . . . . The devilclub plays an important role in magic. This is certainly the least useful and most unpleasant plant in the region from a practical point of view but on account of its purgative and emetic powers, its magic efficiency may have been obvious to the native mind. Purification by means of the devilclub has a parallel in the Tsetsaut use of a decoction of the same plant. The Carriers and others used it as a purgative and the shaman novices of the Tlingit eat the root. The Tsimshian may drink a decoction of the plant or put some of its bark in their baths. The use of plants, mostly twigs of hemlock, cedar, or spruce for ritual purification is widespread on the Northwest Coast, whereas neither the Eskimo — with the exception of the Chugach — nor the Indians of the Woodlands employ them in a similar manner."

In the Goodpaster River area of Healy, "women would melt down spruce pitch and cool it. This was best for sores, like from cleaning fish, and for boils besides and for canoes and for arrows to stick the feather on. This sap from spruce trees they used for medicine too" (Anderson 1956, p. 20). In the same area, dried wild rhubarb root is evidently brewed into a tea and used in the treatment of heart conditions. Emmons (1911, p. 115) has also reported the use by the Tahltan Indians of wild rhubarb root and the root and stem of devil's club as a medicine.

The Tlinget Indians of southeastern Alaska drink tea made from dried and compressed marine alga they call "Thlakusk" *Porphyra lacinaiata* [*Porphyra umbilicalis* (L.) J. Ag.] which is highly esteemed by both whites and natives as very nutritious and valuable in cases of stomach and bowel disorders. It is "claimed to be a specific in the treatment of dysentary. The same or a similar plant is collected and used in the north of Ireland under the name of 'sloke,' 'slocan,' or 'laver.' In addition to the use of thlakusk as a medicine, the root stock of the skunk cabbage has quite a reputation as a domestic medicine." The peppery, aromatic roots are cooked and crushed and used as a poultice for bruises and swellings. "The buck bean, *Menyanthes trifoliata* L., is also recognized as having medicinal value" (Evans *et. al.* 1898, p. 16).

It is probable that quite a number of medicinal plants were recognized and appreciated by these natives and that this knowledge was not monopolized by the medicine men. Divers materials were recorded by Eduardo Blaschke (1842), a physician in Sitka in 1836 (Krause 1885, pp. 298-99). Of these, only the devil's club has maintained a significant use to the present day.

A warm decoction of seal oil and the shaved inner bark of the devil's club, *Echinopanax horridum* (Sm.) Decne & Planch. is drunk as an emetic and also as a cathartic. For accidental wounds in the forest, the green inner bark is chewed and tied onto the wound as a poultice. It is said to relieve the pain and prevent

blood poisoning (Alberts *c.* 1930, p. 8). In reporting on the use of devil's club in southeastern Alaska, J. W. Justice (1966, p. 36) has noted:

> "Ancient medicinal uses, which are probably not practiced now, included: body perfume; baby talc; emetic; regulation of puerperal menstruation; lactation suppressant, and for menstrual cramps.
>
> "The present common medicinal uses are, for the most part, extensions of ancient practices . . . Tlingit and Haida people make an infusion of bark or of the roots, after removing the hairy spines, and drink it for general strength, colds, chest pain following a cold, arthritis, black eyes, gall stones, stomach ulcers, constipation. Tuberculosis was recently thought to respond to the extract . . . The stalk is chewed and spit directly upon open wounds as an emergency analgesic measure. The bark may be laid in strips, inner side against the skin, to reduce the pain and swelling from a fracture."

A tea made by steeping dried wax plants, *Monesus uniflora* (L.) Gray, was used in the treatment of coughs and colds. Crushed roots of the yellow blossomed water lily, *Nyphar polysepalum* Engelm., have been used as a poultice on swellings and bruises. In the regions of Kodiak, the roots of the sarsaparilla were boiled and the water poured off and used in washing wounds (Alberts *c.* 1930, p. 8). The pounded bark of the Sitka willow, *Salix sitchensis* Sanson, has also been applied to heal wounds (Viereck and Little 1972, p. 122). The sap from the lodgepole pine, *Pinus contorta* Dougl. ex Loud., was also used as a medicine. The patient drank the juice as a cure for coughs and colds (Taylor 1950, p. 13).

PSYCHOTROPIC PLANTS

Reports on the use of psychoactive materials have been particularly rare (Schultes 1965, p. 245). However, considering the widespread role of such plants as *Amanita muscaria* (L.) Fr. (fly agaric) as inebriants in Siberian shamanism and the general distribution of similar materials in Alaska, it would be unusual if some ceremonial or medicinal use had not been made of local hallucinogenic compounds (Wasson 1971, pp. 151-63; Schultes 1969, p. 245; Efron 1967). The Cree Indians of northern Alberta chew rat root (flag root, sweet calomel), *Acorus calamas*, for medicinal and stimulant effects, and it has been reported to produce hallucinogenic experience very similar to LSD (Hoffer and Osmond 1967, pp. 55-56). The beach rye grass, *Elymus mollis* Trin., abundant throughout the Aleutian Islands, has a tendency to produce *ergot sclerotia.* It is reported as rare to find a head without one or more diseased grains (Turner 1886, p. 79). It is not at present known whether any natives ever used ergot. A number of native Alaskan plants have been found to contain alkaloids (Heller 1966), although psychoactive uses have not been reported.

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