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CANADIAN ABORIGINAL CANOES

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Canoeing, it may be remarked by way of introduction, is one of a number of things which have been borrowed, either for use or amusement, from the American Indian. The name, strangely enough, has been introduced from a region at some distance from that with which we are accustomed to connect canoe culture in its typical form, being derived from the word "canoa," in use among the Arawak of the West Indies. This was adopted in a similar form by the Spaniards, and as "canot" by the early French in Canada. The fact that there was already a name in current use, then, is no doubt the reason none of the names applied by the Indians of the Eastern Woodland area of America was adopted.

An Ojibwa term, fairly well-known from its employment by Longfellow in "The Song of Hiawatha", is "cheemaun". A name applied to a very large craft is "nabikwan". A Mohawk appellation is "gahonwé'ia"; rendered by the Onondaga, a related tribe, as "gaho'nwa". It is interesting to note, in the last-mentioned dialects, the close resemblance to the term for a bark bowl or trough.

Quaint early English forms, now obsolete, are "canow" and "cannoe".

There is little doubt that, in the earlier days of French exploration and settlement along the St. Lawrence and of English settlement in New England, the birch-bark canoe of Indian make was very soon adopted as the most convenient method of travel. We can readily infer, also, from early writers and other such sources, the extremely important part played by the canoe in the development of a very large portion of the North American continent.

It would obviously be most interesting to trace the canoe and other such devices to their origins, but there are indications that the problem in hand is one of the diffusion or spread of a cultural trait already elaborated, or partly elaborated, it may be in some other region. This is in part suggested by both the extent and the continuity of the area in which canoes are used. We can see that migrations of population, or the influence of one tribe

upon a neighboring one (accultural influence) would soon disseminate the canoe idea, possibly in a simple form, very widely, and that, under the influence of the varied materials at hand and diversified requirements, specialization in various directions would later arise.

Materials naturally played an important part. In areas where trees were not at hand, or were less convenient, such materials as rushes were sometimes built into a boat-shaped raft (see the *bæ'sa* of California); or a skin-covered craft was employed, as in the Eskimo area, among the neighboring Kutchin of the Yukon, the Tahltan and other Athabascans of the Mackenzie region, and in some parts of the Plains) see the "bull-boat," a tub-shaped craft of skin and withes, used by various Siouan tribes, including the Mandan and the Hidatsa; also by the Arikara, a Caddoan tribe). The Omaha (Siouan) used hide-covered boats or canoes of ordinary type, but with a rude framework, indicating the slight development among them of ideas regarding navigation. In the last-mentioned craft, an oar or large paddle was used for steering, the paddlers sitting near the bow.

One of the most interesting developments in North American navigation was the canoe of birch-bark, which apparently reached its perfection in the Algonkian area, a region extending from around the Great Lakes, and some distance westward, to the maritime provinces and the New England states, though the birch canoe area exhibits cultural extensions in various directions, but particularly northward and westward to the Mackenzie river basin. There is little doubt that this distribution was largely determined by the range of the canoe birch (*Betula papyrifera*), which extends practically from the Atlantic coast to the Rockies, as well as to some distance south of the international boundary. The disappearance of the birch southward is indicated by the fact that very inferior canoes of elm, buttonwood and basswood bark were constructed by the Iroquois of Central New York state and southward, who evidently found the materials last mentioned

more plentiful. The Iroquois canoe is everywhere stated to have been heavy and loggy, inconvenient for portaging and short-lived generally. In fact, so poor a craft it was in comparison with that of the Algonkians, that the Iroquois are said to have traded eagerly for the lighter and more substantial contrivance.¹

Bark and skin-covered canoes, however, are not the only craft which have been used by Canadian Indians, since at least two other devices—usually constructed in a very primitive style—are found side by side with considerable advancement in navigation. The dugout, for instance, which is usually little more than a hollowed-out log, is employed by a great many tribes along with canoes of a much superior kind. Another very primitive-appearing contrivance, the raft, is distributed quite widely, though employed to a greater extent in some areas than in others.

It may be unnecessary, or even impossible, for us to decide which of the foregoing came into use first, but we should certainly be quite near the mark in placing the raft first in degree of simplicity, with the simpler class of dugout next.

THE BIRCH-BARK CANOE.

Practically everywhere within the region of Algonkian influence proper the birch-bark canoe was essentially the same, such differences as occur concerning mostly the shape of bow and stern, which has evidently been derived almost exclusively from a single pattern, with local variations in the amount of curvature or recurvature and the method of decking over at the ends, where such a device was employed. The Malecite (western New Brunswick) and Ojibwa forms are very good examples of the extremes in outline in the Algonkian region. The Malecite canoe also exhibits the decking-over sheet at the ends, with side-flaps, in a well-developed form. As we proceed westward, this sheet decreases in size in the Algonquin canoe of northern Quebec and Ontario and becomes vestigial in a smaller form used by certain of the neighboring Ojibwa. The same purpose, that of preventing the inflow of water, is accomplished by the recurring ends of the Ojibwa type with which we are most familiar.

Regarding the Algonkian tribes of central Labrador, Turner remarks that "a tribe of great dissimilarity between the Naskopies and the Little Whale River Indians (Eastern Cree) is that the

birch-bark canoe of the latter is much more turned up at each end, producing a craft well adapted to the swift currents of rivers." He also states that "the occupants are skilful boatmen," that "sails are sometimes erected in a single canoe," and that "at times two canoes are lashed together and a sail spread from a single mast."²

An offshoot of the Algonkian canoe was the "rabiscaw" of the Hudson Bay Company, an extra large birch-bark craft designed to meet the demands of the fur-trade. A prominent feature was the high, upturned bow and stern decorated with gaudy designs.

At the western extremity of the bark canoe area we find at least two somewhat divergent forms which suggest an attenuation of eastern accultural influence, combined, possibly, with modifications from other sources. The Dog-ribs, an Athabaskan tribe of the Mackenzie basin, like the Ojibwa, construct a birch-bark canoe having separate keel-pieces for the bow and stern. The small and narrow ribs and the slender, widely-separated siding or flooring strips extending from end to end, however, show some resemblance to kayak construction. A special feature (also showing a resemblance to the kayak)³ is the fairly extensive sheet of decking at either end. Conspicuous side-flaps, of the type found in the Algonquin decking, are lacking. The seams are sewn with spruce root and gummed.

Among the Kootenay and the various Salish tribes of southern British Columbia is found a canoe of pine or spruce bark, rather rude in general workmanship and showing but little external resemblance to eastern forms. The most striking feature is the peculiar pointed extension of the lower part of bow and stern, which is said to be specially adapted to rapid rivers. From a structural point of view no radical difference from eastern types is to be noted. The bark of the yellow cedar (*Thuja excelsa*) is also mentioned as a British Columbia canoe-making material.

A Slave canoe from the neighborhood of Hay river (flowing into Great Slave Lake) exhibits an upward extension at the bow and stern which adds much to its picturesqueness. In other respects it conforms closely to eastern models.

A description of Ojibwa canoe-making will no doubt give a fair idea of the methods employed throughout most of the bark canoe area.⁴ The process is most interesting and requires considerable skill.

¹Turner, Lucien M. "Ethnology of the Ungava District," 11th Annual Rept. of the Bureau of Ethn., Washington, D.C., p. 182.

²Mention of this resemblance is made by Pettit, in "Autour du Grand Lac des Esclaves," p. 268.

³From data obtained by the writer among the Saulteaux, or Ojibwa of the Lake Nipigon region. Permission to use this and other original notes was accorded by the Geological Survey, Ottawa.

⁴Dr. E. Sapir, in "Time Perspective in Aboriginal American Culture," Memoir 99, of the Geological Survey (Canada), p. 29, remarks: "Similarly, the clumsy elm-bark canoe of the Iroquois seems less adapted to its cultural environment than the various types of birch-bark canoe of their Algonkian neighbors. We may risk the guess that the Iroquois bark canoe is an imperfect copy in elm-bark, a characteristically Iroquois material, of the superior Algonkian types, and connect this further with the general consideration that the Iroquois were rather more inclined to be cross-country walkers than the neighboring Algonkian tribes, who



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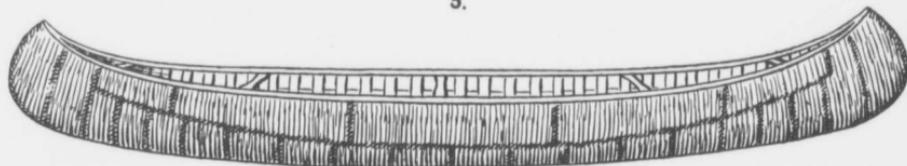
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CANADIAN CANOES.

1, Alaskan Eskimo umiak, or open boat; 2, Labrador Eskimo kayak; 3, Dog-rib canoe; 4, Malecite canoe; 5, Algonquin canoe; 6, Montagnais canoe.

Thin strips of cedar (*Thuja occidentalis*) for the ribs, and the sheeting used between the ribs and bark to prevent injury to the latter, are obtained, split into approximate sizes and placed in water to render them more flexible. Another important requisite is the birch-bark, which peels off most easily late in June or early in July. This is rolled up and laid away in the shade. Towards evening, or at any time, if the day is cloudy, stakes (nine or more to a side) are driven into the ground at intervals to approximate the length and width of the canoe. These are made to flare outward slightly. The bottom pieces of bark are now placed in position, overlapping a few inches in the middle where they are to be joined. A single length of bark is preferred for the bottom. This, however, is not always obtainable, so that two pieces, or even three, may be used. Stones are laid on the bark to hold it down, and a bottom frame, approximating the width of the canoe at the bottom and pointed at both ends, is applied. The work so far is done by the men. The next operation, that of shaping the bottom by making slashes or gores on each side and sewing these with spruce root, is done by the women. The gores are made towards the ends, where the canoe begins to narrow. The upper edges of the bark are also trimmed evenly. The spruce root for sewing has been split by the women to a suitable size and rendered flexible by steeping in fish broth. The men next lay the upper lengths of bark alongside, measure them by trial, then place them in position. The bottom pieces are now scored along the bottom with an axe where they are to be creased for the taper to bow and stern, after which both upper and lower barks are pinched together by stakes driven closely and tied at the top. An inner frame (or "inside gunwale") giving shape to the upper edge of the canoe, and having exactly the right taper and curve, has been prepared beforehand and is now placed between the upper barks and sewn closely and firmly to them. Pieces of cedar, bent to the approved shape of bow and stern, are placed between the barks at the ends of the canoe, the bark trimmed to conform to these in outline, then sewn to them with spruce root. The sewing, as before, is performed by the women, to whom this part of the work is always assigned. Stitches of uneven length are often employed, particularly around the ends, to prevent the bark from splitting.⁵ The gores and laps have in each case been well cemented or stuck together with clear gum boiled a little to thicken it.

⁵Other devices for preventing the edges from splitting along seams, are: The sewing of an extra strip of bark around the outer edge of the canoe beneath the gunwale; also the inclusion under the stitches of a strand of spruce root (often used along longitudinal seams where barks are joined). Both of these schemes are employed by the Dog-ribs, Siaves and Chipewyans.

The bottom frame, which is merely temporary, is now removed, the ribs taken from the water, bent to shape around the knee, cut to length and driven into place with a mallet. Other thin strips of cedar, three or four inches wide, are driven between the ribs and bark as the work proceeds. The purpose of these is to form a protective flooring and siding. The canoe, particularly at this stage, is kept well moistened both inside and out. The placing of the ribs and sheeting proceeds, generally speaking, from each end to the centre. Cross-pieces, to keep the top spread, are hammered in at every second rib. The ribs are a couple of inches wide and about the same width apart. When the insertion of ribs and sheeting is completed, the canoe may require a general correction in shape, which is given by tying it between stakes and exposing it for a while to the sun.

The next process, also a woman's job, is to get ready, or rather, to have ready, the spruce gum and to gum the seams. All laps have their outer edges running backwards or towards the stern, so as not to obstruct the motion of the canoe. The spruce gum is obtained from trees which have been gashed the year before, is boiled a while to thicken it and mixed with powdered charcoal—some say, to make it look nice. The bottom seam is coated with clear gum and pegged, not sewn.

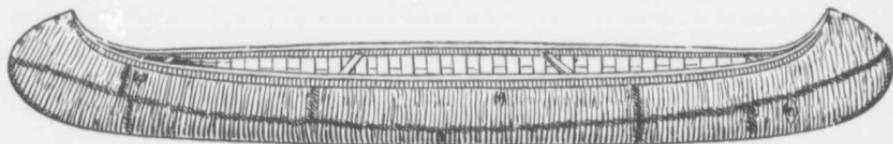
A little grease is said to be added to the gum by most tribes to render it more elastic. The addition of the powdered charcoal is not universal.

Among the Micmac of Nova Scotia and Cape Breton the women and girls are said to have prepared the gum by chewing it.

The last step in Saulteaux canoe-making is to attach a top gunwale strip. This is nailed on at present, but may have formerly been fastened on by tying or binding with spruce root.

The Malecite, according to information supplied by Mr. William McInnes, Director of the Geological Survey, Ottawa, construct temporary or emergency canoes of spruce bark which are used for bringing out furs from the hunting camps in the spring. The ribs and frame are roughly constructed of withes or saplings, flattened slightly and rather widely spaced, the bow and stern being chinked with clay.

Mr. McInnes also furnishes an interesting description of the manner in which the Malecite protect the bottoms of birch-bark canoes in shallow streams: Lengths of spruce bark, with the smooth inner surface placed outward, are wrapped around the bottoms of the canoes from end to end and held in position by tying their edges to the thwarts with cedar inner bark. Another material, which is preferred to the spruce bark on account of its lightness, consists of strips of cedar about two inches wide and three-quarters of an inch thick. The strips run



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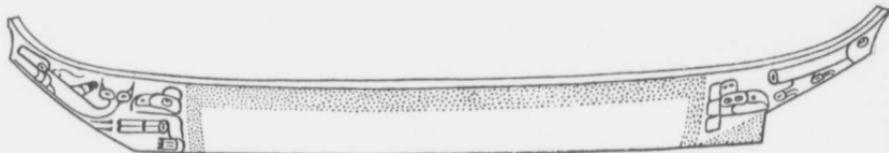
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CANADIAN CANOES.

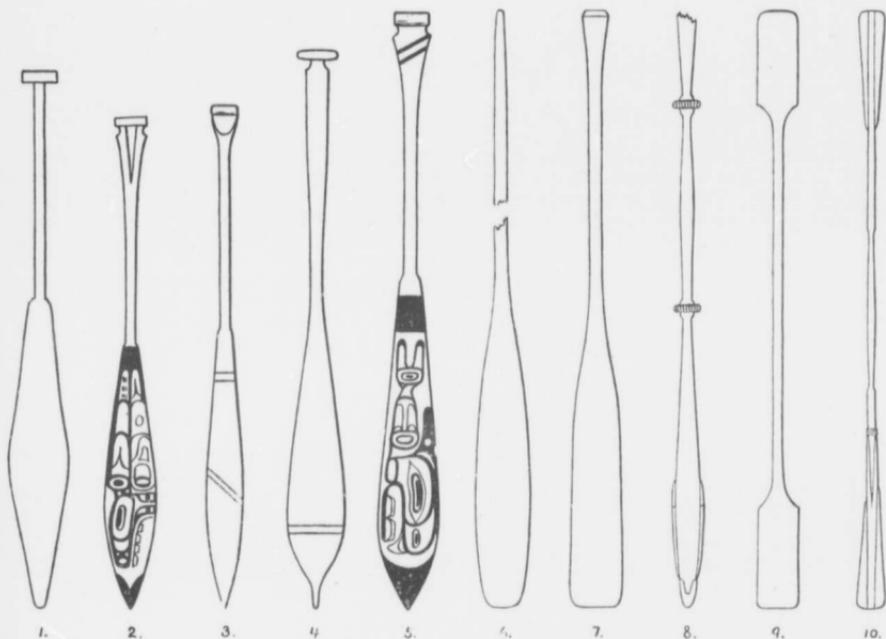
1, Ojibwa canoe (Northern Ontario); 2, Chipewyan; 3, Slave; 4, Kootenay, Shuswap and other southern B.C., tribes; 5, Haida.
Nos. 3 to 6 on plate 1, and 1 to 3 on plate 2, are arranged consecutively to show how one form may have developed from the preceding.

lengthwise from end to end of the canoe, just high enough along the sides to afford protection from rocks, and are lashed together and to the thwarts by continuous strands of cedar bark which are threaded through perforations in their upper edges.

Micmac canoes in the Victoria Museum have the ends stuffed for a short distance with moss or shavings, the purpose being to keep the bark from collapsing or wrinkling where ribs are lacking. The stuffing is held in place by thin partitions of cedar, cut to shape and held in position at the bottom by the end of one of the inside sheeting strips. Slave and Chipewyan canoes also exhibit stuffing.

and navigation developed, with the exception that the Eskimo to some extent use large sea-going kayaks for hunting the whale and seal; and also that the Micmacs, like other coastal tribes, sometimes construct large bark canoes for a similar purpose. The sides of the Micmac canoe are up-curved and turned in towards the centre to exclude heavy seas.

The Eskimo kayak, for present purposes, may be regarded as a highly specialized canoe, differing from the Algonkian in the important, though not essential, respect of having the framework so constructed that it is held together independently of the cover; and in the superficial one that the covering



SOME TYPICAL PADDLES.

1 and 4, West Coast paddles, exact locality unknown; 2 and 3, Tlingit (northern B.C.); 5, probably Haida (Queen Charlotte Islands); 6, Kootenay (southern B.C.); 7, Ojibwa; 9, Copper Eskimo; 8 and 10, Central Eskimo. (The last three are neighboring groups).

In spite of its many excellent qualities and historic associations, the birch-bark canoe is evidently on the wane at present as a medium of travel. The factory-made canoe, though modelled after the Indian article, has, in fact, so far eclipsed it that it is seldom seen except among remote and backward bands of Indians who employ it mainly from economy or conservatism.

ESKIMO CANOES.

In only one region, the great insular area of the North Pacific Coast, was a true seafaring culture

is of skin instead of bark, to which we may add that of being decked over so as to accommodate, in most cases, but one person.

The upper rim or frame of two pieces is made first, with mortises for the insertion of ribs and thwarts and holes for lashings. The thwarts are placed in position and the upper part or deck practically completed, one of the last steps being the attachment of a middle strip lengthwise along the top, except where it is intersected by the opening or man-hole. The whole affair is then turned top or face down-

wards. The ribs are now shaped and fitted and their ends inserted in the upper side-pieces and secured with wooden pins. The ribs are usually from two to six inches apart. The other longitudinal strips are then attached to the sides, with a similar piece along the middle of the bottom, which, like the other canoes described, is destitute of a keel.

The sealskin covering is sewn together and applied to the framework wet, so that it stretches tightly as it dries. The sewing, as in the case of the Algonkian canoe, is done by several women working together in order to complete the job at one sitting. A double waterproof stitching renders the seams water-tight.

of Yukon Territory and Alaska possesses features which give it an intermediate position between the umiak and the canoe of the region to the south and east. A canoe-like feature is the wedge-shaped bow and stern. A pointed or leaf-shaped paddle is used.

The umiak is said to have been entirely abandoned on the east coast of Labrador.⁷ In parts of the latter region and in Alaska it is used largely by the men for whale and walrus hunting as well as for general purposes. Lengthy journeys or migrations are often undertaken in it and its capacity is said to be remarkable.

The bow and stern of the Labrador umiak are



DISTRIBUTION MAP, the dotted portion showing the Eskimo kayak and umiak region, and the part covered by oblique lines, the birch-bark canoe region.

According to E. W. Hawkes, from whose memoir on the Labrador Eskimo the foregoing description is taken, "Great speed is maintained by the Eskimo in their frail kayaks. It is said that a single Eskimo in a kayak will propel it as fast as two white men will a canoe. The Eskimo ventures out in a sea that an Indian would not dare attempt. . . ."

The umiak, an open craft, also used by the Eskimo, presents a somewhat different appearance from the kayak due partly to its not being decked over and partly to its being rather deeper and clumsier in form. In other respects it does not differ materially, a fact which would suggest it as the form from which the kayak was derived.

An open skin-covered boat used by the Kutchin

wider than those of the Alaskan, which gives it a clumsier appearance. It is usually about twenty-five feet long and is steered with a rudder, quite likely an Asiatic borrowing, as are also the oars, rowlocks and sails. In Alaska the umiak is propelled by the more aboriginal paddle, the steering being done with an extra long and heavy one.

SAILS.

Sails were nowhere used as an integral feature of navigation except along the North Pacific Coast, where there is also a suspicion of Russian or other Asiatic influence.

The light and rather easily upset birch-bark canoe was evidently unsuited for propulsion by such a contrivance, except in very light breezes, or when

⁶Hawkes, E. W., "The Labrador Eskimo," Memoir 91. Geol. Survey, Ottawa, p. 72.

⁷Ibid., p. 68.

well loaded. That there was some appreciation of the assistance afforded by sails is likely, even though it failed to crystallize into a definite form. Catlin, for instance, states that among the Sioux a man would sometimes stand in a canoe facing the paddlers and hold a blanket spread out as a sail. The upper corners were held by the hands, while the lower part was tied to the body or to a thwart.⁸

Denys, a French explorer, speaking of the Micmac in 1651, remarks: "They also went with a sail, which was formerly a bark, but oftener of a well-dressed skin of a young moose. Had they a favorable wind they went as swiftly as the throw of a stone. One canoe carried as many as eight or ten persons."⁹

Skinner informs us, with regard to the Eastern Cree, that the "Canoes average twelve or fifteen feet in length, but those used by the Labrador

of Athabascans living on Portland Inlet, B.C., used sails of Marmot-skin.

These items, from various regions, suggest that the idea of sailing may have existed in an incipient form here and there, though none of them is perhaps perfectly free from a suspicion of European influence.

Brinton, the well-known anthropologist, states quite positively that no sails were used by the Déné, or various Athabaskan tribes which occupy an immense region extending throughout northwestern Canada. In this he is supported by Morice, a missionary who spent many years with the Déné.¹¹

PADDLES.

Paddles differ little in pattern throughout the greater part of the area in which we have followed canoe navigation, until we reach the extreme west, or the Eskimo country at the north.



SAULTEAUX CANOE-MAKING: Placing upper barks in position and trimming.

voyageurs are often twice that size and sometimes more. They are capable of bearing enormous weights, and many will hold twenty or more men. The paddles used are short and rather clumsy. They have no swelling at the end of the handle to facilitate the grip. In paddling, the Eastern Cree take shorter and more jerky strokes than their Ojibwa neighbors of the south. When a fair wind is blowing, a blanket or even a bush is set up in the bow for a sail.¹⁰

According to Boas, the Tsetsaut, a small group

⁸Catlin, Geo., "Letters and Notes on the Manners, Customs and Conditions of the North American Indians," London, 1842, p. 214, and plate 294.

⁹Denys, Nicholas, "Description and Natural History of the Coasts of North America," The Champlain Society, Toronto, 1908, p. 422.

¹⁰Skinner, Alanson, "Notes on the Eastern Cree and Northern Saulteaux," Anthropological Papers of the American Mus. of Nat. Hist., vol. IX, part 1, p. 43.

Those used by the Ojibwa are extremely simple and are usually made of clear cedar. The paddler sits rather low, the toes turned inward and bent backward beneath the body. On a long journey a small pad of leaves or clothing is placed beneath the legs conveniently for sitting on.

A double-bladed paddle is used throughout most of the Canadian Eskimo region, although in Alaska the single paddle is found. Among the Aleuts of southwestern Alaska the paddle is pointed, like that of the Pacific Coast.

The Labrador double paddle is about ten or twelve feet long and made of hardwood or spruce tipped with bone. Leather rings on the handles keep the water from dripping on the paddler.

The British Columbia paddle and that used by

¹¹Morice, A. G., "The Great Déné Race," *Anthropos*, vol. 5, p. 441.

certain adjoining tribes, such as the Aleuts and the western or northwestern D  n  , is invariably sharply-pointed or lance-shaped and has almost invariably a T-shaped grip.

British Columbian influence in this respect seems observable eastward as far as the Slaves and the Chipewyans, who have the paddle obtusely-pointed.

WINTER TRANSPORTATION.

A conveyance of the type represented by the canoe, which is suitable mostly for summer, naturally supposes a corresponding winter contrivance, especially for the northern part of our range. That this was, or is, actually the case is suggested by the close correspondence of the dog and sledge or toboggan area with that of the canoe (Eskimo Athabaskan and Algonkian). The exceptions to this are found principally on the West Coast, where conditions are favorable to water transportation through-

Dugouts seem to have been used to a limited extent by the Ojibwa and by the Menominee, a tribe living in northern Michigan and Wisconsin, and fairly closely related to the Sauk, Fox and Kickapoo. This usage may also have been induced by a scarcity of the ordinary material, which is birch-bark.

The eastern dugout region seems fairly continuous southward from among the tribes mentioned, and would probably be contained very largely by the southern half of the Eastern Woodlands area, to which we might no doubt add the eastern half of the south-eastern area.

The canoe in common use on the lower Mississippi is a dugout, called "pirogue" by the French. The bow of this canoe is broad and sloping. The average measurement is forty feet by three in width, with a thickness of about three inches. A canoe



Saulteaux Indian inserting ribs.

out most of the year; on the Plains, where the travois replaced the sledge or toboggan, and canoeing was of relatively slight importance; and in the southern part of the Eastern Woodlands, where the snowfall is comparatively light.

THE DUGOUT.

The dugout, in most cases a rather crude canoe made by charring and hollowing-out a log, also has quite a wide distribution and is found, as already noted, in many regions where a more advanced type of canoe is also used.

Among the Iroquois, who were noted as different canoe-makers, it was quite extensively employed, and is still used for the navigation of small streams for trapping and other such purposes. The scarcity of better materials may have been a factor in its popularity. The favorite Iroquois material is pine.

of this size will carry twelve persons. The material is usually some light or buoyant wood. A craft called by the same name is still to be found in the old "Acadian" region of eastern Canada. The material used is white pine. A black walnut dugout is used on the Arkansas. Besides a dugout, the Chitimacha of the lower Mississippi manufacture an elm-bark canoe.

Bushnell, in speaking of the Choctaw of Bayou Lacomb, Louisiana, states that "dugouts were employed on the creeks and bayous, but evidently only to a small extent." The Creoles at present make dugouts eight or twelve feet in length from logs of black gum.¹²

Those in use among the Creeks (a Muskogean tribe related to the Choctaw) were made of cypress

¹²Bushnell, D. I. Jr., "The Choctaw of Bayou Lacomb, Louisiana," Bulletin 48, Bureau of American Ethnology, p. 18.

and are said to have had their ends slightly elevated and pointed.

Among the northern Ojibwa, Cree and Algonquin tribes generally, the dugout is conspicuous by its absence. The same remark holds good for the Plains tribes and for the Eskimo.

The Iroquois method of making a dugout is probably typical for the whole eastern region in which it is used.

A tree of suitable material and size was first cut down—in former times by burning, the fire being localized by applying some damp material above the point where the tree was to be burned through. The log was cut to length in the same way. The next step was to build a number of small fires at intervals on top of the log, then hack away the charred part with adzes. The fires were rebuilt and the work continued in this way until a suitable hollow was obtained. The ends were shaped in a similar way. The same method of hollowing-out dugouts and large wooden bowls is practised by the present-day Iroquois.

Among the Déné, the adoption of the dugout is considered by Morice to be of fairly recent origin, dugouts of balsam poplar having, in his opinion, replaced the original spruce-bark canoe. These dugouts are sometimes thirty feet in length by not more than three in the middle and are said to possess no elegance or design of beauty.

Along the Pacific Coast the dugout is the characteristic craft and is here elaborated into an article possessing graceful lines and considerable beauty of workmanship. Its development, both in the matter of size and finish, was no doubt due at least partly to the size and workability of the coniferous trees of the coast region, as well as to the decreased demand for portability. A factor which must have greatly improved the product of the last century or two is the introduction of modern tools. Huge sea-faring dugouts were, and are still occasionally, made by the Haida and neighboring tribes of the northern Pacific Coast.

An interesting feature of construction is the retention of the simple or primitive method of alternate charring and hacking in hollowing-out the interior. The final adzing imparts a fine scale-like appearance. When the adzing has been completed the canoes are given additional beam by filling with water, which is heated with stones, after which the sides are forced apart by means of thwarts.

British Columbian dugouts in general bear a degree of interresemblance in outline and structure that suggests a common cultural or intercultural origin. A groove inside the stern provides a rest for the whaling and sealing harpoon.

The eastern dugouts, already described, though possessing some broad features of resemblance to

these of the West Coast, are sufficiently different in general character to suggest a development under differing conditions.

RAFTS.

The raft is at least the crudest of the navigatory devices mentioned and possesses a distribution which is practically universal, though used in many regions merely as an occasional or emergency craft. Its form is usually extremely simple and seldom exhibits anything which can be dignified by the name of design or style, though occasionally there are exceptions to this. The balsa, found among certain California Indians and in isolated localities southward to Chili, is really a raft composed of bunches of tule or rushes tied together, although its pointed ends give it some resemblance to a canoe.

Regarding the northern Déné, we have the statement of Morice to the effect that they occasionally make use of rafts. "They are made of three dry logs bound together, with their larger ends aft, while a slightly tapering shape is given their opposite extremities. The logs are fastened together fore and aft by means of ropes, which, when of truly aboriginal make, are of twisted strips or willow bark, starting from one end of a crossbar placed over them and going round each of the logs and the bar alternately. Among the Loucheux, these primitive embarkations are used in combination with regular canoes."¹³

GENERAL REMARKS.

Decking, so prominent in Eskimo canoes, has been observed to be less extensive in the Dog-rib bark canoe, and still slighter in the Chipewyan, Algonquin and Malecite. It is interesting, however, to find it outside the Eskimo region. The side flaps of the Algonquin and Malecite and some Ojibwa decking sheets have been already referred to.

Sewing, like covering materials, exhibits changes based on geographical location, these consisting mainly of a transition from sinew (used by the Eskimo) to spruce root (used by nearly all Canadian tribes excepting the Eskimo and Kutchin); or, in a few cases, to the bast or inner bark of the basswood and elm (used by the Iroquois).

The seams in all bark canoes are gummed.

The wide, flat rib is characteristic of the Eastern Woodlands and extends westward to the Slave country. This is accompanied by an inside sheeting which covers the bark completely. Contrasted with the wide, flat rib, though not differing from it in principle, is the narrow and widely-spaced rib of the Eskimo, Kutchin and Dog-rib crafts.

A feature which seems to be closely associated with the birch-bark canoe in general is the separate strip or piece used to give shape to the bow and stern respectively. These are also possessed by the

¹³Morice, A. G. "The Great Déné Race," *Anthropos*, vol. 5, p. 443.

Kutchin skin canoe. In the Eskimo canoes they are continuous with the central strip along the bottom.

The differences in outline, which constitute the most striking superficial variations among the canoes described, are dependent principally upon the shape of the end strips or "fashion-pieces" just referred to. A reference to Plates 1 and 2 will show that a series may be found starting with a very simply curved bow and stern piece (Kutchin and Dog-rib) and proceeding to one having an almost perpendicular upper portion (Algonquin and Malecite), and from the latter form to one which is considerably recurved (Slave, Chipewyan, Ojibwa, Montagnais, Micmac).

The gunwale is another interesting item. Among the Slaves and the neighboring Dog-ribs there are two gunwale strips, an inside and an outside, bound at intervals with the sewing or binding material. A similar feature links together the Algonquin and the Malecite. An inside gunwale to which the upper edge of the covering is sewn continuously, is found among the Chipewyan, Ojibwa, Montagnais and Micmac. An upper or top gunwale characterizes all the Algonkian canoes. The Algonquin and Malecite have consequently all three gunwales; inside, outside, and top. The maximum of protection or reinforcement is evidently gained by this employment of three protective strips along the upper edge, although at some addition of weight.

THE FLORA OF KAPUSKASING AND VICINITY.

BY CAPT. T. W. KIRKCONNELL.

Pastures new are always seen through an alluring mist of anticipation, and when, some two years ago, it was my military misfortune but botanical privilege to be detailed for duty on the staff of Kapuskasing Internment Camp in further New Ontario, I waited with intense interest for my first opportunities for exploration. During my exile, unkind weather and strenuous duties have permitted far fewer local excursions than I had hoped for, yet I have been able to gain a fair approximate knowledge of the sub-arctic conditions that obtain here and of the vegetation which they have evolved.

Kapuskasing, in the so-called "Clay Belt," is situated on a river of the same name which joins the Mattagami, about one hundred miles from James Bay. The region exemplifies in its flora the inevitable selection power of rainfall, temperature, and soil. Lying within the path of the broad cyclonic disturbances that traverse North America from the southwest, it has an abundant rainfall and is consequently completely forested, except in the extreme north where under duress of temperature trees give place to scrubs. It also borders on the great north-western reservoir of high pressure and so tastes the first bitter cold of anticyclonic gales. The menace of winter is felt throughout the greater part of the year, and during 1918 frost was registered in every month without exception. The great penetration of the winter frosts cannot fail to have a discouraging effect on plant life. During August, 1918, a drain was being dug through the camp at Kapuskasing and ice was encountered at a depth of four feet. Snow also persists in the bush until late in the summer. As a result, only species that are exceedingly toler-

ant of cold have survived the selection of ages, and even existing life is dwarfed and stunted. Finally, the soil almost everywhere is a heavy clay resting on gneiss and covered with from one to four feet of rich vegetable mould. Thousands of square miles have absolute homogeneity of conditions and the flora shows like lack of variety.

The change from Southern Ontario is marked and complete. As one travels northward from North Bay, the transition in the character of the forestation cannot fail to attract attention. In the long climb into the rock country deciduous trees are left behind more and more; white pine is supreme in parts of the Timagami area, but before Cobalt is reached the last white pine has disappeared; and in descending into the Great Clay Bog of the North one sees mile after weary mile of stunted spruce (*Picea mariana*), broken at intervals by ridges of poplar (*Populus balsamifera*), aspen (*Populus tremuloides*), and birch (*Betula alba*). First impressions of the endless leagues of spruce are peculiar. One might almost, by a stretch of the imagination, conceive of the scene being laid in Paleozoic times amid the forest of progressive Equisetales and Lepidodendreae which clothed the lower James Bay slope when the world was some æons younger. Closer inspection finds other trees eking out a minority existence. Cedar grows along river-bottoms, as do Alder and Willows. Balsam and Jackpine (*Pinus Banksiana*) are occasionally found, and the Mountain Ash (*Pyrus americana*) flourishes as a large shrub on higher ground. Any tamarack that I have found has been dead, apparently the victim of the Larch Sawfly.