Part 2 Materials and Tools

Materials

The first task of the builder is to gather together the materials he will need. They are many and varied, and their collection and preparation take up a third of the total building time of about ten days. It is important to spend time on this, for the choice of materials determines to a great extent the quality of the finished product. These trips into the bush with the builder also provided us with an insight into the Indian's familiarity with his natural environment.

Seldom can all the materials required be found in the immediate vicinity of the camp, but this is probably not a direct result of recent lumbering operations. Actually, it is unusual for a small area to offer growing conditions simultaneously ideal for birch, cedar, jack pine and spruce, and one must go some distance from the camp and in various directions around it to procure all the materials. Albert Birote was thoroughly familiar with the forest around Dam C, for these were his hunting grounds. He was therefore able to go directly to locations for the birch bark, jack pine roots, cedar and spruce resin that he needed. The major problem was transport, and that was solved by using Albert's canvas canoe and my car.

Bark

The best time to peel bark from the trees is in May or June. Our expedition took place in the first week of July, and our informant told us that we were near the end of the season when birch bark can be removed easily. Too early in the season, the inner bark or rind, which is not lamellate and is thicker and pastier than the bark itself, tends to come away from the tree with the outer bark.

Large white birches *(Betula papyrifera)* are becoming increasingly rare in the St-Maurice region, having been subject to various diseases in recent years. However, while out hunting, Albert had noticed a fairly healthy stand about eight miles from his camp. When we got there, he set about inspecting those birches that seemed large enough to him, that is about 20 in. in diameter at the base.

The first test is a visual check of each tree's health; diseased specimens have dead branches at the top. The trunk must have at least 12 ft clear of branches (the length planned for the canoe) with a minimum of knots in the bark. If a tree seems satisfactory, the builder proceeds to the next test. Cutting off a sample of bark with his axe, he bends the edges back. This will indicate at once whether the bark has a tendency to split, which it normally does in the direction of the grain. If the sample proves not strong enough, he moves on to another tree. The strength of the bark depends on its thickness; thin bark is naturally more fragile. Bark used for covering a canoe must be from ⅛ in. to ¼ In. thick.

After more than an hour of testing, Albert finally chose two trees that seemed suitable. He remembered their location by reference to the lie of the land, and their position in relation to a few large, easy-to-spot spruces in the same area. On the way back, he made a makeshift container of birch bark to hold the balls of spruce and jack pine resin that he collected.

The next day he returned with his assistant André Petikwi, a young man of about twenty. He decided on the first of the two birches he had chosen, and cut it down with a saw and an axe. Because care must be taken not to puncture the bark, which can happen if the falling birch scrapes against nearby trees or falls on stony ground, the direction of the tree's fall is carefully determined. Some builders place a tree trunk at the foot of the birch, to support it and make the removal of the bark easier. Albert did not follow this technique, but cut the tree in such a way that the base of the trunk remained attached to the stump. If he had not done this, he would have had to slide the bark out from under the trunk, or cut it into two sections and remove them one at a time by rolling the trunk along the ground.

The next step is peeling the bark. The builder winds a cord around the section of bark he plans to remove. If the cord were not there to retain it, the bark would loosen in places and tear when the cut was made along the trunk. Once the bark has been bound so as to prevent this, the builder makes a cut with his knife the length of the trunk and lifts the bark off, pulling it away carefully with his hands in places where it sticks. Next he removes the cord and lays the bark on the ground.

The bark must then be rolled up for

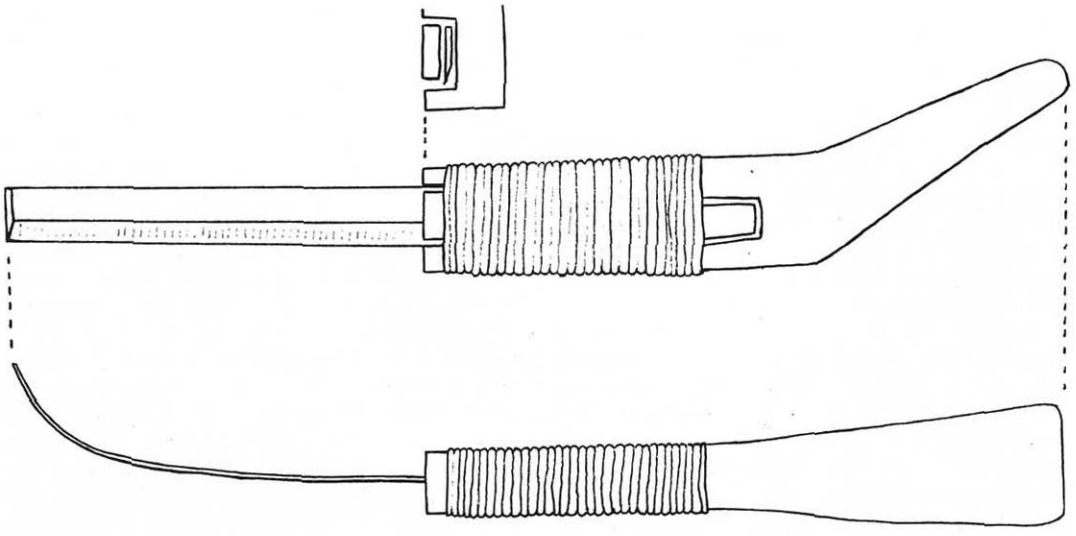

Figure 1
The crooked knife

transport back to the camp. To facilitate this, the roll of bark is left with its inside surface facing up to the sun for 10 to 15 minutes; the roll opens up, its edges bending back as a result of the contraction of the fibres that are directly exposed to the sun's warmth. It is then turned over and the outside is exposed to the sun for another 10 or 15 minutes, after which it can be safely rolled up again, with the inside facing out. The roll is then attached to a shoulder harness.

During this same expedition, Albert also carried back to the camp a second sheet of bark about 4 ft square, which he removed without cutting down the tree. This piece would be used to make extensions for the ends of the canoe. Back at the camp, the bark was stored in the shade until it would be needed. Away from the sun's heat it would keep for a long time.

Roots

The roots of the jack pine *(Pinus banksiana)* are used to stitch the bark and lash the gunwales. They are also used for making baskets of birch bark. Albert, his assistant and another man from Dam C collected the roots from a stand of young jack pines growing in very sandy soil about three miles from the camp. They chose smaller trees, about 3 to 5 in. in diameter at the base, since their roots are the right size for making thongs—between ⅛ in. and ⅜ in. in diameter. The roots are first unearthed at the foot of the tree with a hatchet, then pulled out, an easy operation since jack pine roots grow near the surface. The roots, which are slender and often reach 20 ft or more in length, are then wrapped in bundles of five or six, taken back to the camp, and placed in the shade until the women are ready to process them into thongs suitable for lashing the canoe together.

The thongs are prepared by the women. First the roots are split lengthwise with a knife. If they are too thick, they are shaved down even more, but it is usually sufficient to split them once. The result is a thong semicircular in cross-section. Next the root is run between thumb and knife blade to remove the small lateral roots that remain, as well as any sand still clinging to them. They are then coiled up once more in bundles of five or six, and boiled.

Many hours of boiling in a kettle of water over an outside fire are required to make the thongs supple, but a remarkable degree

of flexibility results. Once they have reached the proper degree of suppleness, the thongs are left in the water so as not to dry out.

Resin

Resin is usually collected near the camp from black and white spruce *(Picea mariana* and *Picea glauca)* that have been injured or slashed. In this case, the slashes probably marked a trapline, but in the past such slashes were usually made for later collection of resin.

To this resin the builder added equal parts of pine resin *(Pinus resinosa* or *P. strobus)* brought by a neighbour. Pine resin was probably in more general use in the past. Pine was the first kind of tree to be used as timber on a large scale in the St-Maurice region, with the result that, toward the end of the nineteenth century, large pines had all but disappeared from the region.

Two or three pounds of resin are needed to caulk a 12-ft canoe properly. Once he has the required amount, the builder prepares the gum. First he melts the resin in a frying-pan over the fire. Next he adds fat, nowadays usually a commercial vegetable fat rather than the bear or fish fat used in the past. The consistency of the mixture, which is not very soluble, depends on the proportions of the ingredients. Without the fat, the resin is brittle; the addition of fat makes it more plastic.

Proportions are determined by strength tests. When the ingredients in the frying-pan are well mixed, the mixture is strained —in this case by pouring it through one of Albert's old shirts—to get rid of the impurities in the resin. Next the builder places a little of the hot gum on a piece of bark, and plunges it into cold water to cool and harden it. He then bends the bark to test the strength of the gum. If the gum cracks easily, he adds a little fat; if it is too elastic, he adds resin. He continues to do this until he is satisfied with its consistency.

For caulking the inside of the canoe, Albert added to the mixture a little pitch he had bought at a local store. "It sticks better," was his explanation. The pitch makes the gum black, and therefore, for aesthetic reasons (as he said), he did not use it on the outside of the canoe. Without added pitch, the light-coloured gum blends with the colour of the bark. The Montagnais Indians also are known not to have used pitch or charcoal in their gum.

Cedar

The wood of the eastern white cedar *(Thuja occidentalis)* is supple, light in weight and decay resistant. It is therefore ideal for the construction of birchbark canoes, and is used for a large number of parts: ribs, sheathing, gunwale members, stempieces, and headboards. Some builders use young spruce for the gunwales, but it is harder to bend.

Like birch, cedar is no longer abundant in this region, and it was necessary to travel 12 miles by car, and 5 miles more by canoe to the marshy banks of Lac Manouane, where there are fine stands of cedar. Albert, his assistant and the latter's father put in a full day's work on this expedition. Green cedar wood is preferred, although a dry fallen tree is sometimes used. A frame saw and an axe are used to cut down the tree; then the trunk is cut into various lengths: three or four 4-ft battens about 8 in. in diameter, and a 13-ft length for the gunwale members. The rest of the work is done by hammering a wedge into the trunk with the axe, splitting it from end to end and then quartering it. This rough preparation makes it easier to transport the cedar back to camp, where an axe blade or a strong knife is used to split one end of each piece. The builder then pulls the two strips apart with his hands. The cedar is always cut with the grain, following the growth rings.

Later the pieces will be fashioned into ribs, sheathing strips, and so on, with the help of the crooked knife, but for the moment they are placed in a stream to keep them from losing their flexibility.

Birch

Birch is used only for the cross-pieces.

Tools

Crooked Knife

The crooked knife of the Indians of the northern forest appears to be an essential tool in the building of a birchbark canoe. All the parts of the craft are shaped with

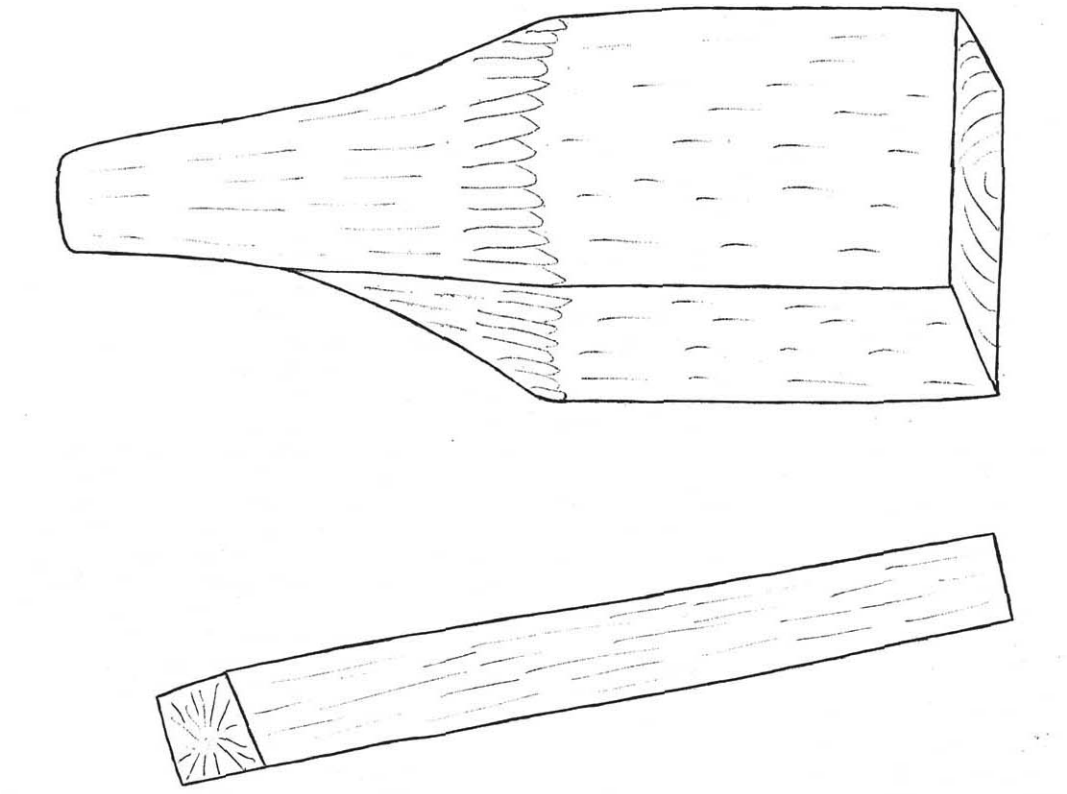

Figure 2
Mallet and drift

it; the builder handles the knife with such dexterity that all the finished parts end up perfectly uniform.

The knife is handmade; it consists of a flat blade, bent laterally upward and sharp on one side. It is set into a wooden handle that projects away from the user, thus providing a place for his thumb to rest. The shape of the knife, and the way it is handled, permits very close control of the blade. The blade is not pushed away from the user as with a normal knife, but drawn toward him; the hand is turned to the side and moves parallel with the work, the thumb resting on the curved end of the handle. This technique considerably increases the user's control over the blade as well as the amount of pressure that can be exerted on it. Albert used two crooked knives, one of them with a horn handle.

Awl

A steel awl was used to punch holes in the bark for the thongs. It too was handmade, from a round file ground to an angle on three or four sides, and fitted with a straight handle. Nowadays, the builder uses factory-made awls more often than not.

Birch Mallet

A wooden mallet is used to push the ribs into vertical position on the inside of the canoe. It is used with a wooden drift so as to direct its impact with greater precision. It has no special characteristics, except that the handle is at a slight angle to the head.

Other Tools

An axe, a frame saw and a small handsaw are used to cut and dress the lumber. An ordinary knife is also put to use in a variety of ways in the course of the construction of a canoe.

Measuring Gauges

Tsimotsigən
This instrument is used to gauge the distance to the thwarts from the bottom of the canoe; it consists of a wooden stick notched in three places, corresponding to the central thwart and the two pairs of thwarts on each side between the centre and the tips of the canoe. These measurements are standardized; for a 12-ft canoe, the height of the central thwart is the span of the thumb and index finger, or about 8 in. Half an inch is added for the first thwart on either side of the centre, and an inch for the second. Although the rounding of the bottom when the ribs are inserted increases the depth of the hull appreciably, the same proportions are retained. The builder uses the same gauge to build a number of canoes of the same length. Recording these measurements on a wooden gauge ensures a perfect symmetry for the canoe, front and back.

Tibwehitaban
This is a wooden measuring gauge used to mark on the gunwales the spaces where the ribs will fit between the lashings. Ribs and lashings alternate the length of the canoe. On a 12-ft canoe, the spaces are double the width of a thumb, or about 2¼ in. The thumb measurements are marked on the *tibwehitaban* carried by the builder.

Another measuring device that should be mentioned is the line-level used over the building bed to indicate the horizontal.

There are many ways of measuring without graduated instruments. We have already mentioned the width of the thumb and the thumb-index span. To measure a foot, the canoe builder places his hands flat on the work with his thumbs extended inward and thumbnails overlapping. Outstretched arms measure 6 ft, a measurement used when cutting the gunwale members. The distance between the nose and the tip of one outstretched arm measures half this distance.

Use of Natural Elements

The builder makes extensive use of heat, water and air throughout the construction process. A short general outline of these methods follows; the procedures will be described more fully during the description of the actual construction of the canoe.

Open-Air Drying

Drying is carefully controlled while materials are being processed, for cedar dries very quickly and loses its flexibility when exposed to the air. Gunwale members, stempieces and other parts have to be bent into shape; after their preliminary shaping, the pieces of cedar are kept immersed in water to keep them from drying out too soon. When they are required in construction, they are bent and then exposed to the air so that they will dry in the required shape. A striking example of this technique is the shaping and installation of the ribs.

Soaking in Water

Soaking fibrous matter in water makes it easier to shape. When cedar is soaked in a stream, it is penetrated and softened by the water, so that it then becomes much more flexible, and easier to bend when shaping is required.

Exposure to Heat

The main source of heat used is the sun. Exposed to its rays, birch bark contracts in the areas most directly exposed, which makes it possible first to unfold the bark and then to roll it up. Heat is also used, of course, in the preparation of the caulking compound.

Heat and water are also used together. Cedar sprinkled with hot water bends more easily, and the roots used for the lashings develop the required flexibility only after prolonged immersion in boiling water.

Thus the canoe builder uses his knowledge of the effects of heat, air and water to control the transformation of his raw materials into the finished product.