"they fight and they fight and they fight." The result of the contest is always uncertain; either "they kill each other" and fall apart, or "one may kill the other and travel home," toward the right hand, "with his enemy's head" (Fig. 32).

If, in forming Opening A, the right palmar string be taken up first, and if, when the figure is completed, the *right* near strings be pulled upon, then the victorious head-hunter will travel home toward the left hand.

There are not many figures like this one which have definite stories attached to them. Doubtless the stories exist, but have not been told and recorded; in some instances the stories have been forgotten by the natives themselves, or have degenerated into formulæ the meanings of which are no longer known.

The Fighting Head-Hunters is a good example of that simple type of figure in which most of the movements consist in passing the fingers away from you and
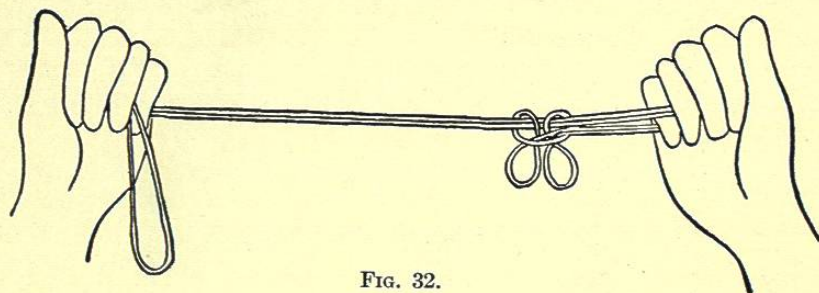

FIG. 32.

toward you, and taking up strings and loops from other fingers of the same hand. The picking up of the strings forming the sides of the central triangle is not a common movement. In the *Second* movement a loop is transferred from one finger to another and turned over during the transfer. In the *Sixth* movement we have the first example of an almost universal procedure: When two loops are on a finger the lower loop is lifted over the upper loop and off the finger to form, toward the centre of the figure, a running noose or ring upon the upper loop. If there be three loops on a finger the lower one may be lifted over the upper two, or the lower two over the upper one, but in all cases the principle is the same, namely, to thread the upper loop, which originally belonged to another finger, through the lower loop, which is usually the original loop of the finger. As we shall see further on, this movement is executed in different ways: with the teeth, with the thumb and index of the other hand, by the aid of another finger of the same hand, or merely by twisting the finger itself. It is so general in the Navaho Indian figures that, following Dr. Haddon, in conversation we often speak of it as the "Navaho movement," or, coining a new verb, direct that the loops on a finger shall be "Navahoed."

A SUNSET

The "Sunset" is closely related to the preceding "Fighting Head-Hunters." It was obtained by Dr. Haddon in Torres Straits (see Rivers and Haddon, p. 150,
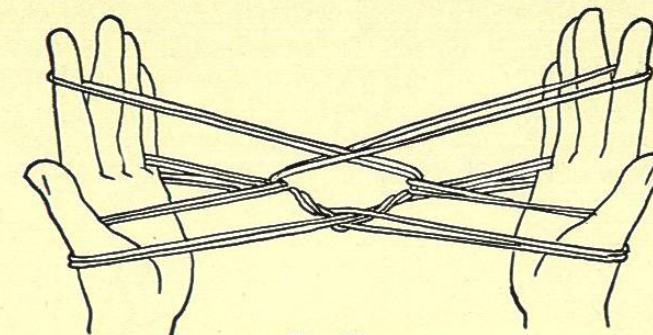

FIG. 33.

Fig. 4). In Murray Island it is known as *Lem baraigida* = a Setting Sun; in Mabuiag as *Dògai* = a Star.

First, Second, Third, Fourth: Similar to the first four movements of the Fighting Head-Hunters.

Fifth: Exchange the loops on the index fingers by bringing the hands together and putting the right index loop on the left index and then putting the left index loop on the right index; in this way the right index loop is passed through the left
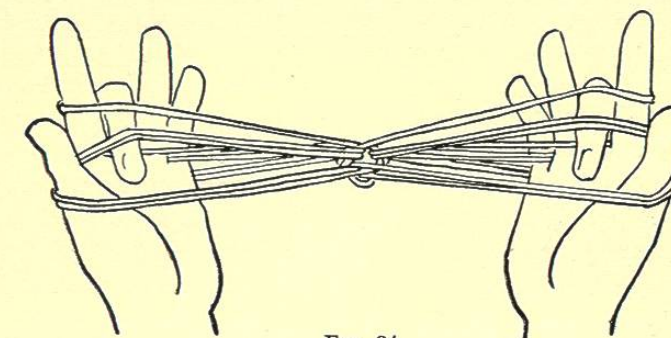

FIG. 34.

index loop. You now have a single loop on each index, two loops on each thumb, and two loops on each little finger (Fig. 33).

Sixth: Bend each middle finger down, and put it from above through the index loop; pick up from below on the back of the finger the two far thumb strings (Fig. 34),

and return the middle finger back through the index loop to its original position (Fig. 35).

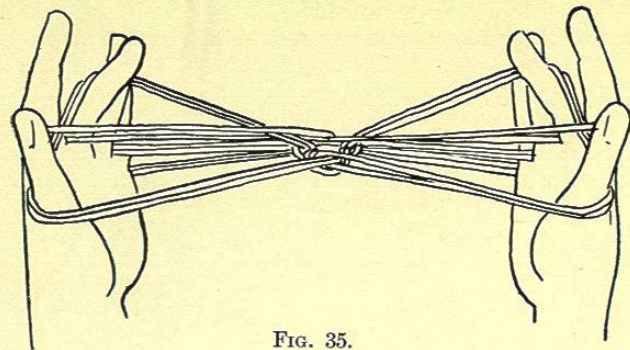Release the loops from the thumbs and index fingers, and transfer the two

Fig. 35.

loops on each middle finger to the thumb, by putting the thumb from below into the loops and withdrawing the middle finger.

Seventh : In the centre of the figure is a small triangle the base of which is on the far side and is formed by the two strings passing from one little finger to the other; each side of the triangle is formed of the two near thumb strings after they have crossed the corresponding strings from the other thumb (Fig. 36). Pick
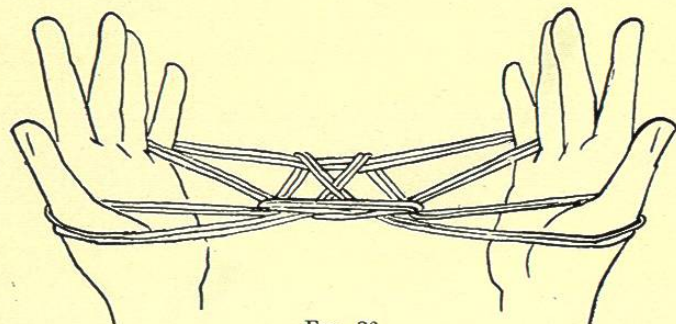

Fig. 36.

up from below on the back of each index the strings forming the corresponding side of the triangle (Fig. 37), and return the index to its position.

You now have two loops on each thumb, two loops on each index, and two loops on each little finger.

Eighth : Put each middle finger from above through the two index loops, and (as in the *Sixth* movement) pick up from below on the back of the middle finger the two far thumb strings (Fig. 38), and return the middle finger, through the two index loops (Fig. 39), to its former position.

Ninth : Release the loops from the thumbs and index fingers, and, keeping

the loops on the little fingers, extend the figure by putting each index finger into the middle finger loop to make it wider (Fig. 40).

The far little finger strings drawn straight represent the horizon, the central semicircle is the sun, and the three other double strings on each side are the sun's rays. These latter may be made more apparent by transferring, on each hand,
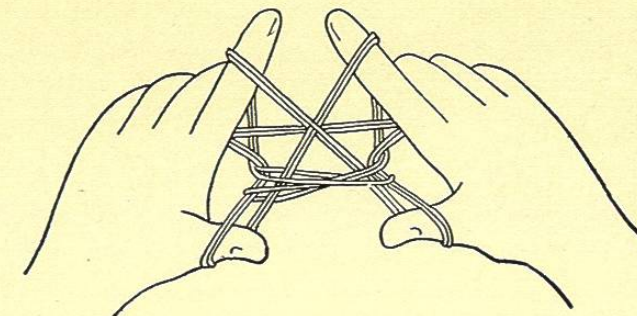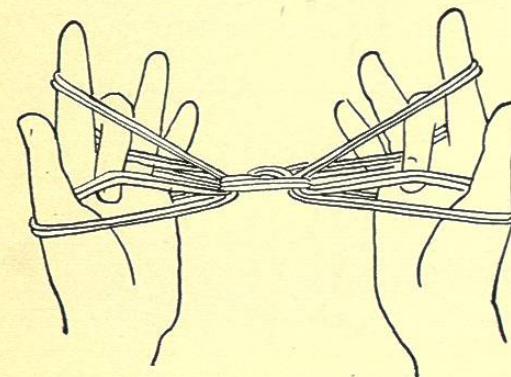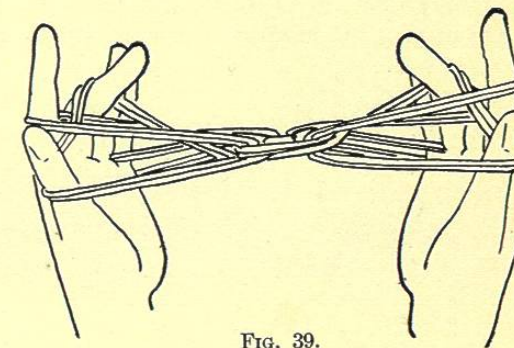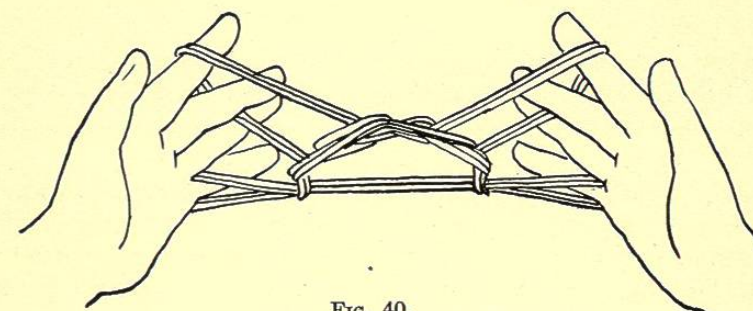

Fig. 37.

Fig. 38.

Fig. 39.

Fig. 40.

one of the middle finger loops to the index. The sun is made to set by releasing the loops held by the index and middle fingers, and drawing the hands apart.

In this figure we have as a new movement the exchange of loops between opposite fingers. We also see the method of transferring a loop from one finger to another finger of the same hand, without turning the loop over in the transfer. The loop of course could be simply lifted from finger to finger by the fingers of the other hand, but that apparently is rarely, if ever, done; it would require two separate movements, whereas by the method given in the *Sixth* movement of this figure, the two hands move synchronously. All the way through these string figures we constantly meet with the fundamental principle that the two hands shall execute the same movements at the same time; in some cases to accomplish this result the movements appear involved and indirect. You will also notice that the *Eighth* movement is a repetition of the *Sixth* movement; this occurs not infrequently in other figures and the repetition may cover not only one but several movements.

OSAGE DIAMONDS

This figure was shown me by an Osage Indian, Charles Michelle from Pawhuska, Oklahoma, at the St. Louis Exposition, in September, 1904.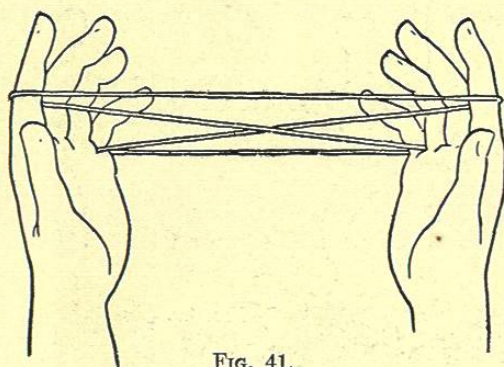 He had no name for it. In the Philadelphia Free Museum of Science and Art there are two finished patterns collected by Mr. Stewart Culin; both are from the Hawaiian Islands. No. 21447 is called *Ma-ka-lii-lii*, and No. 21514, *Pu-kau-la* (see Culin, **1**, p. 222). It is known among Indians, sometimes as "Jacob's Ladder," and also to the Irish, under the names of the "Ladder" or the "Fence."

FIG. 41.

First: Opening A.

Second: Release the loops from the thumbs, and separate the hands (Fig. 41).

Third: Pass each thumb away from you under all the strings, and take up from below with the back of the thumb the far little finger string, and return the thumb to its former position without touching the other strings (Fig. 42).

Fourth: Pass each thumb away from you over the near index string, and take up, from below, with the back of the thumb the far index string and return the thumb to its former position (Fig. 43).

Fifth: Release the loops from the little fingers and separate the hands.

Sixth: Pass each little finger toward you over the near index string and take

CHARLES MICHELLE, AN OSAGE INDIAN OF PAWHUSKA, OKLAHOMA.
(Courtesy of Mr. S. C. Simms.)

up from below on the back of the little finger the far thumb string (Fig. 44, Left hand), and return the little finger to its former position (Fig. 44, Right hand).
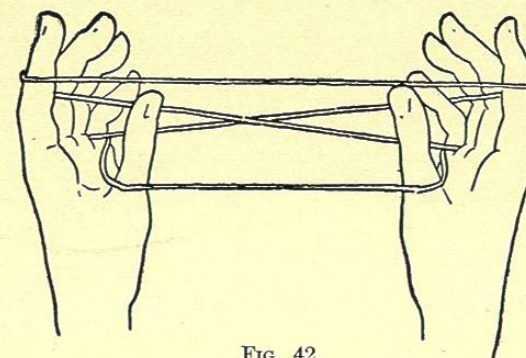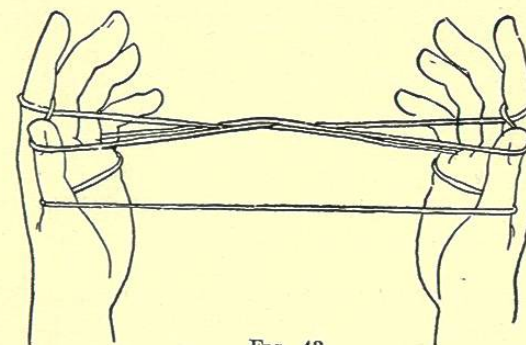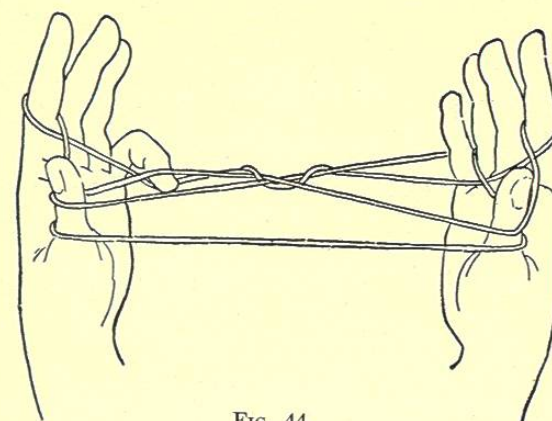

Fig. 42.

Fig. 43.

Fig. 44.

Seventh : Release the loops from the thumbs (Fig. 45).

Eighth : Pass each thumb away from you over the index loop, and take up, from below, with the back of the thumb the near little finger string and return the thumb to its position (Fig. 46).
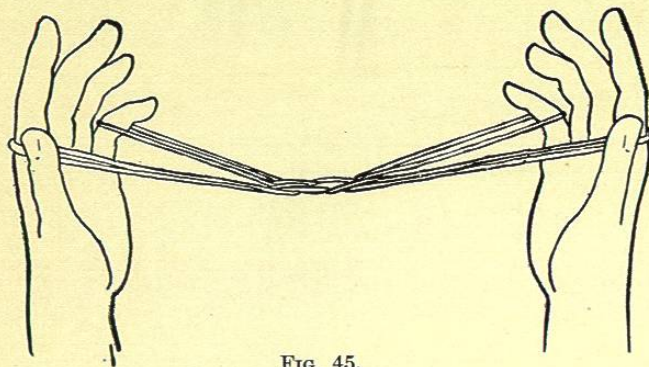
Ninth : With the right thumb and index pick up the left near index string (close to the left index and above the left palmar string) and put it over the left thumb (Fig. 47). With the left thumb and index pick up the right near index string (close

FIG. 45.

to the right index and above the right palmar string) and put it over the right thumb. Separate the hands (Fig. 48).

Tenth : Bending each thumb toward the other hand and then up toward you, slip the lower near thumb string off the thumb, without disturbing the upper thumb loop (Fig. 49, Left hand).

Eleventh : Insert each index from above into the small triangle formed by the palmar string twisting around the thumb loop (Fig. 49, Right hand), and, turning the palms down, release the loop from the little fingers; then separate the hands, turn the palms away from you, and the finished figure will appear (Fig. 50).

This figure is extremely simple; the majority of the movements are most direct. The *Ninth* movement appears to be rather a clumsy way of taking an additional loop on the thumb, but if you try the usual Indian way of putting each t h u m b

FIG. 46.

simultaneously up into the index loop between the palmar string and the index, and then separating the thumbs from the index fingers, you will find it rather difficult.

In the *Tenth* movement we see a new way of slipping the lower thumb loop over the upper loop and off the thumb. The turning of the palms away from you to form the finished figure is a movement we shall meet with repeatedly; in this figure
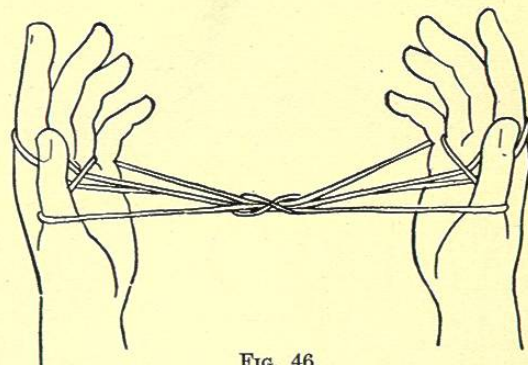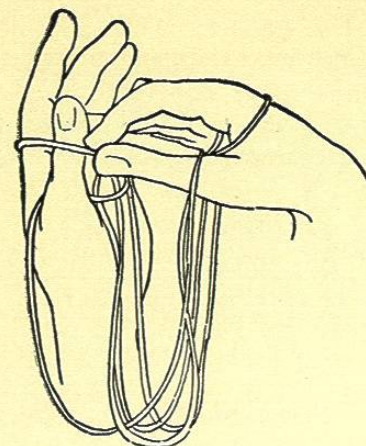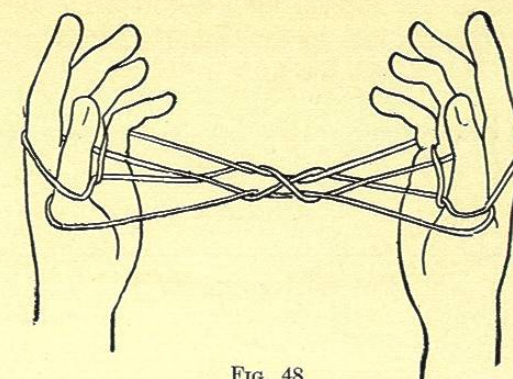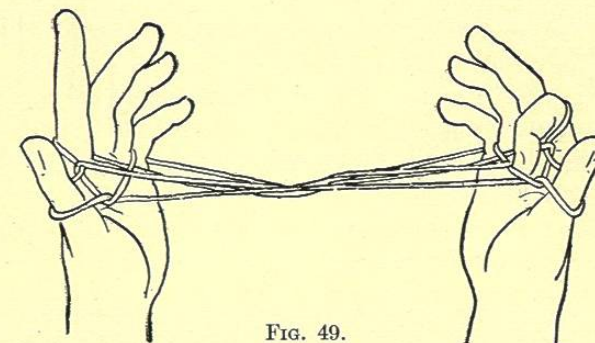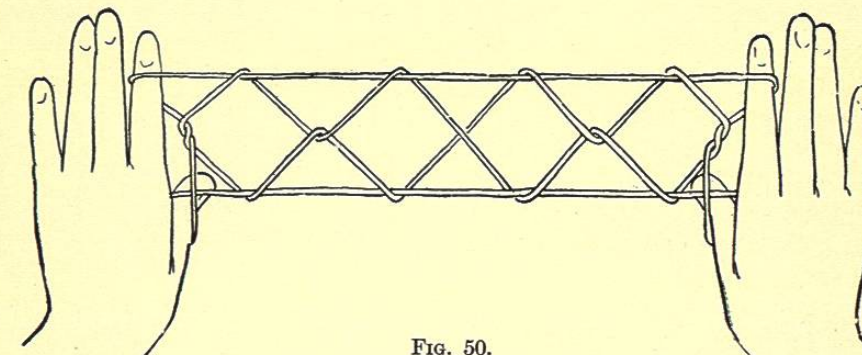
FIG. 47.

FIG. 48.

FIG. 49.

FIG. 50.

it is not essential to the success of the pattern, but in many other figures the final pattern will not appear unless the far strings are drawn tight by turning the palms away from you.

OSAGE TWO DIAMONDS

The Osage Indian who taught me the preceding game gave me this one also; he had no name for it. There is a Hawaiian example done with a single string
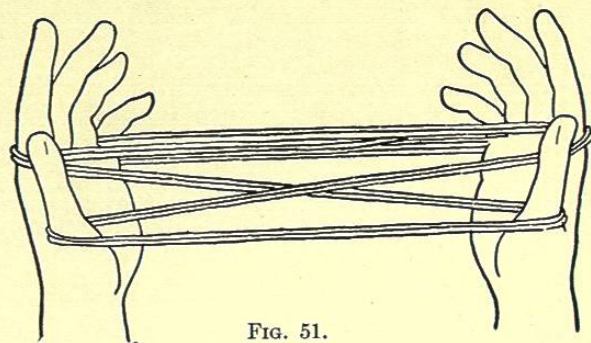

FIG. 51.

loop preserved in the Philadelphia Free Museum of Science and Art. It was collected by Mr. Stewart Culin, is numbered 21448 and called *Pa-pi-o-ma-ka-nu-i-nu-i* (see Culin, 1, pl. xiv, *a*).

First: Opening A, with the string doubled and used throughout as if it were a single string (Fig. 51).

Second: Release the loops from the thumbs.

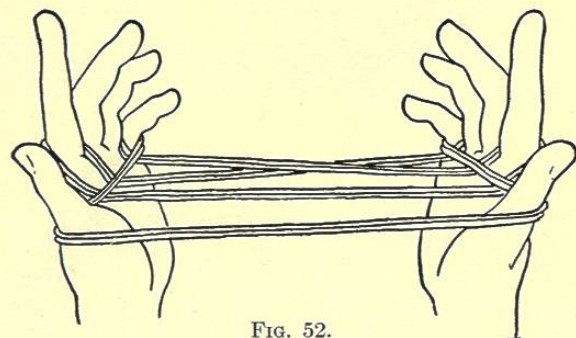*Third:* Pass each thumb away from you over the index loops and the near

FIG. 52.

little finger strings, and take up, from below, on the back of the thumb the far little finger strings and return the thumb to its former position (Fig. 52).

Fourth: Insert each thumb from below into the index loops, close to the index, between the finger and the strings which cross the palm and return the thumb to its position (Fig. 53).

Fifth: Turn each thumb down toward the other thumb (Fig. 54, Left hand),
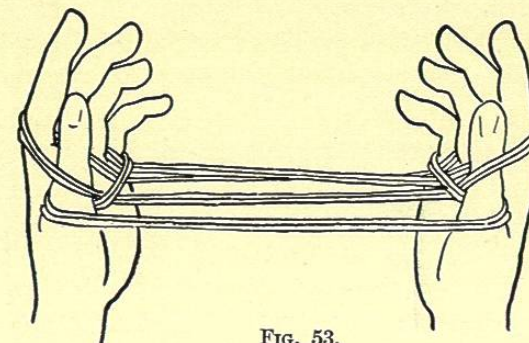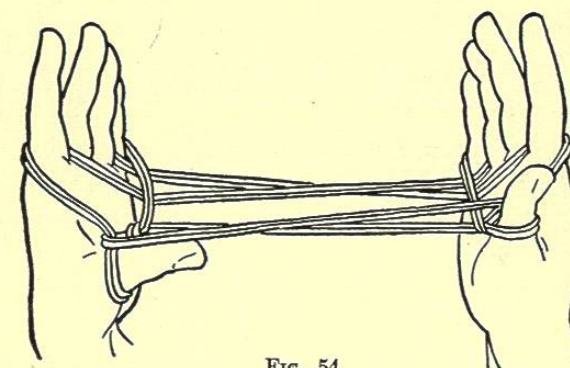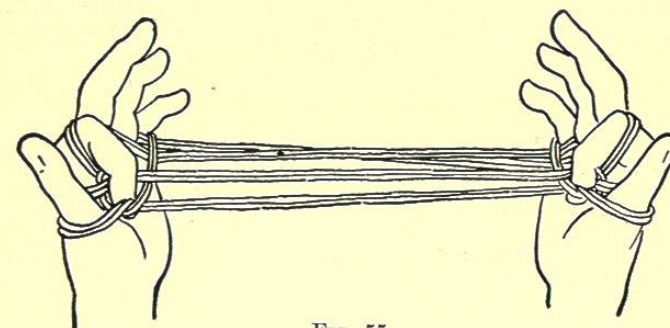
FIG. 53.

FIG. 54.

FIG. 55.

and, letting the lower loops slip off the thumb, turn the thumb up toward you (Fig. 54, Right hand).

Sixth: Insert each index from above into the triangle formed between the thumb and index by the palmar strings looping around the strings of the thumb loops (Fig. 55), then, while turning the palms downward and then away from you,

release the loops from the little fingers, and separate the index fingers widely from the thumbs to extend the figure (Fig. 56).

This is a slightly different and abbreviated form of the Osage Diamonds.
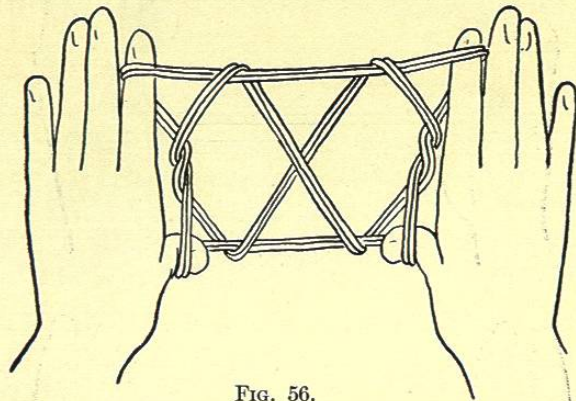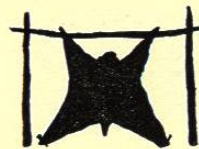

FIG. 56.

Of course it can be done also with a single string loop, but the final pattern is not so effective and closely resembles the final figure of the Navaho "Twin Stars."

DRESSING A SKIN

Dr. Haddon learned "Dressing a Skin" from Mr. Harlan I. Smith of the American Museum of Natural History, New York, who found it among the Salish Indians of Thompson River, British Columbia, when on the Jessup North Pacific Expedition. (See Smith p. 282, fig. 270, *a*, 1-7 and Haddon 5, p. 217.)

First : Opening A.

Second : Release the loops from the little fingers, but do not separate the hands; let the long loop hang down (Fig. 57).

Third : Toss this long loop toward you over all the other strings and let it hang down on the near side (Fig. 58).

Fourth : Bend each thumb down into its own loop, over that part of the string of the hanging loop which crosses over the thumb loop (Fig. 59 Left hand), and let the original thumb loop slip over the knuckle and off the thumb (Fig. 59, Right hand).
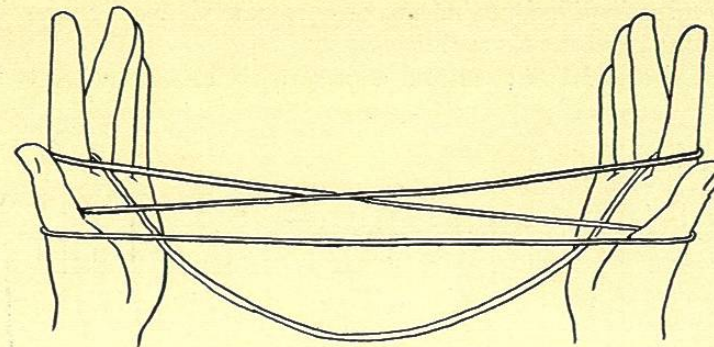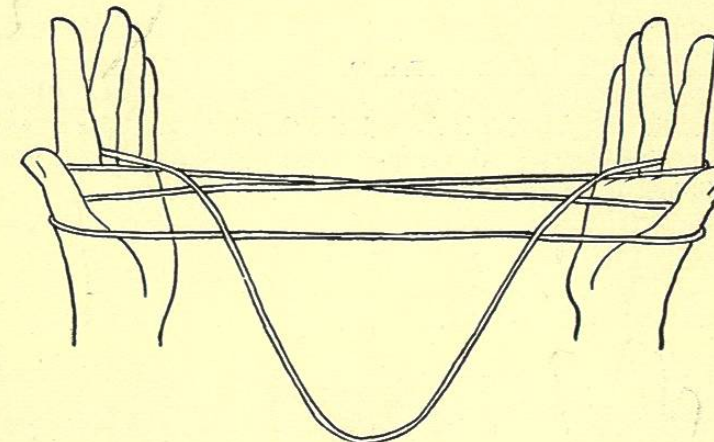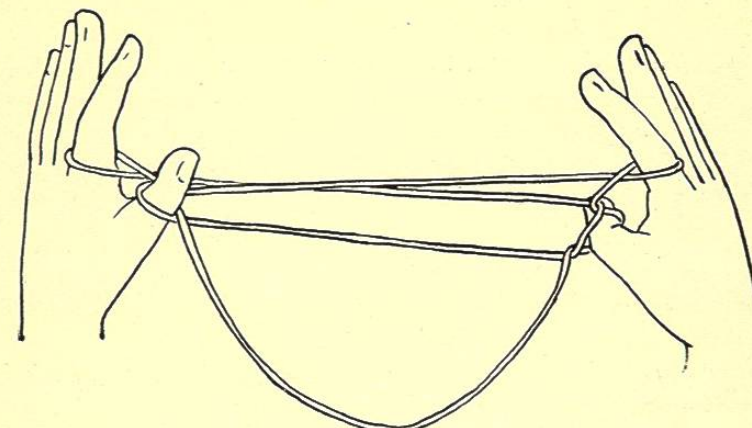
FIG. 57.

FIG. 58.

FIG. 59.

Then turn the hands with the palms away from you and, drawing the strings tight, extend the figure between the thumbs and index fingers (Fig. 60).

The object of the *Third* movement is to get each far index finger string into a
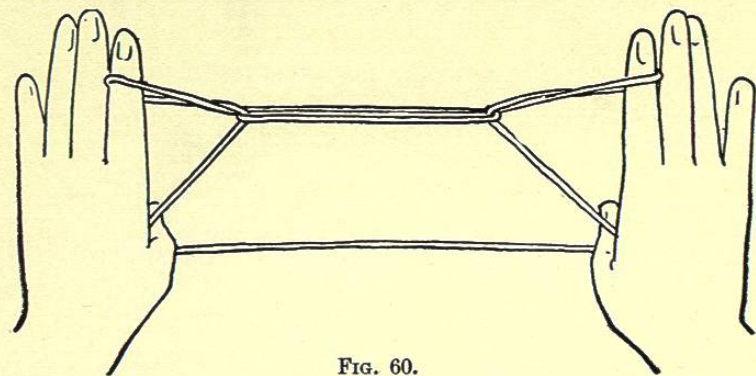

FIG. 60.

convenient position for drawing it through the thumb loop. This movement may be done by drawing each far index string toward you on the thumb and then releasing the little finger loops and the original thumb loops.
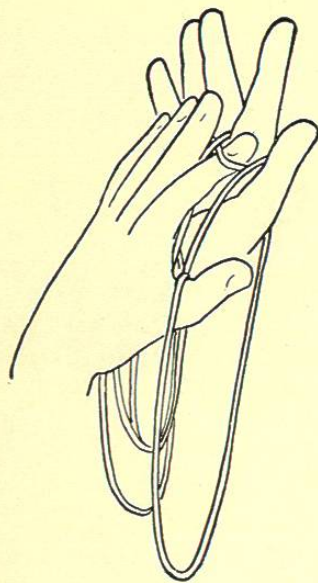
A FISH-SPEAR

FIG. 61.

This little figure comes from Murray Island, Torres Straits, where it is known as *Baur* = a Fish-spear (see Rivers and Haddon, p. 149, Fig. 1). It is identical with "Pitching a Tent," of the Salish Indians, British Columbia, obtained by Mr. Harlan I. Smith, when he secured "Dressing a Skin." Several stages of "Pitching a Tent" are illustrated by Mr. Smith (p. 282, Fig. 270, *b*, 1-4) and the game itself is described by Dr. Haddon (**5**, p. 217). Dr. Haddon has since found it played by the Clayoquaht Indians, Nootka tribe, Vancouver Island, at the St. Louis Exposition under the name "Sea-Egg (Echinus) Spear." There is a finished pattern in the Philadelphia Free Museum of Science and Art, No. 22608 from Zuñi, New Mexico, collected by Mr. Stewart Culin.

First : Put the loop of string on both hands in the First Position.

Second : Insert the right index, from above, be-

hind the string crossing the left palm, and draw out the loop to the right, twisting it several times by rotating the right index.
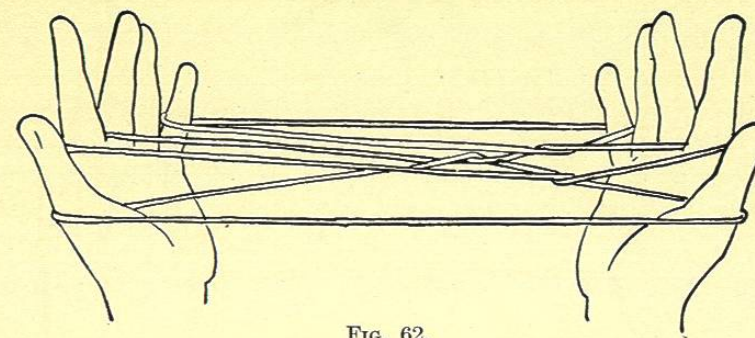

FIG. 62.

Third : With the left index pick up from below the string crossing the right palm, being sure to pick it up between the strings of the right index loop and near
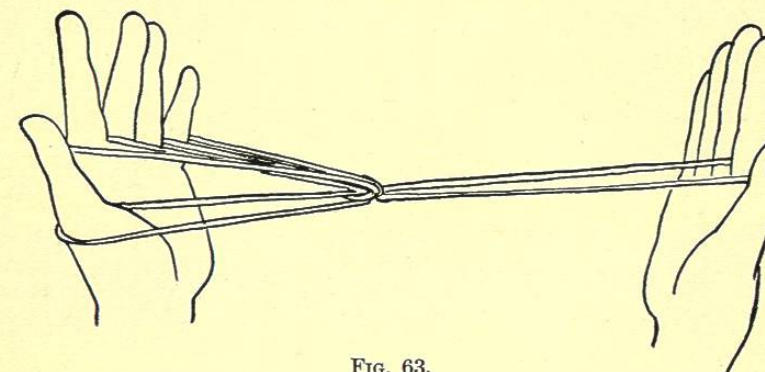

FIG. 63.

the right index where the loop is not twisted (Fig. 61). Separate the hands and draw the strings tight (Fig. 62).

Fourth : Release the loops from the right thumb and little finger, and separate the hands. The points of the spear will be on the thumb, index, and little finger of the left hand, and the handle will be held by the index of the right hand (Fig. 63).