APPENDIX.

NOTE ON THE FISHERIES OF THE DELTA OF THE HELMAND AND ON THE USE OF SHAPED RAFTS OF BULRUSHES IN INDIA AND SEISTAN.

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There can be few lakes that bear fish and have a piscivorous population on their shores in which the fisheries are of a more simple character than those of the Hamun-i-Helmand. Apparently only one species the Seistan Trout Carp (*Schizothorax zarudnyi*) is pursued, and only one method of capture used.

Schizothorax zarudnyi is a fish that bears considerable but quite superficial resemblance to a trout and reaches a length of at least 49 cm. (19 inches). The flesh has an excellent flavour, distinctly "trouty," but is so full of little sharp, stiff bones that it is difficult for a European to eat it. The Persian officials in Seistan get over this difficulty by cooking it in vinegar, which softens the bones; but the fishermen of the Hamun adopt no such refinements. They split and gut the fish and insert a small sharpened stick into the head from below. They then make a small fire of tamarisk-roots and arrange the fish round it in a circle, supported in a slanting position on the sticks. The flesh is thus slowly roasted.

There is some evidence that the flesh of the Seistan Trout Carp, and especially its roe, may be poisonous to those not accustomed to it. We ourselves experienced considerable intestinal disturbance and colic after eating a dish of the roe, and all our assistants and servants except one were taken ill in a similar but more violent manner on another occasion after eating the flesh. In both cases the fish was perfectly fresh. The people of Seistan, however, know of no such inconvenience.

Before describing the method of catching this fish it is necessary to say something about the fishermen and their neighbours on the shores of the Hamun-i-Helmand, and about their peculiar rafts of bulrushes. I take the opportunity also to publish a note on a similar craft used in India.

The shores of the Hamun are inhabited by two different types of people,[1] both more or less nomadic, but occupying different positions in Seistani society. They are called Gaodar (Gavdar) or Herdsmen and Saiyad (Saiad) or Hunters. The Herdsmen are regarded as eminently respectable people, but the Hunters, probably as a result of ancient Buddhist influence, are practically

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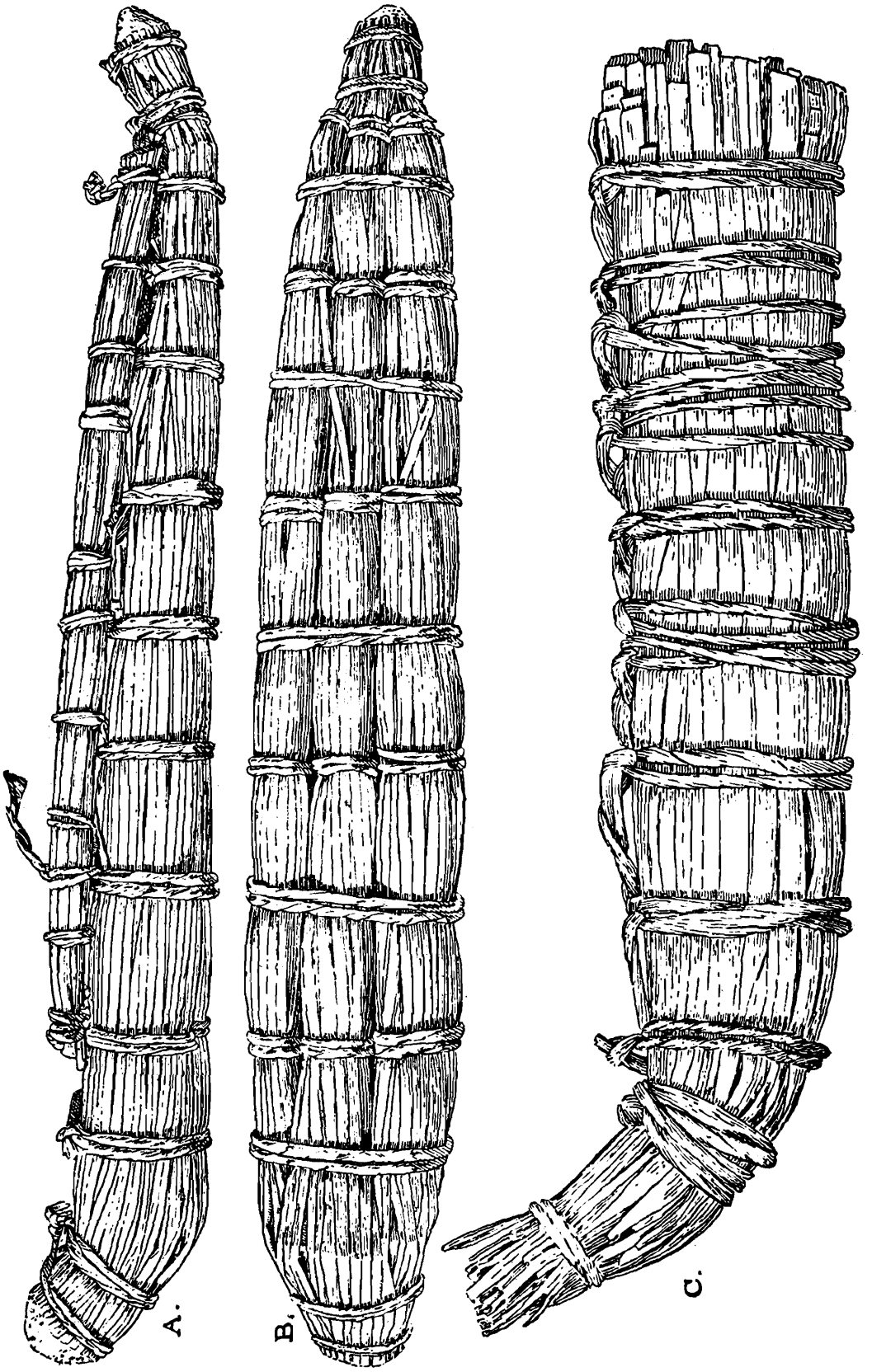
1. For a fuller account of these people see Tate, *Seistan*, pt. IV, pp. 297 and 303.



TEXT-FIG. 16.—Shaped rafts of bulrushes and sedges from Seistan and India.

A.B. *Tutin* used by fishermen and fowlers on the Hamun-i-Helmand.

C. *Bindi* used by fishermen of the Sirkula tribe, Roorkee, U.P.

outcastes. Both tribes pay an annual rent to the Persian government for the right to exercise their respective callings on the shores or in the waters of the lake; the Herdsmen for the pasturage of their cattle, the Hunters for the privilege of fishing and fowling.

One of the most striking features of the Hamun-i-Helmand is the vast reed-beds by which it is surrounded. These vary in extent with the season, but a considerable part of Seistan is known as the *Naizar* or reed-country. The reed-beds provide a livelihood to both the Herdsmen and the Hunters. The reeds are of three kinds. The most abundant is a form of *Phragmites communis*, the common large reed of the fens of England. The dwellings of both tribes are constructed of this plant. Next in abundance is the sedge *Scirpus littoralis*, on which the herdsmen feed their cattle, and finally we have a bulrush (*Typha augustata*), out of which both tribes construct the only craft known on the lake.

No true boats are used in Seistan, but their place is taken by curious "shaped" rafts that may almost be called skiffs and may be compared with the Papyrus skiffs[1] of ancient Egypt and the rafts used in Babylonian times in the delta of the Tigris and Euphrates. These rafts are made entirely of the leaves of the bulrush tied together in bundles. For purposes of transport comparatively stout and clumsy structures[2] of the same kind are employed, but these can only be used in the flood-season and we did not see them. I shall, therefore, describe only those used in fishing and fowling on the Hamun.

These are slender and even elongate structures each made of three bundles of fresh bulrush leaves and about six times as long as broad. Omitting the rail or bulwark along the top, they are about twelve times as long as deep. The bulrush leaves are bent upwards at both ends and the bundles are so arranged that the craft tapers slightly behind. A rail is added on each side above in the form of a thinner bundle of leaves. The rafts are about ten feet long and one and a half feet broad. They are constructed in the following manner (pl. xvii, fig. 2):—

The leaves are cut off close to the roots so as to be as long as possible. All those that are in any way damaged are rejected and the narrow tips are cut and thrown away. Perfect leaves thus treated are then laid out on the shore parallel to one another and arranged in bundles in such a way that there are a few more at one end of the bundle than at the other and that the broader bases of the leaves are all at the same end. Ropes are meanwhile manufactured from other leaves of the same plant, two men or boys doing this by twisting the leaves together in opposite directions by hand. When the thick bundles and ropes are ready each

[1] For an illustration see King's *History of Babylon*, p. 201, fig. 44 (1915), and for Egyptin references Erman's *Life in Ancient Egypt* (*trans.* Tsiard), p. 470 (1894).

[2] For illustrations see McMahon, *Geor. Journ.*, XXVIII (1906), and Tate, *Seistan*.

bundle is bent upwards at either end and fastened together by five bands of rope. Considerable force is exercised in doing this as the stability of the craft depends largely on the tightness of the bundles. After the rope has been twisted round the leaves two men pull the opposite ends taught, pressing against the bundle with their feet and sitting on the ground. The leaves are left free at two ends of the bundle, but the unbound part is considerably longer at the stouter end (at which the basal part of the leaves is situated) than at the narrower, the stern of the embryo raft. Three bundles are thus formed for the body of the raft. They are then tied together, in the same way as each was made individually, by some nine bands of leaf-rope. Two of these bands are situated near each end, and those at the thick end or prow are tied very tight so that the cut basal ends of the leaves expand somewhat. Finally the rail, a thinner bundle of leaves, is added above at each side for comfort's sake to a passenger, and the whole is finished by a short cross-bundle in front between the two rails.

A craft of this kind has a curious resemblance, when unloaded in the water, to an Egyptian mummy (pl. xvii, fig. 1). It can carry a passenger as well as a boatman, who propels it by punting with a pole of tree-tamarisk, but can be used only in very calm water. It is only on exceptionally still days that the Hunters or the Herdsmen, who also use rafts of the kind in moving about the reed-beds, venture into the open lake upon them. They are temporary structures, depending as they do for their buoyancy entirely on the air enclosed in the air-cells of the leaves, which soon decay. Their life is never longer than two months; in hot weather less. The Seistani name for them is *tutín*, from *tut*, a bulrush.

My figures in the text (figs. 16A & B) are drawn from a model made at Lab-i-Baring on the Hamun. It is accurate except in two points,—(1) the leaves employed are of full size and are therefore relatively larger and less numerous than would be the case in the real raft, and (2) the protuberance at the prow is rather too small (*cf.* the photograph on pl. xvii).

On our return journey from Seistan I happened to show this model to Mr. W. J Good of the Calcutta Port Trust, who was then a member of the Indian Reserve of Officers. He told me that he had seen similar rafts in the Roorkee district of the United Provinces and kindly put me into communication with Lt.Col. A. Cunningham, R.E., who has supplied me with the following interesting note, with the photograph reproduced in fig. 3 of plate xvii, and with the model from which text-figure 16C has been drawn.

"The floats used for fishing in the *jheels*, of the Solani and Ganges Rivers *kadir* near Roorkee, U.P., about 20 miles to the South East, are about 8′ long by 2′ diameter, and the cross section is circular, flattened at top and bottom a little. They are solid, made of the local *jheel* grasses, the bundle being tied round at several places with rough ties of grass. The prow is formed into

a point and turned up, the model shows this fairly well. They carry one man, or even two at a pinch; the man stands up and the *Bindi* is propelled by a pole of common bamboo, etc., about 10 to 12 feet long. They are crank and difficult for a European to manage. The fishing is with a spear or a circular casting net.

"They are used by the "Sirkulas," a Mahomedan tribe, numbering about 50 families perhaps. They say they came from Sind from the Manchar Lake, about three generations ago (about 1820 probably); my informant says it was in the time of his grandfather, and he himself is an old man of 60 about. They came because there were wars in Sindh. This is corroborated, as they speak Sindhi, and know all the different kinds of duck by the Manchar Lake names, (I have been to the Manchar and know these names myself, having kept a note of them). They do not intermarry with the dwellers in the kadir villages, who are Hindus of the low caste of Chumar: the chumars do not fish, nor do they use Bindis for other purposes. So presumably the "Sirkulas" brought the shape of the Bindi with them from Sindh, however I do not remember seeing any Bindis on the Manchar, perhaps nowadays the wooden dugout of the present-day Manchar fishermen has ousted the Bindi there.

"The *Bindi* is made preferably from the flat dark-green rush called here *Patera* the *Typha latifolia*: this rush floats even when newly cut, and it will last in a Bindi for about six months, before it rots. This rush is fairly strong and stiff when bound up into a Bindi, and the best Bindis are made of it. The round green reed, called *Tukla* locally, the *Cyperus alterifolius*, is also used at times for making Bindis, it also floats when freshly cut, but the disadvantage of it (compared to *Patera*) is that it is not strong nor stiff, like *Patera*, and the Bindi made of it does not last so long, and will not bear so much handling. The Latin names have been got from the Superintendent, Government Botanic Gardens, Saharanpur, to whom specimens of the grasses were sent.

"The *Patera* grows in water, to about 12 feet high, while the *Tukla* only runs to about 5 feet at most, it also grows in water.

"One of the characteristic points of the shape of the Bindi is the way the prow, or front end, is brought to a point and sticks up about a foot or so above the level of the top surface of the body of the Bindi. The grass in the Bindi is tied round at intervals with wisps of the same grass made into a rough sort of rope."

In many parts of the Madras Presidency rough bundles of reeds are used as rafts by fishermen, especially in the large tanks and reservoirs that are a feature of southern India; but these bundles are not shaped and I have heard of no instance of shaped rafts being employed in Perninsular India. The fact that the people who use them in the United Provinces are of Sindi origin is interesting as suggesting an actual historic connection between their manufacture in those provinces and in Seistan, for Sind is in many respects a country intermediate between India and Persia. As to the possible but more remote connection with Babylonia and

Egypt, I have not the learning necessary for a discussion on the subject. The *bindi* (fig. 16C) is of simpler construction than the *tutin*, but may be degenerate.

Except their bulrush rafts and punting poles the only implement used in fishing by the fishermen of the Hamun is a cotton net of simple structure. The cotton is grown locally. The net is oblong in shape, about 4 feet deep and 100 feet or more in length. The mesh is very large, allowing all small fish to escape.

In setting the net it is tied above and below at each end to a pointed tamarisk stick. The pointed end of these sticks is struck into the bottom of the lake and they are arranged in such a way in reference to the direction of the wind, and therefore of currents in the water, that the net forms a semicircle with its lower edge on the bottom and its upper edge slightly above the surface. It is set in a position into which it is easy to drive the fish, often in an open channel in the reed-beds or, in exceptionally calm weather, just outside one in the open lake. In the former case the channel is usually one that leads out of an open pool and suitable pools are apparently kept free of reeds for the purpose.

A considerable number of fishermen, each on his *tutin*, take part in driving the fish into the net. They arrange their rafts in a wide semicircle opposite that of the net and gradually converge towards it, beating the water with their poles and ululating with the peculiar sound conventionally transliterated "halelujah" in English religious works. They show great skill in directing a few vigorous downward strokes with their poles to give the rafts an impetus, and then striking the water before the forward movement ceases. The fish are gregarious and apparently rather sluggish and are easily frightened into the net in this manner.

When the semicircle of rafts has completely converged on that of the net the supporting sticks are pulled out of the water simultaneously by the men in the two end *tutins*, and turned up horizontally in such a way that the net is transformed into a bag. The two ends are then drawn at the same time into the two *tutins*, which approach one another as rapidly as possible.

Unlike Indian fishermen the Saiyad despise all small fish and do not attempt to catch any much less than a foot in length.

We saw a similar method of fishing used in small channels leading out of the Hamun. Here the net was much shorter and was stretched right across the channel. The men who used it waded in the water.

The only other method of fishing that we saw in Seistan was employed in pools in the dry stream-bed of Randa near the ruined city of Jellalabad. Here a rude and particularly clumsy kind of trawl was used. The net was a large bag, with considerably smaller meshes than that employed in the Hamun. It was fastened to one horizontal and two upright poles. The horizontal pole lay on the bottom of the pool and the two upright ones were held in position by means of ropes attached to their upper ends. Four men worked this trawl, two pulling ropes attached to the

ends of the horizontal pole and two other ropes fixed to the upper end of the upright ones. The four men waded along in the water. The awkwardness of the apparatus lay in the fact that unless all of the men moved together the upper ends of the two poles fell towards one another and the net refused to work properly.

We were told that around Nasratabad the favourite method of fishing was for men to go out into the swamps in the flood-season with swords and to strike at any fish they saw. Our informant, who had had great experience of the country, said that quite large fish were killed in this way.

In the Helmand River in the east of Seistan a more elaborate method of fishing is apparently practised. The following notes are taken from an official document. The author of part of these notes believes that the fish captured belongs to the genus *Schizothorax*. There is a single specimen of *S. zarudnyi* in the collection of the Seistan Arbitration Commison from the Helmand, but the largest fish caught by the author of the note weighed 12 lb., which is much heavier than any fish seen in the Hamun-i-Helmand. *Schizothorax* would seem to be the only genus of fish captured for food in Seistan.

"SEISTANI FISHING NET.

"The net used is a bag about 7·0′ long 9″ diameter at the lower end and 6′×2′ wide at the mouth. The net is held open by a pair of poles or prongs tied together at one end to make a fork. The fork pivots on a post on the bank. The fisherman sits on a platform. Across the mouth of the net fine lines are arranged, the lead string of which the fisherman holds in his hand to get timely warning that a fish has entered the net, whereupon he pulls the net up and removes the fish. The fork that holds the net is held in position by the strain of guy ropes. The net is placed on the bank near a pool at a place where there is a swirl or back water so as to intercept the fish moving along the edge of the bank; sometimes it is put up across the mouth of a small canal; a shallow channel is sometimes obstructed by a line of stakes along which the fish move till they come to the opening where the net is arranged and are caught. Below the Band-i-Seistan the net is arranged opposite a small leak in the *Band* and fish moving along the down stream face of the *band* are swept into the net by the force of the current at this place.

The favourite spots for the big fish are in the slack back water close to where the backwater meets the force of the down flowing current. At such places the small fry, which at certain seasons work their way up the river in thousands swimming as close to the bank as possible, are checked by the current and fall an easy prey to the larger fish which feed on them ravenously.

The autumn is the best season for fishing operations of this nature. The season of 1903 commenced as early as August and continued for several weeks. In 1904 it was late in September

before fish moved and not really well till October. March and April are also sometimes favourable if the river is not very full, but the fish do not move so freely then as in the autumn. During the hot weather (May-August) the fish are quite out of condition.

"LIST OF TECHNICAL TERMS CONNECTED WITH THIS METHOD OF FISHING:—

Name in Roman Characters.	*Explanation of the meaning and use of the word.*
[1] Bok	Platform on which the fisherman sits.
Ruka	Each pole or prong of the frame of two tamarisk poles fitted together to form a fork which holds the net.
Shingalak	The strut which separates the two poles or prongs of the fork.
Achchá	A forked pole, here used as supports to the platform.
Āsak	The piece of wood which acts as a trunion or pivot on which the fork of the frame revolves.
Dahan-i-ruká	The taut rope which holds together the ends of the poles of the fork.
Dast kash ..	The rope by which the frame and net are raised or lowered, and by which it is maintained in its position in the water.
Pish-áb	The rope that stays the frame against the whirl of the water, as the net is usually set up where there is a swirl in the water.
Sarkash	A stay that is used when there is a strong wind.
Maraká	The string which passes to the finger of the fisherman, and to which are connected the lines which are spaced across the mouth of the net. The fish touches these lines and warns the fisherman of its advent, whereupon he lifts the net out of the water.
Pásáo	The line which holds the upper side of the net, and is made fast to a stake on the bank. The lower side of the net is made fast to the lower pole.
Mushtak	A ring in the rope on the *dahani-rúká* where the *maraká* and *pásáo* are made fast.
Kisá	The pocket of the net.

[1] The Baluchis use the same words in describing the parts of this fishing net except that for *k* they say *Barmak* and for *Kisa* they say *Kito*.

Gislak .. .. The line on which the fish that are caught are strung by the gills and kept in the water.

Shak .. . The handle of wood at the other end of the *gislak* for attaching it to a stake on the bank; it also acts as a needle to pass the line through the gills of the fish.

Dám .. . Is the net.

Dám-i-boki . . This whole arrangement for catching fish.

Charkháb Swirling back water forming a suitable place to set up this arrangement to catch fish.

Máhígír . . Fisherman.

Máhí .. .. Fish."

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