On the Fish Fauna of the Lower Nile.

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by

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The desire to establish priority to some interesting facts relating to certain fishes of the Nile has induced me to issue a preliminary notice of a research on the Fish Fauna of Egypt which has been engaging my attention for the past few years.

So far my collecting has been confined to what might be termed the Lower Nile, that portion of the river W. of Assuan, including the Brackish-water lakes connected with the river by irrigation canals. I have obtained somewhat less than half the number of species recorded from all parts of the river. To these I must add two new species, descriptions of which I publish in this communication for the first time.

The collecting of fish in Egypt is beset with much difficulty. The fishermen, as a class, are dense. They seem to exist amongst them a universal prejudice against voluntarily bringing a rare fish ashore. It is only by constant visits to the fish markets, by the examination of the heaps of fish there, that prizes may be obtained.

The present paper will, in addition to a description of the new species, include a summary of my notes on Nile fishes which, although incomplete, I now take the liberty of publishing, and also a short account of the fisheries of Egypt.
Fishing is carried on by professional fishermen in all parts of Egypt, in the river, in the irrigation canals, large and small, in the pools or birkets, permanent or temporary, left by the receding waters of the Nile, in the large lakes on the Mediterranean littoral, and in Birket el-Hezoun in the Fayyûm province. Every town or large village has its market for the sale of local caught fish. Those are in the provinces who cannot refer a common Nile fish to its Arabic name. Fish there are plentiful. The Government derives a large revenue from the fisheries. In most instances the right to fish is let to a tenant who exacts from the fishermen from ½ to ⅔ of the proceeds of the sale of his catch. At Lake Menzaleh, however, Government holds the right to receive 9 sell all fish taken from certain parts of the lake, giving to the fishermen ⅓ of what is received for their fish.

In Lake Menzaleh and the other brackish water lakes connected with the sea, marine fish are naturally found, 9 in those which communicate with the Nile through canals, there is an intermingling of marine & freshwater forms. Taking Lake Menzaleh as a type of the brackish class of lake, it is noticeable that all the species of fish occurring in that part of the river from which the lake derives its fresh water, are not found in lake itself or the relatives
abundance of species found in both situations differs considerably. Certain fish, e.g., Chromis, seem more suited to a life in salt water than others, such as Labeo. A specimen of Chromis mesoleus in my possession was obtained from the Chesh Canal in an apparently healthy state. Labeo is found in the lake in some quantity after the influx of waters from the flood plain, in the months of August and September, or rarely and near the mouths of freshwater canals at other seasons of the year. Amongst the Siluridae, out of the genera Bagrus, Clarias, Hypostomus, and Schilbe, all of which occur in the lake, Clarias exceeds the others in point of numbers, while in the river this condition of things is reversed. The shore-named genera, excluding Labeo, are perhaps the only ones whose instincts (predatory in most cases) lead them to enter the lake. Others, e.g., Labeo, Malapterurus, Alburnus, etc., are caught at the period of high tide only or under the conditions mentioned previously in the case of Labeo, so that their occurrence in the lake is to be regarded as accidental, and Mormyridae have never, to my knowledge, been taken from Lake Mekeleq, or from any of the lakes referred to. Chromis and Clarias are the commonest genera of freshwater fish met with in these lakes. 250 tons of the two
Various species of *Chromis* were taken from Lake Hmaraah in the neighbourhood of Damietta in the space of four days. Both species of *Chromis* spawn in the lake and I have captured species of *Clarias* with nile carps. Thus, it is very probable that Lake Hmaraah is one of their breeding places also. Birket-el-Howar is a brackish lake situated in a depression of the Libyan desert on the western margin of the Fayyom province. It receives the overflow of the Bahr el-Yousof, a large canal which supplies the province with water. It also drains water from the cultivated lands. *Chromis*, *Clarias*, *Bagrus*, and *Lates* are the predominating genera found in it. The *Mormyridae* are absent here as in the other brackish lakes. A noteworthy fact in connection with this lake is that the species of the genera mentioned attain to a much larger size than their fellows in the river or in any part of the Lower Nile system. *Chromis* miltonii of over 50 cm long are common & specimens of *Lates* are frequently caught measuring 150 cm or more. The abundance of large-sized fish caught in this lake may be traced to the fact that the lake is not overfished. Difficulty of transport renders any but a local sale of the catch impossible. Prof. Schwinfurt of Berlin who is well acquainted with the geological formations in this neighbourhood has suggested to me in this connection that the
configuration of the limestone rocks forming the bed of some parts of the lake may shield the fish from the toils of the fishermen.

In the canals of the country, Chasmis, Labes, Barbus, Alcestis, & Silurus are generally, are the fish usually met with, but in the "tricks" any of the Nile species may be obtained, as, with the overflow of the river, fish which would not of their own accord leave the channel of the Nile, and others, are swept out over the cultivated land of the irrigated irrigation basins. When the water level pools of great spreading extent are left which may or may not be permanent depending on their depth. The shallow pools soon dry up, & this finny inhabitants fall prey to the peasants (and water fowl, or are left as a deposit on the dried mud. The larger & deeper "tricks," many of them of considerable extent, would naturally form the rearing-ponds of the multitudes of fry which they contain, were it not for the inactivity of the fishermen who thoroughly and safely deplete them of all fish life.

The machines of capture employed by the native fishermen are:—1st. Hooks baited w/"mist". When bait is used it is either fish fry ("pesarias") or a paste made from sesame seed, germiinated barley, rice, and fowls' eggs. Worms are rarely used on account of their
scarity. The hooks, which are large sized, are attached at intervals of a metre or so along a bottom line which is weighted at each extremity & fitted with floats of empty gourds or inflated goat stomachs. The lines are set usually in the early morning & are picked up two hours later. The species most commonly taken by this means are Anguilla, mainly all Siluroid fish, large specimens of Mynena, cærulea 9Myxine grisea 9.

In swift flowing parts of the river and in shallow portions of the large lakes the method of fishing with naked hooks is often used, 9 with effect. At intervals along the head-line are fastened cords carrying hooks which are larger & stronger than those used in the method first described. A piece of cork is attached to each cord close to where it joins the head-line. Together with these pieces of cork, buoy & weight at the extremities of the head-line maintain the hooks in the water a short distance from the bottom. If there is a strong current in the part to be fished, the line is laid across the current, 9 fish in swimming with or against the stream run the risk of being caught in marlines & lacerated. Specimens of large fish are sometimes seen in the markets bearing wounds which could only be inflicted in this way. In shallow waters the method of procedure is different: several lines are set at a short distance from, and parallel to each other.
The fishermen then enter the water, & drive the fish through the rows of hooks, by beating the water with sticks or by making a din with petroleum tins. The method of using unbaited hooks is not only cruel but wasteful, as many fish escape with wounds which ultimately cause their death. 2nd nets. The principal forms of nets used are the casting net ("traha") & the seine ("grassa"). The first is made of cotton or hemp, is ovular in shape with a closed apex. The free margin of the net is turned in & attached to the sides by cords at intervals of 40 centimetres. A hem is thus formed which is practically open & admits of the entrance of even large sized fish. Small pieces of lead are fastened to the free turned edge. The diameter of the net varies as does also the size of mesh. The diameter of a net for capturing small fry may be 6 metres or more, the mesh 1 centimetre between the knots while for large fish a heavier net of larger mesh & consequently of smaller size must be employed.

Two varieties of this net are in use. One in which the apex of the cone is attached directly to a rope. A another, where a ring of wood is set into the apex & through it a rope passes terminally roundly in many subdivisions each of which are attached at intervals round the circumference of the net. The process of
Being it is as follows. It is manipulated by one man. The terminal stories in length according to the depth of water in which the net is to be used. It is pointed lasso fashion on the fingers of the left hand. When the net is reached it is folded zigzag wise over the extended palm of the same hand till the leads round the circumference begin to leave the ground. The folds are then transferred to the right hand and are grouped firmly. A portion of the free margin of the net nearest to the fisherman is hitched over the right elbow, which is held about the level of the shoulders. The left hand, still holding the rope takes hold of the margin nearest to it. Now the fisherman is ready to throw a caving of the body and a corresponding motion of the right arm. The net is launched through the air to a distance varying with the requirements or cleverness of the thrower. When it touches the water it will, if well thrown, describe an almost perfect circle. The leads round the margin will carry it rapidly to the bottom. The end of the head rope remains in the hand of the fisherman who as soon as the bottom is touched begins to haul the net towards him making the long axis of the cone more at an acute angle as possible with the bottom. If any fish should be encased in the cone they find that escape is impossible. For the weighted
margin with its hem is never allowed to leave the bottom till the opposite sides of the net are in contact, when the whole is hauled ashore or on to the deck of the fishing boat. The same procedure is followed in the case of the second variety of this net, the only difference being that a larger bag is formed for the accommodation of the catch by the head rope being directly connected with the circumference of the net. The casting net is used in the river & in the lakes, in deep or in shallow water. A number of men will sometimes cooperate to fish a small basket. Each man provides himself with a raft of petroleum ties & the company proceed to drive the fish towards one end of the piece of water. At a signal, several casting nets will be thrown so as almost to cover the water, into which the fish have been driven. The work of extermination goes on till the catch does not pay the trouble of fishing.

The seine net is identical with that employed in this country & it is used with great effect in the shallow waters of the country. The size of the mesh varies with the size of fish to be caught. A modification of this net is used by the mullet fishermen & has already been described in the papers on edible fishes of Lake Norman etc.

Other forms of nets are employed, but
not so commonly as those just described. At Birnet et-Heloum a form of trawl net
is used for the capture of large fish. It consists of an otlong meshed pouch
of strong twine with the usual arrange-
ment of floats & weights to keep the mouth
open & two boats are required to work it.
A modification of a net often depicted
on Chinese ornaments is used in some
parts of Egypt. The apparatus consists of
the Y-shaped branch of an Acacia cut
so as to leave only a short supporting link.
A light cotton net is bent to the limbs
of the Y & to a rope joining their
extremities in such a way that it hangs
9 close to the fork, this looseness is
so great as to form a bag-like structure.
One man only is required to work it. With
the lower limb of the Y between his legs
9 grasping the diverging limbs a little
distance from the fork, he advances
keeping the extremities of Y on or near
the bottom, now he again raising the net
out of the water, when if he is success-
ful the fish struggle backwards into
the bag in front of him.
This net is more commonly seen in
Upper than in Lower Egypt. The puddle
left on the land after the irrigation of
a basin, an eddy in a shallow part
of the river or a shallow irrigation
canal are favourite localities for the
employment of this machine.
Another curious instrument is a
Baskets carga shaped like the well known water-pot but minus a bottom. It is about 1metre high and a little less in diameter. It is carried in the hand of the fisherman who confines his attention to shallow canals or mudbanks on the river. While wading at every alternate step or so he brushes it rapidly to the bottom in front of him. If the capture of a fish is signalled by it dashing against the side to escape this method is rather local. I have only seen it practised in Upper Egypt, in the backwaters of the river and in other places overgrown with reeds it is the only practicable method as the presence of reeds prevents the use of any form of net.

In the following pages I propose to enter the summary of my observations on Nile fishes. There still remain many blanks to be filled in both as regards species which have not yet been observed by me and also the natural history esp. the breeding habits of most of the species already in my collection.

It is mentioned a fish which was well known to the ancient Egyptians can readily be recognised in the pictorial scenes on the stelae of the early Egyptian tombs. That it was reverence by the Egyptians. There can be no doubt as specimens of the mummified fish are obtained from the site of an ancient town bearing the Greek name Satispolis from
...have found it throughout the lower Nile. In the river itself it is not at all common, and specimens are not of everyday occurrence in the markets. Bubal-el-Lebara is famous for its large-sized fish. Specimens the height of a man in length are said to be common, but I have never obtained corroboration of it. At any rate, statement that it grows to the length of 60 feet. The largest specimen I have seen possessed the following measurements:—Length over all 158 c.m.
Depth at 1st dorsal fin 43.5 c.m.
Circumference (greatest) 118 c.m.
Weight 34 kilos.
Longest diameter of a scale of the lateral line 4 c.m.

In this as in other large-sized species of individuals I have examined, the tip of the procurrent 3 predorsals are, as a whole, feebly developed, in comparison with those on a smaller fish. In one large specimen all the spines with the exception of that at the angle of the procurrent were represented merely by undulations.

It would appear that the fact this species is extremely susceptible to cold. I learnt on 9th Jan. 95 the mercury fell to 0°C and a thin pellicle of ice formed on the surface of standing water. As a consequence of this low temperature rates of all sizes were found floating dead on the surface of some shallow ornamental ponds near my house. No other fish in the horto seemed to be thus affected by the cold, and the
phenomenon was unique in the experience of the oldest natives. The flesh of the Nile perch is considered a delicacy by the Arabs, but certainly that of specimens is not without flavour but the flesh of large fish is delicate. In Lower Egypt, Gafiri is the name given to large fish of this species, whereas being given to small. At Birgit et Kebir, ‘Elafsh is the Arabic name of the fish.

Mugil. Five species of this genus have been recorded from the Nile. M. cephalus, M. capito, M. petneh, M. saliens & M. cryptochilus. Mugi capito is the only species I have observed in the Nile. Towards the end of April or rather with the first hot days of summer they make their appearance in the catch of Cairo fishermen. I from then onwards till the end of June. A dozen fish may perhaps be got at Cairo in a week so that in the rivers the occurrence of grey mullet is of no economic importance. In Lake Mauzalot & other brackish lakes on the Mediterranean coast of Egypt, fishing for grey mullet is prosecuted on a large scale. From one of the lakes alone the revenue from mullet fisheries is over £40,000 a year.

According to Günther, the grey mullet in their Nile migration ascend as far as the 1st Cataract but the fishermen there do not seem to know it.

Chromis. I'll now only one species of
Chromis has been described from the Nile, viz. C. niloticus. It is, with the possible exception of *habes* niloticus, the most common fish in the Lower Nile and it is to be seen in almost every fishing scene depicted on the monuments. Supplementing to the usual description of the species, I have to add that during the breeding season March to May there exist a most striking difference in the coloration of the sexes. The female possesses the usual colors described to the species together with a series of dark-colored transverse bands on the body. These are evident in the figure of the fish, although somewhat ill-defined. The male in his vegetable garb is most gorgeous. The head, the region between it and the dorsal fin is a bright carminic red. A color which is also suffused over the pectoral and ventral fins. The posterior portions of the soft anal and dorsal fins usually over the entire caudal fin. The interosseous and interradial membranes of the dorsal fin is a deep black along its free margin. No vestige of striped is seen on the body, which is uniformly colored a beautiful silver gray. As to its breeding habits I possess no very accurate information. It appears to spawn sometime between the middle of March and the end of May; for it is at this season only that the male does his sexual colouring. At this period he clears a space among the weeds of the pond or canal he inhabits, in three
A fourth of water is even less. I have never observed the habits to be described elsewhere than in these places, although there is no reason why the fish should not spawn in the river. By burrowing with his snout, he scoops out a depression in the sand or mud at the bottom. In this open space, in the weeds, he remains through what I believe to be the spawning period. He zealously pursues all rivals males which in course of their Peregrinations after the female, approach his nest. I with his dorsal spines erected try to hustle them out of his territory. Males are frequently seen displaying themselves before a sunbath coloured female as if to entice her to his home. Occasionally, I have observed a male & female fish swimming in one of these depressions. What becomes of the eggs after they are laid, I am unable to say at present. I have been told by fishermen at different times that the fish takes the eggs in his mouth & hatches them there. It is by men who could not possibly have heard of Chrois's parking of Syra, to which a similar habit is accredited, but I have never seen a specimen showing the phenomenon. As early as the end of April the fry are to be seen to moving in shoals of several hundreds keeping well among the pond weeds where they are to a great extent free from the attacks of their enemies. At this period, they are about 1½ cm. long.
To all appearance an accompanied by a parent fish. The young gradually assume the coloration of the adult. At first there is no black spot on the operculum & a black spot at the base of the first part of the raged dorsal is present in all specimens under 10 or 11 cm in length.

Chromis Motuosa is found in every canal, lake or stretch of water which at one time has been connected with the Nile. As stated above it is able to exist under conditions which would probably kill any other fish of the river. It grows to a length of 5-4 cm. That being the length of the longest observed during a week's stay at Khartoum. The Arabs call the fish "Bally", "Shabas" or "mohit", the latter term signifying a comb which the erected dorsal spines somewhat resemble.

Two years ago I discovered in Lake Mendrela, a new species of Chromis which I have since found to be as widely distributed in the lower Nile as Chromis Ridibunda. I possess in a higher degree the capacity for living in brackish waters than the common bally. I named it in Edible fish of Lake Mendrela under the provisional name of Chromis menzalensis, which I will adhere to. This species is smaller than the common bally, the longest in my possession being 34 cm. long. Its general appearance is so different from the latter fish that it is difficult to account for it not being observed before.

From statistics of 5-5 fish which I have
examined & measured. The length of the head is contained from three to three and a third times in the length of the body including the caudal fin. 9 the depth twice to three and a third. The upper profile is almost a straight line, 9 the snout which is much longer than the eye is slightly convex. The interocular space has, but little convexity, 9 is a little less than the length of the snout. 9 about one and three-fifths the breadth of the orbit. The mouth which is extensible, is broader than long. 9 is bounded by thick fleshy lips which cover the teeth when the mouth is closed. The teeth are larger than those of 6. Notitia 9 as in that species are arranged in four series, in both jaws. The front series in each jaw is the largest. 9 the teeth in it are set so that they incline upwards towards the middle line of the body. Each tooth is irregularly bicristate; the inner tooth being the larger of the two crowns are brown. There are 21 & 22 teeth in the front series of each side of the upper jaw. The scales below the eye are in four series. The space covered by them is about to four times as broad as the angle of the preopercle naked portion of the preoperculum. The spines & rays of the dorsal fin vary much in number. Out of the specimens examined twenty-six had a fin formula of 15/12, thirteen 15/13, ten 16/12, three 16/11, two 15/11 & one 14/11.
The spines are not so strong proportionately as those of the other species, nor is the difference between the breadth of the two sides of a spine so well marked. The last dorsal spine is the longest. Except that between the first two or three spines, the interspinosus membrane is attached to the entire posterior margin of a spine beyond the apex of which it extends backwards & upwards with a slight anterior convexity. It then bends suddenly downwards & becomes attached to the anterior margin of the next spine, at a short distance from its apex. This configuration differs from that in C. niloticus, where the free margin of the membrane presents a series of pointed teeth directed upwards. The fifth & sixth rays of the dorsal are the longest & when laid back extend as far back as the middle of the caudal in the male, while in the female they are shorter. They do not reach much further than the base of that fin. In the anal, the fifth & sixth rays are the longest, & extend as far backwards as those of the dorsal. The fourth pectoral ray is the longest. It reaches to the level of the anal orifice in males, in females it is shorter. The first vertical ray, extends to the anal opening, & even as far as the origin of the anal fin in males, while in females it does not reach the anus.

The scales are cylindrical, deeper than broad, & the longest no more than covers three-fourths of the depth.

The lower pharyngeal are triangular & are
Involving the lower portion of the first three rays with the adjoining intersegmental membrane is a black spot a little larger than a scale of the lateral line.
Clothly set with conical teeth with brown apices. The five scale formulas are:

- P. 11-13
- A. 9-10
- L. 13-18
- T. 13-18.5

The color of an immature fish or one out of the breeding season is a greenish grey involving into a dirty white or the navel surface of the abdomen. While faint tinge of red shows in the lower portion of the body.

The stripes which are not apparent in a breeding fish are indistinct or altogether absent. The lower lip is tinged a beautiful blue which is continued backwards in a line to the edge of the operculum. In general coloration, the dorsal fincaudal and anal fins are more or less of a golden yellow, which is arrested by bands or spots except in the case of the pectoral which has a uniform color. In the anterior part of the operculum, dorsal fincaudal and anal fins are absent, but in the posterior portion 9 running into the retracted part of the fin, there are three horizontal series of greenish white spots, which in some individuals seem to run into lines. The anal is often irregularly blotched with black. The caudal possesses several series of spots of an exquisite greenish blue color in the center, these do not occur in the posterior portion of the fin which is quite uniform. The ventral seldom contain a trace of yellow. They are mostly deeply pigmented with black. The centre of each scale is lighter in color than the circumference. A has a pearly lustre. The upper angle of the opercula,
is blackish, I is sometimes marked with one or two spots of a golden colour. There is no difference in the coloration of the sexes, during the breeding season, as in the case of C. hilarii, nor is the male brighter in colour than the female. At this period the body above the level of the pectoral fins is bright bronzey yellow, inclining to olive green. There are eleven black transverse stripes on the upper part of the body, the last being placed as far back as the base of the caudal fin. There of the bands are on the head; the foremost, situated between the eyes, is comma upwards; the very sharply defined. If prolonged backwards through the eye it is continuous with the upper of the two longitudinal bands, also black in colour, which correspond to the upper a lower division of the interrupted lateral line. The second band crosses the head immediately behind the eyes but is not continued forwards in the operculum; the third is in front of the perpendicular from the gill opening. The sides of the abdomen below the plane of the pectorals is coloured a bright carmine red, while the under surface behind the ventral is a dirty white. The under surface of the head, I of the body in front of the pectoral is usually deeply blotched with black. The blue line on the lips & cheeks is more vivid than in the non-breeding fish. The black spot on the operculum I that in the soft dorsal are much intensified all the vertical fins are more or less deeply
Augmented with black I all traces of markings may be lost. The ventrals also become quite black.

Chromis menziesii differs from the common "loach" in its breeding habits. It is distinctly monogamous while the latter fish appears from my observations to be polygamous. A pair of the former fish, after mating, seek some suitable spot for depositing their eggs. Any firm, resistant structure, as a flat stone is chosen, but when such is not available, the fish set about excavating a burrow in the mud or sand of the bottom. At Lake Inverness I have seen such a burrow over an arm's length in depth. I have known a pair select a crack in the masonry of a built canal for their nest. Both sexes assist in the work of digging. At the mouth I count alone are used for this purpose. Sand or pieces of stone are scored in the mouth & carried to a distance of two feet or more, from the burrow. Pieces of gravel, about the size of a marble, which I have dropped near the entrance of a nest were immediately cleared away & were often caught before they touched the bottom. The pair work in concert over a series of stones which are too heavy for each individually. When a nest has been prepared, the eggs are laid, which from the nature of their envelopes adhere together, & become affixed to the walls of the burrow or other surface. They are laid in rows in
a single layer covering an area of 6.8 c.m. square. They are a little less than 2 c.m. in diameter & in colour a yellowish green. From the time the eggs are laid & even before while the nest is being prepared the fish are most assiduous in guarding their spawning place. No fish is allowed to approach without a protest from one or other of the pair. The chorion darts at the intruder with its dorsal fin & erects its longer inferiorly beaks to a retreat. The parent fish are never at rest & their movements may no doubt facilitate the aeriation of the eggs. 3 or 4 days before the fry become free from their attachment to the stones & wall of the burrow they may be seen struggling in the endeavours to detach themselves. Hence in the tanks of Parthenium femina. A little to & even immature Chironomus are now relenting in their attention to the parents’ charge. & when the fry detach themselves the latter become very solicit in their efforts to guard them. By circular round them the fish seem to produce a vortex which tends to keep the young together. Later when the fry are about 1.3 c.m. long they seem to defend with the guardianship & shelter themelves in the weeds. Males are about twice as numerous as females. Their average size of the sexes is about the same. but the unevenly matched pairs are not uncommon in one I took the male was 8.4 c.m. & the female 16.7 c.m. long. The breeding season begins in April & continues till June or the beginning of July.
The family of Siluridae are well represented in the lower Nile. Seventeen genera including 28 species, in all are described as occurring in the Nile by Günther in Appendix C of Petherick's *Travels in Central Africa*. Of these 14 have come to my hands, viz. *Clarias anguillaris*, Arab. *armoo*, *lazera*, *parvimanus*, *Sclite mysotus*, *Shilke*, *Shilke mohambet*, *manosomus*, *Sharoofta*, *Eutrophius nilotica*, *Zaydo*, *Silurus codon* *curius*, *Wadne* *Bagrus bagon*, *Bagon*, *Docme*, *Docme* *Chrysichys auratus*, *Shal abour seal*, *Shal haoua*, *Kuweeza* *Hedron*, *memhranacoo*, *Buta*, *soda* *Molapteus electricus*, *Shad* *Clarias* *anguillaris*, *lazera*, *parvimanus* are common in the rivers below Assuan as well as in Braket el Fawum and the lateral lakes. The species attain a large size; the largest I have seen was a *Clarias* 1.45 cm long. Chance once afforded me an excellent opportunity of observing the aerial respiration of a large specimen of Clarias. The fish was somewhat over a metre in length, and when I first saw it was lying perfectly still in about 3 feet of water, but for a twitching of its barbules especially the long
maxillary ones which were kept waving to 7 ft in front of its head. It showed no inclination to pursue several Nile herrings (Alote) & Barbus which were swimming about in its neighbourhood. Now I again it would move off sluggishly, to some distance, I return again to its original resting place. The taking in of air was done at irregular intervals, but often after one of its rambles. The point of the snout was raised above the surface of the water & the inspiration was simultaneous, with a discharge of air from the gills. Ichthys Synodus & Ctenopoma ruficorpus are abundant in the lower Nile, Ichthys Psenops & Silurus corrides are not so common. All these fish are chiefly confined to the river. They are rarely found in a canal or bisket. They are very voracious & take all kinds of bait freely. The flesh of all but especially that of S. Synodus ruficorpus is much esteemed by the Arabs. Pargus bagad & P. dorcat are common in the fish markets of lower Egypt. The "bagad" is the commoner of the two & specimens over a metre long are not rare. Chrysophrys auratus the only species of the genus which I have collected in the Nile is not abundant. Two or three individuals may be the reward for turning over several hundred weights of fish in one of the markets. The rudimentary spine present in front of the first dorsal spine of some Siluridae is well developed in
This fish, I believe, possesses the unique ability to lock the spine in the erect position with perfect precision. When the 1st dorsal spine is fully erect, no lateral movement of it is possible, although it is often considered when the spine is laid back. The stealthy (Symphodus) are present in a day's fishing in the river. After Chrome, they are the most abundant fish of the lower Nile. I have seen one specimen, only of S. membranaceus I could recall. Specimens are rarely sold so far north as Cairo but occasionally at the period of low Nile it is brought ashore. Fishermen reply to queries as to why this is other rare fish are caught most frequently at this season by saying that during the cold months they (the fish) just at the bottom of the river. I only take the bait at the advent of hot weather i.e. at low Nile. I have had confirmed a statement made by Geoffrey C. I believe that this fish has the habit of swimming belly uppermost. As an example of the accuracy with which the drawings of natural objects of animals have been done by the artists of Ancient Egypt, none better could be found than the representations of S. Membranaceus which is frequently seen on the walls of Egyptian tombs. It is always drawn in a position the reverse of that of other fish. I the coloring (the belly bluish-black, the back greyish
is correct. Symphondontis school is the common
of the two remaining species. Accidents often
happen to both, & fishermen through stepping
upon a "shad" The dorsal spine which is
sharp, may penetrate the sole of the foot
inflicting a deep wound. Gangrene of blood-
poisoning are said to follow this accident
but with proper treatment (antiseptics &)
the wound heals up quite normally.
Molpseudæmus electricus is not rare in
the lower part of the river, but as the fishermen
have a dread of its shocking power it is
commonly brought ashore. It is not used
for food, but its electric organ is employed
by the natives in the treatment of pulmonary
& bronchial affections. The electric tissue is
cut out, dried, & the patient is made
to inhale the fumes arising from it
when it is burning on a charcoal fire. This
belief is widely spread in the country & it
is curious that the Torpedos of the Red
sea and Mediterranean should be used
for a like purpose.

While Clarias Bagrus & Sympodontis appear
to spawn at or about the period of high
tide in the latter part of June the repro-
sductive organs are nearly ripe. I have
never been able to procure any very small
Silurids fry so that the date of their
hatching cannot even be approximately
determined. In autumn (November to January)
the spotted young of S. renteitis (7 to 10 cm)
go a large part of the pecuarie fishermen's
catch. The flesh of Siluridae in general
is instead it is with few exceptions consumed
by the poorer natives only.
The Characidae are not so numerous
in the lower part of the river as they are
near the 1st cataract, yet on the whole
some species are not uncommon.
Cichlids (geophagia), known to the Arabs
as 'amra el babt (moon of the river) occurs
plentifully near Assouan from which place
come the specimens I have in my collection.
It is known at Cairo as I have had its
appearance described to me by the fisherman.

Nile tilapia & A. holboellii (br. "irá")
are well known to Europeans by the name of Nile fish. Both species occur in about
equal numbers in the Nile at Cairo. Their
usual food is animal matter, out of the
harvest when boats laden with grain
are passing down the river nearly every
species I have examined had its
stomach packed full of wheat or barley.

Barbusidostus nune I have collected in
quantity below the cataract at Assouan
but if it occurs in the lower portion of the
river it is very rare as its form was
quite unknown to fishermen to whom I
showed specimens.

Hyrcanus forskali is not plentiful in
river north of Cairo though I am common
further south. It is called labra-bahd
"dog of the river" by the natives I well does
it deserve the name. It is very predacious
must be accountable for the destruction
of large quantities of young fish. I have
watched a large individual of the species
preying upon the young Chromis in the
ornamental ponds above referred to. I
have seen the same fish attack a hake
quite as large as itself. Fish are often
cought which are mutilated by the attack
of this species.

Hydrocyon brevis, described from the Nile
at Khartoum, I have not seen in the lower
Nile.

I have here to record the capture of a Hydrocyon
which, while answering closely to the descrip-
tion of H. forskali in Gunther's Catalogue
of Fishes, differs from it in certain points
which I think justify me in describing it
as a new species. The total length of the
fish is 49 cm. Length without caudal 39.5 cm.
Length of head 7.9 cm. Of the greatest depth
of the body 9.1 cm. The length of the head
is therefore contained five times exactly in
the length of the body minus the caudal. 2
the height 4.3 times making the head
to be comparatively shorter than in any
of the species of the genus described
in Gunther's Catalogue of Fishes. The prin-
cipal formulae are

D. 10  a. 15  V. 10  L. lat. 46  L. bran. 745

In this respect it agrees perfectly with H.
Forskali and H. lineatus. I like these it
has two scales interposed between the
digitated scales at the root of the ventral
and the lateral line. There are 6 teeth
on each side of the upper jaw. 8 the lower.
first agreeing in this respect with H. ctenactus. The position is curious. Each series of scales above the lateral line of the one immediately below it presents a black longitudinal streak in the specimen. The streaks break continuity 2 become blackish spots in the centre of each scale of the series. The lower lobe of the tail is a bright orangy red as is also the case with H. forsteri. Abies 7 Other Characimidae of the river. The specimen which as an only one I did not care enough by making an entry. is at present in the collection of the Cairo Medical school labelled provisionally. Dichromis labius called lepacht or "lepaht" by the Arabs is of frequent occurrence in the fish markets of the Delta. & it attains to a large size. Its flesh is better flavoured than that of most Nile fish. In May last year I obtained one specimen of D. anguiphalus (1 ft. 3 in. long). In the Cairo fish market. This is the first recorded occurrence of the species in the lower Nile. It is noticed that the Characimidae as a family, become more numerous in the lower Nile during the period of inundation. Adults Hydrocynus are the only two genera of the family frequenting the canals of lower Egypt. where they make great havoc amongst the fry of fish which spawn in these localities.

The family Mormyridae are a most characteristic feature of the Nile fish fauna. They are not common in the markets of southern
habits; they do not lend themselves to the
simple methods of capture which the native
fishermen use so successfully against other
hills fish. They frequent the deep parts of the
river, and nearly always the neighbourhood of
rocks or stones. If we may believe the fishes
men they are not usually caught on hooks or rarely in nets. They
appear to breed at the period of increase
of the river, as I have observed individuals
with replete generative organs about that
time. Nothing is known about their breeding
habits or mode of spawning. The flesh of
the Mormyrus is firm, and is not so viscous
as that of other hills fish; consequently, it
is that most highly by the natives, who
are almost the sole consumers of this fish.
All the members of the family except Mormyrus
are generally designated "anomum" by
the Arabs, but some are given special
names which shall be mentioned below.
Commencement of all in the lower part of
the river is Mormyrus cahense. 9 specimens
over 60 cm. are not rare. This 9 Th.
Mormyrus are known as "Achiva" or
simply "anomum" or abel-bos. The
smaller one, the "fat father of the small". At
a rough glance both of these species
seem one, but it is likely that the Mormyrus
of the ancients includes both. No drawings
of the Mormyrus on the tombs are
referred to either species. Being a sacred
fish, mumies of it are unavailable for
examination, but those I have seen were
too mutilated to permit of identification.
In cyclops, the only species that occurs in the Nile of the Nile species.
In Arabic, called, "bon", by the Arabs, is not as common at Cairo as it is further up the river. This is the following species are often met with amongst the fry of Labeo & Chrome in the fish markets. 

The cyprinoides is commoner at Cairo & in the Delta than the above species, & according to the fishermen, is often taken quite near the surface of the water. It is called "râ el-bajir." Hypocrenos crenalis (Rud. "âmarâ") is more frequently met with than the two last-mentioned species. Small specimens, 15 cm. 9 under, are common. 9 examples of between 40 95 cm. long are often caught. They regularly placed dark spots seen in the dorsal aspect of a large sized fish are absent in the young.

Note: I have remarked the sculaches & scawels are the sides of the head & body of specimens of M. Carline & M. cyclops, but have obtained no corroboration of the statements made by Herodotus, Geoffrey St. Helvere & Joanna as to the cause of the injuries.

Cyprinoides. Although some species of this family have been recorded from the Upper Nile, I am not aware of the occurrence of a Cyprinoides being noted from the lower part of the river. I have obtained Cyprinoides callitrichus in the Nile near Damietta, where they were moderately abundant. The
They swarm in the shallow waters of the shores of Lake Menzaleh, & it is just possible the specimens observed had entered the river through some of the irrigation canals connecting it with the lake, as I have never found them elsewhere (even in the particular part of the river).

The Cyprinidae are, as far as numbers go, abundantly represented in the river. The genus Laboe, of which three species have been described from the Nile, furnishes almost one half of the weight of fish sold in the fish markets in the river.

Laboe nilotica, Arab. "Labib; Labib" is the most common species. L. corbic, Arab. "Khub" occurs in but small numbers in lower Egypt. L. footali (footali does not occur in the lower Nile).

Less abundant than Laboe, but nevertheless prominent in an average "take" from the river is Barbus bynni (Arab. Binni,) the flesh of which is better flavoured than that of "Labib." Barbus princei is very common in irrigation canals & in the shallow parts of the river. It swarms in the neighbourhood of villages & with the fry of Chronus act as scavengers of the filth. Refuse poured into the river at these places. It is also destructive to fish eggs. I have observed numbers of them near the spawning ground of a Chronus eager, darting on the patch of eggs, when the attention of the parent fish is attracted by some other object. Barbus princei appears
To spawn earlier than most Nile fish, as I have seen fry 14 mm. long at the end of April.

It ought to be mentioned that the biceps thura described as extending from the scapula to the middle of the caudal does not exist in the living or freshly killed fish. In these there are three (rarely four) round black spots on each side of the body, one at the base of the caudal fin, another just behind the scapula & the third on a level with the posterior margin of the dorsal fin. The spots with the exception of the first disappear or becoming indistinct in spirit specimens, their place being taken by the blue streaks above mentioned. It is known to the Arabs as "Barbas" or Beni-cla "Clupea pinta," the Arab, (and "abougha") ascends the river in large numbers during the winter months. They begin to appear in Cairo about the 20th of December & are caught in considerable quantities in the months of January & February. After the middle of March they retire to the sea. I have not secured specimens from further south than Beniswef. But the description of a fish given me by the fishermen at Aswan makes me think that their migration extends as far south as the 1st Cataract. The fish is considerably excellent when salted. A nearly all that is taken on the river is made into "fishish." By the fishermen the sobouga is said to grow large & fat when it enters the river & to become gradually thinner, in the sea after its return, till the following winter when it again ascends the river.
The common eel, Anguilla vulgaris, and
"el-bhayyat" (lit. father of theadder) "al-abān
el-bahi" (river serpent) & "hamash" is very
common in the lower Nile, but becomes rarer as
the 1st Cataract is approached. It abounds
in the fresher waters of Lake Menzaleh & it
is caught in great quantity at the sea
entrance of that lake in the month of
December. They are then leaving the lake
to spawn & it is reported that the fry
enter from the sea a month later. Anguilla
laticlavia is at present included in the
most recent list of Nile fishes on theauthority
of a figure in Pellegrin's "Livre sur l'Egypte"
depuis 1805 jusqu'en 1877 but an authentic
record of a single specimen is wanting.
Yettodon lineatus arab "jahaha" is not
commonly taken by fishermen on the river
probably on account of its habit of frequenting
rocky places. Numerous small specimens
12 c.m. long or so, are to be found amongst
the fry taken from the pools left by the
receding Nile. The largest specimen measured
was 34 c.m. long. The flesh is not eaten
but the fish is in request by the curiosity
dealers who stuff it roughly for sale
in the tourist season.
Polypterus buechi is of rare occurrence in the
lower Nile. During 4½ years' residence in
Egypt, I have only seen two specimens.
These were from the river near Cairo & to
be exact one of them was caught in a
well to which the Nile has access in
high floods. According to report three or
Years are caught off Cairo during a season but I think this unlikely as the price offered for specimens is insufficient inducement to the men to bring that or any other rare fish ashore; moreover its appearance to name are not generally known to the fishermen in lower Egypt. At Assouan the fish although known is not common some years ago a well known American zoologist had to leave the country without securing a specimen. He visited the Cairo markets daily for several weeks & at Assouan he employed fishermen to fish expressly for this fish without success. It is said to be common in the Nile above Assouan so that with the opening of the Soudan many interesting points in the natural history of this & other tropical species of Nile fishes ought to cleared up.