

THE SISCO OF LAKE TIPPECANOE

AND ITS

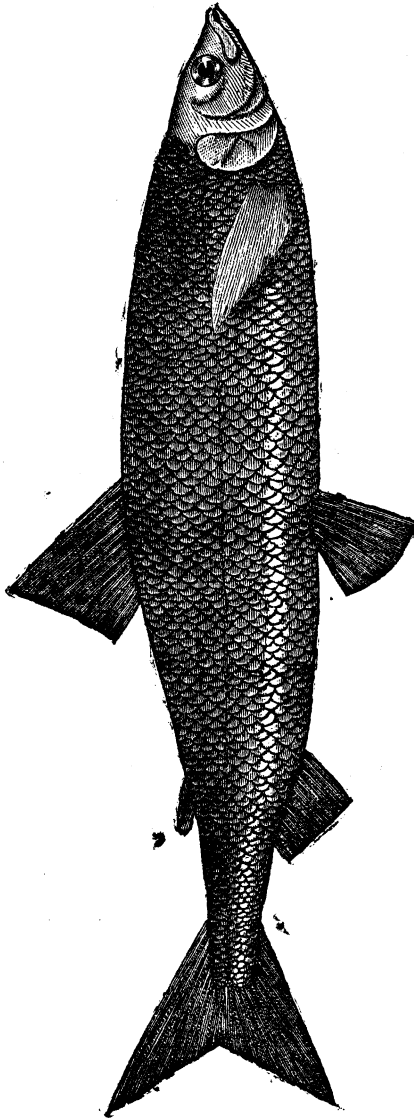
RELATIVES.

BY PROF. DAVID S. JORDAN, M. D.

Some time last winter, a collection of deep water "Siscoes," from Lake Tippecanoe, Kosciusko county, Indiana, was sent to Prof. Cox, by Hon. J. H. Carpenter of Warsaw. These fishes, Prof. Cox turned over to me, with the request that I should examine them and prepare an account of their characters and relationships, as considerable interest is attached to them as well as to other inhabitants of the "bottomless" lakes of Northern Indiana.

They belong to the *Salmonidæ* or Trout family, a group distinguished at once among our fresh water fishes by the presence of the so called "adipose" fin, behind the dorsal fin, in connection with a scaly body, naked head with no barbels about the mouth. The Cat-fishes, (*Siluridæ*), also have the adipose fin, but they are scaleless, and they have long barbels about the mouth, besides other important differences.

Our fishes belong to the Genus *Argyrosomus* of Agassiz (Greek *argyros*, silvery; *soma*, body,) a group closely allied to the White Fishes, (*Coregonus*), from which they were separated in 1850, but distinguished by the greater development of the lower jaw, which projects decidedly



ARGYRO SOMUS SISCO, JORDAN
ONE HALF NATURAL SIZE

ASUS WIFE

beyond the upper, (except in *A. hoyi*), the reverse being true of *Coregonus*. The maxillary bones are rather longer, the bones of the mandible rather heavier and the teeth on the intermaxillaries and tongue, although very minute are slightly stronger than in *Coregonus*. Compared with *Coregonus*, the species are small and, (excepting *A. tullibee*), much more slender in form, approaching the slimness of herrings, hence their popular name of "Lake Herrings," although their resemblance to the Sea Herring, (*Clupea harengus* L.) is quite superficial. Excepting in the general form and color, the Siscoes and Herrings have little in common.

To the above distinctive characters, Prof. Milner adds: Supra-orbital bones, long and narrow, extending considerably beyond the middle of the orbit, intermaxillaries relatively short. This character and the projection of the lower jaw make the snout more pointed than in *Coregonus*.

On careful comparison with the other species known to me, I have ventured to describe this Indiana fish as a distinct species under the name of *Argyrosomus sisco* JORDAN (Am. Nat. March 1875, p. 135). The description there given is reproduced below, and I accompany it here with a wood cut, representing the fish reduced one-half. I also give a short account of each of the other species of the genus known in our waters together with their full synonymy.

Genus ARGYROSOMUS. Agassiz. Siscoes.

Salmo (ARTEDI) LINNÆUS and early writers, (not type).

Coregonus (ARTEDI) CUVIER and most writers, (not type).

Argyrosomus, AGASSIZ, Lake Sup. p. 339, (type *S. clupeiformis*, Mit).

ARGYROSOMUS CLUPEIFORMIS. (Mit.) Ag. The Lake Herring.

SYNONYMY.

Salmo clupeiformis. MITCHILL. Am. Month. Mag. 1818, p. 321.

Coregonus artedi. LESUEUR. Jour. Ac. Sci. Phil., 1818, p. 321.

(First respectable description). RICHARDSON. Fauna. Ber.

Am. III, p. 203. KIRTLAND. Bost. Jour. Nat. Hist. 1842, p.

231. STOREY Synopsis, p. 199 and of some lists, etc.

Coregonus clupeiformis. DEKAY. N. Y. Fauna, Fishes, p. 248. CUVIER & VALENCIENNES. XXI p. 523. AGASSIZ. Lake Sup. p. 339 GUNTHER. Cat. Brit. Mus. VI, p. 198, and of various lists etc.

Salmo (Coregonus) lucidus. RICH, op. cit. p. 207.

Coregonus lucidus. GUNTHER, l. c.

Salmo (Coregonus) harengus. RICH op. cit. p. 210.

Coregonus harengus. DEKAY, op. cit., GUNTHER op cit. p. 199.

Coregonus clupeoides. GUNTHER, l. c. (slip of pen for *clupeiformis*).

Coregonus albus. AGASSIZ op. cit. (not of LeSueur).

Argyrosomus clupeiformis. AGASSIZ. HOLMES Maine Ag. Rep. 1862. JORDAN. Am. Nat., March, 1875. MILNER. Rep. Fish Com., 1872-3, (published 1875) and of other recent writers.

This species, the common "Lake Herring" or "Shad-Salmon," abounds in all of the great lakes and in all bodies of clear water tributary to them. I am not aware that it occurs in the Mississippi valley. Unlike most of the others it is a shallow-water species and may also be generally distinguished by its relatively larger size and looser scales. This fish varies much in different waters and the characters assumed to distinguish *A. harengus*, *A. lucidus*, etc., seem to be of little value. The specific name (*clupeiformis*, herring-shaped,) has been already alluded to.

ARGYROSOMUS SISCO. JORDAN. The Sisco of Lake Tippecanoe.

SYNONYMY.

Argyrosomus sisco. JORDAN. Am. Nat. March, 1875, p. 135.

DESCRIPTION.

Form regular, spindle-shaped, compressed, slightly elevated at the beginning of the dorsal fin; general outline not very different from others in the genus.

The greatest depth of the body is contained 4 1-10 times (4 1-4 in males, 4 1-2 in *A. hoyi*), in length from tip of snout to the end of the scales at base of caudal. The thickness of the body is about half its depth. The head is moderate, pointed, compressed and depressed. The skull is flattish above, with a longitudinal ridge. The interorbital space is slightly wider than the eye. The length of the head is less than

the height of the body (nearly equal in males), and is contained 4 1-2 times (4 1-3 to 5; 4 in *A. hoyi*) in length of body exclusive of caudal. The eyes are large and circular, and their diameter is contained 3 3-5 (3 1-2 to 3 3-4; 3 1-2 in *A. hoyi*) times in the length of the side of the head. The nostrils are large, nearly midway between eye and tip of snout, and on the upper surface of the head.

The opening of the mouth is rather small and quadrangular. The lower jaw is longer than the upper, rather less so than in *A. clupeiformis*, very much more so than in *A. hoyi*, which is almost *Coregonus*-like in this respect. A slight elevation at the tip of the lower jaw, suggesting the "nail" on the bill of ducks, overlaps and fits into a slight emargination at the end of the upper jaw. Margins of lower jaw with slight roughnesses representing teeth. Intermaxillaries with minute asperities. Tongue provided with minute teeth which, however, are readily evident.

Maxillaries rather strong, weaker than in *A. hoyi*, contained 3 1-3 (2 3-4 in *A. hoyi*) times inside of head, not reaching a vertical line through the centre of the eye.

Length of mandible much more than least depth of tail, 2 1-8 (2 in *A. hoyi*) times in head. General character of opercular bones, branchial openings and branchiostegals as in other species.

Distance from occiput to tip of snout contained 2 1-3 times (1 7-8 in *A. hoyi*) in distance from occiput to beginning of dorsal. Depth of head at occiput 2-3 the length of the side of head.

The scales are relatively smaller than in most of the other species, the lateral line having 84 developed scales (81 to 86; 75 in *A. hoyi*, 73 in a specimen of *A. clupeiformis* 80 in *A. nigripennis*), besides several small ones at the base of the caudal, which form a concave margin somewhat parallel with the fork of the fin, as in other species.

The scales, though thin, are quite firm, rather less so than in *A. hoyi*, very much more so than in the "Lake Herring."

The lateral line is very evident, nearly straight, and rather nearer the back than belly. There are eight series of scales between the lateral line and the ventrals.

The radial formula is D. II, 9 or 10, P. 15, V. 12, A. I, 12.

The dorsal fin begins in front of the ventrals at a point about equidistant between the front margin of the eye and the front rays of caudal. It is short and rather high. Its greatest height is a little more than 2-3 the length of the head. Its length is 2-3 of its greatest height. Its longest ray is a little more than 3 times the length of the shortest, thus giving the fin a different form from that of *A. hoyi*, in which the longest ray of the dorsal is nearly 4 times the length of the shortest. The adipose fin is rather slender and reaches slightly beyond the termination of the anal.

The pectorals are rather long and pointed, about as long as the ventrals and of course not reaching nearly to them.

The ventrals are rather large, more than 2-3 the length of the head, falling considerably short of vent. The accessory scale at their base is rather short and triangular, less than half the length of the fin. The depth of the body at the vent is contained 5 3-4 (6 3-4 in *A. hoyi*) times in the length of the body.

The caudal fin is deeply forked, its lobes are long and pointed, but in all my specimens more or less mutilated. The distance from the vent to the rudimentary caudal rays is contained 4 3-5 (4 1-2 in *A. hoyi*) in the length of the fish.

The color, (from fresh specimens,) deep steel-blue above becoming gradually paler to below the lateral line, where it changes to silvery. The arrangement of the scales gives an appearance of longitudinal lines which are conspicuous in certain lights.

All the scales, except those of the belly, are finely dotted with black, except on their free margins, which being transparent, show the dots on the scales below.

Vertical fins and tips of paired fins also thickly punctate,

as well as the skin of the head, particularly above and on the maxillaries and suborbitals.

These black dots seem to be of some importance as they occur in both Wisconsin and Indiana specimens. They are not noticeable on *A. hoyi*, excepting on the head. The latter is a more brilliantly colored fish, its scales having a peculiar rich silvery lustre, wanting in the Sisco.

Average length of specimens examined, 9 1-2 inches, including the caudal fin, being thus larger than *A. hoyi*, which rarely exceeds 7. The largest specimen of the Sisco seen measures 10 1-2 inches. Larger individuals sometimes occur. Mr. Carpenter writes that "occasionally one is caught weighing 1 1-2 to 2 pounds, but it is very unusual to find them so large."

Although not described till lately this fish has been for some time known to naturalists. Besides Lake Tippecanoe, it occurs in Geneva Lake, in Walworth county, Wisconsin, and in Lake Mendota, Dane county, (probably introduced, from Geneva Lake, *Milner*). It should be noticed that these lakes belong to different water systems, Geneva Lake being drained by Fox river, a tributary of the Illinois, Lake Mendota, by Catfish river, a branch of Rock river, while Lake Tippecanoe is one of the sources of Tippecanoe river which flows into the Wabash. I have not heard of these fishes in any water flowing into Lake Michigan. In Lakes Winnebago and Buttes des Morts, the name "Sisco" or "Cisco," (of Indian origin, allied to Siscowet?) is transferred to the common white bass of the Lakes (*Roccus chrysops*, Gill).

Types—Several specimens male and female, (the latter less elongated) taken in the spawning season at Lake Tippecanoe, about November 25, 1874.

The single specimen of the Wisconsin Sisco now in my possession, agrees in the main with the above, but it is a slimmer fish (perhaps owing to sex or season), the depth being contained 5 times in the length of the body, the head 4 2-3 and the eye four times in the head. The maxillary is longer,

2 7-8 in length of head, the depth at the vent 6 3-4 in the length of the body, and the distance from vent to base of caudal only 4 times. The scales are obviously larger, there being but 77 in the course of the lateral line. To how much weight these differences are entitled can only be told by a comparison of a number of specimens.

Concerning the habits of the Indiana Sisco we have the following from Judge Carpenter:

"Some years ago, probably five, these fish were discovered on the north side of Tippecanoe Lake by Isaac Johnson, and at each return of their spawning season, which is the last of November, they have reappeared in large numbers. They are not seen at any other season of the year, keeping themselves in the deep water of the lakes. The general opinion is that they will not bite at a hook, but Mr. Johnson says that he has on one or two occasions caught them with a hook. To my knowledge they have never been found in but two of our lakes, Tippecanoe and Barber's which are both large lakes and close together, as will be seen by reference to the map.

"The spawning season lasts about two weeks and they come in myriads into the streams which enter the lakes. There are large numbers of persons who are engaged night and day taking them with small dip nets. They are caught in quantities that would surprise you, could you witness it. Those who live in the neighborhood put up large quantities of them, they being the only fish caught in the lakes that will bear salting. Some gentlemen who have been fishing to-day (Dec. 8) inform me that the run is abating and that in a few days the fishes will have taken their departure for the deep water of the lakes and will be seen no more until next November."

As far as I can learn, the habits of the Wisconsin Sisco are similar, but they seem to be much less abundant. Fishermen say that specimens were once sent from Geneva to Prof. Agassiz, who pronounced them new to science and extremely interesting. Specimens procured for me last year by Prof. H. E. Copeland, cost a dollar apiece

of the fishermen, which shows the high value attached to these fishes, as *A. clupeiiformis* when taken from the nets is not worth more than ten cents a dozen.

Argyrosomus sisco is most nearly related to *A. clupeiiformis*, and perhaps it may ultimately be considered as a variety of that species, modified and improved by long residence in the small lakes, perhaps since the time, (if ever,) when Lake Michigan extended over this region.

A parallel case is that of *Coregonus otsego*, DeWitt Clinton, the noted white fish of Otsego Lake, which is said to differ from the common white fish, (*Coregonus albus* Le Sueur,) in much the same way.

ARGYROSOMUS NIGRIPINNIS, Gill. The Black-fin.

SYNONYMY.

Argyrosomus nigripinnis. GILL MSS., HOY. Trans., Wisc., Acad., Sc. 1872, p. 100. (Name only.) JORDAN. Am. Nat. March, 1875, p. 135. MILNER Rep. Fish Com., 1872-3. (First description.)

A large, magnificent fish of an average weight of 1½ pounds and a length of 16 inches. It may be known at once from the others by its larger black fins, its stouter form and its greater size. Thus far it has been found only in Lake Michigan and it is especially abundant in Grand Traverse Bay. "It is never caught in less than 60 fathoms and not in large numbers, till you reach a depth of 70 fathoms."—(Hoy).

ARGYROSOMUS HOYI. Gill. The Sisco of Lake Michigan, Deep water Moon-Eye.

SYNONYMY.

Argyrosomus hoyi. GILL MSS. Hoy, Trans. Wis. Acad. 1872, p. 100, (name only.) JORDAN, Am. Nat. March, 1875, (diagnosis), MILNER, Rep. Fish Com. 1872-3, (description).

This beautiful little fish is noticeable for its silvery brightness, the scales having a lustre similar to that of the common Moon Eye (*Hyodon tergisus*, LeSueur). It is one of the smallest of the *Salmonidæ*, rarely exceeding 7 inches in length and not reaching the weight of half a pound. It is found in the deep waters of Lake Michigan and in Lake Superior (Milner) and I believe also in some of the inland

lakes of Michigan. In a fine specimen sent me by Dr. Hoy, who discovered this species and the preceding, the upper jaw is slightly but distinctly longer than the lower, a character unusual in this genus. In fact the prolongation of the lower jaw is usually considered the principal generic character of *Argyrosomus*. This peculiarity is not mentioned in Milner's description, his specimen being perhaps not perfect in this respect. Dr. Hoy writes: "This little beauty never approaches shoal water where *A. clupeiformis* is only found. About 30 or 40 fathoms is as near shore as it has ever been captured here." (Racine, Wis).

ARGYROSOMUS TULLIBEE, (Richardson) Agassiz. The Tullibee.

SYNONYMY.

Salmo (Coregonus) tullibee. RICH. F. B. A. III, p. 201.

Coregonus tullibee

GUNTHER, op. cit. p. 198, AGASSIZ, L. Sup.

I do not know this species. It was originally described from Arctic America, but Professor Agassiz mentions finding it in Lake Superior. It differs widely from all of the foregoing, the body being much more elevated, the depth being about one-third of the length of the fish. Nothing special is recorded concerning its habits.