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PADDLE-NOSED STURGEON IN ONTARIO.

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The late Mr. A. N. Montpetit in his work "Les Poissons d'Eau Douce du Canada," referred to a specimen of the Paddle-nosed Sturgeon (*Polyodon spathula*, Walb.) shown in the Fisheries Museum, Ottawa. "Ai-je besoin de répéter qu'il est unique au Canada," he wrote. "Faut-il vous le décrire? Couleur olive un peu pâle; opercule démesurément allongé en point, atteignant presque les ventrales ; la tête, y compris la spatule et les pointes operculaires, presque plus de la moitié de la longueur du corps : la tête seule n'est égale qu' à la cinquième partie." The specimen described is indeed remarkable enough to call for special notice, for the records of the capture of *Polyodon* in Canadian waters are extremely few. I have not been able to obtain information of more than four specimens ever having been secured. About the end of May an Indian captured a fine specimen in Lake Helen, Nepigon River, Lake Superior, and on account of the uncommon interest to naturalists of such an event, I venture to offer a few remarks upon this rare and curious Canadian fish. The mounted specimen in the government collection was obtained over twenty years ago, and I have been informed by a fisherman at Sarnia that a second specimen was procured about the same time. A specimen is also recorded from Lake Erie ; but hitherto none have been secured in Lake Superior, and the example recently shipped to Ottawa is of special interest as extending the range of this rare fish westward. It was sent fresh ; but on examination its condition was such that it could not be preserved, and even the skeleton, being mainly of cartilage, is difficult to prepare as a museum ex-

hibit. This is the more to be regretted as the specimen was about five feet in length, and much larger than any known to have been before taken in the Dominion. Old fishermen near Point Edward on the Lambton county shore vaguely refer to other specimens of *Polyodon* occurring in Lake Huron ; but on the other side of the watershed which bounds the southern margin of our western great lake system, that is, in the basin of the Mississippi River, and in the lakes of the central plateau of the United States, the Paddle-nosed Sturgeon is said to be common. Curiously enough it inhabits the Yang-tse-Kiang and certain Chinese waters ; but elsewhere this remarkable fish is unknown. What is the meaning of this sparse distribution in such widely separated localities ? Again, why is it so rare in our own lakes, and common in the great river basin to the south ? The naturalist's answer is obvious. It is a fish that was once probably widespread in both the old and new worlds. It is indeed a Ganoid, a group of fishes which preceded our existing kinds, and formerly predominated on our planet. Their fossilized remains are familiar to the geologist in the Palæozoic strata. In the ancient world, especially in the Devonian Age, the Ganoid fishes abounded. At the present time the existing species are few, not more than twenty or thirty in all, as compared with 12,000 species of living Teleosteans. Their distribution is erratic and very local. Excepting the common Sturgeons (the family Acipenseridae) the surviving species of Ganoids are amongst the rarest of fishes, and *Polyodon* amongst them, is the rarest of all, and in Canada apparently almost extinct. One would expect to find in the case of any tribe of animals which are dying out, that they would survive here and there in isolated areas, and in some such localities would become more and more scarce. These features in the occurrence of an animal are the surest signs of its approaching extinction, and such signs appear in the most marked manner in the case of *Polyodon*. The exceeding rarity of specimens in our waters has called forth the suggestion that those, which are at long intervals captured in our great lakes, are not survivors or descendants of Spatularoids indigenous to Canada ; but wanderers that still find means of migrating across the watershed of the Mississippi. It is more probable, however, that a few pairs still

survive, and that the young progeny find their changed environment so unfavorable that most of them perish, hence their rarity.

It is with a pathetic interest that the naturalist examines a fresh specimen of a Canadian *Polyodon*, when the rare opportunity occurs. Its uncouth and indeed grotesque form is largely due to the exaggerated length of the snout which is as long and flat as a canoe paddle. It is said to enable the fish to grub amongst sand and mud and to dislodge small crustaceans, and possibly mollusca, which are supposed to constitute its food. The organ is an enormous and cumbersome one for so simple a purpose, and it is possible that this lengthy nose or rostrum has other uses. It is, of course, a far more formidable organ than the snout of the shovel-nosed sturgeon (*Scaphirhynchus*). It recalls the powerful weapon of the Saw-fish (*Pristis*) and the Sword-fish (*Xiphias*), and differs most markedly from all its Ganoid congeners in its general external form. Of course the Sword-fish is a shark, and the Saw-fish is a Teleostean allied to the Mackerels (*Scomberidæ*), both equally distantly separated from *Polyodon*, yet there is a striking resemblance in the flat, elongated, blade-like snout of all three. The anatomist finds, however, that these externally similar structures are very differently formed, and bear no resemblance to each other when their osteology is examined. Thus in *Pristis* the mesethmoid rod which, in such a fish as the haddock, projects from the frontal-bone, covering the fore part of the head, is prolonged and flattened, and provided along its lateral edges with twenty or thirty strong teeth. On the other hand, in *Xiphias*, the Sword-fish, the double vomer, which underlies the mesethmoid and roofs over the mouth anteriorly, grows forward, along with the two premaxillary or upper-jaw bones, and the three form the toothed flat beak which is often thirty inches in length. It is the palato-quadrate cartilages in *Polyodon* which are lengthened and shielded by bony maxillary plates which form the long spatulate beak in front of the head in this species. I was struck by the massive rotundity and vertical depth of the body in the Paddle-nosed Sturgeon under consideration. The protruding beak occupied fully one-third of the total length of the fish. Its eyes, small, dull, and in life no doubt expressionless like those of the common Sturgeon, were low down and

close to the root of the paddle-snout. They were placed as in some of the whales just above the angle of the mouth. The mouth was of enormous capacity, toothless and quite underneath the head, far back as in all sturgeons. The gape was enormous so that the lower jaw formed a huge tongue-shaped flap, pointed in front and capable of being very widely opened. Next to the absurd elongated snout and the great capacity of the mouth, the most noticeable feature was the remarkable leathery operculum. In the Sturgeon it is small and insufficient to cover the red gills, but in *Polyodon* it sends back a pointed flap long enough to reach nearly half the length of the body. From this upper flap the hind margin of the operculum gracefully curved down and forward and the flap on each side met below and formed a prominent projecting collar in the jugal or throat region. The skin was, soft slimy and naked, in contrast to the enamelled scales and bony plates which cover the skin in other Ganoid fishes. It resembled the smooth integument of the porpoise : but was of a dark bluish purple colour, varied by pale blue wavy lines passing diagonally and slightly opalescent. The opercular flap is traversed by radiating sinuous mucus canals. The paired fins, pectoral and ventral, occupy the characteristic Ganoid position quite underneath the body. They are powerful, and possess a stout and prominent basal part or peduncle. The great dorsal fin and the equally large anal fin resemble the same members in the Sturgeon : but the basal portion is far more massive and the margin more deeply lunate. The tail is an enormous organ, very deeply forked and the upper lobe is extremely high, and the back bone extends to the tip, a perfect heterocercal caudal fin. All the fins are dusky and leathery like those of a shark.

An anatomical examination would have revealed many interesting features : but it was not possible. It would, for example, have shown the absence of ribs, the persistence of the gristly rod or notochord, whose sheath never becomes segmented. There is, in *Polyodon*, no true backbone. The operculum develops a bony basal part : but it is attached to the suspensorium of the jaws, which is cartilaginous, except at the upper part articulating with the periotic surface of the skull. It is interesting to find that the spiracles which, with one exception, are found on the top of

the head in Ganoids, between the eyes and the gills, possess a few gill-filaments, and have not lost their branchial function. There is no accessory or opercular gill, such as we find in the Sturgeon and *Lepidosteus* on the posterior face of the hyoid arch; but a pseudobranchia distinct from a true opercular gill occurs. In spite of its name *Polyodon* has no teeth. They are present in the young: but disappear as the fish grows. It is said to frequent only the dark and deeper parts of the rivers and lakes where it occurs, and both on account of its structure and habits is a singular type amongst fishes. It has, as already pointed out, many exceptional features distinguishing it from its Ganoid allies, and would never be ranked by an ordinary observer with the Sturgeon, the Bow-fin (*Amia*) or the Bony Pike or Bill-fish (*Lepidosteus*) of our own waters or with the *Polypterus* of the Nile and Senegal, or with the African *Calamoichthys*, from Calabar. To the scientific eye they all belong to one group, one of the most interesting groups in the whole range of Zoology. The Ganoids on the one hand possess features of the Shark tribe (e.g. the many-valved conus arteriosus, the heterocercal tail, and the intestinal valve), while they exhibit features which are equally typical of the Teleosts or Bony Fishes, viz.: free pectinate gills, an operculum, a permanent mesonephros, and the production of small spherical eggs in considerable quantity. They are a generalised type of fishes, and of great antiquity, as geological evidence demonstrates. Hence their morphological and palæontological importance.

SALSOLA KALI TRAGUS.

A few specimens of "Russian Thistle" were found this summer by Mr. W. T. Macoun, the Horticulturist at the Experimental Farm, in a field of Alfalfa sown last year. The Alfalfa seed was purchased in Ottawa, but though the "thistle" has ripened its seed there is no danger of its spreading or becoming the noxious weed it is in the west. It is only on the prairies that it is to be feared.



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