

and never giving one canary an entire complement of wild bird's eggs. In all cases the eggs were hatched and in no case did the foster-young attain an age of more than a week, though it is to be remembered that in every case young canaries in the same brood with the foster-birds flourished and reached maturity. During the season of 1903 I took two young song sparrows, just beginning to show the feathers, and put them with two canaries about the same size, though more fully feathered. These birds were readily adopted by the parent canaries, but one of them died after three days; the other was reared, reached maturity, was weaned by the old birds, being treated precisely as were their own young, and is still alive at this writing.

This series of experiments I have reported as a suggestion for further work of a similar kind. I had hoped that hatching the eggs of wild birds under canaries would enable me to observe the development of the foster-young to an advanced age. It seemed to me that there would be no possibility of their song being other than such as could be attributed either to inheritance or to intimate association with a new kind of singing bird. In all this I have, of course, met with disappointment; the only young bird being reared to maturity, from the many I have tried, was a song sparrow, almost fledged before introduced to his foster-parents. It has occurred to me that perhaps the kind of food, partially digested by the parent canary birds, and then regurgitated and fed to their young, would have militated against the growth and development of another kind of bird. However, in the case of three cowbird's eggs upon which I have experimented, all of which were hatched, this should not have prejudiced their growth, when we consider the variety of foster-parents that are induced to hatch and rear the eggs and young of the cowbird.

To briefly summarize the work I have described in some detail, forty-one different eggs of wild birds, representing six species, and three young birds already hatched, form the aggregate of individuals dealt with. All of the forty-one eggs were fertile, and were hatched by the foster-parents. This is sug-

gestive in regard to the propagating powers of wild birds, and though not conclusive, indicates a much higher percentage of fertility in the eggs laid by them than obtains in song birds when caged, or semi-domesticated. None of the young which were hatched from these eggs reached a greater age than seven days, which would seem to indicate that the food supplied by the foster-parents, which was the same on which they raised their own offspring, was of a kind so different from that used by wild birds in rearing their young, that it proved inadequate. I also believe that the nest lining was of a character so unlike that of the nests natural to the foster-chicks, that it prejudiced their development and growth.

In the light of the knowledge I have gained I shall endeavor, in the coming breeding season, to conduct further experiments of a similar character, and hope for better results. It seems worthy of note that I have been able to rear not only all the kinds of birds mentioned by hand, but in addition some twenty other species of song birds. These birds have been taken from their parents' care at ages varying from three to six or seven days, and over ninety per cent. have been successfully reared, being fed by hand. Such birds in most cases have not only reached maturity, but many of them have lived from three to seven years.

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NOTES ON POLYODON, I.

WHILE engaged last summer on the upper Mississippi in investigating the natural history of the spoonbill (*Polyodon spathula*) I had occasion to examine a great many specimens, caught by the fishermen in a five-hundred-yard seine. My attention was soon called to the presence of a pair of minute barbels some distance in front of the mouth. Not recalling any reference to these in the literature on *Polyodon*, I examined a great many specimens and invariably found them present. A further examination of the literature shows that among systematists these barbels have been entirely overlooked, although the ordinarily recognized affinities of the fish to the

sturgeons would cause one to look for them especially. So Jordan and Evermann (Bulletin 47, U. S. N. M., Pt. 1, p. 101), in their characterization of the Polyodontidæ, say definitely, 'no barbels.' Only within the last few weeks I have discovered what is seemingly the only reference to these barbels, in a paper by Mr. Edwards Phelps Allis, Jr. (*Zoologische Jahrbücher*, Abth. für Anatomie, etc., Vol. 17, p. 671).

In a specimen of *Polyodon* 85 cm. long, these barbels lie 47 mm. in front of the mouth, on the ventral surface of the 'paddle.' They are 23 mm. apart, and the right one measures 3.5 mm. in length. The left one is considerably shorter, and in general there is considerable difference in their size in different individuals. They are very slender, nearly colorless, and translucent. It seems doubtful whether they are functional.

The fact that these barbels have not heretofore been noticed even by our best systematists suggests the idea that they may not be present in specimens from other regions. As to this point I hope to gather evidence next summer, in connection with other researches on *Polyodon*.

Another interesting point concerning *Polyodon* is the occurrence of peculiar small true scales over the surface lying over the entire scapular arch and extending forward the entire length of the isthmus. They thus form a barrier that must be crossed to enter the branchial region from behind. As this entire region is well covered over by the large opercular flaps and gular pouch, it was at first very difficult to see any significance in such an arrangement. But a few observations in the field soon disclosed the meaning. *Polyodon* is preyed upon, more than any other fish I know of, by the lampreys. To find from ten to fifteen of them attached to one paddlefish is not uncommon, and there is scarcely an individual that bears no scars. Once or twice I observed the lampreys had worked their way under the opercular flaps. Now these, if they worked further forward would encounter the band of scales which would undoubtedly stop them, to judge from their avoidance of scaled areas on other fishes. An examination, how-

ever, shows that just inside of this band lies the great branchial artery, but little below the surface. It is evident, therefore, that this band of scales is an important adaptation for the protection of this vital region against attack from so fearful an enemy as the lamprey.

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CURRENT NOTES ON METEOROLOGY.

CLIMATE OF THE PHILIPPINES.

In an article by Gannett on 'The Philippine Islands and Their People,' published in the *National Geographic Magazine* for March, there are some notes on Philippine climate. The mean annual temperatures are not far from 80°, the range between the mean temperatures of the warmest and coldest months at Manila being but 7°. Temperatures of 100° are almost unknown. The lowest temperature on record is 60°. The diurnal range near the seacoast rarely exceeds 15°, and the mean for the year is only 11°. The relative humidity is always high, being usually at least 75 per cent. From November to June the northeast trade, and from July to October the southwest monsoon, is the prevailing wind. Rainfall is much heavier on the windward than on the leeward sides of the mountains. In most parts of the islands the northeast trade wind gives the dry season, and the southwest monsoon brings the rains. The mean annual rainfall varies between 40 and more than 100 inches. At Manila, four fifths of the annual rainfall comes between the first of July and the end of October. Then the streets are flooded, the air is saturated, and things are covered with mould.

CONDITIONS OF ATMOSPHERE DURING FOGS.

In *Das Wetter* for January, Elias discusses the conditions of the lower air during fogs, as shown by kite observations at the Aeronautical Observatory near Berlin during the years 1901-2. The results are plotted to show the variations in temperature, humidity and wind with altitude. The most striking fact is that