ferred from the life habits of a form which encysts during periods of drought. For the ability to undergo suspended animation necessitates such specialization that it is improbable that evolution operated through such an encysting form (which is absolutely helpless and inactive until it is set free into the water), in bringing about a vertebrate which breathed air the year around.

Reference was also made to the breeding habits of *Polypterus*, and an accessory copulatory organ in the male—a modified anal fin—was described. The breeding season follows the inundation of the Nile.

The general collections, some of which were exhibited, brought back by the Senff zoological expedition, are intended for general distribution to qualified investigators, who can work up the material within a reasonably short time. Aside from a large collection of Nile fishes, there is material preserved for researches in embryology, electric organs, pseudo-electric organs, neurology and Plankton.

The Coronary Vessels in the Hearts of Fishes. G. H. PARKER and F. K. DAVIS.

THE muscular substance of the heart in mammals receives its blood from a pair of coronary arteries which connect with coronary veins opening into the right auricle. The inner surfaces of the four chambers of the mammalian heart have upon them openings which lead into vessels connecting with the coronary capillaries, and especially with the veins. These vessels are the veins of *Thebesius*. Is there a similar system of vessels in fishes? Coronary arteries were identified in the common skate, the sand shark and the mudfish (*Amia*). In the skate they may come from various combinations of the efferent branchial arteries of the second to the fifth gill cleft; in the sand shark, from combinations reaching from the first to the fifth clefts; in the mudfish, from the second branchial arch. In these three species coronary veins occur, all of which open into the venous sinus. On inflating these, bubbling was observed from the natural inner surfaces of the auricles and sometimes from those of the ventricles. These fishes, therefore, have veins of *Thebesius*.

Longitudinal Fission in Metridium marginatum. G. H. PARKER.

TEN animals with double mouths were studied. Two had each two mouths on one oral disc, and the pedal ends of their œsophageal tubes were united. Eight had each completely separate oral discs and œsophageal tubes. In six the mouths were monoglyphic; in three one mouth was monoglyphic and one diglyphic, and in one one mouth was monoglyphic and one aglyphic. There were about twice as many pairs of complete mesenteries as in single mouthed individuals. Double specimens are not the result of fusion, for the two partial individuals are strikingly similar in color, etc., a condition unlikely of occurrence in chance combinations of so variable a species. They may be monstrosities or dividing animals. One specimen nearly divided was kept under observation two months, but showed no advance in the process. In good collecting localities isolated pairs agreeing in color, marking and sex may be found. This evidence favors the view that *M. marginatum* reproduces, by longitudinal fission, a process slowly accomplished, but it does not exclude the possibility of some double specimens being monstrosities.

Additional Characters of Diplodocus. HENRY F. OSBORN.

THIS is one of the three types of herbivorous Sauropoda or Cetiosauria, represented by a very considerable portion of the skeleton of one individual found by Barnum Brown and the writer in 1897. The scapula, ilium, ischium and femur are associated with

a remarkable vertebral series extending from the 5th dorsal to the end of the tail: (1) The center of motion is the sacrum, where three vertebræ are completely coalesced to the summits of the spines, besides a fourth rib-bearing sacral with a free spine. The sacro-iliac union is by means of both ribs and neuropophysial plates. The presence of such plates in all the anterior caudals, as first described by the writer, proves that the sacrum is reenforced by additions from the anterior caudals. (2) There are more than thirty caudals and three distinct types of chevron, instead of the single type to which Marsh applied the generic name *Diplodocus*. The tail was undoubtedly a powerful swimming organ and also a lever by means of which the anterior portion of the body was elevated, the acetabulum serving as a fulcrum, while the trunk was immersed in water. This power did not exist upon land as in the Iguanodontia.

The Ossicula Auditus of the Mammalia. J. S. Kingsley and W. H. Ruddich.

Studies on embryo pigs and rats show that the incus is the quadrate, the malleus, the proximal end of Meckel's cartilage. These cannot be homologized with the columellar chain of Sauropsida, since they are in front of the spiracular cleft and in front of the chorda tympani, while the columella is behind the spiracle and chorda tympani. The incus (quadrate) articulates with the stapes in the mammals, exactly as is the case in the urodeles. Nothing similar occurs in the Sauropsida. This is regarded as additional evidence that the mammals have had an amphibian ancestry. The quadrate cannot have disappeared in the glenoid fossa, as maintained by Albrecht and Cope, as this would involve a translation of parts impossible to explain. The mammalian lower jaw articulates by means of the dentary rather than by means of the articulalare, *i. e.*, its articulation is not homologous with that in lower groups. A longer summary of the paper will appear in the *American Naturalist* for March.

Notes on Mammalian Embryology. C. S. Minot. (Read by title.)

Professor O. van der Stricht's Researches on the Human Ovum. C. S. Minot. (Read by title.)

Notes on the Morphology of the Chick Brain. S. P. Gage.

A Specific Case of the Elimination of the Unfit. H. C. Bumpus.

The results of a comparative study of one hundred and thirty-six English sparrows, which were rendered helpless or actually perished during the severe storm of February last, was numerically expressed, and it was shown that there was not only a measurable but a striking physical difference between the birds which actually succumbed and those which survived the storm. The birds which perished were longer, heavier, possessed of shorter heads, shorter leg bones, of less breadth of skull and of reduced sternum, while those which survived tended toward the possession of characters opposite to these.

While these average differences between the two groups of birds were emphasized, attention was also called to the fact that the individuals of extreme variability occurred most frequently among the birds which perished. The longest bird and the shortest bird in the entire collection perished. The same is true of the one having the greatest and the one having the least alar extent. The heaviest bird died; the one with the longest and the one with the shortest head died, and the one with the shortest humerus, the one with the longest femur, the one with the longest and the one with the shortest skull, and the one with the shortest keel to