and the most important river-mart in that province, is situated near the Jamuná or main stream of the Brahmaputra in 24° 26' 58" N. lat. and 89° 47' *5"* E. long., with a population of 21,037 (11,213 males and 9824 females) in 1881. The business of Sirájganj is that of a changing station; the agricultural produce of the surrounding country is brought in in small boats and transferred to wholesale merchants for shipment to Calcutta in steamers or large cargo boats, and in return piece goods, salt, hardware, and all sorts of miscellaneous articles are received from Calcutta for distribution. Sirájganj is also the centre of the jute trade of Eastern Bengal.

SIR-DARIA. See Syr-Darya.

SIREDON. At the end of last century specimens of a kind of branchiate tailed Amphibian were brought to Europe from the lakes of Mexico; they were examined by the zoologists of Paris and described by Cuvier in Humboldt’s *Recueil d' Observations de Zoologie,* vol. i., and by Daudin in *Hist. des Reptiles* (Paris, 1802-1804), under their native name of “Axolotls.” The animals were named *Siren pisciformis* by Shaw *(Zool.,* vol. iii.). Wagler, in his *Natürliches System der Amphibien* (Stuttgart, 1828-1833), separated the axolotl from the Linnæan genus *Siren* and called it *Siredon axolotl,* and later writers have often referred to the animal under the name *Siredon pisciforme,* Shaw.

The axolotl of Mexico is about 6 or 7 inches in length; it has four pairs of gill-slits and three pairs of long feather-like external branchiæ. The branchial apertures are between the hyoid arch and the first branchial arch, and between the first-second, second-third, and third- fourth branchial arches. The branchiæ are attached to the first, second, and third branchial arches. The body is cylindrical, and a median membranous fin extends along the trunk dorsally, is continued along the tail, passes round the end of the latter and terminates ventrally at the anus. It has four limbs, which are short and somewhat stout ; the anterior terminate in four and the posterior in five digits. The colour of the axolotl is a uniform black.

The animal is therefore, except in size, very similar to the aquatic larva of *Triton,* or other Salamandroid, and Cuvier expressed the opinion that it was a larval form which for some unknown reason was unable to attain the adult condition. That it could not be considered simply as the larva of an unknown species of Salamandroid was evident from the fact that it possessed fully developed sexual organs in both sexes. There was every reason to believe that it bred freely in the branchiate condition in which it was discovered. The animal is so common in the lakes near the city of Mexico that it is brought regularly to market and used largely by the Mexicans as food (9).@@1

If nothing more than the above were known about the axolotl it would be classed among the *Perennibranchiata,* in the family *Proteida,* having its nearest ally in the genus *Menobranchus.* Up till the year 1865 no actual observations had been made by zoologists on the breeding of the axolotl: all that was known was that the genital organs in many of the specimens examined were in perfectly mature condition. In that year, on January 18, 6 axolotls, 5 males and 1 female,—which had been living for a year in the menagerie of reptiles of the Musée d’Histoire Naturelle at Paris,—began to breed, and the deposition and hatching of the eggs was carefully studied by Prof. A. Duméril (1). The eggs were 2 mm. in diameter, and the period of development within the *egg* was 28 to 30 days ; the larvæ were hatched in February, and were 14 mm. to 16 mm. in length. In the beginning of September, when the larvæ had almost reached the size of the parents, it was noticed that one of them was undergoing a metamorphosis similar to that of the larval *Triton* to the adult. In a short time yellow spots appeared on the skin, the branchiæ disappeared, the gill- slits closed up, the median fin disappeared, the animal began

to breathe air and permanently quitted the water. The same process of metamorphosis was repeated by several of the larvæ, until finally out of several hundred about thirty reached the salamandroid condition. The parents in the meantime were still alive, and had undergone no change. When the structure of the transformed specimens was examined, they were found to resemble in all generic characters the genus *Amblystoma,* of which several species were known, inhabiting various parts of North America.@@2 The consideration of Duméril’s discovery gives rise to several per­plexing questions, which have been discussed by many zoologists experienced in the study of the *Amphibia,* and even now can scarcely be said to be completely settled. The first question is— To what species of *Amblystoma* did the transformed axolotls of Duméril belong? Duméril himself, in the full account (2) which he published concerning the animals and their metamorphosis, was unable to give a decided opinion concerning the identification of the species of his *Amblystoma,* but on a subsequent occasion he confirmed the suggestion of Prof. E. D. Cope (10) that the specific characters were those of *A. mavortium,* Cope (described in *Proc. Ac. Philad.,* 1867).

The publication of Duméril’s discovery excited a great deal of interest among European naturalists, and for a time experiments and observations on axolotls in captivity were carried on with great earnestness. The metamorphosis in the case of Duméril’s specimens had taken place quite unexpectedly, but the case seemed to offer an opportunity for ascertaining the action of definite conditions in producing definite processes of growth. Marie von Chauvin (6), at Freiburg, at the instigation of Prof. Weissmann, attempted, and with perfect success, to transform young axolotls into the *Amblystoma* form by gradually bringing the animals from water into air.

The transformed axolotls observed by Duméril were kept alive in the Paris Museum, and for ten years showed no symptoms of breeding or sexual activity. It was currently believed that the *Amblystoma* derived from the metamorphosis of *Siredon* was sterile. This belief ultimately proved erroneous. In the autumn of 1874 the animals in the menagerie of reptiles were transferred to new premises, where they were all placed in more healthy conditions. Immediately after this the *Amblystoma* deposited fertilized eggs, and the fact was reported by M. Blanchard to the Académie des Sciences (4), with the comment that the *Amblystoma* was thus shown to be similar to other cold-blooded animals which were capable of reproducing in both the young and the adult condition.

Although at first Duméril believed and stated that his specimens of axolotl belonged to the species which bears that name in Mexico, he afterwards, in his more detailed work on the subject (2), explained that the grounds for his first opinion had been insufficient. American zoologists, especially Baird and Cope, had distinguished several species of *Siredon,* and Baird had separated the Mexican species, which alone was originally called axolotl, as *Siredon mexicanus.* Duméril came to the conclusion that the axolotls in the Paris Museum were identical with *Siredon liche­noides,* Baird (described in Stansburg, *Exped. Gr. Salt Lake, Utah).* All the axolotls which were kept and studied and sub­jected to experiment by naturalists on the Continent after Duméril’s discovery were descendants of the Paris specimens, so that the results obtained really did not necessarily prove anything with regard to the true Mexican axolotl, *Siredon mexicanus,* if that were really a distinct species. There is no evidence in literature to show whence the first axolotls in the Paris Museum were obtained. It was evident that *Siredon lichenoides* was capable of breeding in both the larval and the salamandroid condition, and that its metamorphosis in captivity in Europe was rare and to a certain extent controlled by definite external con­ditions. Prof. O. C. Marsh has recorded his experience of the metamorphosis of *S*. *lichenoides.* He obtained several specimens from alpine lakes 7000 feet above the sea in Wyoming Territory, and some of these metamorphosed into *Amblystoma mavortium,* Cope. Marsh does not say if the larvæ he obtained were sexually mature, nor did he ascertain if breeding of the species in the larval condition took place at all in the lakes he visited ; he thinks it probable that the metamorphosis in that region was rare in the natural conditions.

The metamorphosis of the true axolotl, undoubtedly obtained from the Lake of Mexico, seems to have been observed only once— namely, by Tegetmeier in London. That naturalist had 5 specimens, and one of them underwent the metamorphosis. In 1871 Cope (10) stated that no one had seen the metamorphosis of the true siredon, *Siredon mexicanus,* Baird, and that no *Amblystomæ* had been obtained from Mexico south of the Tropic of Cancer, while

@@@1 These numerals refer to the “ Literature ” *infra.*

@@@2 The generic characters of *Amblystoma,* Tschudi, are, according to Boulenger—tongue subcircular or oval, with radiating plicæ, lateral borders free, anterior border slightly free ; two transverse series of palatine teeth in same straight line, not separated by a wide interspace in the middle ; toes five ; tail more or less compressed.