course of his work on the turbellarians, has already produced some extremely important papers on their morphology, and the relations of plathelminths generally. The monograph of Dr. Mayer, on the curious crustacean family Caprellidae, has just appeared, and the 'Copepoda' of Dr. Giesbrecht is rapidly approaching completion. To the two zoölogists last named belongs the credit of most of the great improvements in technique which have been invented in the station. The value of these improved methods can scarcely be overestimated. Technical difficulties often stand in

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the way of the solution of definite and important questions: before them the investigator is brought to a stand-still, and his advance in the desired direction hopelessly blocked. The discovery of a rapid and certain method of obtaining series of sections, which science owes to Dr. Giesbrecht, has given a new power to research, and enabled investigations to be undertaken which before were impossible.

The publications of the station have already been mentioned, but it is well to add a few details concerning them. The monographs are intended to form a series of complete studies of every group of animals existing in the gulf, and to contain a body of accurate information on the anatomy, histology, classification, and relations of marine forms, which shall serve as a sound basis for future investigations. The series includes Algae as well as animals. They may be written in either of the four generally known European languages. Six have already appeared, the first being the beautiful work of Dr. Chun on the Ctenophorae. One by Dr. Emery has already appeared in Italian; and the Actiniae of Dr. Andres will shortly be published in the same language. They are published by subscription, of which the annual amount is $12.50, and the number of subscribers, up to the present, is two hundred and sixty. The station also issues a journal for original memoirs of work done in its laboratories, called the 'Mittheilungen aus der zoologischen station,' which commenced in 1879, and whose three volumes contain already much important work; also a bibliography, called the 'Zoologische jahresbericht,' in which every paper on biological subjects is not only indexed, but summarized. The latter was commenced in 1880.

It will be allowed that the zoölogical station has already a many-sided activity; that it has done, and is doing, a great deal for biological science; nevertheless, it is about to take a still further expansion. A separate laboratory is in course of preparation for the study of comparative physiology, for which nowhere such favorable conditions could be found as will be provided by the resources of the existing station. Every one who is a friend to the progress of biology must wish the Neapolitan station success in its new enterprise, and a continuance of the successful development which has, up to the present, taken place in the original institution.

Emily A. Nunn.

EVIDENCES OF GLACIATION IN KENTUCKY.

The following notes of observations on glacial action south of the Ohio River are submitted to the fund of evidence of glaciation anterior to the period of the great terminal moraine.

1. At the crossing of the Kentucky River by the extension of the Kentucky Central R.R., opposite the mouth of Otter Creek, and in Clark County on the north bank of the river, the following fresh section was obtained at the mouth of the railway-tunnel.

	Thickness.
Beneath the surface-soil, yellowish clay, with layers of gravel in the lower portion, and in patches through it	20 ft.
True drift clay, bluish, with smoothed and striated gravel; small bowlders of limestone; one large bowlder of blue limestone of several tons' weight; together with many smaller ones which had been partially removed	5 ft.
Limestone in thin layers to level of railway,	3 to 7 ft.
Above the bed of the river	61 ft.

This locality is sixty miles south from the crossing of the Ohio River by the grand moraine.

2. In Rock Castle County, at the summit of the Knoxville branch of the Louisville and Nashville R.R., between Roundstone Lick and Pine Hill, is a hill of modified drift, mainly composed of detritus derived from lower coal conglomerate and limestone. The railway cutting revealed some twelve feet in thickness of this material.

3. At the crossing of Rock Castle River by the same railway, polished and striated blocks of subcarboniferous limestone *in situ* were seen after removal of the superimposed clays. The striation of these blocks may be due to ice moving down the river, though it is doubtful if river-ice has ever weight enough to do much smoothing and striating work.

4. At the Hazel Patch summit of the same branch railroad, on the highest portion of the Cumberland plateau in Laurel county, a cut of the road revealed a low moraine composed of fragments of carboniferous slates and sandstones, and of the upper coal of this portion of the county. In riding over this plateau two years ago, I encountered this moraine, and then traced it east and west for some distance, suspecting its ice-origin. Subsequent work on the line of the railway confirmed my suspicions.

5. In the summit between Laurel branch of Rock Castle River, and Lynn Camp branch, a heavy bed of glacial clay was encountered, showing the worn-off edges of coal-seams on their northern aspect, and fragments mingled with the clays, similar to coal-beds and clays to be seen almost anywhere in Ohio.

My notes of these two last localities having been mislaid, I cannot describe the sections in detail.

These clay-beds cannot be referred to clays derived from decomposition of shales and marls of the coal strata. The latter are always found *in situ*, while the glacial clays may repose upon coal, sand-rock, limestone, or any other strata of the county, so that there is no danger of confounding the two. If the recent cuts of railways in construction and of those lately completed were closely examined, the surface geology of Kentucky would doubtless reveal many other localities where glaciation could be studied to advantage.

R. P. STEVENS.

EARLY DEVELOPMENT OF REPTILES.

W. F. R. WELDON publishes a valuable article on Lacerta muralis (*Quart. journ. micr. sc.*, xxiii. 134). His clearness and conciseness contrast very agreeably with the prolixity of many embryological writings. At the close of segmentation the ectoderm consists of cells very irregularly arranged, often two layers deep. The entoderm is also irregular and two or three cells thick. The area pellucida is formed by the outer cells becoming more columnar, and the inner cells more regular. Soon the posterior end of the area is marked by the presence of the primitive streak, which is a mass of closely packed cells, exhibiting no division into layers. The blastopore commences at the anterior end of this streak as a pit, open above, closed below. The floor of the pit breaks through, and the blastopore assumes its normal condition, forming a communication between the exterior and the primitive entodermic cavity. The mesoderm arises as two lateral outgrowths from the primitive streak, afterwards from the sides of the blastopore, and the axial strip of invaginated hypoblast. Anteriorly the mesoblastic elements are branched cells, which are budded off from the entoderm. (Do not these correspond to Hertwig's mesenchyma?) Weldon confirms Balfour and Stahl's account of the development of the allantois as a process of the primitive streak.

Having examined younger embryos than Braun, Weldon is able to rectify the former's account of the origin of the Wolffian duct and renal tubules. The protovertebrae are connected by an intermediate cell-mass with the lateral mesoblast. In this intermediate mass there appears a series of cavities, each opposite a protovertebra, and separate from one another. They are the segmental vesicles described by Rathke and other writers. When twelve protovertebrae are present, the Wolffian duct begins to appear as a solid cord of cells, splitting off from the intermediate cell-mass, and passing, therefore, into the dorso-lateral wall of each segmental vesicle. The duct develops, acquiring a lumen in the intervertebral spaces first; but, when there are fifteen protovertebrae, it becomes a continuous canal through the first eight segments, and acquires at the same time communication with each segmental vesicle. Back of the eighth segment the development is similar, except that the duct grows independently of the vesicles. This agrees with Sedgwick's observations on the process in birds and elasmobranchs.

Another paper on this subject has been published by Dr. H. Strahl (*Arch. anat. physiol., anat. abth.*, 1883, 1). As an introduction, he gives notices of previous researches on the same theme. Then follows a chapter of general remarks, in which the gestation, growth, and gross changes of the embryos, and the manner of obtaining them, are considered. The main part of the article is devoted to a detailed account of the new observations, prefaced by a summary of the results previously obtained by himself. The new part begins with the stage when the blastopore or neurenteric canal is completely formed. The principal new results may be summarized as follows: in the neurenteric canal, two