	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

parts may be distinguished, — one vertical, descending from the blastopore; the other horizontal, running forwards. In the dorsal wall of the latter, the chorda dorsalis makes its first appearance. The canal closes at the same time as the medullary tube. Just before the closure of the blastopore, the 'anlage' of the medullary cord extends around it. After the external closure, the communication between the medullary tube and the digestive cavity is still maintained by the canal. Strahl uses the unfortunate term 'medullary cord' to designate the medullary tube, notochord, and part of the primitive streak together: hence he describes the chorda as being differentiated from the medullary cord. This only adds to the confusion, and is the more to be regretted, since the real origin as described by him agrees with the accounts of other writers, — it is at first a modification of the epithelium of the neurenteric canal. The middle portion of the chorda is the first to be grown over by the entoderm: therefore the two ends remain longer uncovered than the middle. At the time when the peripheral mesoderm, forming the area vasculosa, reaches the germ-wall, the latter is already completely fissured. Blood-vessels have begun to appear before this time, and without the participation of the germ-wall. C. S. MINOT.

THE INTERNATIONAL GEOLOGICAL CONGRESS.

THE compte rendu of the second session of this congress, held at Bologna last year, has just appeared in a thick octavo, with abundant illustrations. The history of the congress, forming the first part of the volume, was prepared by the president, Capellini, and consists of a brief account of its origin with the meeting of the American association for the advancement of science in 1876, a summary of the results of the first meeting at Paris in 1878, a list of the members and officers of the first congress, an account of the choice of Bologna as the rendezvous for the second meeting, of the nomination of the international commissions, of the organization of the second congress, with its rules and regulations, and lists of the members, delegates, and officers. In connection with this latter portion, it is curious to note that a number of the more eminent geologists who originally took part in it no longer belong to the congress; and also that the number of Italians at the congress was 202, although the geological society of Italy has only 120 members, of whom 14 are foreigners.

The second part, prepared by Delaire and Fontannes, besides the proceedings at the different sittings, contains a number of appendices on geological coloring and nomenclature, and one on the classification of mineral masses by M. de Chancourtois, accompanied by a tabular view of lithological synthesis. This author objects to the indiscriminate use of the word 'rock,' and proposes instead the word 'lithe,' which he subdivides, according to the origin of the rock, into analithes, endo-analithes or endolithes, exo-analithes or exolithes, catalithes, peri-catalithes or perilithes, apo-catalithes or apolithes. The reports of the discussion are interesting, as showing the extreme difficulty of reaching any unity in classifications, even on the most trifling points.

The third part (documents of the congress, prepared by the same hands) contains a brief description of the collections and maps exhibited at the congress. Among these may be mentioned the geological map of Italy (scale, $\frac{1}{1,111,111}$), engraved in the colors of the international commission, especially for the congress, in two editions, — one with the mountains figured in hachures, and the other without them. The latter is the clearer, and preferable as a geological map. It is curious that a map on a scale so small should have twelve colors devoted to crystalline rocks, and only ten to the sedimentary strata; and it answers well its purpose as a study of geological map-coloring. The Italian committee also prepared a geological and paleontological bibliography of Italy, containing mention of 6,566 memoirs from the days of Aelianus (693 B.C.) to 1881. Its arrangement is remarkably clear and simple.

The fourth part (annexes) contains *in extenso*, and in their original language, the reports sent by the national committees to the international commissions established in 1878. They are followed by summaries of a few individual reports on the unification of nomenclature, or of graphic processes.

The scientific communications are the following: 1°. Macrographical classification of the trachytes of Hungary, by J. Szabó, already mentioned in SCIENCE. 2°. On the classification of the ancient stratified rocks of the island of Sardinia, by J. G. Bornemann, who has found a number of primordial fossils, paradoxides, etc., with intercalation of the second fauna. This would seem to be analogous to the condition of the Taconic of Vermont. 3°. On the cretaceous system and the great sand-dunes of the northern Sahara, by G. Roland. He considers the cretaceous as consisting of the middle and upper divisions; that the sand-dunes constitute distinct chains, formed entirely by the wind, and depending for their orography on topographical accidents; that the larger dunes are not moved by the action of the wind, the position of the masses, and the orography of the chains, varying but little, excepting that, as a mass, they are very slowly travelling toward the south-east, and the quantity of sand is continually increasing. 4°. Memoir on the geology of New South Wales, by C. S. Wilkinson, who recognizes all the great divisions, from the Silurian to the tertiary inclusive, and confirms the truth of the report of the late Rev. W. B. Clarke of the association of triassic plants with the marine carboniferous fauna.

Next follows an account of the three excursions taken by the congress to Florence, Pisa, and Carrara. Accompanying the latter is a section from Carrara to the central region of the Alpi Apuane, in which the Carrara marbles are shown to be of triassic age; fossils of this age being found in, above, and below them.

We next have the prize memoirs on the unification of graphic processes in geological maps. The best was considered to be that by A. Heim; next comes the one by A. Karpinsky, and, lastly, that by M. Maillard. Mr. Heim's memoir contains a plate exhibiting the application of his system to profile sections, which is very clear and plain.

The last or fourth part contains numerous reports on geological nomenclature and coloring of more or less importance. It does not seem to have occurred to the congress to compare the different methods in actual use by the different geological surveys. None of the different reports seems to give these, except that by Major J. W. Powell of the U. S. geological survey. The difficulty, with our still imperfect knowledge of geology, of establishing any system of universal application, seems very great, and is well illustrated by Professor Hébert when he expressed the ingenious wish that votes should only be taken on those points on which all are agreed.

In conclusion, we may mention the very sensible motion of Mr. Torel, that the congress, while leav-