

assumption, and we also ask him how he gets the last line on p. 27. These crucial points occur in "independent proofs" of the same theorem; they are pure "beggings of the question," we believe. This is all we have to say on Part I. Part II. opens with an admirable motto (reminding us herein of Mr. James Smith), "Prove all things; hold fast that which is good." Having proved then the previous theorem, he holds fast to that, and proceeds to the "construction of the circle;" his object being "to make manifest the great importance of the circle as one of the fundamental facts belonging to the Plan of Creation." As we consider the foundation wrong, until Prop. A is proved, we shall not follow the writer through the twenty-four pages of rather obscure mathematics devoted to this subject. We come next to "Mathematics and the Art of Computation." Starting from what he has (as he thinks, we will say) just proved, viz., that "the difference of the quadrant and the chord of the quadrant is an aliquot part of the quadrant and of the chord, and that the number of those equal parts contained in the chord being nine—the quadrant contains ten": because he finds in this "conclusive evidence that the (so-called) Arabic system of notation is not an artificial human contrivance, but a great natural fact of a primary character, a fundamental part of the Science of Creation." Further down he speaks of many persons preferring "with a strange, and, as it would seem, with an increasing perversity, to cultivate the thorns and thistles, leaving the good seed as not worth utilising." He is then careful to state that by "thorns and thistles" he does not mean the modern methods of mathematical analysis. Still, "is it, or is it not, true that the language of mathematics is fast becoming an unknown tongue to ordinarily educated men, and that those to whom it is known can scarcely hold converse with their fellows (on any scientific subject) in ordinary language without a feeling of condescension, and scarcely without a feeling of impropriety? . . . Is it true that the mathematician does now, in some degree, regard his fellow-worker who is unpractised in the calculus and non-conversant with differential methods as but little better than a publican and heathen?" We will not undertake to answer this question, but perhaps our author's ground for this opinion is the reputed division of the human species by the "Cambridge Wrangler" into those who understand the differential calculus and those who do not. He himself goes on to say, "If it be true that such a result does manifest itself in any considerable degree, it may be pronounced decidedly unwholesome and bad—bad for science and bad for civilisation—because mathematical knowledge is a necessity to science and a necessity to civilisation." This we admit. He then reiterates the statement that he knows that examination will show his demonstration of the quantitative (*sic*) ratio of the perimeters of the circle to the diameters is "mathematically incontestable." He then goes into an examination of Prop. XIII., Book V., of Brewster's Legendre: "The surface of a regular inscribed polygon and that of a similar polygon circumscribed, being given, to find the surface of the regular inscribed and circumscribed polygons having double the number of sides." Among other objections, he objects to the italicised statement (Prop. XIV., "Legendre"), "We shall infer that the last result expresses the area of the circle, which, since it must always lie between the inscribed and circumscribed polygon, and since these polygons agree as far as a certain place of decimals, must also agree with both as far as the same place." His objection to the whole method is "in the omission to observe that comparison has to be made between a continuous curved line (the circle) and a continuous straight line (the diameter)." And then, as elsewhere, he indulges in metaphysics. Part III. begins with Curvature and ends with Theology. "A human science which does not distinctly recognise the primary truths of theology as its ultimate

basis, is not based on reality; it has not and cannot have any actual and secure foundation. If the science of England is not so based, no matter what seeming progress may for a time be made, whenever the trial comes it will be as the house built on the shifting sand, and, if not destroyed by sudden catastrophe, will eventually become a ruin, together with the civilisation which rests upon it." Our safety then, we presume, Kuklos would have us

believe, is to believe in $\pi = \frac{20\sqrt{2}}{9}$. The supplement has "Supplementary Illustrations" and Tables. The work is printed at Montreal.

The conclusion of the matter is, that there are Cyclo-meters and Cyclometers. We have endeavoured to give a fair presentment of the several kinds by giving as far as possible their views in their own words. The majority of their writings evidence great waste of ingenuity, which, had it been otherwise directed, might have resulted in works of utility instead of in such utterly trivial work as it has done.

To any who may be thinking of taking up this "curiosity of literature," not having done so hitherto, we say emphatically, "Don't."

SCIENCE IN GERMANY

(From our own Correspondent.)

IN Wiedersheim's recently published book, "*Salmandrina perspicillata* und *Geotriton fuscus*," two very little-known tailed amphibians (Urodela) are described and compared anatomically, which, by their entire organisation, stand at the two opposite limits of the *Salmandrinae* that are known to us, representing the highest and the lowest form of these. *Salmandrina perspicillata*, which is rather a land than a water animal, seems to be found only in the western half of Italy; it is a prettily coloured, small, and slender animal, which lives on insects, and during the dry summer months continues in a kind of summer sleep, but in winter it is found in full vital activity. In its skull are almost entirely wanting the cartilaginous parts denoted as the "primordial cranium," so that in this it rises above all other *Salmandrinae*, and comes near the Reptiles. In accordance with this, also, is the existence of a cavity in the base of the skull (*sella turcica*), the prolongation of the frontal bone (*frontale*) into the eye cavity, and a roofing-over of the latter; lastly, the absence of a special nose-partition (which, again, quite characterises the Reptiles). On account also of the course of development of its vertebræ, and the numerous bones of its carpus and tarsus, *Salmandrina perspicillata* must stand at the top of the *Salmandrinae*; its divided kidneys, again, suggest the reptile, so that we must look on this animal as a form rendering



Tongue of *Geotriton fuscus*.

possible the transition from the Amphibia to the Reptilia, and which, on account of its peculiarities, might represent a separate family. *Geotriton fuscus*, on the other hand, holds quite a different position. If, in view of the numerous anatomical relations adduced, we are able, commencing with *Salmandrina perspicillata*, and passing through the various water salamanders (*Tritons*), to the land salamander (*Salmandra maculata*), to form a descending series of ever less-developed forms, *Geotriton fuscus* comes at the lower end of the series, for in many respects it ranks with the lowest Amphibia generally, the Perennibranchiata. Indications of this appear in the fewness of bones in the skull and the tarsus, the extended double cone form of the soft-cartilaged vertebræ;

then, too, the joint processes are wanting, &c. On the other hand, *Geotriton* is distinguished in the most peculiar way, by one organ, from all other Amphibia, viz., by the tongue. This is a pedicelled disc, like a mushroom, on the bottom of the mouth cavity, where it is connected with the tongue-bone apparatus; the latter, however, does not merely consist of the same parts as in other Amphibia, but at its two hinder ends there is attached on either side a long thin cartilage, which reaches, free between the neck muscles and the skin, as

far as the back, and is enclosed in an envelope of special muscles, which are only attached at its hinder end and in front to the rest of the tongue-bone. If, now, this muscle be contracted, it thrusts out the cartilage rod, and with it the tongue, in a way similar to that observed in Chameleons, Woodpeckers, and Ant-eaters. Compare the annexed drawing. Thus Nature connects in the most remarkable manner a complicated organ of the higher Vertebrates with the organisation of amphibians that evidently stand very low.

EVIDENCES OF ANCIENT GLACIERS IN CENTRAL FRANCE

WHEN visiting the Mont Dore district, in Central France, with Prof. Huxley in the summer of 1873, my attention was accidentally directed to some magnificent transported boulders occupying the floor of an ele-

ivated valley due south of the highest ridge of the Pic de Sancy.

These, though gigantic, and occupying a very conspicuous position, in every respect similar to positions occupied by deposits from ancient glaciers in Switzerland and in all other Alpine regions, are not alluded to in Le Coq's exhaustive work on Central France, or his geolo-



FIG. 1.—Transported blocks in the Tranteine Valley, Mont Dore. Mountains of Cantal in the distance.

gical map appended thereto; nor are they in either of Mr. Scrope's works on the Volcanoes of Central France; nor can I obtain any information regarding them from those of my geological friends who are most versed in glacial phenomena.

they cannot have escaped the notice of French observers, if not writers, on the geology of France, I may assume that they are of sufficient novelty and interest to render the accompanying notes and sketches acceptable to the readers of NATURE.

Under these circumstances, though still of opinion that

The well-known lofty range of Mont Dore is described



FIG. 2.—Transported block in the Tranteine Valley, Mont Dore (estimated length 36 feet). Pic de Sancy (N.) in the distance.

by Scrope ("Volcanoes," ed. ii, p. 362) as a mountain mass rising in its highest peaks more than 6,200 feet above the sea-level, composed of beds of trachytic and basaltic lavas, alternating with their respective conglomerates. And again, in his "Volcanoes of Central

France" (ed. ii., p. 124), the same author says of the figure of the mass, that it is best understood by supposing seven or eight rocky summits grouped together within a circuit of about a mile in diameter, from which, as from the apex of a flattened and somewhat irregular cone, all