and "Newton" are generally considered to yield a more valuable mental training than such subjects as analytical geometry is that the older authors, perhaps because they were a bit afraid of purely symbolic argument, tried constantly to keep real pictures and ideas before the minds of their readers. But even so our conviction of the truth of any but the simplest theorems of geometry depends chiefly on the symbolic argument, not on the realization in succession of the actuality of the relations and operations discussed in the course of the proof. This is perhaps sufficiently obvious in the higher branches of even Euclidian geometry, but it becomes absolutely indisputable when we reach such theorems as "Any two conics in one plane intersect in four points." Not only may some of these points be at an infinite distance, but some, or all, may be what is called, on the *lucus a non lucendo* principle, "imaginary"; that is, they may be such that they cannot be imagined by anybody, much less actually drawn.

Accordingly I cannot admit that the theorems of geometry are established by induction at all. If they are interpreted in either of the first two ways I have described, they are only particular propositions, and the inference from them to a general proposition would no more yield a "mathematical certainty" in this case than in any other. And though the third way of looking at the proposition may be paraphrased into a form which appears general (*e.g.*, anything which may fairly be called "an isosceles triangle" may also be said "to have two equal angles"), it is really only a particular proposition about the words "isosceles triangle," and so on. Its wide applicability and usefulness depends on the fact that we can, and do, often find things which can fairly be called isosceles triangles; but it must be admitted that the assertion that, on any given occasion, we have found such a thing,—is not a mathematical certainty. If the triangle in question is an objective one, we can only say that it is probably, or approximately, isosceles; and though perhaps we may subjectively conceive perfectly isosceles triangles, and so regard the *pons asinorum* as a subjective necessary truth, it must be doubtful whether we could do so in the case of a more complex proposition such as Pascal's Theorem, and it is quite certain that we could not do so in the case of such theorems as that about the intersections of two conics.

It is to be hoped, therefore, that logicians will come to recognize the importance of symbolic reasoning, as mathematicians have already done. And when they do so we may hope for this further advantage, that they in turn will teach mathematicians and others not to confuse a purely symbolic with a real conclusion—not to assume that, because they have correctly proved a conclusion symbolically, that it therefore necessarily gives any information about real things, or even real concepts.

EDWARD T. DIXON.

Trin. Coll., Cambs., October 22.

Bell's Idea of a new Anatomy of the Brain.

IN NATURE of October 27 the writer of the review of Mr. Horsley's "Structure and Functions of the Brain," speaking of the rarity of the above book, states that he only knows of one copy in London, viz., that in the British Museum. It may be useful to some of your readers to know that there is a very interesting copy in the library of the Royal College of Surgeons. It is the presentation copy to Dr. Roget "from Mr. C. Bell, 34, Soho Square": by Dr. Roget it was given to Lady Bell, who presented it to the Royal College of Surgeons through Mr. Alexander Shaw.

Mr. Shaw has added in MS. a copy of the letter received from the printers fixing the original date of publication, and also the list of persons to whom presentation copies were sent. The letter and the list are both published in Mr. Shaw's reprint of the Tract in the *Journal of Anatomy*, vol. iii., 1869.

JAS. B. BAILEY,

October 27. Librarian Roy. Coll. Surgeons.

Photographic Dry Plates.

IN reference to "Prevention's" note on Photographic Dry Plates, one cannot but agree with him that packets should be dated when issued from the factory.

I would venture, however, to suggest that good makers' plates do not deteriorate within a reasonable length of time.

As an illustration of my experience I may mention that in April this year I opened a box of plates (½ plate Extra Rapid) which I bought in July 1886.

I had carried them on a three months' tour in the Mediterranean in 1888, and had taken no special care of them since.

They proved in every way as good as new, both in sensitiveness, and perfection and evenness of film.

ARTHUR E. BROWN.

THE GENUS SPHENOPHYLLUM.

NOTWITHSTANDING the small size and comparative scarcity of the plants belonging to this Palæozoic genus, they have long attracted a rather unusual amount of attention. This has been partly due to their peculiar external forms, which suggested even to the earliest observers the idea of resemblances to the Marsiliæ; but the interest they have excited has been further increased of late years by discoveries respecting the peculiar organizations of their stems. In 1822 Adolph Brongniart assigned to them the name of "Spenophyllites," and in 1823 Sternberg figured some of them under the generic title of "Rotularia."[1] Sternberg's figures appeared in his "Versuch einer Geognostisch-Botanischen Darstellung der Flora der Vorwelt," which work is now best known through the French translation of it by Comte de Bray. To the first of his specimens figured (*loc. cit.*, tab. xxvi., figs. 4*a* and *b*), Sternberg gave the name of *Rotularia pusilla*, and the example so designated is very characteristic of the simpler type of the group, in which we have a somewhat branched stem, with verticils of wedge-shaped leaves at each node. A second form was figured on a later plate of the same work. It is interesting to note that Sternberg associated with these figures the observation, "Plantæ organisatione foliorum Marsileis, forma caulis Hippuri Maritimæ." The generic name thus given by this author represents the rotate arrangements of the leaves in each verticil, as the wedge-shaped contour of each separate leaf is further indicated by Brongniart's generic term, "Sphenophyllites." In 1820 Von Schlotheim had also included similar examples in his too comprehensive genus, "Palmacites.[2]"

In 1828 Brongniart published his classic "Prodrome d'une Histoire des Végétaux Fossiles," in which work we find the generic name of these plants changed to Sphenophyllum, which name they have retained to the present time. In this work Brongniart examines in some detail the probable affinities of these plants, which even in 1822 he inclined to regard as having some affinities with the Marsileæ. He defines them as having six, eight, ten, or twelve leaves in each nodal verticil, each leaf being wedge-shaped; sometimes entire, truncated at its apex, which is denticulate. In some others these leaves are bilobed, and in other species they are not only profoundly bifid, but each of these lobes is either divided into two, or their ends are laciniated. Lastly, in some cases the lobes become narrow and linear. Brongniart here compares these leaves with those of Ceratophyllum and Marsilea, concluding with the statement, "We cannot for the moment decide between these two relationships." At this date the fructification was wholly unknown.

In his introduction to the "Natural System of Botany," p. 37, Brongniart again reverts to the idea that Sphenophyllum had Marsileaceous affinities.

In 1831 the authors of the "Fossil Flora of Great Britain" commenced their publication of that work, and in one of its early numbers they figured and described under the name of *Spenophyllum erosum* what appears to be identical with the first figure published by Sternberg. When discussing the relationships of this plant, Lindley and Hutton

[1] These figures were preceded in 1709 by a still earlier one by Scheuchzer in his "Herbarium Diluvianum." (Coemans and Kickx, "Monographie des Sphenophyllum d'Europe").

[2] "Die Petrefactenkunde auf ihrem jetzigen Standpuncte,"