VARIÆ AUCTORITATIS.

TO THE EDITOR OF SCIENCE: Mr. Emmons, in SCIENCE (October 21, p. 537), gives Professor K. von Zittel's 'History of Geology and Palæontology,' p. 3, as his authority for the statement that 'Origenes reports of Xenophanes of Colophon that he had observed seashells on mountains, etc.' But Ritter and Preller, 'Historia Philosophiæ,' §140, *a* (p. 86), are more correct in attributing the statement to 'Hippolytus, *Ref. Hær.*, I., 14.' The 'Philosophoumena, or Adversus omnes hæreses,' attributed formerly to Origenes, was proved by Bunsen in his 'Hippolytus and his Age' to have been the work of the latter. See Donaldson's 'History of the Literature of Ancient Greece,' Vol. II., p. 323, n. 1.

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BOSTON, October 29, 1904.

SPECIAL ARTICLES.

AN OVERLOOKED FORM OF STEREOSCOPE.

MODIFICATIONS of instruments, though in themselves not important, are often of interest as illustrating the variety of ways in which a given principle may be expressed in practise. This is notably true of the stereoscope, which as a practical instrument may be defined as any device that gives to each eye its appropriately different view and then enables the eyes to combine two views with facility. The oldest form of the apparatus, as is well known, was devised by Sir Charles Wheatstone in the year 1838, and consisted of two mirrors set nearly at right angles and of two separate and appropriately different views of the object (in the early experiments always two mathematically constructed diagrams) carried at the ends of two movable frames. The serious disadvantage of this apparatus was noticed by the inventor himself and consisted in the fact that the two views, being separated, required a troublesome adjusting to secure an exact combination of their images. A great improvement introduced in the present form of the apparatus, which was due to Sir David Brewster, was that the two views could be permanently fixed on a single card. It is rather interesting, even seventy years after the original discovery, to record that this advantage can be secured by a slight modification of the same principle which Sir Charles Wheatstone had so brilliantly demonstrated. It was, indeed, in reading his original account that the idea occurred to me of arranging the two mirrors in such a way that they would give proper reflections of two halves of the ordinary stereoscope card. The device will be easily understood from the accompanying diagram.

In using this device the eyes are placed just above the card which is turned with its back to the observer (Fig. 1). The slight inclination of the mirrors brings it about that each eye sees only one view of the card, while the

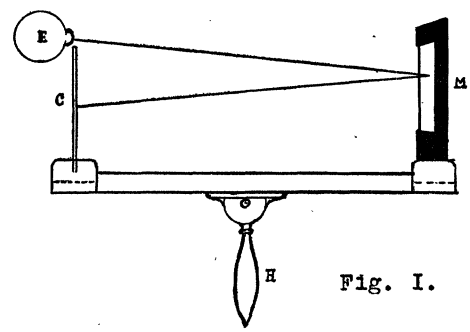

Fig. I.

FIG. 1. The apparatus as seen from the side. *E*, the eye; *C*, the stereoscopic card; *M*, the mirror; *H*, the handle.

combination is easily effected by a proper convergence of the eyes to a common meeting point beyond the plane of the mirrors. It is an incidental feature of this device that it dispenses with the necessity of the bridge or screen which in an ordinary stereoscope is necessary to prevent each eye from seeing both views. This is unnecessary because the image of the other view of the card falls outside of the field of vision of the one eye.* There is no advantage to be maintained for this form of the stereoscope; indeed, it has a disadvantage which in certain cases is slight

* This is practically the case; yet with a full-sized stereoscopic picture (3–3¼″) there will be a small portion of the outer edge of the left-eye view visible to the right eye, and *vice versa*. This is not seriously disturbing, and could be eliminated by appropriate screens.

and in others more serious, of presenting a mirror reversal of the views. The views likewise appear somewhat small, though it would be easy to introduce lenses to magnify them. But the interest in the device is merely in its simplicity and in the fact that so direct an application of the Wheatstone plan should have lain so near at hand for so long a time and, to my knowledge, not have been intentionally sought for or accidentally hit upon by the many experimenters who have contributed to the literature of the stereoscope. And it is also fair to add that the practical preparation of a pair of mirrors at this angle is not an easy matter, if one is desirous of eliminating the seam or line at their point of junction the presence of which to some extent mars the perfection of the stereoscopic effect. It seems, however, worth while thus briefly to record the possibility of a reflecting stereoscope which is adaptable to the ordinary stereoscopic card. As a laboratory device for illustrating the variety of applications of the stereoscopic principle, it may possess interest if not value.

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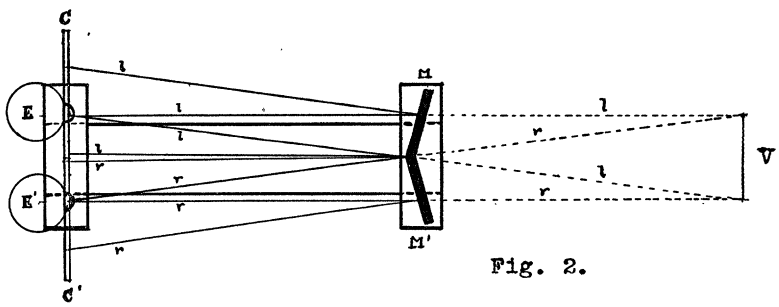

Fig. 2.

FIG. 2. The apparatus as seen from above. The letters as above: *V*, the combined view as projected by the eyes in stereoscopic vision; *r*, *r* and *l*, *l*, the paths of the rays in the right and left eyes from cards to mirrors and back.*

* In this diagram no account is taken of a minor discrepancy due to the fact that stereoscopic photographers have agreed upon a separation (and size) of the stereoscopic views (3–3¼″) greater than the interocular distance (2¼–2½″). As a result practically so much of the views as corresponds to the interocular distance becomes completely stereoscopic, the marginal portions not participating in the stereoscopic effect. Yet for ordinary views this discrepancy is not serious; none the less the effect in views mounted within the limits of the interocular distance is distinctly more perfect.

THE NATURE OF THE ACTION OF DRUGS ON THE HEART (PRELIMINARY NOTE).*

THE analysis of the nature of the action of drugs and certain inorganic substances in solution on the isolated heart of vertebrates is rendered difficult by the intimate connection of the nervous with the muscular elements in the heart, making it practically impossible to study the effects of a solution on the nervous elements apart from that on the muscle, and *vice versa*. In the heart of *Limulus* the relation of the nervous to the muscular elements is such that this analysis can be made. The heart of *Limulus* can be prepared in a manner allowing the determination of the nature of the action of a solution: (1) On the ganglion cells, (2) on the motor nerves, (3) on the motor nerve endings and the muscle.

I have shown elsewhere that in *Limulus* the origin of the heart-beat is nervous, not muscular, and that the coordination or conduction in the heart is effected through the nervous, not through the muscular tissue. I have some evidence that a similar mechanism of the heart-beat obtains also in the molluscs and the crustaceans, and I have little doubt that we shall have to revise the generally accepted theory of the function of the ganglion

* The experiments were performed at the Marine Biological Laboratory, Woods Hole, Mass.