cation of an originally irregular shore line by cutting off headlands and throwing bars across bays.

In other States, the Bath (Maine) sheet is a remarkably effective illustration of a ragged coast line; it includes the northward deflection—presumably by drift barriers—of the Androscoggin at Brunswick to the expansion of the Kennebec in Merrymeeting bay. Wood River, Grand Island, Minden and Kearny sheets, Nebraska, show how the overburdened Platte sprawls across the Plains in its many channels. The shore line on the Seattle (Wash.) sheet has a number of low cuspate points, apparently small-scale examples of the action of eddying currents. For the most of us who cannot see the country itself, these maps are highly illuminating and suggestive.

THE DELAWARE WATER GAP.

THE plunging Medina sandstones that form Kittatinny mountain, the wall on the northern side of the Great Appalacian valley in Pennsylvania, are trenched across by a number of streams, all flowing from the region of the inner Alleghany ridges southeast towards the sea. It may be plausibly suggested that the ancestors of these streams originally ran to the northwest, as the New-Kanawha of Virginia still does; but that in Pennsylvania the drainage was afterwards turned to the present direction of discharge in some manner not now well defined but probably dependent on moderate deformation and the associated shifting of divides. The date of this change is not settled, but it is supposed to have been before the post-Cretaceous elevation of the region. This would imply that the Tertiary excavation of the broad longitudinal and the narrow transverse valleys or water gaps was accomplished by rivers running as a whole in their present courses.

A recent article by Emma Walters (Does the Delaware water gap consist of two river gorges? Proc. Acad. Nat. Sci., Phila., March, 1895) takes another view in suggesting that the most noted of the water gaps is the work of a river that ran northward for most of the time while it was cutting down the gap, and that it assumed its present direction in comparatively recent time. The local and immediate evidence quoted to indicate a northward flow is a pool, fifty to seventy feet deep, on the northern side of the hard sandstone sill of the gap; but the excavation of such a pool seems to be within the power of a strong river flowing in a narrow, curved channel. Collateral evidence of northward flow is found in the favorable interpretation of a number of indecisive observations made by various geologists, but the value of this kind of evidence is very uncertain.

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PSYCHOLOGICAL NOTES.

THE SENSE OF EQUILIBRIUM.

DR. A. CRUM BROWN, in a lecture on 'The Relation between the Movements of the Eyes and the Movements of the Head' (printed in *The Lancet*, May 25th, and in *Nature*, June 20th), reviews the evidence that has led to the assumption that the semi-circular canals (together with the utricle and sacule) of the inner ear are sense-organs, giving us our information concerning position and equilibrium of the body. This view is now universally accepted, although the evidence is only circumstantial and not altogether conclusive to the present writer. There is no doubt but that injuries to the semi-circular canals cause corresponding disturbances in equilibrium, but dizziness and sickness are also caused by visual sensations. We may become dizzy from watching a waterfall, and when whirled about grow dizzy much more quickly when the eyes are open than when they are closed. It would seem that

our instinctive knowledge of equilibrium and of a motion of the body as a whole depends on very complex sensory impressions. One of these is very probably the pressure due to inertia of the perilymph and endolymph of the semi-circular canals, but it is quite possible that the inertia and weight of the soft parts of the head and body are more important factors. Rotation of the body would tend to cause congestion of the brain cortex by centrifugal action, and the resulting dizziness would be analagous to that accompanying intoxication or fever. The position of the body as a whole affects not only the circulation of the blood, but also the pressure of brain, viscera, etc., and the alterations in the direction in which gravity acts would cause important changes in muscular tensions. Motion of the body as a whole would cause pressure of the soft parts of the body on those more hard, and skin sensations (due to inertia of the body as a whole) would occur at points where the body touches other things. Sensations from the soles of the feet are of great delicacy, being part of the reflex mechanism which enables us to stand upright.

CONSCIOUSNESS AND THE ORIGIN OF SPECIES.

Professor Cope contributes to the July number of *The Monist* an article in which he formulates with great clearness the *Present Problems of Organic Evolution*. He sums up the positions of the Neo-Lamarckians and Neo-Darwinians in the accompanying table. It is of special interest to the present writer owing to the definition of the place of consciousness in the two theories, thus calling attention to the relations of modern psychological research and evolutionary theories. The general result of psychological investigation seems to increase the difficulties and decrease the need of assuming consciousness in causal interaction with the physical world, whereas the biologist finding physical causes insufficient adduces consciousness as a *vera causa* in the origin of species. J. McK. C.

1. Variations appear in definite directions.	1. Variations are promiscuous or multifarious.
2. Variations are caused by the interaction of the organic being and its environment.	2. Variations are 'congenital,' or are caused by mingling of male and female germ-plasmas.
3. Acquired variations may be inherited.	3. Acquired variations cannot be inherited.
4. Variations survive directly as they are adapted to changing environments (natural selection).	4. Variations survive directly as they are adapted to changing environments (natural selection).
5. Movements of the organism are caused or directed by sensation and other conscious states.	5. Movements of organism are not caused by sensation or conscious states, but are a survival through natural selection from multifarious movements.
6. Habitual movements are derived from conscious experience.	6. Habitual movements are produced by natural selection.
7. The rational mind is developed by experience, through memory and classification.	7. The rational mind is developed through natural selection from multifarious mental activities.

SCIENTIFIC NOTES AND NEWS.

THE PARALLAX OF ETA CASSIOPEIÆ DEDUCED FROM THE RUTHERFURD PHOTOGRAPHIC MEASURES.*

The new value of the parallax of this well-known binary star is not without considerable interest in view of the fact that it depends upon several pairs of comparison stars, thus eliminating largely, though, of course, not entirely, the disadvantages arising from the unknown parallaxes of the stars of comparison; whereas, in the two previous investigations by O. Struve and by Schweizer respectively, only *one* star has been used, and that probably the same star in both investigations, and one in such

*Based on Contributions from the Observatory of Columbia College, New York. No. 6. By Herman S. Davis.