

in metaphors; they evidently have something quite definite before them which they believe is conveyed to their readers. Is it what other writers, e.g. Sir Frederick Mott, would call innervation? Apparently so, for he writes in "The Brain and the Voice in Speech and Song" (*Harper's*, 1910) of "innervation currents." Now currents must be real, must be a flowing of something.

Clinicians—neurologists—believe in nerve energy, but apparently they do not derive their belief from their physiological teachers, for, according to McDougall, "the professional physiologists refer to it (nerve energy) contemptuously as a survival from the Dark Ages." Without doubt, something here is in need of being cleared up.

The intelligent layman thinks there *is* such a thing as "nerve energy," physicians use the term constantly, some professional physiologists use it when they find it convenient, and yet Dr. Adrian assures us that "as a physiological concept, 'nerve energy' has little to recommend it." If that is so, it is unfortunate the term is so popular. Dr. Adrian, however, concedes that "If the term 'nerve energy' is to be retained, it might be used to mean the total potential energy in the neurone available for use in the transmission of impulses."

This definition is so broad that it would cover (as it should) such cases of innervation as cerebellar control of other nerve centres, as well as unconscious cerebral inhibition of certain lower centres, neither of which could be called mental energy.

This is all that is wanted as a beginning of the clearing of the air. In this sense, nerve energy is real. I had only suggested it might be measured in order, if possible, to satisfy the demand that as a form of energy it should be measured.

It now remains for some physiologist to discuss the reality of nerve energy by defining the concept, relating it to nerve impulses and to innervation-processes, and placing the term in his index. Then the neurologist and psychopathologist would know whether he was using the term nerve energy in the same sense as that in which other men of science use it. In time, something more definite than at present would filter through to the laity.

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Habits of *Echinus esculentus*.

In the October issue of the Journal of the Marine Biological Association, Miss Trewavas records the occurrence of *Echinus esculentus* between tide-marks on the Cornish coast and makes a request for information "of the occurrence or absence of this sea-urchin between tide-marks at other parts of the British coast."

In this district *E. esculentus* occurs abundantly between tide-marks in spring and early summer, on rocky coasts; a few may be found at almost any other season. About February or early March a shoreward migration seems to set in, so that in suitable weather conditions some hundreds may be collected at springs between April and June. Then their abundance decreases until about November, from when until January it is at a minimum. This inshore vernal maximum is coincident with the spawning season; ripe individuals being found from February to August with a maximum occurring in early May. A similar shoreward spawning migration occurs in other, chiefly Boreal, species—*Solaster papposus*, *S. endeca*, *Henricia sanguinolenta*, *Archidoris tuberculata*, *Jorunna Johnstoni*, *Aeolidia papillosa*, *Leander*

squilla, *Spirontocaris pusiola*, and doubtless various other species.

The presence of *E. esculentus* between tide-marks is strongly influenced by various conditions—e.g. (1) in April 1921 a spell of sharp frosts caused numerous urchins which had invaded the intertidal zone to retire to deeper water, where they were visible in abundance in 1-2 fms.; (2) during the hot spell of May and June 1921 they were unusually scarce between tide-marks; (3) in April 1922 a spell of heavy weather either washed away or caused a temporary seaward movement of urchins from the intertidal area, and further, although they had also been abundant in 1-2 fms., none were to be seen there, all having apparently retired into the shelter of crevices and boulders. There is some evidence that males approach the shore ahead of the females. While inshore, urchins feed very largely on barnacles.

On an average the life of *E. esculentus*, as an urchin, begins about midsummer: the first months are spent in the Laminarian zone browsing freely on such limy food as *Membranipora*; by the end of the calendar year some are well over 2 cms. in diameter and at the close of their I.-year period about 4 cms., the more advanced having spawned about May at an approximate age of 10-12 months. The II.-year group appear to range between 4-7 cms., the III.-year group 7-9 cms., and the IV.-year group 9-11 cms. Largely owing to the prolonged spawning period there is no discontinuity between the year groups, which merge into one another. The adults feed on Polyzoa, Laminaria—particularly if encrusted with *Membranipora*,—balanids, etc. In October urchins are found with large gonads rich in fats; an occasional one may have a few immature ova. The yearly cycle would seem to be:

July–November—Growth and fattening of gonads—Laminarian zone offshore.

December–March—Maturation of gonads—Laminarian zone offshore.

April–June—Spawning—largely inshore.

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Perseid Meteors in July 1592.

MAY I bring it briefly to the notice of readers of NATURE that there is apparently a reference in the history of Akbar, the Emperor of India, to a brilliant display of Perseid meteors in the Panjab about the end of July 1592. The passage occurs in the account of the 37th year of the reign, and just before the description of Akbar's expedition to Cashmere.

Akbar and his son Daniel had left Lahore and crossed the Rāvi, and were encamped at a garden called the Rāmbāri. On the 27th day of Tīr O.S., which might correspond to about July 28, 1592, three hundred little stars or pieces of stars (*siṭāracha*) were seen traversing the heavens from west to east. The Persian text does not say whether this was in the day or in the night, but presumably it was the night or at least the evening, for the meteors would not be visible during the day.

Akbar and his son were so alarmed at this appearance, which took place three days after their departure from Lahore, and while they were still encamped at Rāmbāri, that they at once consulted the astrologers who were with them in the camp and by their advice broke up their camp and returned to Lahore. Nor did they resume their march till about a fortnight later and after they had ascertained a more auspicious day for a start.