

warning is pronounced against a too wide generalization of the fact that a few species of fishes have been proved to react to tones. Sections are devoted to the chemical senses, with special reference to investigations on invertebrates, and to unknown senses.

It is in the treatment of the nervous system that the author breaks farthest away from conventional paths and takes a partisan stand on debatable ground. The neurone theory is not accepted, but throughout the whole nervous system there is a complete continuity of living substance. Neurofibrillæ are merely the skeleton of the nerve cell; the neuroplasm is the conducting part. Poisons have revealed the presence of at least six different kinds of living substance in the nervous system: the irritability of the end-organs of cross-striated muscle, of the end-organs of glands, the cardiac branches of the vagus nerve and of smooth muscle, and of sympathetic ganglion cells being depressed by curare, atropin and nicotin, respectively; the irritability of motor cells, intercalated cells and sense cells being augmented respectively by phenol, by strychnine and by neither phenol nor strychnine. Motor differ from non-motor cells in possessing less fatiguability, less need of oxygen and less sensitiveness toward narcotics. The central type of nerve substance is sharply differentiated from the peripheral type by various characteristics, such as its power of summation, certain peculiarities of its conductivity, its greater tendency toward fatigue and its greater need of oxygen—all of these differences, however, being quantitative and capable of being overcome by experimental devices. The author discusses the "adequate," or normal, stimuli for the successive nerve elements that partake in a reflex action, and raises the question whether internal secretions may not constitute the adequate stimuli for the cells of the sympathetic system. Reflex actions are discussed and numerous examples are cited to illustrate their principles. Brief sections are devoted to tonus, to inhibition, as to the theory of which no definite stand is taken, and to instincts; and the chapter ends with a dis-

cussion of the motor reactions of animals, which cites Yerkes's work. The final chapter deals with a comparison of organisms.

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*Star Lore of All Ages.* By WILLIAM TYLER OLCOTT. G. P. Putnam's Sons. 1911. Pp. xxii + 453, illustrated.

The star groups or constellations, so fantastically figured in the ancient maps, are of unknown antiquity; they are found described in the earliest writers of the Greeks, and upon the tablets of Babylon. Around each group has collected a vast number of traditions, myths and legends; and these traditions Mr. Olcott has traced to their sources, the legends and myths he has collated, and has put all into a very readable form. The book is most attractively printed and illustrated and should be of interest to all who like to watch the stars.

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#### SCIENTIFIC JOURNALS AND ARTICLES

THE opening (January) number of volume 13 of the *Transactions of the American Mathematical Society* contains the following papers:

E. Landau: "Ueber eine idealtheoretische Funktion."

R. G. D. Richardson: "Theorems of oscillation for two linear differential equations of the second order with two parameters."

E. J. Miles: "The absolute minimum of a definite integral in a special field."

E. G. Bill: "An existence theorem for a problem of the calculus of variations in space."

L. E. Dickson: "Linear algebras."

R. L. Moore: "A note concerning Veblen's axioms for geometry."

Joseph Lipke: "Natural families of curves in a general curved space of  $n$  dimensions."

F. R. Moulton: "A class of periodic orbits of superior planets."

O. D. Kellogg: "Harmonic functions and Green's integral."

THE February number (volume 18, number 5) of the *Bulletin of the American Mathe-*