and moon it in turn attracts both earth and moon. The tendency for the earth and moon to approach each other is greater than before the pound mass was raised from the surface of the earth; the potential energy of the system is increased by an amount equal to the energy expended in raising it and there is no more a disappearance of energy to be accounted for than in the simpler case where a mass subject to no attraction but the earth's is raised above the earth.

E. S. MANSON, JR.

COLUMBUS, OHIO,
April 29, 1911

SCIENTIFIC BOOKS

Œdema. A Study of the Physiology and Pathology of Water Absorption by the Living Organism. By MARTIN FISCHER, M.D. Pp. 209. New York, John Wiley and Sons. 1910.

A trenchant alternative to current and generally accepted ideas of the distribution of water in the organism is presented by Fischer in this essay. The familiar reference to filtration, diffusion and osmosis as explanatory factors is notably absent and, instead, the part played by the colloids in the cells and body fluids is emphasized. That some colloids, such as gelatine, for example, are able to take up water and thus enormously to increase their volume is common experience. Such "hydrophilic" colloids Fischer has investigated with reference to the conditions which cause them to take in water or to give it forth. The degree of swelling of the colloid depends on its nature and also on the character of the solution in which it is placed. Thus both gelatine and fibrin swell more in alkaline or acid solutions than in water, both have the amount of swelling in acid or alkaline solutions reduced by the presence of electrolytes, and in both the addition of non-electrolytes fails to exert the checking effect produced by electrolytes. By extensive experiments Fischer has demonstrated that the body tissues, represented by muscle and the eyes, when immersed in water, or in acid and alkaline solutions, or in combinations of acid and alkaline solutions with various electrolytes, behave in a manner quite analogous to gelatine and fibrin.

On the basis of these experiments the suggestion is offered that œdema is induced whenever, in the presence of an adequate supply of water, the affinity of the colloids of the tissues for water is increased above what we call normal. Particularly by the accumulation of acids in the tissues is the affinity for water increased. Thereupon Fischer proceeds to show that states in which œdema develops are accompanied by an abnormal production of acid, that under such circumstances œdema can be reduced by the same agencies (electrolytes) which decrease the affinity of hydrophilic colloids for water, but remains unaffected by non-electrolytes, and that experimental production of acids in tissues results in the development of œdema.

The argument thus devised for the explanation of œdema in general is applied to the peculiar phenomena of œdema in special organs, and is then extended to other biological phenomena in which the transfer of water plays an important rôle, as in hæmolysis, growth and urinary secretion.

The experimental procedures on which the conception described in this volume is founded are of the utmost simplicity, and can be readily tested by any one. Fischer's application of these simple tests to conditions in the body is made with much ingenuity and in many instances with compelling conviction. To what extent the process can be used to explain certain results of experimental procedures which cause increased production of lymph, or which vary the amount of urine secretion, remains to be seen. Certainly the conception is highly suggestive, and well worth putting to further test.

The subject is expounded by Fischer with clearness, with enthusiasm, and with evident assurance of the adequacy of the theory to meet the demands that can be put upon it. The essay was awarded the Nathan Lewis Hatfield Prize by the College of Physicians of Philadelphia in 1909.

W. B. CANNON