SCIENCE

FRIDAY, MARCH 21, 1913

CONTENTS

MSS. intended for publication and books, etc., intended for review should be sent to Professor J. McKeen Cattell, Garrison-on-Hudson, N. Y.

AVOGADRO'S LAW AND THE ABSORPTION OF WATER BY ANIMAL TISSUES IN CRYSTALLOID AND COLLOID SOLUTIONS[1]

I. STATEMENT OF THE PROBLEM

FIFTEEN years ago, on an occasion similar to this, the writer stated that if the constitution of matter is the main problem of the physicist the constitution of living matter is the main problem of the biologist. To-day I will discuss the applicability of Avogadro's law, one of the most fundamental laws underlying the constitution of matter, to a group of life phenomena, namely the regulation of the amount of water in animal cells and tissues. According to Avogadro's law equal volumes of gases at the same temperature and pressure contain an equal number of molecules; or, in other words: In the gaseous state equal numbers of any kind of molecules enclosed in equal volumes have the same pressure at the same temperature. This law was extended to solutions by van't Hoff in the following form: All dissolved substances produce upon a membrane which prevents their diffusion but allows water to diffuse an osmotic pressure equal to that which would be produced by gaseous matter containing the same number of molecules in the same volume. Combining Avogadro's and van't Hoff's law we may state that the same number of molecules of any kind of matter produce at the same temperature and volume the same pressure upon the walls which prevent their diffusion.

[1] Read by title in the Botanical Section of the Cleveland meeting of the Society of American Naturalists, December, 1912.