

of disinfectant substances has made probable the ionic nature of this influence. The introduction by Dreser of the conception of the osmotic work done by the kidney, and a calculation of the same in foot-pounds is of the deepest interest, even if his interpretation of his results, as it would appear, has to be somewhat modified. The practical results in sight from the clinical studies by the method of physical chemistry undertaken by Hamburger, Koppe, Koranyi and others are being thankfully received by clinicians all over the world. Loeb of Chicago has recently interested us by proving the poisonous effects of pure solutions of common salt; and though his experiments have been upon lowly organisms, I should consider the medical man rash who continued to give a patient of low vitality large doses of ordinary salt solution when he can just as well introduce a solution in which the holding in a variety of salts corresponds more nearly to that of normal serum. Almost startling, too, is the assertion of Loeb that the eggs of echinoderms can be fertilized in the absence of spermatozoa by magnesium ions. If the phenomenon of fertilization—that *sanctum sanctorum* of physiological processes begins to be invaded by physical chemistry, what may we not expect from that science in the future. It would take too long to refer to other work in this field—to the constant reciprocal relation existing between chlorides and achlerides of the blood and urine, to the newer ideas on the occurrence of edema, to the speculations concerning so-called ion-proteids. Suffice it to say that the promise for the future in pathogenesis and in pharmacodynamics is much brightened by the advent of physical chemistry. Were a medical student, suited by heredity and environment to look forward to the higher things in medicine, to ask me the question, "How can I best fit myself to make real advances in knowledge in medicine and therapy during the next twenty-five years?" I should say, "In addition to a thorough medical course, arm yourself with sufficient mathematics and gain a thorough theoretical and practical training in the methods of physics and chemistry and especially in the principles and methods of what is called 'physical chemistry.' After this turn your attention to the solution of medical problems." Not that the doctrines of Van't Hoff and Arrhenius will be able to clear up all difficulties—the doctrines themselves may even be found to be only helpful hypotheses and later be supplanted by others less faulty, [some physicists are inclined to believe that the corpuscular doctrine advanced by J. J. Thompson seriously threatens the position of the ion conception], but all our knowledge is but relative, and at present new knowledge can probably be easiest reached by working with the methods referred to.

Conviction is not infrequently expressed that surgery having