SCIENCE

VOL. LXVI DECEMBER 23, 1927 No. 1721

CONTENTS

Some Applications of Physical Chemistry to Medicine: Professor Albert P. Mathews ............ 603
The Abuse of Water: Professor James Kendall 610
Frank W. Very: H. H. Clayton 611

Scientific Events:
Building Program of the U. S. Department of Agriculture; Guide-Lecture Tours at the Field Museum; The Cleveland Meeting of the Geological Society of America; Presentation of the Royal Society Medals .................. 612
Scientific Notes and News .................................. 614
University and Educational Notes ......................... 618

Discussion and Correspondence:
The Control of Diabetes in Siam by the Use of Solanaceous Plants: Dr. Hugh M. Smith. The E.M.F. induced in a Straight Wire: Professor J. B. Whitehead, Professor Leigh Page. Sir Jagadis Chunder Bose and his Latest Book: Professor George J. Pierce. When is Mid-Winter: Professor Bernhard H. Dawson 619

Quotations:
International Congresses .................................. 624

Scientific Books:
Mortensen's Handbook of the Echinoderms: Dr. Hubert Lyman Clark 625
Ionization by Positive Ions: Professor Leonard B. Loeb 627

Special Articles:
Correlation between Electromotive Series and Oxidation Potentials and Nutrition: H. P. Cooper and J. K. Wilson. Inhibition of Enzymatic Action as a possible Factor in the Resistance of Plants to Disease: Dr. L. J. Kiotts 629

Science News .................................................. x

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. McKeen Cattell and published every Friday by

THE SCIENCE PRESS
New York City: Grand Central Terminal.
Lancaster, Pa. Garrison, N. Y.
Annual Subscription, $6.00. Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.
Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.

SOME APPLICATIONS OF PHYSICAL CHEMISTRY TO MEDICINE

The growth of knowledge, like most processes of growth, is autocatalytic. It is self stimulating. The discovery of fact, principle or idea speeds the discovery of new facts, principles and ideas. Progress is thereby self accelerating, although the acceleration is not constant, but increases for a time after each discovery only to slow up or to come to a constant velocity until some new catalyst is discovered. A remarkable feature of this growth of science, a feature which shows that knowledge is indeed an organic whole, is that an idea or fact discovered in one branch of science often serves as a catalyst to a very remote and apparently unrelated branch.

Nowhere is this illustrated better than in the repercussions between physics, chemistry, biology and medicine. The study of what is going on in an evacuated glass tube provided with electrodes, when there is a strong difference of potential between those electrodes, results in the discovery by a physicist, Crooks, of the so-called "cathode ray"; study of this ray by another physicist, Röntgen, leads to the discovery of the X-rays set up when the cathode rays impinge on glass, metal or other solid surface, and as a result the physician is provided with a means of seeing the bones, the stomach, intestines, heart, ureters, and gall-bladder of a living man; of learning whether these are normal or not; and he is in addition provided with a means of treating successfully many hitherto hopeless conditions.

But the effects of this discovery do not stop here; even more important to physiology and medicine is the resulting study of the mechanism by which the X-rays act upon the body. For it is clear that if substances are opaque to X-rays, they must absorb such rays. And when they absorb such rays the energy in the ray is passed to some substances in the tissues, or to substances which have been introduced into the cavities of the body to make their outlines visible. Now molecules of substances which have absorbed energy are in a quite different condition from molecules of the same substance which have not. Energy is that which gives the power of acting. So substances which have absorbed energy are thereby rendered far more reactive than they were before.

1 Lecture given at the University of Buffalo, April 12, 1927, on the Harrington Foundation.