

SCIENCE

A WEEKLY JOURNAL DEVOTED TO THE ADVANCEMENT OF SCIENCE, PUBLISHING THE
OFFICIAL NOTICES AND PROCEEDINGS OF THE AMERICAN ASSOCIATION
FOR THE ADVANCEMENT OF SCIENCE.

EDITORIAL COMMITTEE: S. NEWCOMB, Mathematics; R. S. WOODWARD, Mechanics; E. C. PICKERING, Astronomy; T. C. MENDENHALL, Physics; R. H. THURSTON, Engineering; IRA REMSEN, Chemistry; JOSEPH LE CONTE, Geology; W. M. DAVIS, Physiography; HENRY F. OSBORN, Paleontology; W. K. BROOKS, C. HART MERRIAM, Zoology; S. H. SCUDDER, Entomology; C. E. BESSEY, N. L. BRITTON, Botany; C. S. MINOT, Embryology, Histology; H. P. BOWDITCH, Physiology; J. S. BILLINGS, Hygiene; WILLIAM H. WELCH, Pathology; J. MCKEEN CATTELL, Psychology; J. W. POWELL, Anthropology.

FRIDAY, MARCH 22, 1901.

CONTENTS:

<i>The Condition, Prospects and Future Educational Demands of the Chemical Industries:</i> DR. WM. MCMURTRIE	441
<i>Man's Place in Nature:</i> W J MCGEE.....	453
<i>Thomas Benton Brooks:</i> BAILEY WILLIS.....	460
<i>Scientific Books:—</i>	
<i>The Appreciation of Non-Euclidian Geometry:</i> PROFESSOR GEORGE BRUCE HALSTED. <i>Allen's Commercial Organic Analysis:</i> DR. G. S. FRAPS. <i>Hickson on Aleyonium:</i> J. P. MCM.....	462
<i>Scientific Journals and Articles.....</i>	466
<i>Societies and Academies:—</i>	
<i>New York Academy of Sciences, Section of Biology:</i> DR. HENRY E. CRAMPTON. <i>Section of Anthropology and Psychology:</i> PROFESSOR CHAS. H. JUDD. <i>Section of Astronomy, Physics and Chemistry:</i> DR. WILLIAM S. DAY. <i>The Las Vegas Science Club:</i> T. D. A. C. <i>Ottawa Field Naturalists' Club:</i> DR. H. M. AMI.....	467
<i>Shorter Articles:—</i>	
<i>Arsenic Tests:</i> G. E. BARTON. <i>Preliminary Note on the Embryogeny of Nelumbo:</i> HAROLD L. LYON.....	470
<i>Current Notes on Physiography:—</i>	
<i>Physiography of New Brunswick; Drainage Changes in Norway; The Assam Earthquake of 1897:</i> PROFESSOR W. M. DAVIS.....	471
<i>Botanical Notes:—</i>	
<i>Trees of the Northern Plains; Shrubs of the Northern Plains; New Edition of the Phytogeography of Nebraska; Botany and Agriculture; Field Ecology in the Rocky Mountains:</i> PROFESSOR CHARLES E. BESSEY.....	472
<i>The National Bureau of Standards.....</i>	474
<i>Scientific Notes and News.....</i>	475
<i>University and Educational News.....</i>	480

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

THE CONDITION, PROSPECTS AND FUTURE EDUCATIONAL DEMANDS OF THE CHEMICAL INDUSTRIES.*

It has been well said that chemistry is an offspring of the nineteenth century. The closing years of the eighteenth century had some glimpses of the wonders the new science had in store, but it remained for the workers of the first decade of the nineteenth to collaborate the results obtained by their immediate predecessors and develop the new truths which finally established the foundation of the glorious structure, which has now grown so great. During this period human necessities were in every way augmented, and particularly in France, claimed to be the fatherland of our science, human ingenuity was sorely taxed to meet these needs.

The struggle to find ways and means stimulated the energies and increased the zeal of the searchers after truth, and the utilitarian quest, as is always inevitable, brought forth results of interest and value above and beyond the actual needs, furnished data upon which are based the most important and fundamental laws of the science and firmly established many of the most important of our industries. The labors of the chemists of the last decade of the closing century had cleared away the

* Address of the President before the American Chemical Society, Chicago, 1900.

by Mr. R. J. H. Gibson and Miss Helen Auld. The editor announces twenty-five other memoirs in course of preparation.

The present little volume, which may be taken as a sample of the series, opens with a brief introduction containing a definition of the order Alcyonaria, and then follow sections on the general appearance of a colony of *Alcyonium digitatum*, its reproduction, the anatomy of the colony, the anatomy of the polyps, the development of the colony and finally its physiology. Three plates containing twenty-four figures complete the little volume, which consists of but twenty-two octavo pages and is sold for the modest sum of eighteenpence.

It is almost needless to say that a description of *Alcyonium* by Professor Hickson is well done, and if the remaining volumes prove as satisfactory as the present one, the editor is to be congratulated upon the initiation of so admirable and useful a series. It would seem that the zoologists of this country might profitably undertake a similar series of memoirs and the idea may be commended to the attention of the officers of the Marine Biological Laboratory.

J. P. McM.

SCIENTIFIC JOURNALS AND ARTICLES.

IN the January-February number of the *Journal of Geology*, Frank Dawson Adams gives an account of 'The Excursion to the Pyrenees in Connection with the Eighteenth International Geological Congress.' The interest centers largely around certain rocks supposed by Lecroix and some other eminent French geologists to illustrate the transformation of limestone into diorite and of shales into gneiss and granite by emanation accompanying granitic intrusions. Professor Adams does not regard the case as proved and suggests, among other things, chemical analysis as a means of testing the hypothesis. O. C. Farrington contributes a discussion of 'The Structure of Meteorites.' They are treated under three classes, iron, iron-stone and stone meteorites. Structures of the monogenic meteorites are discussed crystallographically those of the polygenic according to their mode of aggregation. In a paper entitled 'The Problem of the Monticuliporoidea,' F. W.

Sardeson discusses these much neglected although important organisms of the Paleozoic faunas. Unlike many of the recent writers, he has considered them as corals rather than as bryozoans, and several of the commoner forms are described in such detail as to greatly assist students beginning the investigation of these fossils. 'Valleys of Solution in Northern Arkansas' are discussed by A. H. Purdue. They are described as steep and bilaterally symmetrical, with remarkable straightness, due, no doubt, to their connection with jointing planes.

The Botanical Gazette for February contains the first of two papers by Dr. H. C. Cowles upon 'The Physiographic Ecology of Chicago and Vicinity; a study of the origin, development and classification of the plant societies.' Dr. Cowles gives his views on the classification of plant societies, and proposes a method based on the laws of physiography. The general principles outlined in full have been noted already in *SCIENCE* (Vol. XII., p. 708, Nov. 9, 1900), and are here worked out in connection with the Chicago area. The plant societies are grouped in five genetic series, the first of which, that on rivers, is presented in the first instalment. The paper is illustrated by half-tone reproductions which show the various stages in the development of river-plant societies, from the ravine with its mesophytic slopes, through the xerophytic bluffs stages, and culminating in the mesophytic forest of the flood plain which is regarded as the climax phase of regional development. Mr. John Donnell Smith, publishes his 22nd paper on 'Undescribed Plants from Guatemala and other Central American Republics,' describing about thirty new species from this exceedingly prolific region. Miss Mary H. Smith, of Cornell University, publishes an account of some experiments which would indicate that nitrates are a source of nitrogen for saprophytic fungi. Carlton E. Preston, of Harvard University, publishes a second note on non-sexual propagation in *Opuntia*. Various book reviews, minor notices, notes for students, and news items complete the number.

Torrey is the title of a new monthly journal of botanical notes and news edited for the Torrey Botanical Club by Dr. Marshall A. Howe. A half-tone medallion of Dr. John Torrey, in whose honor the periodical is named, adorns the cover. The object of the journal is to provide a medium for short and semi-popular articles and for reviews, news items, etc., the *Bulletin* of the Club being thus reserved for the longer and more technical papers. It is expected that considerable prominence will be given to notes relative to the teaching of botanical science. The first number of *Torrey* (January) includes the following articles: 'Notes on *Rudbeckia hirta*,' by Dr. N. L. Britton; 'Seedlings of *Arisæma*,' by Dr. D. T. MacDougal; 'Notes on the Genus *Lycopodium*,' by Professor F. E. Lloyd; 'The Summit Flora of King's Mountain and Crowder's Mountain, North Carolina,' by Dr. J. K. Small; 'A simple Dynamometer,' by Dr. H. M. Richards; 'The rare Mosses of Bashbush Falls,' by Mrs. N. L. Britton; and 'Economy in Nature,' by Dr. P. A. Rydberg. The February number contains: 'The Value of Forestry in a Course of Nature Study,' by Miss Elizabeth Carss; 'A new Hygrometer suitable for testing the Action of Stomata,' by Dr. D. T. MacDougal; 'The *Lygodium* at Home,' by Frederick H. Blodgett; 'A new *Senecio* from Pennsylvania,' by Dr. N. L. Britton; and '*Rosellinia ovalis*,' by William A. Riley.

MR. HARRY F. WITHERBY, who has lately made an expedition to the White Nile in search of birds, will commence, in the next issue of *Knowledge*, a series of illustrated articles descriptive of the country, its people, its wild animals and its birds. In the first instalment the author deals with his journey by river and the Desert Railway from Cairo to Khartoum, and gives his impressions of Khartoum and Omdurman.

SOCIETIES AND ACADEMIES.

SECTION OF BIOLOGY OF THE NEW YORK ACADEMY OF SCIENCES.

THE regular monthly meeting for February was held on the 11th, Professor C. L. Bristol

presiding. The following program was offered:

D. T. MacDougal: 'The Critical Points in the Relation of Light to Plants.'

A. G. Mayer: 'The Variations of a Newly-arisen Race of Medusa.'

Dr. MacDougal stated that an examination of all the data at hand shows no correspondence among the maxima, minima and optima of intensities of light with regard to the various influences exerted upon the plant by light, and that the current conception of *phototonus* is not based upon well-defined generalizations, Etiolative phenomena of plants are irritable reactions, consisting chiefly in the elongation of organs which would carry the chlorophyll screens and reproductive bodies up into the light. Light is not necessary to the motility of protoplasm, nor for the activity of the motor mechanisms of such plants as *Mimosa*. The condition known as *darkness-rigor* does not exist. Appearances commonly supposed to be due to rigor of darkness are pathological phenomena occasioned by the disintegration of chlorophyll and other substances. Light may exert a direct chemical (disintegrative) effect upon the constructive material of the cell, but it does not retard growth; on the contrary, it accelerates growth in algæ. Evidence that light exercises a paratonic influence upon plants is not at hand, and no observations could be found by the speaker supporting the conclusion that a similar retarding influence of light upon growth occurs among animals. In discussion of Dr. MacDougal's paper, Mr. M. A. Bigelow called attention to some experiments made by him, under the direction of Professor C. B. Dayenport, to determine the influence of light upon embryonic development and post-embryonic growth in Amphibia. Light does not retard, but rather accelerates developmental processes, the effective rays being red in embryonic and blue during post-embryonic stages.

Dr. Mayer stated that in 1898 he had discovered a pentamerous Hydromedusa at the Tortugas, Florida, and had named it *Pseudoclytia pentata*. In this form there are five radial canals, five lips, and five gonads 72° apart, instead of four of these various organs at intervals