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.

FRIDAY, NOVEMBER 13, 1903.

CONTENTS:

Robert Henry Thurston 609

Simultaneous Solar and Terrestrial Changes: SIR NORMAN LOCKYER 611

The German Anthropological Association: DR. GEORGE GRANT MACCURDY 623

Scientific Books:—

Small's Flora of the Southeastern United States: F. V. COVILLE. *Plate's Ueber die Bedeutung des Darwinische Selectionsprincips:* J. P. MCM 627

Scientific Journals and Articles 629

Societies and Academies:—

The Torrey Botanical Club: DR. F. S. EARLE. *Section of Geology and Mineralogy of the New York Academy of Sciences:* DR. EDMUND OTIS HOVEY 630

Discussion and Correspondence:—

Antedated Publications: DR. J. A. ALLEN. *The 27-day Period in Auroras and its Connection with Sunspots:* HENRY HELM CLAYTON 631

Shorter Articles:—

Mont Pelé from May to October, 1903: DR. EDMUND OTIS HOVEY 633

The Huxley Memorial Lecture 634

Scientific Notes and News 636

University and Educational News 640

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

ROBERT HENRY THURSTON.

ON October 25, 1903, Robert H. Thurston, director of the Sibley College of Cornell University and one of the editors of this JOURNAL, was stricken down with heart failure while awaiting in his library the coming of a few friends who had been invited to a dinner celebrating his sixty-fourth birthday. The news of his sudden death came as a great shock to the engineering profession throughout the United States, while to Cornell University the loss is one that seems irreparable for several years to come.

Robert H. Thurston was born in Providence, R. I., and was graduated from the engineering course of Brown University in 1859 with the degree of C.E. In 1861 he became an assistant engineer in the navy and served throughout the civil war, finally being promoted to the position of chief engineer of one of the monitors. In 1865 he was appointed an instructor in the U. S. Naval Academy at Annapolis, leaving that position in 1871 to accept the professorship of mechanical engineering in the Stevens Institute of Technology. This chair he held until 1885 when he was called to the directorship of the Sibley College of Mechanic Arts, a position which he filled until the day of his death.

The work of Professor Thurston at Stevens Institute and at Cornell University was most successful, it being characterized by great energy and executive ability,

by clear ideas of the needs of engineering education and by well-formed and definite plans for increasing its efficiency. When he took charge of Sibley College it had but sixty students, while now it has nearly a thousand, this being probably a larger registration of students pursuing mechanical and electrical courses than that of any other institution in the United States. Dr. Thurston's capacity for organization, his knowledge of all the details of the courses of study, his skill in managing the many professors and instructors under his charge and his untiring energy in work have always been an inspiring example to professors of engineering everywhere.

In 1873 Dr. Thurston was U. S. Commissioner to the Vienna exposition and wrote the volume on machinery. In 1875 he was appointed a member of the U. S. board to test metals, and became its most active member during the three years of its existence. In connection with this work he devised a machine for torsional tests and made numerous investigations in the mechanics of materials, the most important one being that which established the fact that the elastic strength of wrought iron or steel is increased by stressing the material beyond that limit. In 1883 he published a work in three volumes entitled 'The Materials of Engineering,' which has been of much value to the engineering profession; an abridged edition of this work called 'Materials of Construction' has been widely used as a text-book in technical schools.

While at Stevens Institute Dr. Thurston instituted tests of the efficiency of boilers and engines and continued these studies throughout his life, becoming one of the highest American authorities on thermodynamics. His books entitled 'Handbook of Engine and Boiler Trials,' 'Stationary Steam Engines' and 'Boiler Explosions' have had a wide circulation, while his 'Manual of the Steam Engine,' a work in three volumes, has had the high honor of having appeared at Paris in a French translation. He also made many experiments on the friction of machinery, the results of which are given in his books 'Friction and Lubrication' and 'Friction and Lost Work.' Other books which appeared from his ready pen were 'The Animal as a Machine and Prime Motor' and 'Life of Robert Fulton,' while his contributions to scientific and engineering periodicals are numbered by the hundreds.

Professor Thurston was a member of many scientific and engineering societies, both American and foreign, and always maintained an active interest in their work. In 1880 he was one of the founders of the American Society of Mechanical Engineers and its first president, and his counsel has always been highly valued by the governing board of this society. The presidency of many other societies was often urged upon him by his friends, but he seemed to have a marked aversion to being regarded as a candidate, although always ready to assist in the scientific or professional work of such organizations.

The connection of Professor Thurston with the American Association for the Advancement of Science began with his election in 1874, and in the following year he was made a fellow. In 1877 and 1878 he was vice-president of Section A, which at that time included mathematics, physics and chemistry, while the remaining work of the association was grouped as natural history in Section B. In 1884, when the association had expanded to six sections, Professor Thurston was vice-president of Section D which includes mechanical science and engineering, and he always took a deep interest in its work.

When Science began its new series in 1895, an editorial committee was organized

covering essentially the same departments as those of the sections of the American association, and Professor Thurston accepted the charge of the department of engineering. His contributions to the pages of this JOURNAL have been many and are well known to our readers. His work, which never flagged, continued to the last, for on the day of his death an article signed R. H. T. was in type and it appeared in the issue which contained the obituary announcement.

It is yet too early to speak with accurate judgment regarding the final value of the scientific and engineering work of Professor Thurston. There can be no doubt, however, that it was of great benefit to mankind, for he made engineers better scientists, promoted engineering education, helped to put engineering upon a higher professional plane, and constantly was on the watch to dispel the fogs of prejudice by help of the truths of science. His alma mater conferred upon him the degree of LL.D., and Stevens Institute devised the degree of doctor of engineering to do him special honor. In personal disposition he was quiet and retiring, but yet affable and kindly. His work was done with method and precision, and he was always most untiring to serve the interests of the educational institution with which he was connected. It is announced that the authorities of Cornell University propose to commemorate his services by the erection of a costly laboratory as a memorial, the same to be called Thurston Hall.

---

*SIMULTANEOUS SOLAR AND TERRESTRIAL CHANGES.**

THERE are very many cases recorded in the history of science in which we find that the most valuable and important applications have arisen from the study of the ideally useless. Long period weather forecasting, which at last seems to be coming into the region of practical politics as a result of the observation of solar changes, is another example of this sequence.

The first indications of these changes on the sun, to which I have referred, are matters of very ancient history, and so also is the origin of some of the branches of observation on which the study of them depends.

I will begin by referring to these and to the conclusions arrived at in relation to simultaneous solar and terrestrial changes previously to the last 25 years.

The facts that there are sometimes spots on the sun, and that there is a magnetic force which acts upon a needle, seem to have been known to the ancient Chinese. In more modern times the enquiries with which we are now concerned, date from the times of Galileo (1564–1642) and Kepler (1571–1630).

To Galileo, Fabricius and Scheiner we owe the first telescopic observations of the spots on the sun; to Kepler, the basis of spectrum analysis, which has not only revealed to us the chemistry of the sun and of its spots, but enables us to study daily other phenomena, the solar prominences, which will in all probability turn out to be more important for practical purposes than the spots themselves.

It is only quite recently that the importance of the study of the prominences in this direction has been indicated, so that we have to deal, in the first instance, with a long period of years in which only the spots and their terrestrial echoes were in question.

According to Professor Wolf (as quoted by Professor Köppen), Riccioli, in 1651, shortly after the first discovery of sun spots, surmised that some coincidence

* Report, International Committee, Southport, 1903.