SCIENCE:

A WEEKLY NEWSPAPER OF ALL THE ARTS AND SCIENCES.

PUBLISHED BY

N. D. C. HODGES,

47 LAFAYETTE PLACE, NEW YORK.

SUBSCRIPTIONS.—United States and Canada..... $3.50 a year.

Great Britain and Europe..... 4.50 a year.

Communications will be welcomed from any quarter. Abstracts of scientific papers are solicited, and twenty copies of the issue containing such will be mailed the author on request in advance. Rejected manuscripts will be returned to the authors only when the requisite amount of postage accompanies the manuscript. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guaranty of good faith. We do not hold ourselves responsible for any view or opinions expressed in the communications of our correspondents.

Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

VOL. XVI. NEW YORK, JULY 4, 1890. No. 387.

CONTENTS:

GEORGE HAMMELL COOK.[1]

"YET once more, O ye laurels, and once more
Ye myrtles brown, with ivy never sere,
I come to pluck your berries harsh and crude,
And with forced fingers rude
Shatter your leaves before the mellowing year.
Bitter constraint and sad occasion dear
Compel me to disturb your season due."

ONE by one the great men depart. As they pass from the sphere of personal association through the portal of the grave into the world of immortal influence, their deeds and honors are recounted by those who remain.

When the last entry has been made, the book is opened, the account is rendered. Blessed is he whose good deeds more than balance his emoluments, whose services to mankind more than equal the honors paid him by mankind, for "it is more blessed to give than to receive." Thrice blessed is the man whose life and services we commemorate to-day.

The generation now at the zenith of life succeeds a generation whose zenith was clouded by war. As the great men of that day pass out through the sunset of life, their battle-deeds are told. It is thus that the mortuary ceremonies of this generation echo the clangor of charging squadrons, the shrieking rattle of battle-lines, and the roar of batteries.

Sequestered from the pomp of parade, from the roar of funeral gun, from the battle cemetery that hides under marble columns the victims of battle strife, here in the peaceful halls of learning we assemble to commemorate the life of a man whose ways were "paths of peace," whose chariot of progress through the world bore no scythe of destruction, whose life was wholly beneficent, whose youth was devoted to learning, whose early manhood was devoted to instruction, whose prime of life was devoted to research, and whose old age was devoted to the organization and development of institutions for the increase and diffusion of knowledge.

It falls not to my task to characterize the student life of George Hammell Cook. That his opportunities for training were wisely used is abundantly demonstrated by the monument of success which he unconsciously reared for himself in the years of his public activity. It is not in my province to speak of his professorial life. The scholars and public men who were guided into a higher intellectual life constitute a living monument to his fidelity and genius as an instructor.

It was as a man engaged in research that I first knew Professor Cook, and learned to honor his untiring industry, his deep insight, and his intellectual integrity. The catalogue of his contributions to science is long—too long to be recounted here, for it constitutes the annals of a long life. Only a few examples can be used to illustrate the wealth of his accomplishments,—in chemistry, geology, and geography.

In 1854 Dr. Cook became an assistant on the Geological Survey of New Jersey. This was his induction into scientific work. For three years the field of his research was in the southern part of the State, in the marl-beds and amid the potter's clay. Up to that time little attention had been given to these sources of wealth, and fields of industrial operations.

While in this field of labor, he discovered that a thorough geological survey must be based upon geography, and he constructed a topographic map expressly for the representation of geologic structure. His stratigraphic determinations were based largely upon instrumental measurements and carefully drawn plans and profiles of the land surveys. Thus was inaugurated in America a system of geological surveying which has gradually obtained ground until it is practically universal. The anatomy of the earth is exhibited in its topographic forms. Plains, valleys, terraces, hills, and mountains are full of meaning to the geologist, for in them is revealed the deep-seated structure of the earth and the history of that struggle between the great geologic powers which is forever in progress, and from the throes of which the continents are born.

The theatre of these early operations was near the coast, where the tides of the Atlantic ceaselessly surge to devour the land. Here his trained eye observed phenomena that led to a long system of observation and investigation, by which he ultimately demonstrated that the margin of the coastal plain of the Jersey shore is slowly subsiding, and that the sea is steadily enlarging its dominion. This work, as it has progressed through the years ending in his death, constitutes an important contribution to the facts and philosophy of the science of geology which he cultivated.

In 1864 Dr. Cook was appointed State geologist, and held the position until his death. His first task was found in preparing an elaborate exposition of the mineral resources of the State, which had been brought to light by earlier surveys; and he added to these a series of special investigations, such as were required for the symmetric treatment of the subject. This exposition was completed and published in 1868 in a large octavo volume accompanied by a portfolio of maps. He thus at the beginning cleared the field, systematized the existing knowledge, and developed a comprehensive plan for the researches which he carried on until the day of his death. To him geology was not wholly a speculative science. His conception of the duties imposed on him by being intrusted with public funds urged him to administer his trust in such a manner that the welfare of the State might be increased thereby. He did not neglect the great philosophic problems of his science, for he directed the investigations of the survey into structural geology, paleontology, chemistry, and geography; but he held over these researches a constant corrective by making them responsible for exact determinations of industrial

[1] Address of Major J. W. Powell at the funeral of Dr. G. H. Cook, late State Geologist of New Jersey.

value. A series of great economic problems was forever in his mind: How can these inundated lands be regained? How can the broad fields of New Jersey be fertilized? How can the potter's art be developed from the clays of the coastal plain? How can the deposits of zinc be utilized by the industries of the State, and how can the great beds of iron-ore be transformed into the instruments of modern civilization? And he applied the principles of science to these problems. Geography, geology, paleontology, and chemistry were all made subsidiary to the leading purpose of his survey.

Science was thus made to bless mankind, and the advancement of science did not lose thereby; science and industry in copartnership were each strengthened; industries of great magnitude and value to the people were steadily developed; and science itself steadily grew under the genius of his guidance.

The State of New Jersey is the seat of ancient seas. From the sediments therein deposited the rocks of the hills of New Jersey were made. The history of New Jersey through long geologic time is a history of innumerable earthquakes consequent upon the upheaval and depression of its lands. At one period in its history it was the scene of vast volcanic activity, when molten rocks poured to the surface. Built by the sea, it has been fashioned by the storm, and the waves of ocean have carved its shores with a fretwork of beautiful forms. Its low shores, its coastal plains, its broad valleys, and its billowy hills have been carved by rains and rivers until it presents a landscape of beauty. These physical features of the State, which express its beauty, and record its history, and reveal its structure, became one of the great studies of Dr. Cook when he began the topographic survey of the State. He lived to see that survey completed; and he gave to the industries of the land and to the science of the world the first great topographic map of a State constructed on this continent. Had this been his sole contribution to the knowledge of the world, it would have made him worthy of high honor.

With the increase of population in this country the ordinary wells which gather the water from the surface steadily become polluted, and dangerous to health and life. With the multiplication of manufacturing establishments, and through other agencies ever on the increase, the streams become polluted, and their waters are freighted with disease. The supply of pure water for domestic purposes to the people of the State of New Jersey early attracted the attention of Dr. Cook. With profound insight into the physical structure of the State, he early became convinced that the hills of the highlands constituted a catchment area for the waters of deep-seated rocks in the lowlands; and that, through these pervious formations outcropping above, the waters were filtered and purified, and could be reached by artesian boring along the coast. His prophecy was fulfilled, and now the beautiful towns of the region are made salubrious through the genius of his scientific induction. To-day thousands of wells extending along our coast from New York to Florida pour out the pure waters of life, and bless multitudes of people, and make their homes happy. The clouds of the highlands are tributary to the cottages of the coast, and the rocks deeply seated in the foundations of the earth carry them on their way.

Through long years of his life Dr. Cook was engaged in investigations relating to agricultural industries. The interests affected by these investigations are vast, for they are at the foundation of all prosperity. The facts and principles to be investigated are multifarious and complex, relating to climate, to soil, to vegetal life and animal life, and the relations of all these to human life. Science has done much for modern industries in manufacturing, in mining, in transporting, and in commerce; the hidden powers of the world have been discovered and tamed; but science has done comparatively little for agriculture; and Dr. Cook was one of the founders of a vast system of research, which has now been established throughout the land on a comprehensive and symmetric plan. Through the agency of these founders, of whom Dr. Cook was one of the leaders, experiment stations have been established in every State of the Union, endowed by National and State grants, and the greatest army of investigators ever organized under the sun is now at work on the complex problems of agricultural science. This was the crowning labor of a long and fruitful life. It has been a quiet but vigorous and efficient movement, and the people do not realize what has been done. The labors in this cause, of this beneficent friend of mankind, were untiring. They were conducted among men of affairs, in the seats of learning, in State legislatures, and in the National Congress. Everywhere his benign influence was exerted and felt, his counsels were taken with delight, and he became a leader of men where only the wisest and best men could be led. His appeal was to scholars and statesmen, and the counsels of the old man eloquent ultimately prevailed.

From the early history of civilization until the present time, many great thinkers of the world have been constructing temples of philosophy. It began with Socrates, Plato, and Aristotle, and this temple-building has continued through the times of St. Thomas Aquinas down to Hegel, Schelling, and Fichte, and even later to the days of Herbert Spencer. These theorizing philosophers have attempted to construct systems for the explanation of all things of the universe, and to build their philosophy upon a few "fundamental principles,"—postulates, presuppositions,—to construct temples founded on their domes. One by one these great philosophies have crumbled into dust, and we know them only by their ruins. The history of civilization is marked by the ruins of fallen philosophies, now most interesting to historical archæology.

In modern times another philosophy is being constructed,—the great temple of science. On this structure a vast army of scholars are at work through the multifarious methods of scientific research, and they are building this temple with its foundation on the granite base of fact. George Hammell Cook was a master workman on this temple, built as it is being built out of the facts and principles discovered by modern scientific research.

I knew Dr. Cook best as a counsellor and a friend. Having responsibilities thrown upon me kindred to those borne by him, I was glad to seek wisdom at his feet. Honest and pure, he was wise and far-seeing, and for his counsel I owe a debt of gratitude. His ways were characterized by directness and simplicity, and I learned to love him as a father, and be guided by him as a son. And now the wise old man is gone. This fountain of wisdom flows no more. The processes of time and change never cease. On we go with the stream of events. Shall our lives also make the world better?

The light is from on high.

The powers of the earth come from the heavens.

They who have wielded these powers best are placed in the firmament of history.

The method of human progress is not through "the survival of the fittest," for man is more than the brute.

The agency for the progress of mankind is the influence of the fittest. In all ages this has been recognized, now clearly, now dimly. In harmony with its principles, those who have best served humanity have been placed on high among the stars of history, that the light of their immortal deeds may forever shine upon the pathway of mortal men.

George Hammell Cook is among the stars. On earth he loved justice and he rendered justice; he loved the truth and he sought the truth; and, dead, he lives again, the star of justice and truth. O venerable friend! your counsels were wise, and your example was beneficent. Shine on to illumine our way to the truth and the right with the light of the knowledge of the glory of God.

LETTERS TO THE EDITOR.

*** Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

The editor will be glad to publish any queries consonant with the character of the journal.

On request, twenty copies of the number containing his communication will be furnished free to any correspondent.

The International Congress of Geologists.

I HAVE just seen a note of Professor Lesley's in your issue of June 13, in which he characterizes the statement of the May *Naturalist* regarding the action of the committee on organization