

has by the award of this Medal conferred on me and, through me, on the geographical service of the British Armies in France. Every officer and man of that service will share my pride in this honour, and will recognize, as highly as I do, the appreciation that has been accorded to our work by this distinguished body of geographers.

The PRESIDENT: The Patron's Medal is awarded to Prof. William Morris Davis, of Harvard University, for his eminence in the development of Physical Geography. He is the most eminent of living American geographers, and has devoted his life to investigations in physical geography and to the teaching of geography as a University subject at Harvard, and as visiting Professor in several European Universities. At the commencement of his career he devoted much attention to meteorology, and his 'Elementary Meteorology, 1894' is a standard work. Later he had practical experience as a geologist on the U.S. Geological Survey. For forty years he has given his main attention to the physical geography of the land surface, on which he has published several books and very many papers, some of the most important of these in the *Geographical Journal*. Prof. Davis has travelled throughout North and South America and Europe, widely in Asia (including an expedition to Turkestan), Africa and Australasia. All the leading geographers of Europe have at one time or another taken part in geographical excursions on a great scale led by Prof. Davis, and have borne witness to his extraordinary grasp of physical features and his power of exposition in the field. As a university teacher he introduced new methods of study, especially in his geographical laboratory at Harvard, which have proved of high value in scientific training. As a theoretical geographer he is known mainly by the completeness with which he worked out the geographical cycle of erosion, and the consequences which follow from the application of the conception. All the work of Prof. Davis, both in the field and in the study, is marked by a forceful originality which has acted as a vivifying stimulus to several generations alike of disciples and critics. It is not too much to say that his writings have been largely instrumental in displacing German in favour of English as the language of advanced work in geography. Mr. Butler Wright has undertaken to accept the Medal on behalf of Prof. Davis, and it is with honour that I give it to so distinguished an American. There has always been a good feeling between American geographers and ourselves, and I hope that this will be a small token that it will continue.

Mr. BUTLER WRIGHT (Councillor of the American Embassy): It is very regretful that Prof. Davis has not the pleasure of being here himself this afternoon, not only to receive this generous tribute but also to hear the generous words which you have used; and also that you should have been deprived, by his sudden absence in Paris, of the pleasure of hearing the American Ambassador, who had consented to receive this Medal. Your loss, however, is my decided gain. I consider it a pleasure and an honour which I should seldom, if ever, claim to either appear in the ranks as a member or much less to address the members of the Royal Geographical Society. I only hope that possibly the liability in our Foreign Service, which sometimes renders us averse to accept orders to very far distant posts, may now be turned into an asset, because by so doing and by possible explorations I might be able to appear here on my merit instead of as so absolutely plausible a proxy as I am.

The PRESIDENT: The Victoria Medal is awarded to Prof. J. W. Gregory, F.R.S., of Glasgow University, for his many important contributions to Geographical Science. He received the Cuthbert Peek Grant in 1894 in recognition

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Professor Davis on Physical Geography

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stream. We reached Amarr on September 5, and found various exciting events in progress, but of more military than geographical interest.

On the 8th I arrived once more at Ibi and comparative civilization, having dropped down stream in a native canoe in eighteen hours from Amarr.

I saw no large game of any sort in the course of my journey, but that was only to be expected in the rainy season when the grass is long. Twice, however, we saw elephant tracks across the path; and at Jebjeb I followed up some giraffe tracks for several hours, without, however, seeming to get any nearer to the animal.

Taking observations was also most uncertain work, as the sky was always cloudy. In fact, I only succeeded in taking six reliable observations the whole time. But the beginning of the rainy season is not a bad time for travelling, as the sun's rays are generally tempered by welcome clouds, and also there is enough water in the small streams to save any anxiety on that score.

PROFESSOR DAVIS ON PHYSICAL GEOGRAPHY.

By HUGH ROBERT MILL, D.Sc.

PROF. W. M. Davis, who occupies the Chair of Physical Geography in Harvard University, has published, with the assistance of Mr. W. H. Snyder, a little book to which the title of 'Physical Geography' * is peculiarly applicable. The book is strictly geographical, and purely educational. It avoids the wider scope of physiography, and deals only with facts the relations of which are sufficiently well known to admit of a clear statement of cause and effect. The theories which are dealt with are carried no farther than the supporting facts warrant, and, while the style could not be clearer or the language more precise, there is a complete absence of technical terminology, which might deter the general reader or make the book unattractive for use in schools. The leading principle of the book is thus expressed in the preface :

"The Earth's physical features must not only be described—they must be explained, so that the understanding shall aid the memory in holding them in mind. They must not be presented apart from the manner in which they affect man's ways of living; attention must frequently be drawn to the association of human conditions with the environment by which they have been determined, in order to form the habit of looking at the features of the Earth as prime factors in guiding

* 'Physical Geography.' By William Morris Davis, Professor of Physical Geography in Harvard University, assisted by William Henry Snyder, Master in Science in Worcester Academy. Boston, U.S.A., and London: Ginn & Co. 1898.

the development of mankind. In brief, physiographic facts should be traced back to their causes and forward to their consequences; and thus the phrase, 'causes and consequences,' comes to serve as a touch-stone by which the treatment of the subject may be tested."

This scientific conception of geography animates the whole book. The introductory chapter very briefly points out that man is very largely a creature of his natural surroundings, and the following chapters are devoted to the study of those surroundings in gradually increasing detail. Chapter II., "The Earth as a Globe," is a very slight sketch of mathematical geography, and is reinforced by several appendices touching on various points in geodesy, the determination of latitude and longitude, and the theory of maps. Chapter III. deals with the Atmosphere, especially in regard to normal climate and weather-changes. Chapter IV. discusses the Oceans. Waves and tides are treated with proportionately great detail and success; the other parts of the subject are not quite so satisfactory. The definition of an "ooze" as a deep-sea deposit of animal origin is a slip for "of organic origin;" but even such trifling errata are exceptionally rare.

Chapter V., "The Lands," is reached on the ninety-first page. It touches on various general points as to the arrangement and structure of land and the distribution of life. The following five chapters are the most original and the best, dealing respectively with Plains and Plateaus, Mountains, Volcanoes, Rivers and Valleys, and the Waste of the Land. Land-forms are dealt with in a comprehensive and yet definite manner, the fundamental classification being by their origin. The many varieties of the coastal plain have never previously been so clearly described or so simply explained, the origin of the form leading directly to the consequences of the form with regard to the distribution of plant, animal, and human life. The same method is carried out for other land-forms, and the descriptions are greatly aided by admirable diagrams in the form of drawings of models combining the superficial appearance and the geological structure of the various features. In dealing with the waste of the land, Prof. Davis calls attention to a matter which has hitherto been unduly neglected in geographical books. Geologists frequently treat of the waste of the land in order to emphasize the different effects produced by weathering on rocks of different composition, texture, and structure. Here we find the geographical aspect of the subject in the study of the phenomena common to the weathering of all rocks :—

"There are many resemblances between the movement of water-streams and of waste-streams. Water flows along stream and river channels more rapidly at the surface, more slowly at the bottom; it is here delayed in lakes, there hurried down rapids. Land-waste may be thought of as moving in streams and sheets down every hillside and along every valley, more rapidly at the surface of the ground, more

slowly at a depth of several feet; more rapidly on steeper slopes, more slowly on plains. The shape of the land-surface and its usefulness as a home for man depend in no small degree on the character of the sheet of waste with which it is clothed."

Chapter XI. is on Climatic Control of Land-forms, a somewhat ambiguously worded title, as the chapter has to be read before one understands that it means the changes produced in land-forms by climate, not the changes produced in climate by land-forms. The effects of floods, of wind, and ice-action are considered under this head.

The twelfth and last chapter is devoted to shore-lines, the elaboration of part of the earlier discussion of coastal plains, and it is very well done, including a discussion of the growth of coral reefs with an absolute minimum of theory.

We know of no other American text-book which draws so freely on other continents for illustrations of striking scenery, although not neglecting the splendid type-specimens of almost every land-form which the surface of the United States supplies. The illustrations are very numerous, most of them new, and all good; but the maps supplied at the end are not sufficient to render an atlas indispensable. Taken altogether, text, illustrations, and maps make up a work of unique value which ought to produce a great effect on the geographical education of the English-speaking peoples.

PROF. PETTERSSON ON METHODS OF OCEANOGRAPHIC RESEARCH.

By H. N. DICKSON.

THE number of investigators taking an interest in oceanic physics is slowly but steadily increasing, and every addition to the number makes it more and more desirable that a uniform method of observation should be adopted, in order that the work of each observer should be strictly comparable with that of all the others. In oceanography, as in meteorology, a system of observation has been elaborated such that, while most of the individual methods are susceptible of high refinement in special cases, the ordinary observer need find no difficulty in attaining sufficient accuracy for practical purposes, the all-important matter being to ensure comparability. A certain margin of probable error may sometimes be admitted, which, although not showing a method at its best, means an immense saving of time and labour in dealing with large quantities of material, and makes no appreciable change in the geographical significance of the results.

The system now recommended for general adoption has been elaborated by Prof. Otto Pettersson and his colleagues, and subjected to severe practical testing in the international and other investigations carried on during the last six years in the North sea and North Atlantic. An authoritative explanation of it was published by Pettersson in the *Annalen der Hydrographie* for August last, and the gist of that article is here produced. Those parts of it which have already been



Obituary: William Morris Davis

Hugh Robert Mill

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OBITUARY

WILLIAM MORRIS DAVIS

W. M. Davis, who died on 5 February 1934, within a week of his eighty-fourth birthday, was a geographer who impressed his personality on his own generation, and his memory will not soon fade.

He was born in Philadelphia in 1850 and was descended on both sides from a strong-minded Quaker stock which predisposed him to austerity of thought and tenacity of opinion. He studied at Harvard University, where he came under the influence of Shaler and resolved to make himself a career in physical science. At the age of twenty he went to the Argentine Republic as an assistant in the Central Observatory at Cordoba, where meteorology claimed a large share of his attention. After three years of this routine he spent two years in foreign travel, visiting many parts of the world. In 1878 he returned to Harvard, in a subordinate capacity, to conduct classes in geology and geography. At the same time he was attached to the U.S. Geological Survey and had the advantage of being introduced to the western territories under the guidance of such veterans in structural geology as Gilbert and Powell. He always thereafter liked to derive his knowledge direct from Nature rather than from books, and thus he developed original methods of research and of exposition. When appointed Professor of Physical Geography at Harvard in 1890 he was already known throughout America as a leader in his own subject.

As a teacher he laid less stress on books and lectures than on observations in the field and demonstrations with maps, models, and block-diagrams in the Geographical Laboratory which he was one of the first to equip. He set himself before everything to make his students observe accurately and reason clearly. His own mind worked on lines of remorseless logic, and he expected the same hard thinking from his classes. Not every student who entered on a course could stand the severe discipline of such a master. But he saw without concern his audience dwindle as the session advanced, for he knew that if the rough blast of his method blew away the chaff, it was the breath of life to the few who had the power and the will to follow in his footsteps. Thanks to the wise American rule of the Sabbatical year and the creation of exchange professorships with other countries Davis had many opportunities of paying prolonged visits to Europe and of delivering courses of lectures at the Universities of Berlin and Paris. When in 1912 he exchanged his chair of Physical Geography at Harvard for a special professorship of Geology not requiring whole-term residence, he obtained still more freedom for travel, research, and the spread of his system of teaching to other universities.

His life was so strenuous, full, and varied that it is hopeless to attempt a chronological record of his work. Davis's contributions to scientific literature were very numerous. A list of his papers now before me runs to 72 inches of

column of small type and includes about 220 titles. It is not their number but the solid compression of fact and theory that makes them almost unique in the influence they exerted. The services which Davis rendered to geology were great ; but our concern here is with the manner in which he turned his unrivalled knowledge of geological detail to the service of Geography.

As an investigator and teacher he entered into the study of land-forms and the development of geographical features in all parts of the world. He saw everything for himself, not only in the tremendous arena of recent geological activities in the Rocky Mountains and the Great Plains, but also the ancient worn-down contours of New England, the vast desert wastes of Turkistan, and the coral islands of the tropical Pacific. I have been with him in long excursions across Canada from ocean to ocean, on the deserts of New Mexico and Arizona, including a memorable day in the Grand Canyon itself, and in South Africa from Table Mountain to the Victoria Falls. In such surroundings one saw his quick eye and strong mind at work on the crude facts, forming new generalizations or verifying the old. So occupied he was at his best, and the European geographers who were fortunate enough to join in his great trans-American excursion of 1912 recorded their admiration of his leadership in such reports as that by Dr. G. G. Chisholm in the *Geographical Journal* for October 1913.

Davis was the object of a good deal of misunderstanding and of some ridicule when his work first became known in this country. In February 1895 his "Development of Certain English Rivers" appeared in the *Geographical Journal*. It was a tough piece of reasoning requiring close application and the mastery of a group of new and even uncouth terms. It set out a typical example of the Geographical Cycle of erosion and uplift which is usually held to be his chief contribution to geographical theory. The facts were not unfamiliar in regard to the special cases ; what was new was the logical deduction of a general principle and the terminology employed. Most of the English criticism was on the latter aspect and was of the same order as the popular criticisms of Summer time and the 24-hour clock. The only real difficulty to fight against was unfamiliarity, an ill which time very speedily cures. Davis's work has long since been built into the foundations of geography. The *Geographical Journal* has published five later memoirs from Davis's pen, and these won more ready approval. They dealt with the Geographical Cycle in 1899 (vol. 14), a Scheme of Geography in 1903 (vol. 22), the Geographical Cycle in an arid climate in 1906 (vol. 27), the Colorado Canyon (vol. 33), and the Systematic description of land-forms (vol. 34), both in 1909; and the Islands and Coral Reefs of Fiji in 1920 (vol. 55). The Patron's Medal of the Society was awarded to Davis in 1909.

In his later years he moved from the harsh climate of New England and took up his abode under the genial skies of California, but in his mind he was always at home, for wherever he was his real home was the world, and its crust-forms were everywhere his familiar furnishings. To the last he remained intensely at work. The very issue of the *Geographical Review* which published a noble tribute to his memory from the pen of his disciple Isaiah Bowman contained also an acute discussion by the veteran of eighty-four on the origin of the submarine valleys off the Californian coast. In this he developed an oceanographical as distinct from a geological theory of their origin—a theory, by the way, which fits with a neglected suggestion of J. Y. Buchanan more than forty years before.

Davis never measured success by size or by popularity. He founded the Association of American Geographers and was proud that it was perhaps the smallest geographical society in the world, for it admitted only geographers of proved competence. His efforts at home and his example abroad have been amongst the most active causes of the present widespread recognition of geo-

graphy as a subject worthy of the high academic standing it has at last attained in the English-speaking world.

Davis had a share with Suess, Richthofen, Penck, and de Margerie in making the world recognize that the despised by-product of geology known as geomorphology was really the corner-stone of Geography. He was an indefatigable participant in all international gatherings of geographers; and of him, if of any man, it could be said that he was personally known to all the leading exponents of his science in every university in the world. It was not his way to insinuate himself smoothly into the society of his colleagues or to charm them with easy concessions to their views. Davis possessed a hard and angular personality. His opinions, formed with labour and deliberation, were not easily shaken or modified by the opposition they often provoked. His contacts with his equals in knowledge and devotion to truth struck fire like steel on flints. But he bore no malice, for he liked to be criticized even as he loved to criticize others, and he held his ground unmoved, gradually wearing down the sharp points of disagreement. Long before his death he was recognized in Europe as well as in America as a friend and helper of all who were earnest in the effort to understand the order of Nature. He could unbend socially with a play of humour peculiar to himself and very disarming to those who disliked his views. He was fond of expressing his happy thoughts in fluent verse or pithy epigram. He would often with bantering asperity expose the shallowness of knowledge accepted without thought, and he dealt as faithfully with his own followers when they dared to press his methods beyond what he held to be their just limits as he did with those who rejected his theories altogether. Though strong in his opinions he was singularly modest in his claims to originality. He never sought honours, but they came to him in full measure in degrees from the Universities, honorary membership and gold medals from many of the Academies and most of the geographical societies in all the continents. He never rested on his laurels though his nature mellowed and his views were less aggressively enunciated as time went on, and when he died he left few enemies and many sincere friends.

HUGH ROBERT MILL