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.

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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. XIV. NEW YORK, DECEMBER 20, 1889. NO. 359

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ONE OF THE DISADVANTAGES of a popular form of government and of thorough democracy, recognizing absolute equality of all citizens, whether rich or poor, wise or stupid, familiar with business or ignorant of all its forms, is illustrated by the fact that the current technical journals are describing an ironclad "designed" by a distinguished lawyer, who happens to be a member of Congress and of the Naval Committee of the House of Representatives. It would seem that this distinguished lawyer has thought himself, and has been thought by his colleagues, competent to plan what, in its highest form, is the very culmination of scientific knowledge, of engineering talent, and of the mechanic's inventive power. In other countries it is supposed, both popularly and by the officials of governments, that such a construction could only be safely attempted when the designs have been prepared by engineers and naval architects of the most exceptional experience, and who have shown by their works that they possess those combinations of talents (vastly more rare than those of the successful general) which are essential, as has been supposed, to highest perfection of construction. It would sooner be proposed, in any other country than the United States, to intrust the life of a sick man to the care of an uneducated laborer of the docks rather than to that of an educated physician, as to place in the hands of a non-professional the planning of structures which are expected to cost millions of dollars, to illustrate the grandest results of modern engineering, and protect the interests and the honor of a great nation.

The story, if told abroad, will undoubtedly be received with absolute incredulity, as one of those incomprehensible American "jokes" which the average European mind can never hope fully to appreciate; but, were it believed, the average American can probably as little conceive the astonishment that it is likely to awaken. The conceit of the lawyer, turned engineer and naval architect, who could imagine himself fitted for performing the work of a member of another profession; the social, and especially the official, customs that could make such a thing possible; the quietness with which the proper departments and officials could thus permit themselves to be set aside while an amateur undertakes their work; the even more extraordinary attitude of the committees of Congress, of Congress itself, in looking on with indifference while this curious and remarkable phenomenon is being exhibited, and actually, as is reported, voting the million dollars and a half required for the still more remarkable experiment in the inversion of the commonly accepted principles of business, — would appear, then, about equally extraordinary and incredible. In fact, it would seem quite as incredible to some of our own citizens, were it not for the fact that the name of the distinguished amateur is given, and the details of his proposed construction are presented in full.

Our only explanation of this singular incident seems to be suggested by the extent to which details are given in the specifications published, which indicate, that behind the great lawyer, and hidden by his grander proportions, is somewhere a naval architect who is too modest, or who, for some more inscrutable reason, either does not care or does not dare come into view as the responsible designer of this expensive toy. Could it be possible that the whole performance represents the catering of a bureau of the Navy Department to the political friend relied upon to promote its interests or those of its officials in Congress? If this be the case (and we would not like to believe it, suggestive as the circumstances are of such an explanation), the danger to the interests of the government and of the people; the injury to the reputation of the constructive bureaus of the Navy Department and to that of the secretary of the navy; the compromising of the unquestionably able and distinguished lawyer who is the victim of this scheme, and who must appear before the world, at home and abroad, as enormously conceited and equally unwise, — should promptly lead to the revelation, by the officials concerned, of the real state of the case. The people of the United States cannot afford to hand over a million dollars and a half to an amateur, or to risk its success in battle, and its honor on the sea, in any such wild experiment; much less can it afford to place in official position men who have so little knowledge of the first principles of ordinary business.

THE CONTOURED MAP OF MASSACHUSETTS.

FIVE years ago the United States Geological Survey and the Commonwealth of Massachusetts entered into an agreement concerning a topographic survey of the State, the results of which are now gradually coming before the public. The field-work was completed two years ago. A number of the inch-to-a-mile, contoured, quarter-degree sheets have been engraved, and proofs have been struck off for use in the survey. It is to be hoped that they may all be soon published by the State, and placed on sale at the cost of printing. New Jersey has reached this desirable stage, and its invaluable atlas of twenty sheets can now be bought for twenty-five cents apiece, or five dollars for the entire set.

The map of Massachusetts here referred to more particularly is in four sheets on a reduced scale of about four miles to an inch (1: 250,000), with contours every hundred feet. The irregular shape of the State gives the map an unsatisfactory form, that will be

remedied when Connecticut and Rhode Island are added to it, as they may be in a few years; the field-work being completed for Rhode Island, and well under way for Connecticut. The water is printed in blue; the contours, in brown; the names, boundaries, railroads, and meridians and parallels, in black. The map is a handsome piece of work, but it is questionable if a finer effect could not have been produced by using a dark gray to indicate the cultural work; for the black is in too great a contrast with the rest to give satisfaction to the eye.

The larger physical features of the State are brought out with much clearness. The gradual ascent inland from the coastal lowland to the uplands can be traced quantitatively now for the first time on a map. The upland surface is, to be sure, greatly broken by valleys, but the general accordance of summit altitudes and their progressive increase westward are so well marked that they are best interpreted as remnants of an old lowland, nearly plain, — a "peneplain," as it might have been called, — now moderately elevated and inclined eastward, and much worn by subsequent valley-cutting. Very few hills rise distinctly above the surface of the old peneplain; Blue Hills near Boston, Wachusett between Worcester and Fitchburg, and Greylock in the north-western corner of the State, being the most conspicuous examples of such forms. The mountains of Berkshire are generally but little higher than the expanded surface of the plateau next eastward, and have gained their present bold relief by the wasting-away of the limestone valley floor. In the same way the trap ridge of Mount Tom and the conglomerate mass of Mount Toby stand above the floor of the deep and broad Connecticut valley that has been excavated by this ancient river in the soft triassic shales.

The contrast of form between upland and valley gives corresponding contrast in the villages built at high and low levels. Hubbardston, Petersham, and Royalston on the central plateau, east of the Connecticut valley, stand just above the contour line of 1,000 feet. Blandford, Worthington Corners, and Heath, on the western plateau, are over 1,500 feet. The hills rise little above the open country far and wide around these airy settlements, but the valleys are sunk deep below them. All the larger villages, and most of the factories of the plateau region are in the valleys; but the shoe-shops climb to high levels in Spencer and North Brookfield. The railroads follow the valleys as far as possible, and have no high bridges; this being characteristic of railroad construction on an upland so far consumed by river-work. In western Pennsylvania and New York, where the upland is more continuous and the valleys correspondingly narrower, many railroads run on the high ground, and then have to cross the river-trenches in lofty viaducts.

The wide valleys of Berkshire and the Connecticut River, opened on weak rocks, are cultivated in broad, smooth fields. The narrow transverse valleys of the adjacent plateaus, cut across the hard rocks, have steep rocky slopes and mere strips of gravelly bottomland. The Deerfield, Westfield, Miller's and Quaboag Rivers show these features most distinctly, as any traveller on the Fitchburg or Albany Railroad may observe. The western plateau is drained in a curious fashion by streams that rise close to its western margin at heights above 2,000 feet, and traverse its entire breadth in direct or oblique courses to the Connecticut valley. Its western slope into the Berkshire valley is very abrupt. This suggests that the Berkshire limestones were not so widely exposed on the surface of the old peneplain as they are now; and that then there was no master-stream upon them, such as the Housatonic now is. If this be correct, we must picture the drainage of the old peneplain-lowland as flowing eastward from the western border of the State to the Connecticut valley, and must regard the Housatonic as a capturing stream that grew northward by head-water gnawing, after the old lowland was raised to something like its present height. The short steep ravine streams that now drain the western slope of the plateau follow inverted courses to the Housatonic; and the divides that separate them from the Connecticut tributaries must be unstable, and slowly migrating to the eastward. A walk along the margin of the plateau, past the heads of these ravine-streams, ought to detect the characteristic consequences of such migration in the form of the lateral secondary valley, that have been recently diverted from eastward to westward outlet; but the presence of drift in this region may complicate matters so far as to render such analysis impossible.

The presence of ponds and lakes is the most perceptible consequence of glaciation. The eastern part of the State is perceptibly blued over by them, but on the higher uplands they are relatively rare.

The separate quarter-degree sheets of larger scale, about fifty of which will be required to cover the State, will receive special notice when they are completed and published. W. M. D.

BOOK-REVIEWS.

Aspects of the Earth: A Popular Account of Some Familiar Geological Phenomena. By N. S. SHALER. New York, Scribner. 8°. $4.

THIS is a superb reproduction in book form of the excellent papers by Professor Shaler, that recently appeared in *Scribner's Magazine*. There are sixteen full-page illustrations, besides nearly a hundred in the text, the most of them copies of photographs in the finest and most faithful style of wood-engraving. These transcripts from nature the author believes to be more helpful to the general reader than diagrams that require a schooled eye to apprehend.

The topics of the chapters are "The Stability of the Earth," "Volcanoes," "Caverns and Cavern Life," "Rivers and Valleys," "The Instability of the Atmosphere," "Forests of North America," and "The Origin and Nature of Soils." It is a good selection of themes that at once possess a scientific interest and a popular and practical bearing; all, in fact, relating to the surface of the earth or to phenomena more or less familiar to the public. The author has made it his special purpose, in his own words, to choose subjects that "commend themselves to the attention of intelligent people," and "show the relation of natural forces to the fortunes of man."

The first chapter offers a satisfactory explanation in general of earthquakes, though not emphasizing and illustrating the effect of cumulative tension in the earth's crust, which might be compared to that which is indicated by the cracking sounds of a stove-pipe under the expansion of heat, or of a house under the contraction of extreme cold. There is a full treatment of the facts in regard to earthquake regions in the United States, especially as connected with undisturbed pinnacles of rock and poised bowlders as indices of long periods of rest. These may be admitted as proofs of the absence of great earthquakes, but are hardly to be regarded otherwise, inasmuch as a pinnacle, a wedged bowlder, or a "rocking stone" might endure a good deal of oscillation.

Volcanoes are referred to the superheating of water everywhere permeating the crust to the amount of twenty per cent or more, — a simple solution that is a relief to one's mind after all the theories about descending sea-water, lakes of fire, and what not. Caverns and cavern life, rivers and valleys, are treated with the freshness of statement and illustration that characterize the entire volume; and while a theoretic item still under discussion is sometimes assumed as fact, there is, for example, a candid remark that cave-life exhibits modifications that cannot be caused by the competitive struggle of existence, — an impartial remark in the noble spirit of Darwin himself. The natural bridges, as that of Virginia, are explained as remains of caverns. The cañons of the West are well accounted for, and the cutting of rivers across mountains, also, but in a way that would have been helped by the very apt illustration (in a United States geological report) of a saw-log slowly rising against a horizontal saw.

The advocates of forest conservation have an ally in Professor Shaler, who clearly sets forth the evils of denudation. It would appear, however, that the destructive process goes on mostly in wild districts, and that long settlement of a district tends to restore, and even to create groves where they were not. This last tendency is strikingly manifest on the prairies in a few years after occupation, and a manifestly changed climate follows. The loss of a rich top-soil by washing, after the plough has broken up the original protecting turf, is an evil that needs more attention. Is it not possible to check this in a measure by so running the furrows that these shall not be channels of waste, and to further avoid this