inapplicable. How absurd, then, to claim that the ancients had the same notion in regard to rains following battles as that which prevails at the present day. We might well question, indeed, whether there was any such idea prevailing among the ancients as that to which Plutarch alludes, as a single and unsupported statement by one writer alone is not very conclusive evidence; but admitting that he may have spoken advisedly on the subject, it is plain that it was not a "common thought" with that of the moderns, and all reasoning against the concussion theory based on it must fall to the ground.

The second point in Professor Hazen's article to which I wish to refer is the wholly unwarranted assumption that all, or nearly all, the battles of our late war which I have not shown in "War and the Weather" to have been followed by rain, were not so followed. On a par with this is the violence he does to history in assuming that the 2,200 battles which he says were fought during that war were, on an average, as severe as the 158 mentioned in my book. The greater part of the 2,042 which he says I do not mention could have been nothing more than skirmishes. The most remarkable thing about Professor Hazen's article is that although he has read my book he pays no attention to any of the explanations or arguments I make. I explain the difficulty, from want of records, of getting reliable information in regard to the weather following the land battles that were fought, and he coolly proceeds to count all those not proved to have been followed by rain as belonging to the other side. I give a reason why we should not expect skirmishes to produce rain, and he counts them all in as if one such, not followed by rain, furnished as good evidence against the theory as a great battle followed by heavy rain furnishes for it. By this cheap method of figuring he makes out that only seven per cent of the battles were followed by rain. What weight has such an argument against the fact that all the great historic battles of the war, so far as reliable information can be obtained, were followed by heavy rains?

Professor Hazen argues that the influence of explosions could not extend twenty-four hours, for the reason that the current subjected to it "is borne along at the rate of 20, and, in the higher strata, at 30, 40, 50, and more, miles per hour, so that the specific influence from them will be carried at least 500 miles away in twenty-four hours." Now the learned professor cannot be sure of his ground here unless his knowledge of all atmospheric movements and of processes in the formation of storm centres is infallible. It is generally understood that our Weather Bureau claims such infallibility, though Professor Hazen in another part of his article seems to disclaim it, and though some of the unscientific laity are inclined to believe that the whole orthodox theory of rain-formation will yet have to be remodelled.

Professor Hazen does not think my explanation of the point under consideration worthy of notice, as he does not refer to it. This explanation is as follows. The storm centre may remain stationary over the place where the firing takes place until the storm is fully established, because it is caused by the mingling of two currents of air flowing in nearly opposite directions. At the commencement, the new action set up is confined to the upper stratum of the lower current and the lower stratum of the upper current. These, mingling together, set up a rotary motion, but as a whole, the air partaking of this motion moves neither very far east nor very far west, being acted on by opposing forces, one tending to carry it eastward and the other westward. When, however, large enough volumes of air become involved in the motion to produce rain, the storm will move eastward along with the warm current. As this is not orthodox philosophy as held by the scientists of the Weather Bureau, Professor Hazen will have none of it. But perhaps he will remember cases in which storm centres have lingered long in one place, and, if so, this fact alone furnishes a sufficient argument in refutation of his own

There is only one other point in Professor Hazen's article that I wish to notice, and that is this: he says, "One thing seems very evident, that absolutely no rain can be obtained out of a dry atmosphere." This is an old argument the extreme tenuity of which I have often shown. Professor Hazen well knows how I have met it by showing that there are probably at all times sufficient quantities of aqueous vapor flowing above us in air currents to make rain. He cannot refute my argument on this point, nor I believe, show that there is anything unreasonable in it, therefore he very wisely ignores it. My argument is based on the absolutely certain fact that as much water must come to us from the ocean as runs into the ocean from our rivers, and on the further fact, demonstrated by Professor M. F. Maury, that most of the vapor that forms our rains comes to us from the Pacific Ocean. Coming from the Pacific, it necessarily comes in air currents which flow above the mountains and high above the arid regions of the West. Meteorologists will come nearer a solution of the problem of rain-production when they recognize the fact that it is not the moisture in the lower air east of those mountains and arid districts that gives us our rains, but that it is the rains formed mainly by the condensation of the vapor from the Pacific that cause the moisture.

EDWARD POWERS.

Delavan, Wis., Sept. 26.

BOOK-REVIEWS.

Schliemann's Excavations. By DR. C. SCHUCHHARDT. Trans. from the German by Eugénie Sellers. New York, Macmillan. $4.

THE object of this work is to give a succinct account of Dr. Schliemann's discoveries, sufficient for most students of the subject, and presenting the net results in a single volume. The reports heretofore made of the excavations, chiefly by Dr. Schliemann himself, are contained in several different books published at intervals, none of which contains a complete account of the whole work, so that a good summary was much needed; and such a summary Dr. Schuchhardt, with the approval of Schliemann himself, has here given us. He has also taken account of the discoveries that have been made by others, especially those of the Greek Archæological Society, while Drs. Schliemann and Dörpfeld have given in an appendix reports of their excavations at Hissarlik last year; so that we get a complete account of all that has been done. Mr. Walter Leaf contributes an introduction in which he discusses certain points of interest, expressing in some cases somewhat different views from those of Dr. Schuchhardt. Dr. Schliemann's work was so emphatically the result of his own personality, and his life was in itself so interesting, that Dr. Schuchhardt very properly begins his volume with a biographical sketch. Schliemann was the son of a clergyman, and received excellent schooling in early boyhood; but, owing to misfortunes in the family, he was obliged to leave school and go to work to earn his living. For several years his life was hard; but at last a firm in Amsterdam detected his commercial abilities, and from that time his advancement was rapid. The foundation of his large fortune seems to have been laid in Russia during the Crimean war; but it was not until several years later that he was able to retire from business with a fortune sufficient to carry on the archæological researches which had been the dream of his life. The first sod was turned at Hissarlik in 1870, and, as the excavations were continued with some interruptions until the great explorer's death last year, they covered a period of twenty years.

Of the importance of the work thus done there can be no doubt; it was, as Mr. Leaf remarks, nothing less than the creation of prehistoric Greek archæology. Before Schliemann's excavations began, most scholars doubted the story of the Trojan war, maintaining that it was a poetic fiction and that the personages represented in the "Iliad" and "Odyssey" were mythical, and there was great uncertainty as to the site of Troy itself. Dr. Schliemann has now uncovered the site of Troy just where Greek tradition uniformly placed it; and, as the ruins show that the city was destroyed by fire, its reduction by siege is highly probable. Thus far only the citadel has been excavated; but the massiveness of its walls prove that it must have been the nucleus of a large and powerful city, though the utensils and ornaments that have been found indicate a lower stage of civilization than that of the prehistoric cities on the European side of the sea.

It is at these last-named cities, indeed, and especially at Mycenæ and Tiryns, that the most important discoveries have been made. Tiryns, which stood nearest the sea, was first excavated, and here Schliemann first had the assistance of Dr. W. Dörpfeld,

who had previously been engaged on the German excavations at Olympia. The remains uncovered at Tiryns consist of a citadel and palaces almost identical in plan with those of Troy; and these features are repeated with some variations at Mycenæ. It was at this latter place, however, which Homer has celebrated as the capital of Agamemnon's empire, that the greatest variety of remains were found, and Dr. Schuchhardt has devoted nearly half of this book to a description of them. There are at Mycenæ two different kinds of burial places, the bee-hive tombs outside the citadel (so called from the form of the principal vaulted chamber), and the shaft graves within the citadel, which are simple pits sunk in the ground and covered by a slab. The bee-hive tombs, which belong to the later ages of the Mycenæan civilization, have long since been rifled of their contents; but the shaft graves were found to contain remnants of corpses, together with a great variety of utensils, ornaments, and weapons which reveal a high order of workmanship and artistic skill. The shield of Achilles and other works of art spoken of in the "Iliad" have been regarded as extravagant creations of the poet's fancy; but here at Mycenæ we find objects of precisely that character — goblets, diadems, and even shoulder-straps of gold, artistic pottery of various kinds, and sword blades and daggers inlaid with figures of men and animals made of gold, silver, and other rich material. Similar objects have been found in various parts of the Grecian mainland, and on the islands of the Ægean, so that the civilization they betoken must have been widespread; but where its centre was and what particular race were its representatives are questions still unsettled. The period of its prevalence is still more uncertain, but is vaguely assigned to the interval between 1500 and 1000 B.C.

These questions, and others of equal importance, to which Schliemann's discoveries have given rise, have been discussed by Dr. Schuchhardt in his concluding chapter, and by Mr. Leaf in his introduction. We want to trace the connection of the Mycenæan civilization with the nations of the east and with the later developments among the Greeks themselves, and also to find out the relation between that civilization and the one presented in the poems of Homer. The resemblances between the life revealed to us in the Mycenæan remains and that depicted in the "Iliad" and "Odyssey" are numerous and obvious; but there are also discrepancies which our present information does not allow us to account for, and which seem to show that the poems date from a later age than that of the Mycenæan prime. The most important of these differences is in the mode of disposing of the bodies of the dead, which at Mycenæ were buried, whereas in the "Iliad" and "Odyssey" they are burnt on the funeral pyre. The figures portrayed on some of the ornaments and weapons at Mycenæ also show a mode of dress quite different from that described by Homer; and it is evident that we must have further information before the difficulties thus presented can be cleared up. Meanwhile, we cannot withhold our tribute of admiration and respect for the man who has taught us so much about the life and civilization of those early ages.

Stones for Building and Decoration. By GEORGE P. MERRILL. New York, Wiley. 8°. $5.

THE author of this work is curator of geology in the United States National Museum, and he has succeeded in treating the subject in a way that will make the volume of especial interest to architects and engineers without lessening its value to the student, or, in fact, to any person interested, whether from an economic or a purely scientific standpoint. Though the subject is presented mainly from an American point of view, the volume includes descriptions of all stones of importance found in the American market, from whatever source they may come.

The first chapter gives a brief but very interesting history of stone-working in the United States. The succeeding chapters of Part I. are devoted to the geographical distribution and the chemical and physical properties of such stones as are used for general constructive and decorative purposes.

A systematic description of the rocks, quarries, and quarry regions is given in Part II. Each variety of stone is taken up in turn, its composition, origin, structure, and general adaptability for any form of work discussed, and the resources of each State and Territory described.

The different methods of quarrying and working, the machines and implements used in such processes, the weathering of building-stone, the selection of stone for building purposes, and the methods employed for the protection and preservation of stone from the ravages of time, are treated of in Part III. Part IV. is made up of appendices, including tables showing the qualities of stone as indicated by their crushing strength, with ratio of absorption, and chemical composition; a table on the prices of stone and the relative cost of dressing, and a list of some of the more important stone buildings in the United States and the dates of their erection. The volume concludes with a bibliography of building-stone and a glossary of terms. It is illustrated with eleven full-page plates and several figures in the text.

Mr. Merrill has made excellent use of the opportunities afforded him by his position in the National Museum to gain a thorough knowledge of his subject, and has given us a most exhaustive and comprehensive treatise on an interesting topic.

AMONG THE PUBLISHERS.

A NEW feature has just been introduced in the *New England Magazine*. It is, "In a Corner at Dodsley's," a gossip about writers and books, by Walter Blackburn Harte.

— Macmillan & Co. have been appointed special agents in the United States for the books published in London by George Bell & Sons, including the well-known collection of standard literature issued under the name of "Bohn's Libraries."

— In *St. Nicholas* for October is a short letter from Meredith Nugent explaining where grasshoppers and crickets tried to hide their ears until Sir John Lubbock rummaged them out for us. It would be a knowing boy indeed who would not be surprised to find a grasshopper's ear on his fore-leg.

— Among the contents of the *Engineering Magazine* for October are the following: "Progress in Aerial Navigation," by O. Chanute; "One View of the Keely Motor," by T. C. Smith; "Railroad Building on the Texas Frontier," by G. W. Rafter; "Marble Quarrying in the United States," by E. R. Morse; "The Conditions Causing a Tornado," by Professor H. A. Hazen; and "The Future of Our Wagon Roads," by W. Claypoole.

— The October number of *The Alienist and Neurologist* contains a paper on the subject of "Traumatic Neuroses and Spinal Concussion," another on "The Insanity of Torquato Tasso," an illustrated study of "Criminals and Their Cranial Development," "The Weight of the Brains of the Feeble-Minded," and "A Study of the Heredity of Inebriety." The respective writers are Guiseppe Seppilli, W. W. Ireland, G. Frank Lydston, A. W. Wilmarth, and T. L. Wright. Besides there are the usual selections, editorials, hospital notes, reviews, etc.

— With the issue of the second number of the *Journal of Comparative Neurology*, the editor, C. L. Herrick, indicates the sphere which it will attempt to occupy. The *Journal* offers to investigators an avenue for immediate publication with full illustration, there being no restrictions as to size or frequency of the fascicules. A feature is the list of current neurological literature, which it is hoped may be made complete and accurate, and in connection with this are given synopses of the more important papers. Critical estimates or reviews of such papers, however, will usually be offered only in connection with special *résumés* or digests of given topics. While especially devoted to original investigation, each volume will contain semi-popular, historical, and controversial matter which may serve to adapt the results of the technical work to the general reader. While it is inevitable that much of the space will, for the present, be occupied with anatomical and morphological matter, it is hoped to devote an increasing amount of attention to physiological problems and to the accumulation of data which may serve, in however indirect a way, as materials for a comparative psychology. All observers are invited to contribute facts having any scientific bearing upon the nervous or psychical activities of animals. It is the intention soon to inaugurate a series of articles to constitute, when completed, a laboratory guide to the study of the nervous system, to which the attention of