proper time and place. In the mean while, the many kindly, encouraging, and sometimes flattering words of approval which I have received from persons who have read the 'advance sheets' you criticise, and whom I believe to be specially qualified to judge of a work on this subject, will sustain me in the labor of completing it as begun.

You have criticised a work projected on one plan, and to fill a demand amongst irrigators and persons, from one cause or another, interested in the details of the subject, as though it purported to be on another plan, and for general circulation and sale. When the first volume is published, I hope to make this clear to you. It has always been the intention to bring the more important matter of general interest in this report within the compass of one moderately sized volume, to meet the demand of which you speak. This was the subject of a recommendation to the legislature, in my biennial report transmitted with the advance sheets of the final report; and I am glad to tell you that there will be submitted to the legislature at its next session (January, 1887) a concise and readable report for general circulation, in addition to the more voluminous books of reference.

WM. HAM. HALL,
State engineer, California.

Sacramento, Cal., Dec. 22.

The Davenport tablet.

As the evidence in regard to the limestone tablet indicates that it was a plant made to deceive the members of the Davenport academy, we are led to inquire whether the authenticity of the shale tablets rests on any better foundation. Accepting the statements in regard to their discovery as published in the Proceedings, and referring to the excellent albertypes on plates 1, 2, and 3, vol. ii., we notice the following facts calculated to arouse suspicion: —

On the so-called 'cremation scene,' plate 1, vol. ii., are three Arabic 8's, one so much like that on the limestone tablet as almost to lead to the belief that the two were made by one hand. Moreover, there are, as admitted by the finder (vol. ii. p. 223), four other characters on the latter identical with characters in the 'cremation scene.' This links the two so closely together as to induce the belief that they belong in the same category, and hence that the conclusion reached in regard to the limestone tablet must apply to all the shale tablets, as the latter were found together in the mound known as No. 3 of the 'Cook farm group.' It is also stated in the Proceedings (vol. ii. p. 223), that the bird-figures on the limestone tablet "have each a bit of quartz crystal set in for an eye, *like the eyes of the animal figure from mound No.* 3, . . . and, like those, they are held in place by a white cement of some kind." This animal figure was found in the dirt thrown out of mound No. 3, from which the shale tablets were obtained (vol. ii. p. 256). It is therefore almost impossible to avoid the conclusion that all must stand or fall together.

No. 3 appears to have been a double mound, the southern portion only having been explored in 1874; the northern part (in which the shale tablets were found), not until 1877. According to Dr. Farquharson (vol. i. p. 119), the part first opened contained no layers of shells or stones; and no mention is made of an excavation or grave in the earth beneath, nor does the figure (No. 3, plate 2, vol. i.) show any stratification or grave. Turning to the figure of the same mound (vol. ii. p. 92), we find both strata and grave represented in this southern portion. Mr. Gass, in his subsequent account (vol. ii. p. 92), says some errors were made in the first description and illustrations; but Dr. Farquharson says his description was made from Mr. Gass's statements, and partly from personal observation on the spot (vol. i. p. 118). Attention is also called to the fact that the skeletons of the intrusive burial over the southern grave, as well as the three in it, were whole and undisturbed; while over the northern grave the human bones of the intrusive burial were scattered through the soil, and with them the fragments of a brass ring; while in it, beneath the shell stratum, were "fragments of human bones and small pieces of coal slate or bituminous shale" (Mr. Gass's account, Proceedings, vol. ii. pp. 95, 96). In the plan of the mound (fig. 9, vol. ii. p. 93), a single skull is represented in this northern grave where the tablets were discovered. This condition of the contents is scarcely consistent with the idea that there had been no previous disturbance of this part of the mound.

The tablets were not discovered until five o'clock in the afternoon (Jan. 10), "*covered on both sides with clay, on removal of which the markings were for the first time discovered*" (vol. ii. p. 96), yet we are informed which side of each was upward as they lay in their resting-place.

It may not be out of place to call attention to the fact that nearly all of the letter characters of the 'cremation scene,' as represented on the albertype, may be found on p. 1766 of Webster's unabridged dictionary, edition of 1872, or any subsequent edition, where the letters of the ancient alphabets of the old world are figured. A few, it is true, are reversed, and in some instances the form is slightly varied; but the resemblance in most cases is very strong. The reader can make the comparison for himself; but I would call his attention to the fact that in the upper of the two transverse curved lines, near the right-hand end, the two forms of the 'Gallic' *O appear together*, just as given on the page of the dictionary. He will also observe that in some instances a number of characters in close relation on the tablet are found near together on the page of the dictionary; here, also, we find the 8 so often used on the tablets. A photograph or the albertype must be used for this comparison.

It is true, letters of almost any form can be found on this page, but it would be an anomaly to find a brief ancient inscription consisting of letters from half a dozen alphabets of widely different ages, and partly of the angular and partly of the cursive types. That this is true of this inscription, is readily seen by the suggested comparison. Dr. Seyfforth, in his attempt at an explanation, published in vol. iii. of the Proceedings, was forced to go to half a dozen or more alphabets to find the letters given in this single short inscription.

The tablet represented in plate 3, vol. ii., and known as the 'calendar stone,' indicates, beyond any reasonable doubt, contact with people acquainted with the twelve signs of the zodiac. This is admitted by Dr. Farquharson (vol. ii. p. 109) and Dr. Seyfforth (vol. iii. p. 77), and necessarily forces us to the conclusion that it is post-Columbian, or the result of contact, possibly at some very ancient date, with people of the eastern hemisphere.

The fact that the diameter of the inner circle is

exactly two inches, of the next three and a half inches, and next to the outer one five inches, 'certainly has a modern look,' as Dr. Farquharson truly remarks (vol. ii. p. 109). The reader is doubtless aware that among the illustrations in the latter part of the dictionary mentioned is a figure of the zodiac with four rings or zones (p. 1704).

These facts, gathered from the statements and figures published in the Proceedings of the academy, are presented for consideration by our antiquarians. The question of the authenticity of these relics should, if possible, be definitely settled, as they have, if genuine, an important bearing on some troublesome archeological problems. CYRUS THOMAS.

Dr. Otto Meyer and the south-western tertiary.

In the December number of the *American journal of science*, Dr. Otto Meyer publishes what purports to be a reply to criticisms on his attempt to prove that all observers previous to himself have been mistaken as to the broad facts of the succession of the tertiary strata of the south-western states, and that what Lyell and the American geologists have found to be the top is really the bottom, and *vice versa*. This is the third of three lengthy papers devoted by him to the same theme; and one would naturally suppose that one who is allowed to occupy so much space in a scientific journal of such high standing had at least some new observations of his own to communicate, upon which to base so sweeping an assertion; and that he had studied and candidly considered the published work of his predecessors. His second paper showed the extremely limited extent of his own observations, and his failure to even read, much less study, the literature of the subject, from which he quoted only disjointed sentences, selected to suit his ideas. The three articles in the October number of the journal, from three observers whose observations he calmly sets aside as unworthy of confidence beside his own superior lights, expressed their astonishment at the cool assumption, grounded on such a slender basis, that pervades Dr. Meyer's methods and assertions; and they gave a few of the simple facts that irrefragably prove the correctness of the recognized succession of formations.

In his latest article, Meyer goes even farther than before. He not only denies categorically that stratigraphy alone, including dips, can give any certainty as to the natural succession of the formations, unless we could 'follow the strata foot by foot;' but he proceeds to pick out from the work of myself and others such portions as leave room for doubt in their interpretation, and upon these constructs and supports his fanciful fabric. He simply ignores facts pointedly stated, that completely overturn his whole scheme; as, for instance, the paragraph in which I state the fact, verified innumerable times, that the sandstone of the Grand Gulf group is found "*overlying* the Vicksburg strata generally along the southern line of the Vicksburg group." In the face of this statement, which, if he had chosen, he could easily have verified near the very localities examined hy him at Jackson and Vicksburg, and of the universal and patent fact that all the divisions of the Mississippi tertiary disappear beneath the drainage-level with a southward or south-westward dip, he presents for acceptance by guileless American geologists a section in which the Grand Gulf rocks are made the base of the tertiary. In referring to the re-appearance of the Jackson shell bed at one point on the Chickasawha River, southward of the main belt, he entirely overlooks the fact that it is there directly overlaid by the most characteristic 'orbitoides limestone' of the Vicksburg group, under which it disappears to southward.

Similar methods are pursued in other cases, varied with elementary platitudes concerning the general value of lithological and paleontological characters.

I cannot consent to cumber the columns of this or any other journal with a detailed refutation of assertions founded upon such methods of procedure. Whenever Dr. Meyer or any one else shall come forward with any thing tangible that seems incompatible with the results deduced from my elaborate researches in the south-western tertiary, I am ready to discuss the issue; but I am unwilling to waste time, paper, and ink upon the flimsy but elastic structure which Dr. Meyer has, in the face of known facts, evolved from his inner consciousness. Fortunately, the geological area which he attempts to turn wrong side up is now again under examination by competent observers, who have no hobby to ride, and whose results, I have reason to hope, will be made public before many months. In the mean time, I commend Dr. Meyer's methods to the attention of ambitious young geologists as a conspicuous example of 'how not to do it.' E. W. HILGARD.

Berkeley, Cal., Dec. 15.

A new meteoric iron from West Virginia.

In your last issue appears a communication entitled 'A new meteoric iron from West Virginia,' in which a meteorite said to have been found near Charleston, Kanawha county, W.Va., is described.

The writer is evidently not aware that this same piece of iron was described in a paper read at the meeting of the American association for the advancement of science, held at Ann Arbor in August last. The transactions of that session are not yet published, but the title of the paper above mentioned was noticed in *Science*, vi. No. 136, p. 222, Sept. 11, and in the *American journal of science*, xxx. No. 178, p. 326, October, 1885. No mention would be made of this oversight if the iron were correctly described, but several inaccuracies demand attention. When the paper was prepared, the only information at my command was that furnished me by Dr. H. G. Torrey, and was simply this: that the iron had been sent to him from Charleston, Kanawha county, W.Va., by Major Delafield Du Bois, who wished to have it assayed. The major had received it from parties who thought it precious metal of some kind.

Since this first report was made, Major Du Bois has looked up the matter more thoroughly, visiting the true locality, and making many inquiries. At a meeting of the New York academy of sciences, Nov. 30, the writer read a paper, announcing the full particulars of the finding. Owing to press of matter, this paper will not appear in the *American journal of science* until February, and in the New York academy proceedings as customarily published. I then announced the true locality to be Jenny's Creek, — a fork of the Big Sandy River, 15 miles from the Chatteroy railroad, 35 miles from Louisa, Kentucky, and 38 miles from Wayne Court-house, Wayne county, W.Va., not Kanawha county, as formerly announced. Your correspondent says, "Of its chemical constitution and the circumstances of its fall, we are quite ignorant." He further asserts that