relics of this first-known fish have hitherto been found. Some excavations, made of late in the passage beds between the old red sandstone and the Ludlow rocks at Ledbury in Herefordshire, have afforded a fine series of the fish found in the 'bone-bed' and passage rocks. Among them, Mr. Piper has obtained plates and cephalic shields of Scaphaspis, Pteraspis, Cyathaspis, and Auchenaspis. Auchenaspis has been found perfect; and much more of the structure of these early fishes has come to light. But there is a good deal of difference in the geological horizon of these fish at Ledbury and that of the Scaphaspis at Leintwardine. The lower Ludlows appear in great thickness at Ledbury, but hitherto they have not presented us with fish. W. S. SYMONDS.

The Camp, Sunningdale, July 31.

Depth of the glacial submergence on the upper Mississippi.

I desire to call attention to certain facts which appear to me to indicate a submergence of even the highest land at this point, which, it may be said, is near the centre of the driftless area. I am not aware of their having been previously noted.

That which first called my attention to the matter was the discovery that the layer of broken stone which covers the undisturbed rock on the top of the bluffs to a depth of four to six feet, contained numerous shells belonging to several species of pulmoniferous gasteropods. I have thus far obtained specimens of the following species (the identifications were kindly furnished by Mr. Sanderson Smith of the U.S. fish-commission): Helicina acculeata Say, Lymneae columella Say, Helix (Patula) attenuata Say, Helix (Helicodiscus) lineata Say, Helix (Patula) striatella Anthony.

The condition of the shells, and the positions in which found, even more than the mere fact of their occurrence, indicate submergence by giving strong evidence of wave-action, evidence of which is also seen in the general order and arrangement of the stones composing the layer, especially in the remarkable evenness of its upper surface. Overlying this layer of broken stone, and sharply distinguished from it, is a layer of earth from two to four feet thick, destitute of either stones or shells, and having all the characteristics of the loess, which, in unmistakable deposits, reaches a height of two to three hundred feet above the Mississippi. As the bluffs at this point reach to about five hundred feet above the river, a submergence to at least that extent is indicated, — a conclusion which is sustained by other facts, which I need not now refer to.

G. H. SQUIER.

Trempealeau, Wis.

THE VISIT OF THE BRITISH ASSOCIATION.

ALTHOUGH the British association does not meet officially on our own soil, we may yet regard it as in some sort paying a visit to our neighborhood, and opening up such an opportunity for personal communication between the scientific men of England and America as has never before offered itself. It is true that Principal Grant, as a Canadian by adoption, suggests to the members to be satisfied with Canada on this occasion, "and to leave the United States and Mexico to other and more convenient seasons." He strengthens this suggestion by the statement that the time of meeting of the American association was chosen so as to give the members of that body an opportunity of visiting Montreal, thus correcting the current impression that the object was to make it convenient for the members of the British association to visit Philadelphia. The Canadians may also feel fairly entitled to all the credit which the visit of the association can bring, since so long a journey by so large a body of men would hardly have been seriously considered, but for Canadian enterprise. A proposal was privately discussed among us, a few years ago, to invite the British association to Boston on the occasion of the anticipated exposition of 1883. But, after the exposition was abandoned, no one was so bold as to seriously press the invitation in the absence of any special attraction to second it; and it was left for our neighbors to successfully attack the problem which we had abandoned as hopeless. It is not, however, to be expected that the individual members of the association will be greatly influenced by sentiment in the use they make of their time on this side of the ocean, or that Canadian pride, enterprise, or loyalty, will prevent them from crossing the border. Not even such energy as that of our neighbors, and such glory as that of their dominion, can compensate for the charm of novelty in life and institutions offered the foreigner by such countries as "the United States and Mexico." It may be well worth the while of a studious Englishman to take a long journey to learn from actual inspection what an English province can become under the influence of so energetic a people as those of Canada; but he cannot suppress his curiosity to study the ampler and more varied civilization which his race is working out under political conditions less like those to which he is accustomed. We therefore look upon the present meeting as nearly the equivalent of a visit to our own country, and, in the name of the stu-

dents of science in America, we extend a cordial welcome to the greatest body representative of the intellect of the old world which has ever visited our shores. Did our visitors not represent the most hospitable of nations, we should indulge in bolder assurances of the warmth of the reception they will meet with from all classes of Americans. But those who know what English hospitality is will content themselves with modestly hoping that American hospitality does not fall far short of it, and with remarking that our great railways extend a corporate hospitality to distinguished visitors which is not known abroad.

The sentimental consideration that the visit is one the very possibility of which is a striking illustration of what science has done, will add zest to the occasion. In times past, the idea of a local society choosing a place of meeting across the Atlantic would have appeared as quixotic as can readily be imagined. Indeed, we can but suspect that the project at first presented a little of this appearance to a majority of those concerned, and that a meeting very successful in point of numbers was hardly expected. But the result seems likely to more than realize the hopes of the most sanguine supporters of the project, and it is fitting that the promoters of science should enjoy to the utmost a result which the work of their class has rendered possible.

Circumstances are in several ways favorable for paying us a visit. The time and place of holding the meeting of the American association were especially chosen so as to facilitate the reception of any visitors from the sister-organization who might grace the meeting by their presence. Arriving in Philadelphia, they will find not only our own association, but the electrical exhibition of the Franklin institute. Although the latter cannot be expected to rival the great displays at Paris and Vienna, it will afford a better opportunity than any which has been offered in Europe, for seeing what has been done here in forwarding the utilitarian applications of electricity. Visiting electricians, of whom we may hope for a considerable number, may also expect an invitation to take part in the electrical conference, which is to be conducted under the auspices of the government, and in which the novelties of the exhibition will be made known. Philadelphia is only four hours distant from the national capital, and thus a visit can be made to the collections of the government without any serious loss of time. The division of his time between pleasure and business will be a question for the decision of each individual visitor, to whom the journeys and excursions tendered to the American association will be freely open. He should, however, bear in mind that the colleges and universities are generally in vacation till near the close of September.

Finally, the student of politics and sociology will regard it as fortunate that his visit takes place in the height of a presidential canvass, thus enabling him to study one of the most interesting of political phenomena on the largest scale. If he judges only from the course of newspaper criticism on the presidential parties and candidates, he will doubt what the future has in store for us; but, if he looks deeper, he will see a process of endosmosis, by which, from the huge mass of objurgation, falsehood, and not very elevated humor, political acumen is being infiltrated into the minds of millions of voters. And no one, whatever his politics, need fear the danger of being converted to new principles. Whether he be the most advanced Liberal, or the most conservative Tory, he will have no difficulty in seeing every thing by the light he brings with him, and returning home with all his views strongly confirmed.

LORD RAYLEIGH.

LORD RAYLEIGH, the president of the British association of science for this year, is well known to all Americans who have kept pace with the development of physical science. Although his reputation cannot be called a popular one, yet no student of physical science can well be ignorant of his investigations; and his treatise on sound places him easily in the front rank of writers on a subject of which the