

confined to the notes on animals, birds, reptiles, insects, and the parasitic torments of Brazil, notes on botany and on geology, together with a discussion of the theory of evolution and observations made on protective colouring and mimicry.

With reference to the theory of evolution the author states that he has constantly endeavoured to oppose it, on the ground apparently put forward by theologians many years ago before they knew what the theory really was; and we think that if our author will continue his scientific studies a little longer he will probably find that the arguments he uses against it are really not in point.

*The Colloquial Faculty for Languages.* By Walter Hayle Walshe, M.D. Second Edition. (London: Churchill, 1886.)

THIS is a book full of pleasant gossip round the central idea embodied in its title; hence we have essays on the nature of genius, the conditions regulating colloquial faculty, and the causes of variety of colloquial faculty and faculty for translation.

In the chapter on composition in foreign tongues it is pointed out that the man of science proves now and then well capable of wrestling effectively with the humorist on his own ground of the *littera humaniores*, and gives as an example Herbert Spencer's *exposé* of abounding errors in a passage from Addison quoted by Matthew Arnold, as an example of classical English.

We gather from our author that the English race is not the most gifted with the colloquial faculty, and a remark of Prince Bismarck's is quoted that he had always found that an Englishman who could speak good French was a doubtful character.

#### LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

[The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to insure the appearance even of communications containing interesting and novel facts.]

#### Periodicity of Glacial Epochs

PERMIT me to ask, as a matter of international comity in science, the help of my learned British colleagues in the following matter.

I am just now occupied upon a work treating upon the periodicity of glacial epochs, a question which has already been broached by me in previous writings several years ago. The cause of this phenomenon being attributed by the astronomers, as well as by the majority of geologists, to the displacement of the perihelion, whose cycle is 21,000 years, it follows that, according to the actual position of this point, the ice now covering the Antarctic regions had its maximum of intensity at about the year 1250 of our era. For the same reason, the ice of the boreal hemisphere must have offered at this same epoch its minimum of intensity. Consequently the latter must have been increasing since the close of the thirteenth century, while the former must have been receding. The researches of European geologists must have shown a marked extension of the glaciers of Spitzbergen, Greenland, &c., since the beginning of the fourteenth century, and a recession of vegetation from the latitude of Sicily to the Polar Circle. But we in France are not informed of what has happened in the southern hemisphere since the arrival of the first navigators. I would therefore, in the name of science, beg of any British officers, consuls, or scientific observers who are, or may have been, collecting facts at stations near the South Pole, in Patagonia, New Zealand, Tasmania, and elsewhere, to communicate to me directly, or through your columns, any information they may have upon this subject. I wish to know whether, since the first arrival of Europeans in those regions, the ice-field has shown a recessive movement, accompanied by an inverse tendency of vegetation.

Tarascon, Ariège, June 27

ADOLPHE D'ASSIER

#### Evidence of Man and Pleistocene Animals in North Wales prior to Glacial Deposits

SOME of the results recently obtained during the researches carried on at the Tremeirchion caves under the superintendence of Mr. E. Bouverie Luxmoore and myself, seem to me of so much importance that I have thought it advisable to communicate them, in anticipation of the full report which will be presented to the British Association, especially as an important section is now exposed, and may be examined by any one desiring to do so, which will probably have to be covered before the end of the summer.<sup>1</sup>

In continuing our explorations this year, by means of a grant from the British Association, we found that the Cae Gwynn Cave (described in my paper in the *Quart. Journ. Geol. Soc.* for February last) had come to an abrupt termination in a plateau of Glacial deposits. On further examination it was found that this must have been the main entrance into the cavern when it was occupied by the Pleistocene animals, and that the Glacial beds in and upon it must have been deposited subsequent to the occupation by the animals. As in the other parts of the cavern, the cave-earth at the entrance—a brown sandy clay, contained fragments of a stalagmite floor and of stalactites along with angular fragments of limestone. The bones also occurred at all angles, showing that the contents had been greatly disturbed by water action. The bone earth was covered over at the entrance and for some distance inwards by a few feet of stratified sand, containing well-scratched boulders, and it, as well as the sand, was traced for a distance of fully 6 feet beyond the entrance under the series of Glacial deposits, shown in the section.

In digging outside the entrance, the floor of which is 20 feet below the surface of the field, it was soon found that we could not extend our researches outwards, owing to the nature of the lower deposits, chiefly sands and gravels, without making an opening into the field. By the kindness of the owner, Mr. Edwin Morgan, a shaft was allowed to be dug in front of the opening, about 9 feet across at the surface and over 5 feet at the bottom. This shaft was subsequently widened at the bottom, in consequence of some falls, and the lower part, except at one point, had to be carefully faced with timber. The upper part of the shaft is now much widened and sloped. To make it certain that the Glacial deposits are continuous from the shaft in a westerly direction, I had the beds probed at different points for a distance of about 70 feet; and subsequent examination showed clearly that there is here an extensive terrace of drift reaching to heights of between 400 and 500 feet above Ordnance datum. The section was carefully taken at two different points in the shaft by Mr. C. E. de Rance, F.G.S., of the Geological Survey, and myself, and in doing so we found well-scratched boulders in each of the deposits. Among the boulders found are granites, quartzites, flint, felstones, diorites, volcanic ash, Silurian rocks, and limestone. Silurian rocks are most abundant. It is clear that we have here some rocks from northern sources along with those from the Welsh hills, and the manner in which the limestone at the entrance to the cavern is smoothed from the north would indicate that to be the main direction of the flow. A small but well-worked flint flake was dug up from the bone earth on the south side of the entrance on June 28, in the presence of Mr. G. H. Morton, F.G.S., of Liverpool, and myself. Its position was about 18 inches below the lowest bed of sand. Several teeth of hyæna and reindeer, as well as fragments of bone, were found at the same place, and at other points in the shaft teeth of rhinoceros and a fragment of a mammoth's tooth. One rhinoceros tooth was found at the extreme point examined, about 6 feet beyond and directly in front of the entrance. It seems clear that the contents of the cavern must have been washed out by marine action during the great submergence in mid-Glacial time, and that they were afterwards covered by marine sands and by an upper boulder-clay, identical in character with that found at many points in the Vale of Clwyd, and in other places on the North Wales coast.

The facts obtained seem to me to prove conclusively that man and the Pleistocene animals must have lived in parts of the North Wales area, and have occupied some of the caverns, before the period of the great submergence indicated by the Moel Tryfaen and other high-level sands; hence certainly before the Upper Boulder-Clay was deposited.

HENRY HICKS

<sup>1</sup> Tremeirchion is about four miles from St. Asaph, and less than two miles from Bodfari Station on the Chester Mold, and Denbigh line.