added two others. The first, inserted between numbers one and two of those referred to, reads thus :—

"That, notwithstanding the great advantages which the general introduction of the decimal division of the quadrant for geographic and geodetic co-ordination, and the corresponding expressions for time, is destined to realise, scientifically and practically, reasons eminently sound appear to justify the passing by the consideration thereof in the great measure of unification proposed in the first resolution. Meanwhile, to satisfy at the same time important scientific considerations the Conference recommends on this occasion the extension, in multiplying and perfecting the necessary tables, of the application of the decimal division of the quadrant, at least for the great numerical calculations for which it presents incontestable advantages, even if it be desired to preserve the old sexagesimal division for observations, maps, navigation, &c."

The other, inserted between resolutions six and seven, is as follows :—

"The Conference hopes that, if the whole world is agreed upon the unification of longitudes and hours in accepting the Greenwich meridian as the point of departure, Great Britain will find in this fact an additional motive to take on her side new steps in favour of the unification of weights and measures, by joining the Metrical Convention of May 20, 1875."

The resolution as to the choice of the initial meridian was carried by 22 votes to 4 ; while Mr. Christie, supported by the French delegates, moved the substitution of Greenwich midnight for noon as the point of departure ; this amendment was negatived by 20 votes to 8. Finally, Dr. Hirsch made a motion, unanimously carried, to the effect that the Conference should request the Government of His Majesty the King of Italy to officially communicate the resolutions voted by the assembly to all the Governments, including those not represented at the Conference.

Among other reports read was one by Dr. Hirsch, on the works of precise spirit levelling carried out in different States during the last three years. Col. Perrier, one of the French delegates, recommended that those works should be continued, so as to connect the Atlantic with the Pacific, and to ascertain the difference of level between those two oceans. General Ibanez read a report on tidal studies with the mareograph. An interesting discussion followed as to the best means for obtaining the most exact results, and a proposal made by General Ibanez to exclude observations taken at times when the sea is agitated was accepted.

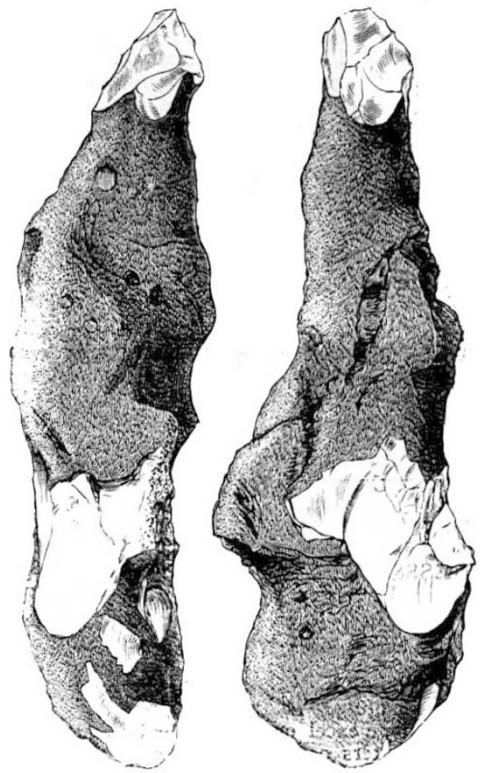
Col. Ferrero proposed to close the network of triangles around that basin of the Mediterranean of which Italy forms the eastern side, and invited France to connect the Algerian network with the Italian at Tunis as quickly as possible. Col. Perrier replied, giving assurances that France would commence the work next year, and then read his report upon the measure of bases and the instruments employed, which concluded with a request that the Geodetic Association would invite Germany to prevent the destruction of geodetic signals.

A Committee, composed of Col. Clarke on the part of England for Malta, Capt. Kalmar for Austria, Col. Perrier for France, and Capt. Magnaghi, Col. de Stefanis, and Prof. Pergoal for Italy, were charged with the establishing of an accord for the trigonometrical junction of Italy with France, and Austria and Sicily with Malta, and instructed to invite the co-operation of England in communicating differences of longitudes to be determined telegraphically between Malta and Bona, between Malta and Naples, between Naples and Corfu, &c.

The honorary president of the Conference was General Baeyer, and the acting president Col. Ferrero, President of the Italian Geodetic Commission. Mr. Christie, the Astronomer-Royal, and Col. Clarke, R.E., represented England at the Conference. The United States was represented officially by General Cutts of the Coast Survey, though Messrs. Hilgard and Peirce seem also to have been present.

LARGE AND RUDE PALÆOLITHIC IMPLEMENT

IN November, 1881, Miss Eleanor A. Ormerod, F.M.S., of Isleworth, found the remarkable instrument here illustrated, and kindly added it to my collection. It was found in the gravel and brick-earth thrown out of an excavation made for the new Hounslow and London Railway, immediately south of Osterley Park, near Isleworth. The excavation at this spot showed about three feet of brick-earth resting on eight feet of gravel, and at this depth the London clay was reached, a foot or two of which was exposed. The gravel showed horizontal seams



of fine sand, and agreed well with the well-known Thames gravel at Acton and Ealing.

The implement is engraved one-sixth actual size, and a front and side view are shown. It is exactly two feet in length, and weighs thirty-two pounds. It belongs to the gravel and sand, and is Palæolithic, as is proved by the ferruginous stains. Miss Ormerod, who saw that the flint had been trimmed to shape by human hands, took the instrument to be a huge club, the more attenuated end being possibly, she thought, designed for grasping in the hands; she also noticed that the more massive end was battered as if by use as a club. The more pointed end of this tool has been rudely but skilfully trimmed to a wedge-like point, and any one acquainted with flaking can see at a glance by referring to the illustration that the point is artificial. Towards the base at A (seen more distinctly on the right of left figure at same point) the battering is remarkably distinct. I do not think this battering has

arisen from the use of the tool as a club, but rather as an anvil, as pointed out more than once in reference to other stones observed by Mr. F. C. J. Spurrell and myself. Several flakes have been removed from the extreme butt, and a few small inconvenient asperities have been knocked off elsewhere. Greater part of the flint is covered with the original bark, and this bark is brownish ochreous, its colour proving its derivation from the ochreous gravel. The trimmed parts are lustrous, unabraded, and very slightly stained. The tool was no doubt made and used close to where it was found, and probably belongs to a "Palæolithic Floor," of which so many examples are known now that attention has once been drawn to them. The whole condition of the implement exactly agrees with the stone implements from Stoke Newington, Erith, and Northfleet. The tool appears to have been used as an instrument for thrusting, as well as in a horizontal position as an "anvil-stone." It would be idle to mention the possible uses of such a huge tool as this, but every one who has formed ideas of the mode of life of Palæolithic men will readily think of numerous uses to which such an implement could have been put.

In March, 1882, I had an opportunity of hastily walking through the railway cutting, and I not only lighted on several unabraded Palæolithic flakes, but I found a subtriangular somewhat abraded Palæolithic implement in a lump of concreted gravel, which had fallen out of the side of the cutting between Hounslow and Isleworth at six feet from the surface line. This implement, formerly 556 in my series, is now in the collection of Mr. John Evans at Nash Mills. I also found a large butt-end of an implement, broken in Palæolithic times, a little nearer Hanwell, and another implement in the cutting between Hanwell and Ealing.

Near Hanwell in this cutting fresh-water shells were abundant, and I do not think they have been recorded, with implements, before from this position. It is to be hoped the members of the Ealing Natural History Society collected and took note of them.

WORTHINGTON G. SMITH

AGRICULTURE, ITS NEEDS AND OPPORTUNITIES

PROFESSOR W. J. BEAL'S address on this subject, delivered before the American Association for the Advancement of Science, in August, is of interest to Englishmen from more than one aspect. In the first place its perusal gives us the means of knowing what is being done in the United States for the advancement of scientific agriculture. In the next place we are able to judge how far we excel or are excelled by our American relatives in matters connected with agricultural inquiry. Lastly, it is in such addresses that we may expect to find suggestions worthy of attention, and thoughts which in due course will develop into acts. Prof. Beal takes for his text—"Agriculture, its Needs and its Opportunities." So far as its needs go they are manifold, and its opportunities are certainly coextensive with its vast domain.

The first need is a very common one indeed—it is the need of brains. Agriculture needs brains to guide and counsel her. Prof. Beal is evidently a man calculated himself to supply this need so far as one man can so do. He invites the assistance of men of intellect to rescue agriculture, and he laments the fact that within a comparatively recent time but very little of the best thought even of civilised nations has been devoted to subjects intended to advance agriculture. He calls attention to the munificent aids granted by the United States Government for the encouragement of anthropology, astronomy, geological and mineralogical and other surveys, while but a small sum has been appropriated to agriculture. To illustrate the hesitancy of men to bequeath money for the promotion of agriculture he takes the following from an address given by President T. C. Abbot:—

"I met a very pleasant and intelligent gentleman, who, from his large wealth, was about to give some sixty or seventy thousand dollars for the advancement of higher education. He had been for some years, and was still, the president of a State Agricultural Society. He was a farmer. Did he then endow some Chair of Agriculture or Agricultural Chemistry, of Veterinary Science, or of Horticulture? Did he fit out an experiment station to analyse fertilisers, to study the value of cattle foods? None of them. This farmer gave his thousands to endow another workshop of astronomy."

The above sentences are couched in the language of indignation. They illustrate our own experience on this side of the water, for the public ever seem to take more interest in abstract science and fine art than in technical instruction. The interest in agricultural science has been always languid, albeit it has had its stalwart and enthusiastic supporters. But the public have hitherto failed to tangibly grasp the importance of the subject. It is allowed in a sort of languid and perfunctory manner, but without enthusiasm. We have recently passed through a fervid effort towards the attainment of better musical instruction by means of a College of Music. But when are Royal personages going to lead a movement in the direction of securing better instruction in agriculture? And is not agriculture as noble a subject whereon Royalty might bequeath its patronage and lavish its wealth as music?

We find then a certain unaccountable indifference to agricultural science on both sides of the Atlantic, and yet we ought not to forget that, while much more ought to be done, much has been done both in America and Europe.

The field as a field of research has not been so fruitful as at one time it was expected to prove. The old and time-honoured practices of the farmer have too often justified themselves when confronted by scientific objectors. The suggestions of the scientific man have too often been found impracticable and over-expensive by the practical farmer.

It is indeed very difficult to improve upon processes which have stood so many trials. A certain reckless assumption that old practices *must* give way to new has been the ruin of many good men. Agriculture is undoubtedly capable of improvement, but the improvement is generally most evident when established upon the old lines of good practice, and when heroic measures are avoided.

Limited production is the chief difficulty in the way of scientific agriculture. We cannot multiply our production by steam power or chemical fertilisers. We can only add to it, and that rather sparingly. We cannot increase the number of our crops. Harvest only comes once a year. Thus the examples of the printing press and of the loom fail to impress the farmer with what science is to do for *him*. Let it not, however, be thought that there is not scope for the application of science to agriculture. If we cannot multiply we can increase our produce and cheapen processes. The uses of fertilisers; the comparative values of foods; the improvement of instruments; the introduction of steam; the propagation of improved animals; the study of grasses and economic plants in general; the improvement of wool and of cereals; the introduction of new and cheap building materials, &c., are all worthy of attention, and all require the aid of science.

Prof. Beal points out the importance of meteorology to the farmer. He illustrates this by a quotation from Dr. R. C. Kedzie, who wrote in 1882, "If specific warnings had been given our farmers at that time (harvest), most of the wheat might have been safely housed, and the farmers of Michigan saved from a loss of $1,000,000." Another point made by the professor refers to our imperfect knowledge of those epidemics which from time to time visit our own flocks and herds, as well as those of America—