Dr. Nestle was on the right track when he enquired for it at Dublin. In the list of the MSS. of Trinity College, there is one in Syriac, numbered 726 (586) in Bernard's Catalogue, which contains, together with some homilies of Severus and other matter, an article—"De Inventione S. Crucis." I have very little doubt that this was the MS. which Dudley Loftus used for his book entitled *A History of the Twofold Invention of the Cross*. In his address to the reader, he states that "it is contained in a Bialogie [*sic*] of Eastern Saints, written in a fair Estrangalar [*sic*] character." It is true that the former part of this description is, to judge from the printed account, by no means an accurate summing-up of the contents of the MS.; but it may be, to some extent, justified by the character of certain tracts in the volume. That the Dublin MS. is written in Estrangelā I can state on the authority of Prof. Wright, who casually looked at it a few years ago.

In conclusion, I may observe, with regard to some incidental remarks of Dr. Nestle, that all the Syriac MSS. of Dr. Huntingdon are not in the Bodleian, for a copy of the *Ecclesiastical History of Bar Hebraeus*, which once belonged to him, is preserved in the University Library of Cambridge; and, from internal evidence, it may be proved that this was the MS. from which Dudley Loftus made his translation.

ROBT. L. BENSLY.

NUÑEZ DE ARCE.

Fern Bank, Higher Broughton, Manchester: Oct. 15, 1881.

The readers of the Rev. Wentworth Webster's interesting notice of Nuñez de Arce will, I think, be glad to see another specimen of that poet's writings, and I therefore send you the latest sonnet he has published. It appeared in *El Imparcial* of the 10th inst.:—

ANTE UNA PIRÁMIDE DE EGIPTO.

Quiso imponer al mundo su memoria
un rey, en su soberbia desmedida,
y por miles de esclavos construida
erigió esta pirámide mortuoria.

¡Sueño estéril y vano! Ya la historia
no recuerda su nombre ni su vida;
que el tiempo ciego, en su veloz corrida,
dejó la tumba y se llevó la gloria.

El polvo que en el hueco de la mano
contempla absorto el caminante ¿ha sido
parte de un siervo, ó parte del tirano?
¡Ah! todo va revuelto y confundido;
que guarda Dios para el orgullo humano
sólo una eternidad: la del olvido.

This fine sonnet may be instructively compared with that on Ozymandias, in which Shelley has dealt with the same grand but sombre subject,

WILLIAM E. A. AXON.

APPOINTMENTS FOR NEXT WEEK.

MONDAY, Oct. 24, 7.30 p.m. Aristotelian: "Plato"
7.30 p.m. Education: "When, and in What Order, should Subjects be Introduced," by Mr. F. G. Fleay.
8 p.m. Royal Academy: "The Joints," by Prof. John Marshall.
WEDNESDAY, Oct. 26, 8 p.m. Zetetical: "Positivism," by Dr. Richard Congreve.
FRIDAY, Oct. 28, 8 p.m. Royal Academy: "The Muscles," I., by Prof. John Marshall.
8 p.m. Browning Society: Inaugural Meeting, "The Characteristics of Mr. Browning's Poetry and Philosophy," by the Rev. J. Kirkman.
8 p.m. Quekett.

SCIENCE.

Vegetable Mould and Earth-worms. By Charles Darwin, LL.D., F.R.S., &c. (John Murray.)

MR. DARWIN'S powers of work are inexhaustible, and not less remarkable than his genius. Here is another delightful book from his pen, for which all intelligent readers will feel the heavy obligation which they are already under to him greatly increased. With all the other vast amount of original investigation of the utmost importance on his mind, the fruits of which have so deeply affected the world, he has, nevertheless, ever since 1837, when he read a short paper on "The Formation of Mould" before the Geological Society of London, been steadily accumulating the observations and making the experiments the results of which are set forth in the present fascinating volume. We read with astonishment of such experiments as that of his spreading a layer of chalk over a patch in one of his fields in 1842, and patiently awaiting to exhume his result until 1871.

Mr. Darwin has long kept worms in confinement in pots of earth in his study, and the first chapter is devoted to their habits. Worms, though they must be considered as terrestrial animals, are nevertheless able to live under water, and Perrier kept several large worms for nearly four months alive thus submerged. They are nocturnal in their habits, but seldom wander far from their burrows, though sometimes after heavy rain they crawl as great a distance as fifteen yards. They probably then never find their old burrows again, but have to make fresh ones. They often lie for hours almost motionless close beneath the mouths of their burrows, probably, as Mr. Darwin believes, for the sake of warmth. They line the upper parts of their burrows with leaves with great skill and neatness, filling up the interstices between the leaves with small stones and such objects as beads and bits of tile when these are strewed near their burrows. That the tubes are thus lined with leaves is a discovery of Mr. Darwin's. It is in keeping with the great skill in tube building exhibited by numerous marine annelids, though not hitherto suspected of earth-worms. Worms, though destitute of eyes, are not entirely insensible to light. But light takes some time to act upon them, and must be intense to do so. Only the anterior extremity of the worm's body is sensitive to light, which acts apparently directly on the cerebral ganglia. Possibly their progenitors had eyes, which were lost on their taking to underground habits; and the sensitiveness of the cerebral surface may be a last trace of a former more complete power of vision. When the attention of worms is taken up by work at leaf dragging, or some such occupation, their sensibility to light seems to fall into abeyance. Worms kept in the dark, from habit still come out in the night and withdraw into their burrows during the day. Though they are entirely deaf, they are extremely sensitive to vibrations of the earth in which their burrows are made. This was proved by putting two pots of earth with worm burrows in them on a piano. Single notes struck in either bass or treble sent the animals into their holes forthwith. The worms kept in confinement found out little bits of food buried near the mouths of their burrows apparently by means of a sense of smell. They like raw fat better than anything else to eat, and next to that onion. They swallow earth in enormous quantities in digging their holes,

coming to the surface tail first to eject it in the well-known heaps called castings. They also swallow it as food, and extract the digestible matter from it. They seize objects either by taking hold of them between their upper and under lips or at their edges, or by using their mouths as suckers. One of the most curious of their habits is that of protecting the entries of their burrows. They often pile little heaps of stones over these. Their strength is extraordinary, for one stone dragged over a gravel-walk to the mouth of a burrow weighed two ounces. Usually they plug the mouths of their burrows with leaves, leaf-stalks, sticks, &c. Anyone who looks about him will see plenty of worms' burrows with such things sticking out of them. They show very great intelligence in the selection of the substances which they use as plugs, and in choosing which ends of them they shall seize and drag in first. They do not seize most leaves, for instance, by their stalks, which would seem most handy to lay hold of, but by their tips, because the leaves are most easily dragged down into the holes when thus introduced; but when the basal parts of the leaves are narrower than the apices they do take hold of the stalks. Mr. Darwin made a series of most interesting experiments with triangles of paper and other objects, with the result of proving the marked intelligence exhibited by worms in this matter.

The latter part of the book deals with the modification of the earth's surface by the action of worms, and is of the utmost importance to the agriculturist, the antiquary, and the geologist. "Farmers are aware that objects of all kinds left on the surface of pasture land after a time disappear, or, as they say, work themselves downward." Mr. Darwin describes how a field of his, after being ploughed, in 1841, showed very scanty vegetation, and was thickly covered with small and large flints, some of them half the size of a child's head. The smaller stones disappeared soon, and after a time all the larger ones, till when thirty years had elapsed a horse could gallop over the compact turf "from one end of the field to another without striking a single stone with his shoes." This burying work, though contributed to slightly by ants and moles, is almost entirely performed by the worms; they swallow the earth below the stones and eject it again as castings above them. All superficial mould passes in a few years again and again through their intestines. Hensen, from his observations on gardens, calculates that there are 53,767 worms, or 356 pounds weight of them, to an acre of ground. Mr. Darwin takes the half of this quantity as living in an acre of old pasture-land as a safe estimate. Anyone who, when a boy, has poured water in which the husks of walnuts have been pounded on the ground to get bait for eel-fishing must have been utterly astonished, on the first occasion, at the numbers of poisoned worms which came hurrying up out of the soil in all directions, appearing as if by magic, from the small area affected. Mr. Darwin cites an instance in which bad vinegar, when upset in a field, produced a similar effect. He has not himself made any direct estimate of the numbers of worms in a given area. It could probably be tolerably well arrived at by the use over measured areas of such liquids poisonous to the animals, which make them all hurry to the surface. As the result of various careful observations and weighings of castings, the author concludes that fifteen tons of earth are annually thrown up as castings on an acre of old pasture-land. The accumulation of soil thus formed upon objects placed on the surface of the ground amounts to a layer of about one inch in thickness every five years. It is estimated by the author from examination of sections of the soil of fields on which cinders, lime, broken brick, or similar well-recognisable substances were spread either intentionally for experiment or simply for farming purposes many years ago. The buried layers are found to maintain their continuity as such in a remarkable manner, the fragments composing them sinking at a nearly uniform rate all over a large area.

The burial of most of the remains of Roman villas and pavements scattered over the country, as well as numerous other ruins, is shown by Mr. Darwin to be principally due to worms. Thus were the remains of Silchester and Uriconium preserved to make antiquaries happy. It would seem at first thought impossible for worms to penetrate tesselated pavements set on concrete, but Mr. Darwin has watched such pavements when freshly exhumed and cleaned, and has found worm-castings to be thrown up all over them persistently. The worms not only penetrate the pavements, but the foundations of the walls, and heap mould on these also. It is due to the fact that the worms work pretty evenly that the pavements, like the layers of ashes on the surfaces of fields, subside as wholes without breaking up. They are, however, often bent and inclined a good deal, from unequal excavation beneath them, from firm support at their sides, and from other causes. The old walls, when their foundations are not very deep, being also undermined by the worms, sink with the pavements, and the cracks in the walls of many ancient buildings are probably due to unequal subsidence thus produced.

"Archaeologists ought indeed to be grateful to worms," writes the author in his conclusion, and so, no doubt, they will be in future for this much. But he seems to forget, in making the general statement, that not much further on in the book he shows also how the same worms, in a most provoking manner, spite archaeologists of Canon Greenwell's proclivities by inhabiting earth-works, such as ancient encampments and tumuli, and gradually lowering them. This effect is thus produced. When worms inhabiting grass slopes eject their castings, which, when first emitted, are soft and plastic, a certain larger proportion of each casting falls below the mouth of the burrow than falls above it. The excess falling below is so much earth carried down towards the bottom of the slope; by repetition of this process, for long periods of time, a large amount of earth must, aided by the rain, be carried down the slope to be finally washed away. The castings, moreover, when dried, break up into pellets, which roll downhill and aid in the same process. The two processes are constantly at work on every grass-covered slope, which is thus perpetually undergoing denudation, although its covering of grass remains intact and its inclination may remain the same. Very many of the series of small, narrow, terrace-like ledges seen on grass-covered slopes, which are usually attributed to the constant tread of animals when feeding, are believed by Mr. Darwin to be formed by accumulations of pellets of castings arrested in their roll downhill. Castings, when both moist and dry, are moved to leeward by the wind; and a not unimportant movement of soil, especially as dust, may thus be caused in some countries, though not much in Great Britain.

Worms triturate in their gizzards the particles of sand and small stones swallowed by them; and, though their digestive fluid is alkaline and allied to the secretion of the pancreas, their castings, when fresh, are acid, various humus acids being produced in their intestines by the decomposition of swallowed vegetable matter. These acids act as solvents of the mineral constituents of the superficial earth. Thus the process of denudation is further aided by worms.

Worms drag great quantities of leaves into their burrows, sift the superficial earth free from all but the finest stones, mix it up with their partially digested food, saturated with their secretions, and thus form the dark rich mould so necessary for the growth of most plants which cover so much of the surface of the land. It may, indeed, as Mr. Darwin concludes, "be doubted whether there are many other animals which have played so important a part in the history of the world as have these lowly organised creatures."

One of the charms of the present work is that it is extremely easy to read, the nature of the subject requiring the use of no technicalities. It will delight everyone, every page being full of interest. In very many of his observations Mr. Darwin has been largely aided by his sons—indeed, the book may, to some extent, be regarded as representing the results of a family research conducted under his directions. H. N. Moseley.

NOTES OF TRAVEL.

Mr. A. H. Keane is writing the volume on *Asia* in Mr. Stanford's "Compendium of Geography and Travel." Sir Richard Temple will write a Preface to it, and his name will appear on the title-page as nominal editor.

Mr. Frederick Courteney Selous, the most famous hunter in all South Africa, and scarcely less well known for his hospitality and advice to travellers in that region, has written an account of his nine years' *Wanderings in Africa*, which will be published this autumn by Messrs. Richard Bentley and Son. It will include notes of his explorations beyond the Zambeze, on the Chobe, and in the Matabele and Mashuna countries. As might be anticipated, special attention will be given to the natural history of the larger mammalia, about which probably no man living knows more than the author. The work will contain twenty-one full-page illustrations and a map.

In travel literature Messrs. Bentley also announce the following:—*East of the Jordan*, a record of travel and observation in the countries of Moab, Gilead, and Bashan, by Mr. Selah Merrill, archaeologist of the American Palestine Exploration Society; *Sport in the Crimea and Caucasus*, by Mr. Clive Phillipps-Wolley, late British vice-consul at Kertch; *A*