sonally canvassing the members. The gain to the explorers in this way would surely far more than compensate for any fancied loss of independence.

One word more about American exploration, and it shall be one of unqualified admiration. When a member of any of the branches of the public service in this country which are concerned with scientific publications contemplates the style in which such publications are prepared and issued in the United States, he finds a spirit of envy rising uppermost within him. Quarto after quarto, atlas after atlas, all published in the most sumptuous style as regards paper, printing, engraving, and chromo-lithography, are poured out from the American national press, yet at such prices as not to place them beyond the reach of all but the rich. The number of copies of these costly works actually distributed gratuitously is almost incredible. They are scattered lavishly over Europe, not merely to public libraries, but even to private students of science whose names are known to few of their own countrymen save those who read their writings in the scientific journals. Such open-handed generosity makes many a recipient of the gifts accept them almost with reluctance when he knows how little we in this country can offer in exchange. It is not that we are idle, or that the results of our labours would not furnish materials for important memoirs. But they manage these things better in the States. Perhaps we may profit by their example some day.

ARCH. GEIKIE

Discovery of a Scottish Crannog

WILL you kindly allow me, through the columns of NATURE, to draw the attention of archaeologists to a recent discovery of an ancient crannog on the farm of Lochlee, near Tarbolton, Ayrshire. It appears that formerly a considerable portion of what is now arable land, and divided into several fields, was occupied by a loch with mossy banks and bottom, and that about forty years ago its outlet was deepened and its whole area completely drained. When this was done a small mound was observed near the outlet of the lake and about 100 yards from its nearest bank, which, from its artificial appearance and the discovery of two canoes in the bed of the lake, then attracted the curiosity of a few observant people in the neighbourhood, but led to no further result, and soon the whole affair was entirely forgotten. Just now the same locality is being re-drained under the direction of Mr. Turner, factor for the Duke of Portland, and his men, while engaged in cutting the main drain which happened to pass through a small bit of this mound, came upon the peculiar structure of the crannog. Fortunately this came under the cognizance of Mr. James Brown, Tarbolton, who wrote a note to Mr. J. Anderson, Keeper of the Museum of the Society of Antiquaries of Scotland, drawing his attention to this discovery. This gentleman immediately wrote to R. W. Cochran Patrick, Esq., of Woodside, Secretary of the Archaeological Society for the counties of Ayr and Wigton, who lost no time in visiting the district, and at once recognised the nature and importance of the discovery. Meantime Mr. Turner and myself made several visits to the locality, in the course of which we observed that three rows of closely-set wooden piles, six feet apart, extended from the mound to the mainland—presumably forming the foundation for a wooden gangway. The tops of these piles, except in a very few instances, are below the surface of the soil. At the same time the men dug up a canoe, in a good state of preservation, hollowed out of one log, and tapering rapidly and uniformly at both ends. It was lying about 150 yards from the mound, and the highest portion of it was three feet below the surface. It measures ten feet long, two feet six inches broad, and one foot nine inches deep. It was then arranged that a careful exploration of the mound should be made, and accordingly systematic excavations were begun on Tuesday last, in presence of Messrs. Turner, Patrick, Anderson, Dr. McDonald, Ayr, and myself, and are now being prosecuted with great vigour and success. As a detailed account of whatever discoveries may be made, together with plans, sections, and drawings of the crannog, will be published in the Collections of the Archaeological Society of this county, under the superintendence of its accomplished secretary, Mr. R. W. Cochran Patrick, it is unnecessary for me to give here more than a few remarks, just sufficient to convey to your readers some idea of what has already been done and may yet be expected. Guided by the tops of a few upright piles which just appeared on the surface, a broad trench was dug right round the mound. Some of these piles, all of which

were formed of young oak trees, were found to terminate in holes in large horizontal beams, while others appeared to be driven into the muddy bottom and surrounded by thick planks of oak, young trees, and brushwood, amongst which beech, birch, and hazel were readily recognised. On the north-east side, and only about one foot below the surface, were two series of horizontal beams of oak from five to six feet long, and about five feet apart, each of which had two square-cut holes near its extremities, through which upright piles penetrated and were firmly fixed by wedges of wood. These mortised beams rested on round trees which lay horizontally but pointed in various directions. Conterminous with these beams and running towards the centre, there was a rude and very much decayed platform formed of rough planks and saplings lying on large beams of split oak trees. The oozing of water prevented the complete exposure of the mossy bottom on which this curious structure was reared, but it was ascertained to be from seven to eight feet below the present surface. In all the parts that were examined large stones were found interspersed with the woodwork, and the diameter of the foundations of the mound was estimated at about twenty-five yards. A trench was then dug across this circular area, and near the centre we exposed two stony pavements, one lying immediately above the other, the space between being 2½ feet thick. These pavements rested on a thick stratum of clay which extended for several feet all round, gradually thinning towards the rim, and, from the abundant remains of ashes, charcoal, and burnt bones, evidently formed fire-places. About two feet below the lower pavement another layer of clay, together with ashes, charcoal, &c., was observed, and though not yet excavated, we concluded that it must have been a third fire-place. Nearly on a level with this was a layer of chips of wood as if cut by an axe, and underneath this was a layer of turf with the heather part downwards. On pressing the spade still further down it struck a log of wood. The perpendicular height from this log to the top of the upper pavement was seven feet nine inches. All these fire-places were below the level of the water before the first drainage was made. As it is ascertained that previously there was no island to be seen, the whole island must have sunk very much since its original structure. Round these fireplaces were the remains of a series of seven or eight large piles with their bases cut flat and resting on the floor of the middle pavement or a few inches below it. These upright piles inclosed a somewhat circular area, with a diameter varying from ten to fifteen feet. The articles hitherto discovered in the interior of the mound consist of querns, hammer-stones, bone-chisels, and lance-like objects, a spindle-wheel, wooden implements like clubs or paddles, &c., deer-horns, some cut across and marked with holes and other markings, numerous boars' tusks, and a great assortment of bones and teeth belonging to various kinds of animals. With the exception of a singular three-pronged iron instrument found in the large drain outside the mound and a rusty piece of iron shaped like a door-handle, picked up very near the surface of the mound, not the slightest trace of either iron or bronze has been discovered. A piece of red pottery, said by a competent authority to be so-called Samian, found in the same drain and near the same spot as the iron implement above alluded to, and the half of a grooved bead of the size of a hazel-nut and covered with a greenish pigment, are the only fragments of pottery as yet brought to light.

Kilmarnock, October 21

ROBERT MUNRO

Power of Stupefying Spiders Possessed by Wasps

MR. ARMIT'S letter, from Queensland, on this subject (NATURE, vol. xviii, p. 642) is, to my mind, of great interest as showing that the habits of insects are the same at the antipodes as on our side of the globe. I was well aware that the spiders were stupefied (or paralysed) and not killed, and that the use made of them by the wasp was as a nidus for her ovum, and to serve as fresh provisions for her larvæ when hatched. Of course if killed they would be useless for this purpose. We have a wasp of similar habits, but he makes use, in the cases in which I have watched his operations, of the larvæ of the garden white butterfly, which are rendered passive and helpless, but not killed, in a similar manner.

I make alternative suggestions for further, and if possible microscopic, examination into the matter. First, are the wounds producing this insensibility inflicted with the sting, or by an ovipositor in the act of inserting the ovum? Is the egg in the case of the wasp, as with the ichneumon, inserted in the insect to serve by and by as food, or outside it, in the cell? If

the latter, then the punctures are, no doubt, true stings; and I make the alternative suggestion that the wasp is guided by its instinct—as the larva of the ichneumon is when feeding—to select for attack parts of its victim not vital, where the injected acid produces insensibility or partial muscular paralysis, but not death. Because in the rare cases in which a wasp or bee struggling in a spider's web succeeds in stinging his captor, in anger and at random, the spider dies. May the observation made in your columns by a recent correspondent, on the self-administration, through the mouth, of the poison of the sting by wasps and bees under chloroform not point to a stupefying property in the acid when taken, as the natives of India take the poison of venomous snakes, into the stomach, and not directly into the circulation of the blood? There is good work here for an observer with patience and a good field microscope.

Bregner, Bournemouth, October 19 HENRY CECIL

A Fossil Plant—Misquotation

IN an article on a fossil plant from the Isle of Man, in NATURE, vol. xviii. p. 555, the following sentence is attributed, apparently on the authority of Mr. Leo Lesquereux, to my report on the Devonian and upper silurian plants of Canada: "that these fragments are probably originating in the upper silurian of Gaspé; that as they are found in the lower part of the limestone which underlies the Devonian Gaspé sandstone and become more abundant in the upper beds, this suffices to indicate the existence of the neighbouring land, probably composed of silurian rocks and supporting vegetation."

On referring to the report in question, I find that the original of this strange statement stands as follows:—

"These remains of *Psilophyton* occur in the lower part of the limestone, but are more abundant in the upper beds, and they suffice to indicate the existence of neighbouring land, probably composed of lower silurian rocks, and supporting vegetation."

I have no doubt that Mr. Lesquereux quoted from memory, and probably supposed that he was expressing my meaning, but an English writer should have referred to the original.

I may add that the specimen referred to in Mr. Binney's article does not exhibit the characters of my genus *Psilophyton*, which does not contain "fucoids," but land plants of the rank of acrogens, and of which not merely the external forms, but also the internal structures are described and figured in the report referred to. The plant in question much more closely resembles *Butthollettia harknessii*, Nicholson, from the Skiddaw slates.

J. W. DAWSON

McGill College, Montreal, October 5

Sense of Fear in Chamæleons

DURING the past summer I have kept five chamæleons in captivity, and have repeatedly observed their terror and rage when confronted with snakes. When a large Algerian chamæleon (*C. vulgaris*), now in my possession, perceives a common snake (*Tropidonotus natrix*) wriggling in his vicinity, he at once inflates his body and pouch, sways himself backwards and forwards with considerable energy, or walks rapidly away with his body leaning over in the direction furthest from the snake, opening his huge cavernous mouth, and hissing and even snapping at what he evidently regards as his natural enemy. At the same time his body assumes an almost instantaneous change of colour, and is quickly covered with a large number of small dark brown spots. It is curious that similar symptoms of fear and anger are displayed when a lizard (*Lacerta viridis*), or even a tree-frog (*Hyla arborea*) is exhibited to him. The climax of grotesque nervousness was, however, reached one day, when the sight of a child's doll produced the like effect; in this case, it is probable that the glass eyes of the doll, giving to it the appearance of life, were what caused this terror in the reptile.

R. MORTON MIDDLETON, Jun.

West Hartlepool, October 23

An Unusual Rainbow

OCTOBER 28 was a fine day with a brisk westerly wind blowing. At 2 P.M. a splendid well-defined nimbus cloud passed from north-west to north-east, about a mile to the north of this observatory, and rapidly driving away before the wind, left a large tract of cloudless sky behind it, the sun shining at the time. Suddenly at 2.12 P.M. a magnificent rainbow shone out most brilliantly across

the blue space, the effect being exceedingly novel and charming. The veil of rain-drops forming the bow was so thin as to be invisible except near the zenith, where there appeared to be a thin cirrus. No rain fell on the observatory, and unfortunately there were no means of determining subsequently the area covered by the shower.

Eventually the rainbow faded away over the cloudless sky, and the 30° or so of the extreme eastern end which overlapped the receding nimbus shone out with a vivid brightness until it disappeared.

A secondary bow was not visible in front of the clear sky, but the violet band of the primary stood out with great distinctness, apparently separated from the remainder of the bow.

Kew Observatory, October 29

G. M. WHIPPLE

OUR ASTRONOMICAL COLUMN

A MISSING STAR.—There was a curious, and at the time suspicious, history attaching to an object, shining as a star of 9.10 magnitude, which was compared on several nights with the minor planet *Hygeia*, while under observation at Washington in the autumn of 1850. This star, which was designated ϵ in a list published in Gould's journal, was missed by Mr. Hind, who reported the circumstance in a letter to Mr. W. C. Bond, of Harvard College, by whom the attention of Lieut. Maury, at that time superintendent of the Naval Observatory, Washington, was called to it. Mr. Ferguson having verified the disappearance of this object on August 29, 1851, a search was made for it on the assumption of it being a great planet exterior to Neptune; the reason for this assumption will be apparent from an inspection of the following positions, which result from the observations on three evenings:—

1850.	Washington Mean Time.	Right Ascension.	Declination.
	h. m. s.	h. m. s.	° ' "
Oct. 16 ...	6 52 36 ...	19 17 42.81 ...	-20 44 57.1
" 21 ...	7 6 40 ...	19 17 42.19 ...	-20 44 55.5
" 22 ...	6 35 35 ...	19 17 43.90 ...	-20 44 54.6

It was also observed on the 19th, but the accurate positions of the stars of comparison are not available. These observations appear to indicate that the object had motion in R.A., but that it was stationary at some time between October 16 and 22, and if we suppose it to have been a planet moving in a circular orbit, we find to allow of its being stationary at this elongation from the sun, its distance would be 49.94, and its period of revolution 351 years, or about twice the period of Neptune, and the period of Neptune is about twice that of Uranus. Notwithstanding the search was continued from August 29 to December 11, 1851, and extended to all stars of the eleventh magnitude between 19h. 20m. and 19h. 36m., and from -19° to -21° 20', no planetary body was found. That the Washington observers considered suspicion to attach to the object is obvious, but the only likely explanation appears to be that there was a variable star in this position, and that the observations in right ascension were affected with greater error than might be expected, considering that on two of the days of observation several comparisons were made. To our knowledge search was also made in Europe for the Washington star. Further particulars will be found in two letters from Maury, published in Gould's *Astronomical Journal*, No. 36.

THE SATURNIAN SATELLITE MIMAS.—From some Washington observations of this difficult object between the years 1874 and 1877, it appears that the following elements may be taken as approximately representing the motion of the satellite in the interval on the assumption of a circular orbit in the plane of the rings: epoch 1878, January 1.0207 G.M.T., $u = 0^{\circ} 0'$, $N = 126^{\circ} 14' 5''$, $i = 7^{\circ} 3' 2''$, radius of orbit at the mean distance of Saturn $27'' 40$, period of revolution 22h. 37m. 5.614s., or the logarithm of the period in days = 9.9742473. The