his last-mentioned value that has been used in the above reductions. The probable error of these determinations is then ±0″·00071, which corresponds to ±0″·025 per 1000″. But Mr. Jacoby does not think that the average uncertainty of the final places exceeds 0″·15 on account of scale value. While comparing the Rutherfurd stars with those of Argelander, he found that four stars from the latter were lacking, while they were recorded on the original negatives of the former. Observations made this year showed that three were visible, while the fourth (No. 28), which was quite close to No. 27 on the Rutherfurd negatives, was this year "only a sort of elongation of No. 27." On the other hand, the following of Argelander's stars were absent from the plates :—

B.D.	+ 27°3395	Mag.	8·8
	+ 27°3414	,,	9·0
	+ 27°3417	,,	9·0

and perhaps

	+ 27°3435	,,	8·5
	+ 28°3343	,,	9·0

A NEW VARIABLE STAR.—In *Astronomische Nachrichten*, No. 3124, Prof. Pickering announces the discovery of a new variable star in Aries by Prof. Schaeberle. The fact of this star being a variable was first noted when, on an examination of two plates taken December 18 and January 24, 1891, it was found that on the former it appeared of the 9·5 magnitude, while on the latter it was absent altogether. Recent visual observations have shown, however, a star of the eleventh magnitude in the exact position of the suspected variable, and this has been confirmed by means of photographs. From photographs of the same region, taken since October 31, 1890, the magnitudes recorded have been 9·6, 10·2, 11·0, less than 11·7, 10·1, 10·0, 10·4, 10·3, and 10·9. The star's position for 1900 is given as

R.A. 3h. 5·5m. Decl. + 14°24′.

JUPITER'S FIFTH SATELLITE.—It hardly ever happens that, after a discovery of any importance has been made, there are not a few "claimants" who wish to annex it as their own. This is the case with Prof. Barnard's discovery of the fifth moon to Jupiter, but the advantage he possesses over these said "claimants" is, we might say, infinite, for it is only with such an instrument as that at the Lick Observatory that this "mite" of a satellite can be observed with success. One of the despatches in which one "claimant's" views were put forth, had the audacity to insinuate that Prof. Barnard was directly inspired to this discovery by information contained in a letter sent to the Observatory. We are glad to see that Prof. Barnard deals with these "claimants" as they deserve, and we hope it may be a lesson to others who wish to assert their priority without good and sufficient reasons for doing so.

As an illustration of the difficulty of observing this satellite, we may mention that Prof. Young, in a letter to Prof. Barnard, says that although he has used a 23 inch Clark, which is an instrument as nearly perfect as can be made, he was not rewarded with success.

THE SPECTRUM OF NOVA AURIGÆ.—Herr E. von Gothard, of the Observatory at Herény, has taken a very successful photograph of the Nova spectrum, the results of which he communicates to *Astronomische Nachrichten*, No. 3122. The instrument used was a 10½-inch reflector with a 10-inch objective prism, and the exposure given amounted to 45 minutes. The spectrum shows six lines, and a comparison with the spectrum of the ring nebula and the Wolf-Rayet stars presented a remarkable concordance, the first failing only in the second Nova line, and the second differing only with regard to the intensity of the individual lines. The following table shows this somewhat more clearly :—

	I.	II.	III.	IV.	V.	VI.	VII.
Nova ...	6	1	10	5	3	4	—
G. C. 4964	8	2	10	6	6	8	—
Ring nebula ...	8	—	5	2	7	6	10

The wave-lengths of the lines are, we are sorry to say, not inserted.

"JUPITER AND HIS SYSTEM" is the title of a small book recently published by Mr. Stanford, and written by Miss E. M. Clarke. The authoress has brought this book out at a time when this planet is receiving most attention, for was it not in opposition, shining with exceeding brightness, on the 12th of this month? One great point about this little monograph is that facts throughout have been strictly adhered to, so that the reader is presented with the true state of the planet as we know it. The information is well up to date, as for example the mention of the new satellite, and the book is written in a popular yet accurate style. One thing that calls for attention is the price (one shilling), which could doubtless have been halved.

GEOGRAPHICAL NOTES.

MR. J. Y. BUCHANAN, F.R.S., is this term delivering a course of lectures on Oceanography in Cambridge University. It is satisfactory to know that the lectures are better attended than has been the case since the foundation of the Geography lectureship, and that the greater number of those present this term are undergraduates.

MR. JOSEPH THOMSON has submitted to the British South Africa Company the report of his journey to the Lake Bangweola region, made last year, which ill-health has prevented him from preparing sooner. He speaks of Northern Zambesia generally as a region of great possibilities. It is a plateau rarely less than 3500 feet high, with a climate in which Europeans should find no difficulty in living for several years at a time. It is well suited for cattle-rearing and for planting, and there is an appearance of mineral wealth. Like the rest of tropical Africa, the land must be occupied and cultivated, and the natives must be trained to industry before commercial results of any importance can be obtained.

THE special meeting of the Royal Geographical Society to hear Captain Lugard's paper on Uganda will be held on Thursday, Nov. 3, at 8.30 p.m. On account of the great popular interest at present being manifested in the region of the Equatorial lakes, no extra tickets can be issued by the Society, as the attendance of Fellows and their friends will probably more than fill the hall.

THE new number of *Petermann's Mitteilungen* contains some articles of considerable interest. Dr. W. Ruge, son of the well-known geographer, Dr. Sophus Ruge, contributes a short but learned treatise on the geography of Asia Minor, which combines literary research with personal exploration. Dr. Ernst H. L. Krause produces an interesting map of North Germany, showing the distribution of forests and the most common species of trees during the Middle Ages. This work is accomplished mainly by the consultation of old records, and the examination of the remains of old forests and very ancient trees. The study of history is greatly helped by such a map, and the influence of increasing density of population and extending cultivation of farm crops is brought out strikingly by comparison with a map of the vegetation at the present day. Dr. Karl Sapper's description of Lake Yzabal in Guatemala is also worthy of note.

GEIKIELITE AND BADDELEYITE, TWO NEW MINERAL SPECIES.

VARIOUS pebbles were lately brought to this country by Mr. Joseph Baddeley, who has been acting as manager of a Gem and Mining Company in Ceylon. They had been picked up by him in the neighbourhood of Rakwana (Rackwanné) at various times, and had then attracted his special attention by reason of their high specific gravity. Their real nature not being evident on inspection, Mr. Baddeley, when invalided, brought them home to England for identification.

One kind of pebble, kindly analyzed for him by Mr. Claudet, was found to be essentially a tantalate of yttrium.

Pebbles of another kind were taken to the Museum of Practical Geology in Jermyn Street for examination. The external characters being found by Mr. Pringle insufficient for the determination of the species, the pebbles were handed over to Mr. Allan Dick for chemical investigation. Quantitative analysis proved the mineral to be essentially magnesium titanate ($MgTiO_3$) and chemically analogous to Perofskite, calcium titanate ($CaTiO_3$). To this interesting new species Mr. Dick, in a paper read before the Mineralogical Society in June, gave the name Geikielite, in honour of Sir Archibald Geikie, F.R.S., Director-General of the Geological Survey, in whose laboratory the analysis had been made.

As described by Mr. Dick, Geikielite has a specific gravity

3·98: its hardness (6·5) is between that of quartz and felspar. It has a perfect cleavage, with a splendent metallic lustre, and an imperfect cleavage nearly at right angles to the former. The pebbles themselves show no remains of crystal-faces, are bluish-black in colour, and opaque; but thin cleavage-flakes, when seen in the microscope, have a peculiar purplish red tint, and in convergent polarized light show a uniaxal figure, of which the axis is just outside the field of vision. When digested with hot strong hydrochloric acid the finely powdered mineral is slowly decomposed, and the titanic acid separates out. In strong hydrofluoric acid complete solution takes place in a few hours. The mineral is infusible with the blowpipe: fused with microcosmic salt it gives the characteristic reaction of titanic acid, notwithstanding the presence of a small proportion of oxide of iron.

Shortly after Mr. Dick's paper had been read, Mr. Baddeley courteously offered to allow me to select a single pebble for the British Museum Collection out of his small store of the mineral, the remaining ones being required by him for sending as samples to be used by searchers in Ceylon. But this store, small though it was, consisted of more than one kind of pebble, the close similarity of aspect being due to friction against a bit of graphite which was with them. On this heterogeneity being pointed out, Mr. Baddeley allowed me to take not only the promised pebble of Geikielite, but also those three pebbles which, not being Geikielite, were useless as samples of that mineral. One of the three fragments proved to be garnet, a second was ilmenite—both of them common minerals—but the third, a fragment of a crystal still retaining some of its faces, presented characters which give it unusual interest.

The fragment, which weighs just over three grams, is black and opaque, and has the general aspect of columbite; its extremely high specific gravity (6·02) and its hardness (6·5) are also suggestive of that mineral. In microscopic fragments it transmits light and is dichroic, changing from a greenish yellow to brown with the plane of polarization of the light; the fragments, when examined in convergent polarized light, show a biaxal figure, the apparent axial angle being large (near 70°); the character of the double refraction is negative. There is only one well-developed zone of crystal-faces remaining on the fragment; it consists of two rectangular pairs of parallel faces (pinakoids) and of four prism faces (*m*), the faces of one pinakoid (*a*) being much larger than those of the other (*b*); the angle *am*, as determined by means of reflection, is about 44°, but the images of the signal are multiple and wanting in definition; the dispersion of the optic axes indicates that the system of crystallization is mono-symmetric. Two other faces form a re-entrant edge parallel to the larger pinakoid, and inclined to the edges of the well-developed zone, but whether this is really due to twinning or not is far from evident.

The above set of external characters suggested that the fragment does not belong to any of the known species, and it became necessary to determine its chemical behaviour, but on account of the necessity of preserving the natural faces of what might possibly be an unique fragment, this was a process demanding great caution; fortunately, the behaviour was such that it was practicable to determine the precise chemical nature of the mineral without interference with the crystal faces, or, indeed, any appreciable destruction of material. It will be sufficient to state here the result, namely, that the material is no other than crystallized zirconia; the technical details relative to both this mineral and Geikielite will be given in the next number of the *Mineralogical Magazine*. It is remarkable that, notwithstanding the wide prevalence of zircon itself (silicate of zirconium), the natural occurrence of the oxide of zirconium has not previously been noticed. For this new species I beg to suggest the name Baddeleyite, in recognition of the services of Mr. Baddeley to mineralogical science; but for his close scrutiny of the mineral products of Rakwana, the existence of the above remarkable species would doubtless have long remained unknown.

L. FLETCHER.

NEW BRITISH EARTHWORMS.

THE additions which I have been able to make to our list of indigenous Annelids during the past two years fall naturally into two groups. There are, first, two species which are new to science, and are therefore at present known only as British species. In addition to these there are several species which, while they have been recorded for various Continental stations, have never been found in England till I discovered them among the gleanings which I have passed under review from nearly every part of the country. I shall first of all give a description of the new species.

1. *Lumbricus rubescens*, sp. nov.

This is a genuine Lumbricus in the strictest sense of the word, as it is understood by all those who adopt Eisen's analysis of this group of worms published in 1873. The lip forms a perfect "mortise and tenon," with the first ring or peristomium, and the girdle consists of six segments, four of which bear the *tubercula pubertatis*. I first discovered it in Yorkshire in 1891, and have since then taken it myself at Hornsey in Middlesex, Tunbridge Wells, and Dallington in Sussex, while more recently I have received it from Avonmouth in Gloucestershire.

In general appearance it resembles the common earthworm (*L. terrestris*, L.), as recently defined and differentiated. It is slightly smaller in size, but frequents similar haunts, and might in most respects easily be mistaken for the type. It has the male pores on segment 15 on raised, pale papillæ; but the girdle invariably commences on segment 34, and extends to the 39th, while the band which forms the *tubercula pubertatis* extends over 35 to 38. Its general form and appearance will

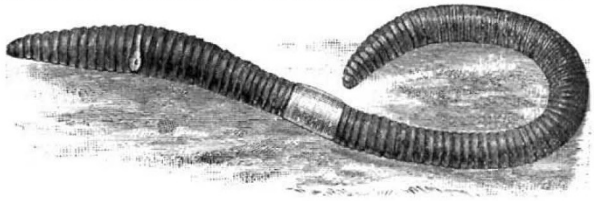

FIG. 1.—*Lumbricus rubescens*, Friend. Natural size.

be best understoood by the study of the woodcut (Fig. 1). Internally it does not differ from the other Lumbrici, but the dorsal pores commence between $\frac{5}{6}$. This makes the fourth true Lumbricus found in the British Isles, and it may be a convenience to collectors if I append a tabular statement of the features by which each is distinguished from the other.

Chart of the Genus Lumbricus.

Lumbricus	Segments occupied by the					Average length.	No. of segments.
	Girdle.	Tubercula.	First dorsal pore.	Papillæ.	Spermatophores		
Terrestris, Linn...	32—37	33—36	8	15, 26	? [1]	5 inches	150—200
Rubescens, Friend	34—39	35—38	5/6	15, 28	32/33	4 inches	120—150
Rubellus, Hoffm.	27—32	28—31	4/5	none	?	3 inches	110—140
Purpureus, Eisen	28—33	29—32	3/4	10 (11)	? [1]	2 inches	100—120

It will be seen that there is now a regular series in relation to the first dorsal pore, $\frac{5}{6}$, $\frac{6}{7}$, $\frac{7}{8}$, $\frac{8}{9}$, as well as in the matter of length from 2 to 5 inches and upwards, and number of segments from 100 to 200 or thereabouts. These points are worthy of note in the study of the evolution of worms.

2. *Allolobophora cambrica*, sp. nov.

This species, which I have since found in several parts of England, first came to my notice as a new species from Wales. Hence the specific name. I had previously assigned it to one or other of the related species, but eventually found on dissection that it was quite distinct from every other worm of which I have been able to obtain any description.

At first sight *A. cambrica* has all the appearance of the mucous worm (*A. mucosa*, Eisen). Its average length in spirits is about 2 inches, but when living, and moderately extended, it measures three inches. It is of a fleshy colour, with a somewhat transparent skin, so that the blood-vessels can be well observed between the girdle and the head. The dorsal pores are conspicuous in specimens which have been placed in methylated spirits, the first occurring between segments 4 and 5. The

[1] Vejdovsky and others mention the occurrence of Spermatophores on these species, but do not state the position. The point is one which should not be ignored.