being of interest in itself, also has reference to the important subject of denudation :—

"Little horizontal ledges, one above another, have been observed on steep grassy slopes in many parts of the world. Their formation has been attributed to animals travelling repeatedly along the slope in the same horizontal lines while grazing, and that they do thus move and use the ledges is certain; but Prof. Henslow (a most careful observer) told Sir J. D. Hooker that he was convinced that this was not the sole cause of their formation."

It is then shown that the initial cause of these ledges is the burrowing of earthworms. For,

"If the little embankments above the Corniche Road, which Dr. King saw in the act of formation by the accumulation of disintegrated and rolled worm-castings, were to become confluent along horizontal lines, ledges would be formed. Each embankment would tend to extend laterally by the lateral extension of the arrested castings; and animals grazing on a steep slope would almost certainly make use of every prominence at nearly the same level, and would indent the turf between them; and such intermediate indentations would again arrest the castings."

Thus, on the whole, it will be seen how important an agency in nature Mr. Darwin has shown the action of worms to be, so that, in his own concluding words, "it may be doubted whether there are many other animals which have played so important part in the history of the world as have these lowly organised creatures."

GEORGE J. ROMANES

OUR BOOK SHELF

The Atlas-Geography. By A. H. Macdonell. (London: H. K. Lewis, 1881.)

UNDER this title Mrs. Macdonell has attempted to supply what she believes to be a want long felt in teaching geography to young children. She finds, as every teacher finds, that children prefer the map to the book, and so she provides the means of teaching geography by means of an atlas. The Atlas-Geography consists of nine double maps. First we have in each case a coloured map with the leading names filled in, and facing it a list of the leading features in the map, countries, their divisions, towns, oceans, islands, capes, rivers, &c., which the children learn by heart, fixing at the same time their positions on the maps. Following this is a corresponding uncoloured map, without names, on which the children should be able to point out the features without assistance. Facing this is an interesting and simple descriptive account of the leading characteristics of the continent or country to which the map refers. It will thus be seen that in the hands of a painstaking and judicious parent or teacher the Atlas-Geography ought to prove a most valuable help in interesting children in the subject, and in enabling them to acquire the leading facts. The maps are well executed, clear, and not over-crowded; they are the World, Europe, Asia, Africa, Australia, North America, South America, the British Isles, and Palestine.

Gesammelte Abhandlungen und kleinere Schriften zur Pflanzengeographie. The collected treatises and shorter writings on Phytogeography of the late A. Grisebach, edited by his son, Dr. Ed. Grisebach. 8vo, pp. 628. (Leipzig: Wilhelm Engelmann.)

As the editor states in his preface, the present volume combines for the first time the numerous writings on phytogeography of the late Prof. A. Grisebach, spread over a period of thirty years, and scattered in various journals and publications, several of them very difficult of access.

Constant reference is made to many of these writings in the "Vegetation der Erde" (1872); hence their publication in a collected form is a great boon. In addition to those articles published previous to the "Vegetation der Erde," this volume contains the author's subsequent reports (1866-76) on the progress in the geography of plants. It also contains a biographical sketch of the late Prof. Grisebach, together with the bibliography of his works. An excellent French translation of the "Vegetation der Erde" appeared in 1874, but no English edition has been published, nor would we recommend the publication of one now, because the data that have been accumulating during the last decade would justify the publication of an original work, treating the subject from a different standpoint.

W. B. H.

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 ensure the appearance even of communications containing interesting and novel facts.]

The Solar Outburst of July 25, 1881

IN the interesting account of a solar outburst on July 25 contained in your last number (p. 508), Mr. Hennessey says that "unhappily the sun remained invisible till July 30." Referring to our sketches of the solar surface, I find that the nearest in time to the date of the outburst are those made on July 21 and 27. On the intervening days clouds prevented all solar work. The sketch on July 21 shows the groups in the [n p] quarter of Mr. Hennessey's disk, and that of July 27 gives those in the [n f] and [s f] portions, and also the two groups in the [n p] which were farthest from the centre on the 21st. There was certainly not the slightest trace on the 21st of the remarkable group which burst forth so suddenly on the 25th, and there can be very little doubt that the spots in the [n p] quarter on the 27th are identically the same as those in the [n f] quarter on the 21st. Drawings of the solar disk are made here on every available day, and the position of each spot is marked with the greatest exactness; but when the sky is cloudy, as on the 27th, it is not always possible to fill in all the details. The exact position of each spot is invariably marked before any details are sketched, and therefore, as the definition on the 27th was good, the group, which suddenly appeared near the centre of the disk on the 25th, must already have completely vanished. I might mention, in conclusion, that our magnetic photograms show no sign of any disturbance synchronous with the solar outburst.

S. J. PERRY

Stonyhurst Observatory, Whalley, September 30

On the Velocity of Light

WITH reference to Lord Rayleigh's article on the Velocity of Light (vol. xxiv. p. 382) I, and possibly others, find it difficult to follow him when he says, in the case of all the methods for determination of the velocity of light except the aberration method, that the velocity arrived at is the "group velocity," and not necessarily the "wave velocity." I, for one, should be glad of further exposition. Does not Foucault's revolving mirror experiment, for instance, measure the velocity of motion of the centre of the disturbance which is transmitted from mirror to mirror? And would it not be the case that, if the waves moved faster than the groups, new groups would be continually formed ahead, the old ones dropping out behind: so that the centre of the disturbance would not remain in any given group? Further, is any credence to be given to the result that blue light travels anything like 1·8 faster than red light, while this is unconfirmed by the colours of Jupiter's satellites? W. H. MACAULAY

Mountsorrel, August 29

An Aquatic Hymenopterous Insect

THE following circumstance may prove interesting, and probably new, to some of your entomological readers. On September

ber 10, in a gathering of pond-water made in this neighbourhood and brought home for microscopical examination, a somewhat singular and unusual object presented itself, but speedily making its way to the sediment at the bottom, it became lost to sight. Upon the evening of the 12th, or after the lapse of fully two days, while holding the bottle to the light, the same object again appeared, swimming or flying in mid-water with a peculiar jerky movement resembling that of some of the Entomostraca, and for one of which I at first mistook it. On removal by means of a dipping-tube to a zoophyte trough for fuller examination, it proved, to my great surprise, to be one of the small Hymenopterous flies of the Proctotrupid family, and here it continued its active movements, now walking and running upon the bottom and sides of the trough, now flying, as it were, through mid-water by the energetic movements of its wings, but apparently making no effort to escape. Examination thus proving no easy task while living, and fearing the loss of a specimen of habits so unique, I decided upon securing it permanently as a microscopical mount. With a minute description I need not now trouble you, but as neither in Westwood nor in any other of the authorities on such subjects at my command I can find any record of this singular fact having been hitherto observed, either in connection with the parasitic Hymenoptera or any other similar insects in the perfect state adapted apparently to an aerial life alone—that they should quit their natural habitat for so lengthened a sojourn in the water—I would make the inquiry as to whether any like occurrence has been noted by any of your other correspondents.

EDWIN POSTOCK

Stone, October 6

[Our correspondent Las had the good fortune to re-discover in this country the little Hymenopterous insect found almost simultaneously by Sir John Lubbock and Mr. Duchess in 1862, to which the former applied the name *Polynema notans* (*Transactions of Linnean Society*, vol. xxiv. part ii. p. 138, 1863). The insect is parasitic in its larval stage in the eggs of dragon-flies. A brief summary of its peculiarities is given in Lubbock's "Origin and Metamorphoses of Insects" (Macmillan and Co., 1874). More recently Prof. Westwood has suggested (*Transactions of Linnean Society*, second series, "Zoology," vol. i. part viii. p. 584, 1879) that the insect is scarcely a true *Polynema*, but rather an *Anaphes*, or the type of a new genus. A true Ichneumon (*Agriotypus armatus*) has long been known to be parasitic in caddis-worms, and therefore also aquatic in its habits.—ED.]

Practical Physics for Boys

IN Prof. Parker's very valuable and interesting paper (vol. xxiv. p. 54) 3 he says: "The consequences of setting large classes of young boys to make oxygen, or to take a specific gravity . . . each for himself, might prove rather subversive of order than conducive to improvement." It may be interesting to some of your readers to know that at Clifton College we have lately tried the experiment of turning some of our ordinary physics classes, numbering from twenty-four to thirty boys, bodily into the physical laboratory, where they work at weighing, measuring, finding specific gravities and such matters, under the control of a single master. The boys work in pairs, each with a little manual of instruction, and each pair with a separate cupboard of cheap apparatus. Two such classes are taken by Mr. Worthington and myself, and we are both agreed that whatever difficulties we may feel, we have none in the matter of discipline. On the contrary, the boys are with scarcely an exception most keen and eager at this work. I understand that similar classes in practical chemistry will shortly be set on foot by Mr. Shenstone in our chemical laboratory.

H. B. JUPP

Clifton College

A New Comet

I OBSERVED a telescopic comet in Leo on the mornings of October 4, 5, 6, and 10. The rough positions, as I estimated them, were R.A. 9h. 22m., Dec. 16° N. on the 4th, and R.A. 9h. 36m., Dec. 15° N. on the 10th. The motion is about 30' daily eastwards. When the present bright moonlight is gone the comet will be a fairly bright object in the telescope. At the end of the present week it must be looked for immediately preceding η Leonis.

When I saw it first, on the morning of October 4, it looked like a bright nebula, and I cannot understand how I missed it on the mornings of September 29 and October 1, when I had

carefully swept the same region for several hours before sunrise. The inference is that it is getting brighter. W. F. DENNING
Ashley-Down, Bristol, October 10

A Kinematical Theorem

SOME little time ago Mr. Kempe published in NATURE a theorem of interest in kinematics. I subsequently stated in the same pages that this theorem and all theorems of uniplanar kinematics are most simply and properly proved from the consideration that epicycloidal motion is the basis of all uniplanar motion—and that this is also the proper principle on which to base the theory of planimeters. It may not be out of place to occupy a few lines in NATURE with another curious kinematical theorem allied to Kempe's, which I have just found by this method. *If a plane, A, move about in any manner over a fixed plane, B, and return to its original position after any number of revolutions, all those right lines in the plane A which have enveloped glissettes of the same area, are tangents to a conic, and by varying the area of the glissette we obtain a series of confocal conics.* I use the term *glissette* under protest—"line roulette" would be better, as the former name is more applicable to a curve of another sort.

GEORGE M. MINCHIN

Foyal Indian Engineering College

Integrating Anemometer

MY attention was called to a letter on this subject in your issue of the 29th ult. (vol. xxiv. p. 510), though not in time to enable me to answer it last week. I take this opportunity of stating that the gentleman to whom the idea of the instrument was originally due, and who has defrayed the whole cost of its construction, is the Rev. J. M. Wilson, M.A., head-master of Clifton College (not Dr. Wilson, as mis-stated in the Association Journal at York and in your abstract). The objection that the air does not move "parallel to itself," by which I presume is meant in planes parallel to its general direction, does not apply to this any more than to any other cup anemometer. Only the horizontal component of the wind's velocity is sought, and this is given with tolerable accuracy. I have no means of knowing to what extent Mr. Burton's integrator resembles the anemometer in question, but it should be noticed that the two instruments are of a different kind and for a different purpose. Mr. R. Scott was in the chair when the paper was read at York, and joined in the discussion. Prof. Stokes was also present, and has since been in correspondence with me on the matter. Neither of these gentlemen, however, mentioned any other instrument as at all resembling it; indeed upon its being compared to that of Dr. von Oettinger, Mr. Scott took occasion to point out at least one important difference, viz. the cost.

H. S. HELE SHAW

University College, Bristol, October 10

Infusorial Parasites on Stickleback

MR. N. H. POOLE (NATURE, vol. xxiv. p. 485) is apparently right in anticipating that he has discovered either a new habitat for *Trichodina pediculus* or a new representative of that infusorial genus. Although hitherto regarded as a parasite only of the fresh-water polypes, *Hydra vulgaris* and *H. viridis*, I have recently obtained specimens of the type in question living as a parasite, or rather a commensal, on the branchial appendages of the larva of the common newt, *Triton cristatus*. An allied, but marine species, *Trichodina scorpana*, has been recently described by Prof. Ch. Robin, that infests in a similar manner the branchia of fishes belonging to the genera *Trigla* and *Scorpana*, and a further search will no doubt reveal a yet more extensive distribution of the Urceolariidae, including *Trichodina*, among the Piscine race. Mr. Poole will find full particulars of the data here referred to, together with an account and illustrations of all the forms so far relegated to this somewhat remarkable infusorial group, in Part V., p. 645 *et seq.*, of my "Manual of the Infusoria," just published.

W. SAVILLE KENT

The Dark Day in New England

REFERRING to your paragraph in last week's NATURE (p. 540) about the remarkable phenomenon which occurred in New England on September 6, I find in the recently-published "History of Lynn, Massachusetts," the following:—

"1716.—Extraordinary darkness at noon day October 21st; dinner tables lighted."

"1780.—Memorable dark day May 19th; houses lighted as at night."

CHARLES W. HARDING

Lynn, October 7