work which are clearly written and well illustrated. A little more space might have been given to the construction of bell indicators and to the maintenance and peculiarities of batteries, both of more importance to the wireman than the details of the manufacture of electric incandescent lamps. Also the distribution of lamps to give the best illumination, the use of globes and shades, and the ageing of incandescent lamps are all subjects on which wiremen would be wise to be informed, which are dealt with either inadequately or not at all. There is a question we should like to ask: Is Mr. Clinton correct in saying that the B.C. holder is known as the "bottom contact"? We had always thought that the letters stood for "bayonet cap," and certainly "bayonet holder" is much the more general phrase.

Finally, we may add that the book should be useful to the wireman entering for the City and Guilds examination in this subject; he will find it a valuable travelling companion as he proceeds to the examination room.

M. S.

The Common Spiders of the United States. By James H. Emerton. Pp. xviii + 225. (Boston, U.S.A., and London: Ginn and Company, 1902.) Price 6s. 6d. net.

THE study of spiders is probably less neglected in the United States than in Britain, for writers on general entomology like Packard and Comstock have included them in their works, and there are several valuable books on the subject. Still, spiders are less popular than butterflies or beetles, and Mr. Emerton has brought out the work before us, illustrated with no less than 501 illustrations in the text, in which he has given a very useful account of the commoner American spiders, classed under ten families. Mr. Emerton informs us that there are at least 300 or 400 species of spiders to be found in the neighbourhood of any city in the United States. The introductory matter is very good, dealing with structure, habits, collecting, &c., and the diagrams on p. ix, showing the undersurface of a spider and the front of the head, are particularly clear. So many families, genera, and occasionally even species of spiders are common to the United States and Europe that a student beginning to collect British spiders could not do better than use this book in conjunction with Miss Staveley's "British Spiders," before passing on to the more elaborate works of Blackwall and Pickard Cambridge.

Trees in Prose and Poetry. Compiled by Gertrude L. Stone and M. Grace Fickett, Instructors in State Normal School, Gorham, Maine. Pp. xi + 184; illustrated. (Boston, U.S.A., and London: Ginn and Company, 1902.) Price 2s.

THERE are many methods of nature-study in America, and in some more attention is given to the æsthetic and emotional sides of education than to the scientific. This little book is a collection of extracts from good writers showing that trees have often been the source of literary inspiration. It is good that children should become familiar with the best literature their country provides, and when at the same time they have their attention directed to the study of nature, the lesson becomes of increased value.

Chart of the Metric System. Constructed by Prof. C. Bopp. With a pamphlet of "Notes." Pp. 15. (London: Williams and Norgate.)

THIS diagram of the metric units of length, area and volume is printed on a sheet of paper about 3 feet 6 inches by 2 feet 6 inches. The various measures are shown full size. To be of the greatest use in class teaching, the chart should be used in conjunction with models, and fortunately these are to be obtained. With the aid of the "Notes," teachers should have no difficulty in making the idea of the decimal system easy of comprehension to their pupils.

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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 intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Vortex Spirals.

IT appears that a reference to Dr. W. M. Hicks's memoir on the properties of spiral fluid vortices (*Phil. Trans.*, 1898), inserted in the recent reprint of FitzGerald's Helmholtz lecture of January, 1896 ("Collected Scientific Writings," p. 353), has suggested the misconception that the idea of spiral vortices originated with FitzGerald and was subsequently developed by Hicks.

It is beyond doubt, from the context, that FitzGerald derived his knowledge of the possible existence and the properties of vortex spirals from the detailed discussion of vortex theories of matter and their difficulties, contained in Dr. Hicks's presidential address to Section A of the British Association in September, 1895; in this address, and in papers communicated to Section A, that striking extension of vortex theory was explained in illustration of the structure of optically rotational atoms. This is the more certain as Dr. Hicks's observations (*loc. cit.*) as to the possibility of the mutual absorption of a pair of Hill's spherical vortices (M. J. M. Hill, *Phil. Trans.*, 1894) were mentioned by FitzGerald in the same context. J. LARMOR.

October 13.

Bipedal Locomotion in Lizards.

THE accounts of bipedal locomotion among lizards contributed by Mr. E. A. Green and Miss R. Haig Thomas are of high interest. This peculiar method of progression has been recorded by me of the Australian lizards *Physignathus lescurei* and *Amphibolurus muricatus*, in addition to the frilled species *Chlamydosaurus Kingi*, all belonging to the Agamidae. More recently I have found by experiment that a member of the American greaved lizards, *Tupinambis nigropunctatus*, possesses a like bipedal habit, and have been informed by a correspondent, Mr. H. Preston, that the same locomotive peculiarity is commonly manifested by the allied form *Amiaeva Surinamensis* and also by sundry species of the typical iguanas. Another correspondent has informed me that that singular iguanoid the basilisk is likewise bipedal, not only on *terra firma*, but that it will also run rapidly over the surface of water in an erect position. As is the case with the long-toed aquatic birds the jacanas, the feet of the running lizard are most probably in this case supported in transit by a more or less substantial substratum of water plants.

The bipedal progression attributed to *Lacerta viridis* and an allied form is, as compared with that of the above-named species, relatively incomplete; the tail is not raised clear from the ground during locomotion, and neither is the erect attitude sustained for any duration of time. The conspicuously greater length of the hind limbs that characterises all those species of which sustained bipedal locomotion has been recorded is a prominent feature in many other types which will probably be found to possess the same habit. Among these, members of the agamoid genera *Gonioccephalus*, *Otocryptis*, *Japalura* and *Calotes*¹; some of the Anolids, *Uraniscodon* and others among the Iguanidae, and *Cnemidophorus* belonging to the Teiidae, may be indicated as likely to yield affirmative evidence in this direction. W. SAVILLE-KENT.

Milford-on-Sea, October 9.

Theories of Heredity.

IS there not room for some provisional hypothesis which shall include both Galton's and Mendel's ideas, which are not necessarily antagonistic, but may turn out to be as simultaneously true as the laws of Boyle and Charles, so that the final results may be of the nature of a product or resultant? I mean that instead of drawing a hard-and-fast line between "recessive" and "dominant" characters we may suppose that these differ like heat and cold, in degree but not in kind. So that "dominance" may be measured on some scale from 0 upwards, the measure of dominance being perhaps a function of the number of generations for which a character has been established.

¹ Since writing this letter, a confirmation of my anticipation in the case of this genus has been recorded in NATURE for October 9 by Mr. N. Annandale.—W. S-K.

To take an instance. Last year (1901) I carefully hybridised two varieties of the sweet pea, using lens, paint brush and muslin nets. One variety used was "Gorgeous," of a salmon-orange colour. It is described in Burpee's catalogue as an improved "Meteor," and "Meteor" was brought out by Eckford about 1893. The other variety was a new cream white, Eckford's "Mrs. Kenyon," novelty of 1901.

The seeds formed were some pale and some dark, the colour following that of the mother parent. None of the flowers of the offspring have been cream-coloured; the seeds borne on "Mrs. Kenyon" by pollen from "Gorgeous" have all yielded purple flowers unlike either immediate parents, but probably taking their colour from the known remote purple ancestor of our sweet peas. Of seeds borne on "Gorgeous" by pollen from "Mrs. Kenyon," eight plants yielded flowers like "Gorgeous," but ten of the plants yielded purple flowers.

Here the dominant purple appears to be due to the previous long ancestry; the salmon variety of ten years' standing has several representatives, but not one single cream flower stands for the 1901 novelty.

Bootham School, York.

HUGH RICHARDSON.

The Fertilisation of Linum.

In the *Proceedings* of the Academy of Natural Sciences of Philadelphia for 1902, pp. 33-36, is a very interesting paper by the late Mr. Thomas Meehan, treating of some points in the life-history of certain plants. On p. 36, Mr. Meehan says:—"Mr. Darwin once stated that one might as well use organic dust as to endeavour to get seeds of *Linum perenne* by the aid of its own pollen. I found *Linum perenne* of our Rocky Mountains abundantly fertile with own-pollen, and said so in one of my papers." As some anti-Darwinian will probably make much of this statement, it is as well to say that the Rocky Mountain plant is a distinct species, *Linum lewisii*, Pursh.

In the same paper, Mr. Meehan has some very interesting remarks on the fertilisation of *Lobelia*, and shows that the Bartram Oak, *Quercus heterophylla*, Michaux, is not a hybrid, but a mutation (quite of the DeVriesian sort) of the pin oak. It will therefore be called *Quercus palustris heterophylla*. Mr. Meehan attributes such variations to "varying degrees of vital energy," and supports this view by calling attention to the fact that in the ivy, for instance, the leaves may at first be more or less lobed, but become wholly entire later on, in the same individual plant. One also recalls the great difference between the early and late leaves of many Malvaceæ, and of species of *Eucalyptus*. It is to be remarked, however, that these differences occur in a regular manner, and their order cannot be reversed.

T. D. A. COCKERELL.

East Las Vegas, New Mexico, U.S.A., October 7.

Retention of Leaves by Deciduous Trees.

HAVING followed the interesting discussion relating to the deferred shedding of their leaves by young beeches, it seems to me that something yet remains to be said, though, as I take it, P. T. (NATURE, May 15) has come very close to the solution. The phenomenon is common here also, and much more of the same kind can be seen. The maturing of leaves appears to be retarded by two causes. In older trees the lower branches with their leaves come late to maturity by reason of the tendency of the energy of growth to expend itself toward the higher branches. With young trees, and especially such as are cultivated late in the season, maturity of the fresh growth is slow by reason of excess of vegetative activity. In both there is failure to mature the abscission layer of cork at the base of the petiole and consequent retention of the leaves. In seasons of early autumnal frosts, the late-growing and imperfectly lignified parts of trees are the first to suffer.

D. T. SMITH.

Louisville, September 25.

THE SCOTTISH ANTARCTIC EXPEDITION.

THE Antarctic summer of 1902-3 will see the unprecedented number of five exploring steamers at work on the edge of the southern ice, and three of these under the British flag. The fifth expedition is on the point of departure, and it promises to be by no means the least important, its equipment for some branches of research being remarkably complete. An objection may

perhaps be taken to the name given to this expedition—the Scottish National—for, so far as we are aware, no public body or learned society in Scotland has been asked to accept any responsibility and none has claimed any credit in the matter; we fear, too, that the number of subscribers is not great enough to indicate any widespread interest amongst the people of Scotland. To Mr. W. S. Bruce is due the whole credit of planning the expedition, arranging all details of equipment and organisation, and beating up subscriptions with a pertinacity which has deserved and commanded success. He now goes out as leader of the expedition, his enthusiasm in all branches of science and his unequalled experience of work in the ice of both Polar zones justifying hopes of good results. In a very full measure it is Mr. Bruce's expedition. Next to him, honour is due to the small number of munificent subscribers, all, we believe, Scotsmen, whose generosity has made the enterprise possible. The expedition is in truth Scottish throughout, but without the formal recognition and support of the leading learned societies it cannot rightly be considered national.

In a paper read to the British Association at the recent meeting in Belfast, Mr. Bruce gave details of his plans and equipment, and on this authoritative statement we base the following remarks.

While the British national expedition on the *Discovery* and the German national expedition on the *Gauss* are devoting attention in the first place to magnetism, for the study of which the ships were specially designed, and the Swedish expedition in the *Antarctic* is in large measure geological, the Scottish expedition will be mainly devoted to oceanography and meteorology. Other branches of science will, of course, be attended to in each case, and Mr. Bruce has made ample provision for turning all opportunities to account.

The ship for the expedition was an old Norwegian whaler, the *Hekla*, which might possibly have made a Polar voyage in her original state; but, on examination, it was found desirable practically to reconstruct her so as to render her absolutely safe in any circumstances that can be foreseen. She was accordingly stripped of her outer skins and resheathed, fitted with new masts and spars, and her whole internal arrangements and deck-plan remodelled, from the designs of Mr. G. L. Watson, by the Ailsa Shipbuilding Company at Troon. Her name suffered a similar sea-change, and she is now the *Scotia*. A vessel of about 400 tons, she is 140 feet long with 29 feet beam, and draws 15 feet of water. She has graceful lines, is barque-rigged, and is fitted with a new engine and boiler which have proved able to propel her at the rate of eight knots, while she is confidently expected to prove a fast sailer.

The leader, captain and scientific staff will occupy an after deckhouse, the officers will be berthed amidships and the crew forward. A large deckhouse has been built amidships containing the galley and also a large, well-lighted laboratory, where most of the scientific work will be carried on. It communicates with a zoological laboratory on the deck below, adjoining which there is a photographic dark-room. This lower deck contains two great drums each carrying 6000 fathoms of cable (presumably of steel wire, as each drum weighs six tons), which is led up to a 40-horse-power steam winch on the upper deck, and is to be used for trawling and trapping in the deep sea. Ample sounding wire is also carried. On the after deck, a special petrol engine is employed for working the winch for winding in the great meteorological kite specially designed and constructed by Mr. John Anderson, of Edinburgh, but of which no description has yet, so far as we are aware, been published. A full equipment of meteorological and oceanographical instruments of the best patterns has been provided.

The expedition has been fortunate in securing the services of Mr. Thomas Robertson, of Peterhead, as