

In glancing through the geological portion errors of fact, such as that palms are oolitic, are seen to be numerous. The confidence too with which the exact succession of dicotyledons in geological time is set out is not warranted by the present state of our knowledge. We read the oft-repeated theory, now stated as fact, that *Apetalæ* preceded *Polyptalæ*, and these *Gamopetalæ*. That this succession really took place, however probable in itself, is, it is well known, far from proved. The actual flowers discovered in the lowest eocene—almost the oldest dicotyledonous flowers known—are *Gamopetalous*, and have been referred to *Porana* and *Symplocos*. The abundance and differentiation of the *Papilionaceæ*, the *Casalpinaceæ*, and the *Mimosæ*, show how ancient are the *Polyptalæ*. Any preponderance we may fancy the wind-fertilised *Apetalæ* possess is due to the fact that most of them are forest trees, and it is the leaves of these which form the great mass of the known dicotyledonous floras. Were those divisions really produced in the sequence assigned them, the origin of all alike is far older than the eocene and at present unknown to us: so that even thus the writer of the book is in error.

A most unfortunate selection of illustrative genera of eocene plants has been made. *Azaleas* did not abound in the eocene, and have never even been met with in it. Neither did the cactus nor aroids, since they have been but recently noticed in the eocene, and then only in England. In like manner the "peculiar" feature attributed to the miocene, its gathering together in the same flora plants now only found at immense distances apart, is not a peculiarity of that formation, since it characterises eocene floras in at least an equal degree. Chapter IV., on the geographical distribution of flowers, deserves especial mention, but must be consulted itself should any one desire to learn (p. 80) how "the *Proleaceæ* became Australian, the magnolias and tulip-trees chiefly North American."

Looking at the more botanical part of the book, it is seen that the explanations of the modifications and appliances of flowers to insure fertilisation are in some cases not treated with the caution the subject requires. To select an instance: the theory that white flowers open more than any others at night, because they are the most visible to moths, seems probable at first sight; but the unscientific reader, to whom the work is addressed, wishing to see for himself, would reject it after his first walk down a hedgerow at eventide, when he found the dog-rose, the white convolvulus, and the daisy, all closed. Why, too, white flowers, if they rely upon their colour to attract, should be also the most powerfully scented, is not explained. It is likely that perfumes would be more necessary to the dark-coloured flowers which are open at night, unless we suppose, which from experience we of course should not, that only white flowers are fertilised by night-flying moths. Persons whose experience of flowers is confined to ordinary English gardens would remember the heliotrope, the mignonette, musk, yellow azalea, wall-flower, rose, coloured pink, hyacinth, violet, scented verbenas, scented geraniums, as the most highly-perfumed plants, and would reasonably doubt that any exceptional attractions in this respect belong to white flowers. In comparison with perfume, the white colour may have little to do with it, but Mr. Taylor must have remarked that some law gives vastly superior brilliance to butterflies and day-flying moths and insects, and this law may also require that flowers which only open at night should, like insects which only fly at night, be white or comparatively very subdued in colour.

J. S. G.

Elements of Descriptive Geometry. By J. B. Millar, B.E. (Macmillan, 1878.)

THANKS to Messrs. Kempe, Hart, and other writers on Linkages, we are able "*Curvo dignoscere rectum*," and

"Parallels design Sure as Demoivre" could. The title of the work before us shows that it is not concerned with such elementary details as those which most naturally find a place in works on practical geometry. Charles in describing the aim of Monge's great discovery, says:—"La géométrie descriptive, en effet, qui n'est que la traduction graphique de la géométrie générale et rationnelle, sert de flambeau dans les recherches et dans l'appréciation des résultats de la géométrie analytique; et par la nature de ses opérations, qui ont pour but d'établir une correspondance complète et sûre entre des figures effectivement tracées sur un plan et des corps fictifs dans l'espace, elle familiarisa avec les formes de ces corps, les fit concevoir idéalement, avec exactitude et promptitude, et doubla de la sorte nos moyens d'investigation dans la science de l'étendue." Mr. Millar's book is a very serviceable exposition of the subject as thus described, and he has prefixed a short introduction on solid geometry. A good English text-book on this branch (solid geometry) is yet a desideratum. The plan on which the figures are arranged and drawn is, we think, likely to aid the student in his working out the propositions in the text.

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.]

Hughes's Microphone

MR. EDISON finds a resemblance between his carbon telephone and my microphone.

I can find none whatever; the microphone in its numerous forms that I have already made, and varied by many others since, is simply the embodiment of a discovery I have made, in which I consider the microphone as the first step to new and perhaps more wonderful applications.

I have proved that all bodies, solid, liquid, and gaseous, are in a state of molecular agitation when under the influence of sonorous vibrations, no matter if it is a piece of board, walls of a house, street, fields, or wood, sea or air, all are in this constant state of vibration, which simply becomes more evident as the sonorous vibrations are more powerful. This I have proved by the discovery that when two or more electrical conducting bodies are placed in contact under very slight constant pressure, resting on any body whatever, they will of themselves transform a constant electrical current into an undulatory current, representing in its exact form the vibrations of the matter on which it reposes; it requires no complicated arrangement and no special material, and to most experimenters the three simple iron nails that I have described form the best and most sensitive microphone. But these contact points would soon oxidise, so naturally I prefer some conducting material which will not oxidise.

Mr. Edison's carbon telephone represents the principle of the varying pressure of a diaphragm or its equivalent on a button of carbon varying the amount of electricity in accordance with this change of pressure; it represents no field of discovery, and its uses are restricted to telephony.

The three nails I have spoken of will not only do all, and that far better than Edison's carbon telephone in telephony, but have the power of taking up sounds inaudible to human ears, and rendering them audible, in fact a true microphone; besides it has the merit of demonstrating the molecular action, which is constantly occurring in all matter under the influence of sonorous vibrations.

Here we have certainly no resemblance in form, materials, or principles to Mr. Edison's telephone. The carbon telephone represents a special material in a special way to a special purpose.

The microphone demonstrates and represents the whole field of nature, the whole world of matter is suitable to act upon,

and the whole of the electrical conducting materials are suitable to its demonstrations.

The one represents a patentable improvement, the other a discovery too great and of too wide bearing for any one to be justified in holding it by patent, and claiming as his own, that which belongs to the world's domain.

D. E. HUGHES
London, July 2

Insects Corroborative of the Nativity of Certain Plants

WHETHER certain plants are, or are not, natives of Britain is a question that often exercises botanists, and any new evidence on the subject is always acceptable. It has recently occurred to me that a certain kind of evidence may be obtained by studying the insects attached to such plants. The question is one of interest not only to phyto- but also to zoo-geographers; for if the species of plant to which an insect is restricted is proved not to be indigenous then the insect cannot be indigenous either. If, on the other hand, the plant is only doubtfully an alien, and the insect is not one that might be easily introduced, then the probability is that the plant is a true native.

The plant that has suggested this idea to me is the wild or yellow balsam, *Impatiens noli-me-tangere*. This plant is reported from twenty-seven counties or vice-counties, but in most of these it seems to be admittedly an "introduction." Mr. H. C. Watson, the indefatigable author of the "Cybele Britannica," &c., seems to think that its claim to being indigenous is very slight, for he writes ("Topographical Botany," part 2, p. 607):—"If the *Noli-me-tangere* be really native here it must be so very locally: say, in North Wales and Westmoreland." Sir J. D. Hooker ("Student's Flora," first edition, p. 80) says, "Probably wild in North Wales, Lancashire, and Westmoreland;" Prof. Babington ("Manual," seventh edition, p. 72) does not mark it as an introduction, but Hooker and Arnott ("British Flora") regarded it with doubt; finally Hudson ("Flora Anglica," 1762, p. 332) thought it in his day truly wild in Westmoreland. It is evident, therefore, that the *Impatiens noli-me-tangere* is looked upon with suspicion by many of the present race of botanists, and probably rightly so in many of the "stations."

There are two species of Lepidoptera attached to this plant, and, I believe, restricted to it. One of these—*Lygris reticulata*—has been for a number of years known as a native of Westmoreland, where, on the banks of Windermere, it occurs very rarely. Its connection with the *Impatiens* in this country was not, however, known till very recently, when Mr. J. B. Hodgkinson, a well-known Yorkshire naturalist, traced it to its headquarters amongst the plant, where he also, still more recently, found the other Lepidopteron—*Penthina postrema*—which is attached to the balsam. Both of these insects are far from common (though *Lygris reticulata* is, like its food-plant, widely distributed—even as far as Siberia), and their occurrence in Westmoreland seems to me conclusive that the *Impatiens* is really indigenous there.

As apparently opposed to my theory, it must not be forgotten that there are several plants, certainly introduced into Britain, which have insects attached and restricted to them. Amongst others are the spruce-fir and the larch. On the spruce the following insects occur: *Eupithecia togata*, *Semasia nanana*, *Asthenia strobilella*, *Coccyx hercyniana*, &c., and on the larch *Eupithecia lariciata*, *Boarmia crepuscularia*, *Spilonota lariciana*, *Coleophora laricella*, &c. But it must be remembered that the spruce and larch are perennial trees (while the *Impatiens* is an annual plant), and that they are frequently imported in the form of young trees, or as undressed timber, and sent hither and thither all over the country. Hence the insects attached to them have many chances of being introduced, and of establishing themselves where the conditions are favourable.

It is possible that some of the insects I have last mentioned may have transferred themselves from the native coniferæ to the introduced ones, but I do not think this is likely. A few species live on the introduced as well as the native trees, as, for example, *Myelois abietella*, upon scots-fir and spruce, and the rare beetle *Dendrophagus crenatus*, upon scots-fir and larch, as I noticed when investigating the natural history of Aberdeenshire some years ago.

It is desirable that all the "stations" in which there is any doubt about the introduction of the *Impatiens* should be searched for the insects mentioned above, for it is not likely that they

are confined to Westmoreland; and should they be found in any other locality, the probability is, it seems to me, that there the plant is really indigenous.

F. BUCHANAN WHITE
Perth, July 5

Physical Science for Artists

SOME years ago, in Madeira, we had been watching a glorious sunset from the hills above Funchal; and, on turning to go eastward, we saw the sky before us suffused with a bright rosy tint, which ended abruptly beyond the Desertas, at some little distance above the horizon-line of the Atlantic.

At first it did not occur to us what was the cold blue-grey form that rose into the pink flush above, slowly losing its definition of outline as it gradually grew higher.

But this strange silhouette had so distinctly mountain outlines that, almost at once, we recognised the fact that we were looking at the shadow of Madeira cast by the setting sun on the mist.

This phenomenon may not be unusual, but I do not recollect having seen it described; and it is perhaps sufficiently different from the phenomena described by Prof. Brücke and Mr. F. Pollock to be worth recording.

G. HUBBARD

Remarkable Form of Lightning

I AM able to confirm the fact that lightning occasionally takes the "punctuated" form described by Mr. Joule in NATURE, vol. xviii. p. 260. Some forty years ago, in a thunderstorm which I had the good fortune to witness at Ampton, in Suffolk, the lightning (with heavy rain) was almost incessant for half an hour or more, and about a quarter of the flashes (speaking from memory only) presented this unusual appearance. I have often looked out for it since, but only once with success, and then it only showed itself in a single flash out of many. On both occasions the "punctuated" flashes presented in general a curved or sinuous line without sharp angles; and two or three of them in the first-mentioned storm appeared to my eye as closed curves, one an almost perfect figure of 8; but their dazzling brightness made it impossible to speak to this with certainty.

London, July 8

E. J. LAWRENCE

Microscopy. The Immersion Paraboloid

THE immersion paraboloid illuminator exhibited at the recent *soirée* of the Royal Society as designed by me, proves to have been anticipated in principle and construction by Dr. John Barker, of Dublin, from whom a paper on the subject will be found in the *Proceedings* of the Royal Irish Academy for 1870.

An immersion paraboloid illuminator was also described by Mr. Wenham in the *Transactions* of the Royal Microscopical Society for 1856. My paper on the subject appeared in the *Monthly Microscopical Journal* for August, 1877, but that journal being defunct, I ask you to allow me to credit these gentlemen with a priority which, on perusing their papers, I find to be due to them. I ought to add that, until the construction by Messrs. Powell and Lealand of my illuminator, the device had never come into practical use, and that, so far as I can learn, no reference to it exists in any optician's catalogue or textbook on the microscope.

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Review of Henfrey's Botany

ALLOW me to correct an error which Mr. Bennett has made in his review of "Henfrey's Elementary Course of Botany" (NATURE, vol. xviii. p. 217). He adds a note as follows:—

"Evidently by an error of the press, the continued fraction of which the most common angles of divergence are successive convergents, is given as $\frac{1}{2} + \frac{1}{1} + \frac{1}{1}$, instead of $\frac{1}{2} + \frac{1}{1 + \frac{1}{1}}$, &c.,

a correction needful to render the sentence intelligible to the student."

My note (p. 44) is as follows:—

"The mathematician will observe that these fractions are the successive convergents of the continued fraction $\frac{1}{2} + \frac{1}{1} + \frac{1}{1}$, &c."

I subjoined it for the sake of mathematical students only, who would know what Mr. Bennett does not seem to be aware of, that the method of writing the continued fraction I have adopted,