

also seen another specimen of the same description. Can it be that these two specimens have been manufactured by Malays for whetstones out of the so-called thunder-stones? I cannot account for them in any other way; they are too slight for hammers.

For my part, I have always found the Sakaies especially wanting in every respect as to traditions beyond the memory of their own generation, and they have invariably answered my inquiries as to the origin of the stone axes by saying, like the Malays, that they are thunder-stones. To such an extent is this belief held by Malays, that the other day a Malay of considerable social standing assured me that once a cocoa-nut palm was struck by lightning close to his house, and that about a month afterwards he searched about the roots of the tree and found the thunder-stone which was the cause of the damage: it was this man's father who for several years kept a fire alight in his house, which fire was generated from the same tree after it had been struck by the electric current.

I have already drawn attention to the Malay belief as to these so-called thunder-stones (NATURE, vol. xxxii. p. 626). My specimens are all in the Perak Museum at Thaiping.

Kinta Perak, April 5

A. HALE

On a Thermo-electrical Phenomenon in Connection with Prof. Balfour Stewart's Paper on Terrestrial Magnetism

IN the *Philosophical Magazine* for May Prof. Balfour Stewart, in his paper "On the Causes of the Solar-Diurnal Variation of Terrestrial Magnetism," takes in one place (p. 443), for an example, the case of "an ordinary electric circuit, say of a circular shape, and horizontal, and heat it by causing some source of heat, such as a lamp, to travel slowly around it with a definite rate of progress." He goes on to say that no current due to the heating will take place. So it would generally be thought. If, however, the experiment be even roughly tried, at all events with an iron or nickel wire, the contrary takes place. An account of the experiments, &c., which I have made on this subject, was read before the Royal Dublin Society on March 24, and will, in the course of time, be printed in the Society's *Proceedings*. Though there is a current in a wire on causing a heated portion to travel along it, it seems unlikely from the nature of the phenomenon that it could in any way be inferred that the higher air would similarly affect a current under the sun's heating.

FRED. S. TROUTON

Physical Laboratory, Trinity College, Dublin

Do Migratory Birds Return to their Old Haunts?

MUCH evidence has been given by naturalists to prove that birds of passage return to their old haunts. The following, I think, may be of interest to some of the readers of your valuable paper. For the past two springs a cuckoo gifted with a decidedly peculiar note has visited this neighbourhood. Within the last fortnight it has again arrived. Its song consists of three clear distinct notes, cuck—coo—coo, the second note being a semitone above the last. This it never varies. We all know that towards the end of its sojourn the cuckoo suffers from hoarseness, or, as the country people say, "changes its tune." Although this bird suffers in a similar way, yet it still maintains its peculiar song—three notes. As far as I can ascertain, it does not wander beyond the same limits—from the park here to a little hill about half a mile distant. I think these facts not only conclusively prove that the cuckoo returns to its old quarters year after year, but that it also restricts itself during its stay in this country to the same locality.

F. C. TAYLOR

Summerleaze, East Harptree, May 13

The Poison of the Stinging-Nettle

IN the interesting article in your issue for May 6 (p. 5), on "Plants and their Defences," there is one sentence on which I should like to be allowed to offer a few remarks. It runs thus:—"This fluid [of the stinging-gland of the stinging-nettle] is generally conjectured to be formic acid—a view based on the fact that this acid can be obtained from the nettle-plant by suitable means." Does this "conjecture" rest on any other basis than the similarity of the effect produced by the sting of the nettle and the bite of the ant? I am inclined to think not. Certainly the fact that formic acid can be obtained from the nettle-plant is not in itself a cogent argument, seeing that it has

been shown that this acid is a widely-spread constituent of the cell-sap of living plants. The formic acid theory is also out of harmony with the fact that the fluid contained in the stinging-glands of the nettle has frequently, if not always, an alkaline reaction. It seems strange that we have at present no trustworthy observations on so interesting a question. Can none of our physiological chemists come forward and remove it from the region of conjecture?

ALFRED W. BENNETT

St. Thomas's Hospital, May 13

What is Histioderma?

CAN any of the readers of NATURE inform me to what class of fossil organisms belongs the genus *Histioderma*? Mention of the name—but of the name only—is made by Sterry Hunt in this journal, vol. vi. (1872), p. 54, and by Hicks in the *Quarterly Journal* of the Geological Society of London, vol. xxix. part 1, 1873, table facing p. 42. It does not occur in Broun's "Index Palæontologica," in Pfeiffer's "Nomenclator Botanicus," nor in Scudder's "Zoological Nomenclator." The name is not to be confounded with that of Carter's genus, *Histoderma*, established 1874, for recent sponges.

S.

Leyden, May 15

ON THE INFLUENCE OF FORESTS ON THE CLIMATE OF SWEDEN¹

A VALUABLE Report on this subject has been prepared by Dr. H. E. Hamberg, and printed as an appendix to the Report of the Forest Commissioners of Sweden for the year 1885. The observations were commenced in 1876, on the principles established by Dr. Ebermayer in Bavaria, but Dr. Hamberg soon found that the mere comparison of the results obtained at the forest station with those yielded by its sister station in the open country was insufficient to bring out all the peculiarities of forest influence, and accordingly he added a third class of station, situated in a clearing in the forest itself (*öppen plats i skogen*). The various results of these observations are discussed in a very exhaustive manner, and we must refer those interested in the subject to the Report itself. The author's conclusions, however, are very interesting, and are reproduced here in full.

"Our researches do not allow us to determine whether the presence of the forests on the whole contributes to increase or diminish the quantity of heat in the atmosphere, that is to say, to raise or lower its temperature. In fact, we have been entirely unable to take into account either solar radiation or the radiation from the needles² and the points of the trees. Until we are able to ascertain the quantity of heat which escapes from these surfaces, and its relation to that escaping from other surfaces, it is quite impossible to determine with certainty the influence of the forest on such an important subject as the mean temperature, and must confine ourselves to approximate estimations. Among the various surfaces which are met with in Sweden the most important are assuredly water, bare ground or rock, soil covered by herbage, and finally forest. Neither the surface of the lakes and sea nor the bare soil of town streets have any resemblance to the forest: the climate of the latter bears no similarity to a maritime climate or a town climate. A forest may best be considered as an instance of vegetation on a gigantic scale, as is evident from the low temperature of the ground under the trees, and the freshness of the air in summer, especially in the evening and at night-time, thus affording evidence of active radiation. In this case the forest would be a source of cold rather than of heat. But here we are simply dealing with suppositions.

"From this point of view a forest is distinguished from all the other surfaces we have mentioned, in that it extends into a stratum of air lying far above that in which man lives and carries on all of his occupations which depend on

¹ "Om skogarnes inflytande på Sveriges klimat." From *Quart. Journal Roy. Mel. Soc.* for April 1886, communicated by Mr. R. H. Scott, F.R.S.

² The forests dealt with were entirely of pines and firs.

climate, such as agriculture, &c. It should follow from this that whether the annual result of the presence of a forest be an excess or a defect of heat, the one or the other should, thanks to the winds, be communicated to a greater mass of air, and be less sensible in the stratum close to the ground. The thermic properties of other surfaces are more immediately available in the lower stratum, and consequently, from the practical point of view, exert a greater influence on the temperature of the earth and of its immediate vicinity.

"If, then, we confine our consideration to that which from the practical point of view is perhaps the most important, the influence of forests on the state of temperature in the stratum in which man generally lives, in so far as this can be determined in the ordinary way by thermometers, I think that our reply for this country (Sweden) will be less uncertain, and it is as follows:—

"In the districts of our country which are open and are cultivated, during the annual interval of cultivation, a forest lowers the temperature of air and soil during evenings and clear nights, restricting the period of daily insolation; and thereby checks vegetation.

"The other influences of forests on temperature are either so slight that they possess no practical importance, as, e.g., the moderation of cold in winter, or else are of such a character that they elude the ordinary mode of observation by thermometers. Among the effects of this nature we may mention the well-known fact that forests afford shelter against cold and violent winds to vegetation which would suffer from these winds, or to objects whose temperature is higher than that of the environment, as for instance the human body. It is in this last respect that the Swedish saying is true, namely, that 'the forest is the poor man's cloak.' In certain cases it may also yield protection against the cold air or fog which on cold nights comes from districts in the vicinity which are visited by frost. The advantages on the score of temperature derivable from the forest may therefore be considered to resemble that obtainable from a wall, a palisade, a hedge, or any object of that nature.

"On the one hand a forest, where it is close at hand, offers mechanical protection against cold and violent winds. On the other hand, it does injury either by retaining the solar heat required by crops, or by lowering the temperature of the soil during clear nights, and thus favouring the development of hoar-frosts. At a distance forests have no sensible influence on the climate of Sweden.

"If we wish to put these results to a practical application, it is impossible to say in general whether one should, or even could, clear the forest without injuring agriculture. But it appears that as regards the temperature, if we disregard the utility of forests in other directions, we might make extensive clearances without any prejudice to agriculture. It is certainly not a mistake to say that our best cultivated districts are the freest from wood, nor is it a mere chance that the harvests are, on the whole, more sure in the open country than in the forest. In the event of a bad harvest it is, as I well know, the wooded districts which have suffered most. At the same time I must at once admit that these provinces are also influenced by other powerful physical factors, possibly even more active than forests, such as an elevated situation, a bad soil, the presence of swamps, &c. But nevertheless it appears to me, after all that has been said in the preceding pages, that the forest has some bearing on the subject.

"At the present day, the words spoken 130 years ago by Pastor P. Högström, and at that time member of the Swedish Academy, are very generally applicable, inasmuch as it has been found that cultivation can to a great extent remove from a district its tendency to hoar-frost; this same result has frequently been obtained by draining or by clearing the forests, particularly those of deciduous timber, where the fogs, especially those which bring on

frosts, appear to have their origin and their aliment. On the contrary, a pine forest is an excellent shelter against cold, especially when it can stand between the country and marshes or surrounding districts where the cold has its rise. If, however, the forest interferes with sunshine and with wind, it should be cleared. It results, therefore, that while in some districts the clearing of a forest has been beneficial in averting hoar-frost, in others the result has been directly the opposite."

RESULTS DEDUCED FROM THE MEASURES OF TERRESTRIAL MAGNETIC FORCE IN THE HORIZONTAL PLANE, AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1841 TO 1876

SIR GEORGE AIRY has recently published a valuable and extensive series of diagrams representing the diurnal changes in the magnetic forces in the horizontal plane at Greenwich between 1841 and 1876. In an introduction, the ex-Astronomer-Royal gives a short statement of the circumstances under which the magnetic work was undertaken at Greenwich, and the various changes which have taken place. With regard to the curves here brought together he writes as follows:—

The form of the curves, and the position of the points on them corresponding to hours of solar time, leave no doubt that the diurnal inequality is due mainly—and, as far as I can judge, entirely—to the radiant heat of the sun; and, it would seem, not to its heat on the earth generally, but to its heat on points of the earth not very distant from the magnets. In the hot months of the year the curve, though far from circular, surrounds the central point in a form which, as viewed from that central point, never crosses itself, and is, generally speaking, usually symmetrical with regard to E. and W. But in the cold months the space included in the curve is much smaller, in many cases probably not one-fifth of what it is in the summer months; and the curve often crosses itself in the most bizarre fashion, with irregular loops at these crossings. In the summer months there is a certain degree of symmetry; but here is, constantly, a preponderance on the west side, which leads me to imagine that the magnetic effect of the sun's heat upon the sea is considerably greater than the effect on the land.

To obtain some numerical basis for a report which, though undoubtedly imperfect, may convey some ideas on this wonderful subject, I have adopted the following course. I have confined myself to the months of June and July as probably the two hottest, and the months of December and January as probably the two coldest. In each of the curves applying to these months I have laid down a system of rectangular co-ordinates corresponding to the Greenwich astronomical meridian, and the line at right angles to the meridian (the geographical E. and W.). The extreme north ordinate and the extreme south ordinate were measured, and their sum taken, and interpreted by a scale of measure formed in accordance with the theory of the instruments, and this interpretation forms the "range of meridian force in terms of the mean horizontal force." In the same manner, the "range of transversal force" is measured. As the time of each two-hourly or hourly result is marked on the curve, there is no difficulty in fixing approximately on the solar times corresponding to the extreme N. and S. values and the extreme E. and W. values mentioned above. These are all the elements of the magnetic record which are included in the table.

MOVEMENTS ON THE SUN'S SURFACE

M. A. BELOPOLSKY, of the Moscow Observatory, states in *Astronomische Nachrichten*, No. 2722, some considerations of much interest regarding the solar