

With a view to learning what becomes of the winter gnats during inclement weather I frequently jotted down, when the flies were upon the wing, the temperature of the air in the places of their resort, the time of the day, and any peculiarity noticeable in the flight of the insects. Upon other occasions, at corresponding periods of the day, when the weather was colder and no gnats could be seen anywhere, I made similar entries of the temperature prevailing in their usual playgrounds. The instrument employed was a Casella's pocket-thermometer mounted in ebonite, graduated upon the stem at intervals of every two degrees, and duly compared with a standard.

From the notes thus obtained, which need not be quoted in detail, it appears that the flight of *Trichocera* varies in style with the temperature, and, as a general rule, is altogether discontinued when the cold exceeds 36° F. Once indeed I saw a gnat flying when the thermometer stood at 34°·5 F., but there was reason for suspecting that it had just been startled out of the hedge by a passing carriage. When such low readings as these are obtained the insects do not congregate, but fly singly with a heavy drowsy flight, as though impelled by business rather than pleasure; and very few venture to show themselves upon the wing at all. At temperatures of 38° to 42° F. they may be seen occasionally flying steadily in places sheltered from wind; and when a warmth of 45° F., or more, is attained, they throng together and dance for joy. These particulars, by the way, need not prompt meteorologists to do something with their phenological tables by entering in them "*Trichocera* flying" every calm winter's afternoon if the temperature exceeds 40° F., without troubling themselves to go out of doors and look after the gnats.

It was some time before I succeeded in tracing *Trichocera* to the places where it seeks repose after its gambols and whiles away periods of weather too cold or boisterous for excursions abroad. The flies may be seen sometimes at rest upon fences, with their legs stretched out flat, and it appeared probable that they took refuge in the hedges somewhere. A very favourite harbourage of theirs however seems to be the under side of boards and stones frequented by woodlice and earthworms. They stand back downwards on the wood or stone, not upon the earth below; and although the specimens found in such situations are mostly females who have gone there to lay eggs, I have once or twice noticed males taking shelter in similar places. Beneath a single flower-pot saucer standing upon damp earth, and eight inches across the bottom, I have counted as many as ten females at once; an individual gnat dislodged crept back underneath it again; but the site became dry, and they forsook it. The wonder was how they managed to enter so shallow a crevice in the first instance. The haunts of the isopod, *Trichoniscus pusillus*, are not too damp for them; but in frosty weather they are apt to take shelter under any dry pieces of wood lying loosely upon the ground. It is obvious that flies with such habits as these cannot fail to be snowed up in great numbers at the first fall; and when the frost is over, having been securely protected from extreme cold, they are ready to take wing again as soon as the snow has melted sufficiently to admit of their creeping forth. Hence, though the temperature may be relatively mild directly after a snowstorm, no gnats are likely to be seen flying until the snow has largely disappeared, when *Trichocera* will become common. Similarly after frost without snow, when the thaw sets in the flies will probably not issue from their retirement immediately, but will rest quietly until the change of temperature has had time to reach them in their lurking-places, whatever may be the warmth of the outer air meanwhile. Perhaps this is the cause of so few winter gnats being seen in the mornings early in the year; but whether it be so or not, the other foregoing surmises harmonise well with my observations.

The maximum of cold to which winter gnats can be exposed without fatal consequences has not yet been ascertained.

Chepstow Road, Croydon, April

A. E. EATON

Australian Plants in India

IN NATURE, vol. xxiii. p. 370, some remarks are made (with reference to Mr. Wallace's observations in "Island Life") regarding the apparent inability of Australian plants to become naturalised in the northern hemisphere. It may therefore be interesting to you and to Mr. Wallace to learn of some striking exceptions to this rule in the case of Australian plants which have been introduced on the Nilgiri plateau in Southern India,

at elevations ranging from about 5500 to nearly 8000 feet above sea-level. Acacias and Eucalypti in particular have found a congenial home in this region, and visitors from Australia who have seen them say that they appear even more vigorous than in their native soil. Hundreds of acres of *Eucalyptus Globulus* and of *Acacia melanoxylon* and *A. dealbata* have been planted by Government as firewood reserves, and the trees have grown up splendidly. The only drawback to the success of the experiment has been that the *Acacia melanoxylon* has been greatly injured by Lorantheaceous parasites. In fact this species will apparently in course of time be exterminated by these indigenous pests. Besides *Eucalyptus Globulus* the following species of the genus have also been introduced, and thrive well:—*E. sideroxylon*, *E. obliqua*, *E. fissilis*, *E. rostrata*, *E. viminialis*, *E. amygdalina*, and *E. perfoliata*. In addition to the two species of *Acacia* already mentioned, the following have also been added to the list of healthy growing exotics on the Nilgiris, viz. *A. pycnantha*, *A. salicina*, *A. longifolia*, *A. decurrens*, *A. cultriformis*, *A. elata*, and others, might also be enumerated. As regards other Australian plants on these hills we have *Hakea*, *Banksia*, *Myoporum*, *Kunzea*, *Tristania*, *Pittosporum*, *Beaufortia*, &c. In short there is a very considerable Australian flora flourishing on the "Blue Mountains" of Madras, and so extensively have the trees been planted out about the principal stations that they have given quite a new character to the scenery. Some of the acacias have a considerable resemblance in shape and colour to the Scotch fir, and this likeness has, to some visitors, added a fresh charm to the beauties of the scenery.

G. BIDIE

Madras, March 15

The Tide Predictor

WITH regard to the letter of Sir William Thomson in NATURE, vol. xxiii. p. 482, respecting the above instrument, I may say that the Tide Predictor which I have planned and designed for the prediction of Indian tides owes its development, not to the British Association Tide Predictor, but to a complete two-component working model made by me in the spring of 1873. This model was made before the British Association instrument was designed.

It was on the express recommendation of the Surveyor-General and Superintendent of the Great Trigonometrical Survey of India that I was invited to plan and undertake the construction of the instrument, and I was left absolutely unfettered in my choice of mechanicians to carry out the work. My connection with the instrument is clearly explained in the official prefaces to the Tide Tables for Indian Ports, 1881, published by authority of the Secretary of State for India in Council. I may point out that my paper upon this instrument (*Proceedings Roy. Soc.*, No. 197, 1879) was written at the desire of Sir William Thomson, to whom it was first submitted, and by whom it was entirely approved and originally communicated. He was also present at the meeting of the Royal Society when the paper was read, and never expressed the least objection to any of its contents. In that paper credit is given to him for the improved slide, which he, with Prof. James Thomson's assistance, had devised for an harmonic analyser, and also to Mr. A. L  g   for the admirable plan of the wheel-gearing.

EDWARD ROBERTS

3, Verulam Buildings, Gray's Inn, W.C., March 26

"The Oldest Picture in the World"

IN Mr. Loftie's "Ride in Egypt" is a woodcut (p. 209) of what is called "the oldest picture in the world," a fresco from a tomb at Maydoom, now in the museum at Boolak, wherein are represented six "pasturing geese." Two of these are undoubtedly *Anser albifrons*, two, probably *A. ferus* or *A. segetum*, and the other two seem to be the rare *A. ruficollis*, from Northern Asia. I should be greatly obliged to any one who would let me see a coloured copy of this picture, that I might be assured as to my determination of the figures. Mr. Dresser, in his excellent "Birds of Europe," mentions his having received a specimen of *A. ruficollis* sent him from Alexandria by the late Mr. Stafford Allen. Otherwise its appearance in Egypt seems to have been hitherto unrecorded.

ALFRED NEWTON

Magdalene College, Cambridge, April 10

Probably New Variable Star

ON January 22, 1879, I observed near α Canis, a very remarkable double star, with one component a fiery red δ 5

magnitude, and the other a blue 9. The contrast of colours was very striking, but there was little difference in size. In a letter recently received from the Rev. Mr. Webb, I find that it was previously observed by him, and it appears as one of his own discoveries in the second edition of "Celestial Objects," published in 1868. The red star is there classed as 6.5 mag., and the blue as 8. The two stars, therefore, appeared to differ very considerably in magnitude when seen by Mr. Webb, while to me, eleven years subsequently, they seemed quite nearly equal. Hence I conclude that the red is a variable, and I wish to call the attention of observers to it while it still remains in view. By a rough measurement I make out its position for 1881 = α 7h. 10m. 44s., and δ = $23^{\circ} 6' 6''$. JOHN BIRMINGHAM.
Millbrook, Tuam, April 9

Concealed Bridging Convolution in a Human Brain

IN his work on the "Convolutions of the Human Brain" Ecker denies explicitly that the first and second external bridging convolutions of Gratiolet, as seen in *Cercopithecus*, *Inuus*, &c., are ever concealed, either in the higher apes or in foetal or adult man. I have however in my possession an adult human brain in which a convolution nearly corresponding in position to the external bridging one of Gratiolet is concealed, while another slightly external to it is nearly so. The brain was hardened in nitric acid with the membranes on (a much preferable method, by the by, to that of first removing the membranes; as these, by absorbing the acid and swelling, serve, like so many wedges, to keep the convolutions apart, and prevent the shrinkage that otherwise takes place). There was no indication of any concealed convolution until the membranes, just moistened for the purpose with water, were being removed. Then, owing to the opening out of the sulcus occipitalis transversus of Ecker, the tip of one became visible, and this tip, even now that the edges of the sulcus are widely separated, is from one-eighth to one-sixth of an inch beneath the general surface.

Its position relative to the great longitudinal fissure and to the posterior border of the gyrus supramarginalis seems to me pretty accurately to correspond to that of the external bridging convolution to those parts in the brain of an Indian pig-tailed baboon of undetermined species with which I have compared it; but in the latter the sulcus occipitalis transversus does not exist, while in this human brain, as is very common, the lateral or horizontal portion of the fissura parieto occipitalis, beneath the bevelled edge of which in the baboon the convolution lies concealed, has a very short course indeed.

The only difference then is that in the one specimen (the human) the concealed convolution lies in the transverse occipital fissure, there being no lateral extension of the parieto-occipital fissure, while in the other it lies in the parieto-occipital fissure, the transverse fissure not existing
WILLIAM CARTER
Liverpool, March 26

Sound of the Aurora

IF I had consulted Franklin's account of his Polar researches before I sent you my extract from Tacitus, I should not have revived the question of sounds being heard with the aurora borealis. Franklin and his companions watched the aurora 343 times in two successive winter seasons; and never once, he says, did they observe a sound. Were, then, the experiences quoted by your other correspondent and myself mere illusions? Perhaps not. Franklin made his observations at and about the southern shore of Bear Lake, in latitudes varying from 67° to 69° north; might not the greater volume of air through which the phenomenon had to pass in reaching our island have caused the electric fluid to work up a sound? Surely that is possible. The attractive force of the aurora is—we learn from Franklin himself—increased within a certain limit as its rays proceed southwards; for whereas Parry and his party at Port Bowen in latitude $73^{\circ} 15'$ noticed no deflection of the compass-needle under the influence of coruscations, Franklin and his party on the shores of the Bear Lake, six degrees further south, constantly observed this effect. And the attractive force is strongly felt here—hindering telegraphic communication at all events. Might not the vibratory force not sensible at within so short a distance from its origin as the attraction be increased within a greater limit?

Sunnymead, Chislehurst Common

M. L. ROUSE

PERIODIC OSCILLATIONS OF BAROMETRIC PRESSURE

THE MSS. of the accompanying article, which was left unfinished by the late Mr. John Allan Broun, F.R.S., were handed over to me some time ago by Prof. Balfour Stewart, with a request that I would put them into shape for publication.

I have not found it necessary to make many alterations in, or additions to the original, and where made they are mostly indicated in initialed foot-notes.

E. DOUGLAS ARCHIBALD

In an article which appeared in NATURE (vol. xix. p. 6) a remarkable relation was shown to exist between the annual ranges of the atmospheric pressure and of the temperature of the air, as derived from the monthly means obtained from several years' observations of the barometer and thermometer at certain stations in India. The results and the conclusions from them do not appear to have been always understood, and as they bear on some of the most interesting questions on meteorology, I shall now examine them anew with the aid of observations at some other stations, under different local conditions.

For this end it is desirable to employ some elementary considerations. Let us, first of all, consider the action of varying temperature on a vertical column of the atmosphere. Let us consider a column of air reaching from the soil at B to the upper limit of the atmosphere at A; and suppose that the pressure shown by a barometer at B is 30 inches, while at a higher station, C, it is only 20 inches. If, now, the column of air is heated so that the temperature of the part B C is increased by 10° F. we know from laboratory experiments that the air will expand, so that a part of that which was below C will be pushed above it, and while the barometer at B will continue to show 30 inches, that at C will show 20.2 inches, the mercury at C will have risen two-tenths of an inch.

If, now, we suppose that the mass of air remains constant throughout the year, there will be an annual variation of the barometer at C, where its height will be greatest in the warmest month and lowest in the coldest month. For the same reason the difference of the barometric heights at B and C will be least in the warmest month and greatest in the coldest.

It has been supposed that the mass of the atmosphere remains constant throughout the year; if this is not the case the variations of pressure at C will not depend on temperature alone, but also on the other causes which produce variations at B.

In NATURE, vol. xx. p. 55, Mr. Douglas Archibald has given a series of differences of barometric heights at high and low stations in India for the months from October to April. The month of lowest mean temperature, January, shows always, as in the case just supposed, the greatest difference of pressures. As the high and low station is never in the same vertical, the one being sometimes 300 miles horizontally distant from the other, it is difficult to eliminate the part of the variation due to temperature at the higher station, but if we take as an approximation, however rude, the mean of the temperatures at the two stations as that of the vertical column, we can see that a considerable part of the variation at the upper station may be due to the expansion of the column with temperature.

Thus for Leh and Lahore the mean temperatures and difference of barometric heights are ¹ :—

¹ The numbers are taken from the work cited by Mr. Archibald, "The Indian Meteorologist's *Vade Mecum*," by Mr. H. F. Blanford, Pt. ii. pp. 176, 178.