

desire to add my testimony to Mr. Common's opinion (NATURE, vol. xxxiv. p. 470), that the conditions of the sky must have been wholly different; and where the visibility of the corona is in question, the atmospheric diffusion is all-important.

We have a most trustworthy criterion of the amount of diffused sky light in the visibility of the moon's limb outside the sun on the coronal background. This appears not to have been observed at all last August, and it may be useful to recall what it looked like under certain almost ideal conditions, which are not likely to recur.

On July 29, 1878, I observed it in the remarkably clear air of Colorado, and at an altitude of over 14,000 feet, on Pike's Peak, and have a vivid recollection of its appearance then. After totality, and while writing my notes, I heard a call from some bystander of "Look at the moon!" and glancing up from the paper (with an eye which could not have been in a sensitive condition), saw the moon's limb outside the sun, most conspicuously defined by a band of pearly light, which faded outward, but whose visible width can be estimated from the fact that though I went on intermittently with my notes, and took no other precaution to shield the eye than keeping it in the shadow cast by my telescope stand, the limb continued in my view under these unfavourable circumstances for *four minutes and twelve seconds* after totality was over. A similar duration was recorded by Gen. Myer, the Chief Signal Officer of the United States, who observed near me; and others at a lower altitude certified to having observed it over three minutes. Something is due to the increased sensitiveness of the eye after the darkness, but there is no doubt that, with even the slight rest of the retina which totality afforded, the phenomenon was such a salient one as to force itself on the attention of those not regarding it.

This is for a very exceptionally pure sky, of course; but if, as is stated, observers specially seeking it could not even see the limb a little outside the sun (where the corona is brightest) last August, it seems clear that no conclusions as to its non-visibility under any ordinary means are to be drawn from negative evidence of such a kind.

S. P. LANGLEY

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The Astronomical Theory of the Great Ice Age

IN your issue of November 4 (p. 7), my friend Mr. W. H. S. Monck asks one or two questions relative to the paper on "The Astronomical Theory of the Great Ice Age" which you did me the honour to reprint.

I take as a convenient unit the mean daily sun heat on one hemisphere. The amount of this unit is indicated by the fact that it continuously maintains the earth's temperature some 300° more or less above what it would be were the sun's heat withdrawn.

The calculations I gave showed that in the glacial winter the mean daily receipt of heat sunk to '68 of a unit, while in the brief glacial summer the mean daily receipt was 1.38 unit.

Considering the magnitude of the unit, it is obvious that fluctuations like this must correspond to vast climatic changes of the kind postulated in the Ice age. Here it seems to me lies the great originating cause of the Ice age, and to dwell on the minor phenomena merely obscures the real point.

If it be said that no great climatic change takes place because the total sun heat in the year remains the same, then I remark, as I did at the Royal Institution, that on this principle it would be the same thing to give a horse 15 lbs. of oats a day for six months and 5 lbs. a day for the other six months as to give him 10 lbs. of oats a day all the year round.

ROBERT S. BALL

The Observatory, co. Dublin, November 11

P.S.—I take this opportunity of correcting a misprint in my paper as given in NATURE (vol. xxxiv. p. 608). The maximum number of days' difference between summer and winter is $465 \times$ eccentricity.

Abnormality in Cats' Paws

AMONG the many interesting features suggested by the genealogical table in last week's NATURE (p. 40), showing the persistence of abnormality in the number of toes on a cat's paw, there is one the significance of which seems not to have occurred to, or to have been passed over by, Mr. Edward Poulton. The peculiarity I refer to is the larger percentage of abnormality among the female offspring than among the male. Taking "Tabby

V." as a starting-point, and leaving out one abnormal kitten of which the sex was unnoted, as well as the families of which no particulars are given, the total number of descendants in the table is 36, of which 12 are males and 24 females. Of the 12 males, 5 are normal and 7 abnormal, or $41\frac{2}{3}$ and $58\frac{1}{3}$ per cent. respectively; and among the 24 females 7 are normal and 17 abnormal, or $29\frac{1}{4}$ and $70\frac{3}{4}$ per cent. respectively. Or, to put it in another way, among the 12 normal kittens 5 are males, 7 are females, or $41\frac{2}{3}$ and $58\frac{1}{3}$ per cent. respectively, instead of $33\frac{1}{3}$ and $66\frac{2}{3}$ per cent. as it should be; and among the abnormal 7 are males and 17 females, or $29\frac{1}{4}$ and $70\frac{3}{4}$ per cent. instead of $33\frac{1}{3}$ and $66\frac{2}{3}$.

This would seem to indicate either (1) that there is a greater tendency among the male offspring than among the female to revert to the normal condition, or (2) that there is a tendency among the offspring to inherit rather the peculiarities of the parent of their own sex—the male parent in all cases in the table being assumed to be normal. If rather, probably the former, though the latter could easily be tested by a similar set of observations with cats, the male parent of which was abnormal, the mothers being in each case normal.

J. HERBERT HODD

Hatton Garden, London, E.C., November 15

Abnormalities in the Vertebral Column of the Common Frog

IN preparing skeletons of the frog, my students came across the following abnormalities in the vertebral column, a record of which may be not without interest:—

(1) In a large *Rana temporaria*, the centrum of the eighth vertebra, instead of being biconcave (amphicœlous), is concavo-convex (proœlous), like that of the preceding vertebra. This abnormality I have observed before.

(2) In a medium-sized *Rana temporaria*, the eighth and ninth vertebrae are both abnormal. The ninth vertebra has well-developed only one transverse process (the right) for articulation with the ilium. The other (the left) is quite small and ill-shaped; there is no anterior zygapophysis on this side. The centrum is anteriorly convex on the right side and concave on the left side. Posteriorly, there is on the right side a convex articular surface for the urostyle; but on the left side the articular surface is ill-developed and irregular. In the eighth vertebra, the left transverse process is abnormally large and strong, has a marked backward direction, and has taken on itself the sacral function on this side, articulating with the ilium. The right transverse process is nearly, but not quite normal. There is a right, but no left, posterior zygapophysis. The anterior end of the centrum is normally concave; but the posterior end is convex on the left side and concave on the right side. The urostyle and the ilia are slightly modified in accordance with the abnormalities of the vertebrae.

C. LLOYD MORGAN

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Influence of Wind on Barometric Readings

ALLOW me a few words of supplement to Prof. Abbe's useful letter in NATURE of November 11, p. 29.

Sir H. James's paper is perhaps better known on this side of the Atlantic than Prof. Abbe thinks; but there undoubtedly is too great a tendency to rush into print without previously reading up what has been done. The great bibliographical work which the Signal Office has in hand will do more to check this evil than anything which could be suggested, and hence its enormous importance.

As regards the application of suction to anemometers, no reference is made to that of Bourdon,¹ of which my friend Dr. Fines was recently kind enough to show me a very fine specimen at work at his observatory at Perpignan.

The Cowl Committee of the Sanitary Institute, far from being (as has been imagined) asleep or dead, has been very hard at work, and will in a few months report the result.

I sincerely hope that Lord Rayleigh will accede to Prof. Abbe's suggestion, but in the interim I append the report of Lord Rayleigh's Southampton paper which appeared in the *Meteorological Magazine* for October 1882, p. 130:—

"On the Effect of Wind on the Draught of Chimneys," by Prof. Lord Rayleigh, F.R.S.

¹ See also Laughton, "Historical Sketch of Anemometry," *Quart. Journ. Roy. Met. Soc.* vol. viii. (1882), p. 177.

"The author said that the draught diminished as the direction of the wind was more and more downwards, but did not go backwards until the inclination amounted to about 30° . The maximum up-draught would occur, not, as was often supposed, with a direction of wind vertically upwards, but with one making an angle of about 30° with the vertical. A chimney with a T-piece at the top never produced an unfavourable effect on the up draught, and only in one case failed to produce a favourable one. With a T-piece to which was affixed vertical ends, every wind met with would have a favourable effect, and no wind known would have an unfavourable effect.

"Prof. De Chaumont thought that vertical ends increase the resistance of the up-draught, and described a chimney with a lamp-shade-like top and conical cap, with which it was impossible to get a down-draught." G. J. SYMONS,
62, Camden Square, N.W. Registrar Sanitary Institute

Barnard's Comet

I WONDER that more has not been written about Barnard's comet (*f* 1886). On the 9th, at 17h. 50m., in spite of the strong twilight, it was plain with the naked eye as a star. I did not notice its exact brightness, but it was perhaps equal to ρ Virginis. With the telescope its head was about 8' diameter, and it had two faint tails at about position-angles 250° and 300° . The former, which was the brighter at its origin, was $\frac{3}{4}$ long, and was straight; the latter I believe was curved, and was $\frac{1}{2}$ long.

Sunderland, November 11

T. W. BACKHOUSE

Aurora

LAST evening (November 2), between the hours of seven and eight o'clock, a bright aurora was visible in this vicinity. At intervals later in the evening, patches of cirrus clouds in the northern sky became luminous. The disturbance of the suspended magnet was at its height early in the evening, when the aurora was brightest. It is interesting to note the fact that this aurora was twenty-six days removed from that of October 7 and 8, corresponding to the time of the revolution of the sun on his axis. It is noteworthy, also, that very near to the time of the appearance of each aurora there was a slight renewal of earthquake activity in South Carolina and other localities.

Lyons, New York, November 3

M. A. VEEDER

"Lung Sick"

DR. EMIL HOLUB, in writing to me a few months ago from Panda-ma-Tenka, Albert Country, Zambesi, mentions having treated his cattle in a similar manner to that referred to in *NATURE* of the 11th inst. (p. 29). He says:—

"Shortly after I started northward from the Vaal, a contagious disease broke out among my cattle; there was any amount of sickness among the numerous trains (forty teams a day) going to the Diamond Fields, but I could get no clue to the lameness of the front legs of my bullocks for a long time. Having shot one, the disease proved to be a contagious pleuro-pneumonia, similar to the 'lung sick' so prevalent in this neighbourhood, affecting hips and shoulder-blades, causing lameness. The lungs were partly destroyed, but the animal had but little cough. I disinfected the whole herd, and vaccinated the healthy as well as the sick. The end of the tail was pierced with a narrow-bladed dagger, and a piece of lung full of virus inserted and then bandaged. The second vaccination effectually prevented the spreading of the disease for the whole journey, even in native locations similar to the Bechuanas, in which we were surrounded with 'lung-sick' cattle dying near our encampment."

PHILIP J. BUTLER

55, De Beauvoir Road, London, N., November 13

PAUL BERT

PAUL BERT, who has died at his post as Governor of Tonquin, was born at Auxerre in 1833, graduated Doctor of Medicine in 1863, and Doctor of Science in 1866. Obtaining a professorship in the Faculty of Science at Bordeaux, M. Bert devoted himself especially to physiology, and in 1869 he obtained the Chair of General Physiology in the Faculty of Science at Paris.

He continued here his experiments on the influence of changes of barometric pressure on life, and presented a series of papers on the subject to the Academy of Sciences, which awarded him, in 1875, its great biennial prize of 20,000 francs. He entered political life in 1870, and has all along been known as an advanced Radical. He, however, never lost his interest in science; he did much to promote education in France, and took an active part in the legislative movement which obtained for M. Pasteur an annual pension of 12,000 francs as a national recompense. M. Bert was elected President of the Biological Society in 1878, in succession to Claude Bernard, whose most brilliant pupil he was, and more recently was admitted to the Academy of Sciences. In Gambetta's Cabinet of 1881 he was Minister of Public Instruction, and a few months ago accepted the post of Governor of Tonquin, where one of his most notable acts was the founding of a Tonquinese Academy. M. Bert's papers on "Barometric Pressure" were published as a separate volume in 1877, and his lectures at the Museum of Natural History were in 1869 published under the title of "*Leçons sur la Physiologie Comparée de la Respiration*." He also issued, in 1869-70, "*Notes d'Anatomie et de Physiologie Comparées*." For many years he had charge of the scientific department of the *République Française*.

At the sitting of the Academy of Sciences on Monday, the President, M. Jurien de la Gravière, expressed regret that politics had diverted M. Paul Bert from physiology; and M. Vulpian remarked that his death, though glorious for the country, was a calamity for science, his numerous memoirs having placed him among the first physiologists of the age. The Academy adjourned in sign of mourning.

THE RECENT WEATHER

AT the close of a short period of somewhat unusual weather conditions, it may be worth while to call attention to the more prominent features of those conditions.

Cyclonic systems, some of wide, some of small dimensions, have been primarily developed over Western Europe in unusually large numbers. Opportunities for studying those atmospheric conditions from which barometric depressions originate within the area of our European stations are by no means very rare, but they are nevertheless sufficiently scarce to merit careful scrutiny at the hands of every student of weather knowledge. So much is this the case that a meteorologist of eminence made, some years since, the statement that no one had ever been present at the birth of a storm.

Considering the disastrous nature of the floods, the sloppiness of earth and sky, and the general misery in the aspect of things, which characterise the event, few of us can wish to be very frequently spectators of it. But when it occurs, the conditions accompanying it should be carefully attended to. These may perhaps be briefly summarised thus:—

(1) Barometric depressions are primarily developed over a region where atmospheric gradients are slight, the exceptions to this rule being those systems (secondary or subsidiary, as they are termed) which first appear as loops or bulges in the isobars of a large pre-existing cyclone.

(2) They originate either in the rear of a depression which has already passed away or in the inter-space between two large anticyclones, and more especially when the anticyclones are so large that this inter-space constitutes what is called a "trough" of relatively low pressure.

(3) They are preceded and accompanied by an enormous condensation of vapour into cloud.

(4) They do not, at the moment of their birth, appear