LETTERS TO THE EDITOR.

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The Weather of 1911.

I HAVE received the subjoined letters from Dr. Schmauss at Munich, which may be of interest to your readers. In England in December, 1911, the temperatures up to 8 km. were decidedly below the mean. This is nearly always the case in stormy weather.

In the following table the correlation between the general drift of the atmosphere and the temperature is shown.

N denotes the north component of the drift of the balloon, the positive direction being the north.

E, the drift to the east.

T_0 , the surface temperature.

T_4 , the temperature at a height of 4 km.

T_8 , the temperature at a height of 8 km.

H_c the height of the commencement of the isothermal column.

The observations in England were taken during the four years 1908 to 1911 on some eighty different days. Owing to the practice of the International Commission of nearly always fixing the week for daily ascents in the summer, the preponderance of the observations lies in the summer. Since observations made at neighbouring stations on the same day cannot be considered independent, and since large groups of observations are concentrated into particular weeks, during some of which unusual conditions prevailed, the probable errors are really far larger than the number of observations would indicate.

Correlation Coefficients.

	English. Four years			Continental One year
	Winter	Summer	Combined	
E and T_0 ...	0.18	0.07	0.13	-0.12
E „ T_4 ...	-0.17	0.12	0.07	-0.28
E „ T_8 ...	-0.08	0.17	0.16	-0.26
E „ H_c ...	-0.31	0.08	-0.09	-0.08
N „ T_0 ...	-0.16	-0.01	0.18	0.26
N „ T_4 ...	-0.13	-0.16	0.10	0.18
N „ T_8 ...	-0.17	0.00	0.06	0.21
N „ H_c ...	-0.26	-0.11	-0.06	0.04
H_c „ T_0 ...	0.22	0.42	0.43	0.49
H_c „ T_4 ...	0.60	0.57	0.67	0.75
H_c „ T_8 ...	0.75	0.72	0.71	0.76
No. of obs.	(46)	(93)	(139)	(80)

It will be seen that the only correlation coefficients large enough to be significant are those showing the connection between the height of the isothermal and the temperatures.

Dr. Shaw's hope, expressed in your issue of December 21, 1911, seems to be fulfilled, for were there any close and systematic connection between the temperatures and the direction of the air currents, or between the latter and the height of the isothermal, it could scarcely fail to appear in the figures. The small values of the coefficients (0.31, with a probable error of 0.1, even if we treat all the observations as independent, is the largest) and the want of agreement between the different groups both lead to the conclusion that there is no connection, or at the best a very slight one.

The connection between the height of the isothermal and the temperature of the air below down to 4 km., and perhaps even to the surface, is very plainly shown, and makes me regret my somewhat rash statement that the surface temperature was more dependent upon the direction of the wind than upon anything else.

The negative value of -0.16 between T_0 and N is certainly curious, and the sign would probably be reversed if there were some hundreds of observations instead of forty-six; but the drift of the balloon is not necessarily the same as the direction of the surface wind, although, as a general rule, especially when the wind is strong, the two agree fairly well. The negative sign indicates that a

south wind is colder than a north, and must be taken as a warning not to ascribe any significance to small correlation coefficients.

W. H. DINES.

December 30, 1911.

Kgl. bayer. meteorologische Centralstation,
München, den 11. Dezember, 1911.

Es wird Sie im Anschlusse an Ihre Mitteilung in NATURE 88 S. 175 interessieren zu hören, dass unsere September-fahrten über München nahezu die gleichen Verhältnisse aufweisen wie Ihre britischen Aufstiege.

Es war die Temperaturabweichung vom Mittel:—

$\begin{matrix} 516 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 \text{ km.} \\ +2.9 & +4.3 & +5.7 & +4.4 & +4.3 & +3.4 & +2.3 & +2.3 & +2.2 & +2.4 & +1.0 & -3.4 & -7.4 & -6.9 \end{matrix}$

München, den 27. Dezember, 1911.

Auch noch die Dezembraufstiege haben eine ähnliche Abweichung über München ergeben. Es wurden die Werte der drei Dezembraufstiege gemittelt und die Abweichungen vom Mittel gebildet.

Es war dieselbe:—

$\begin{matrix} \text{In } 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \text{ km.} \\ +3.7 & +6.3 & +5.5 & +5.0 & +4.0 & +4.0 & +5.8 & +5.7 & +3.1 & -0.1 & -3.3 \end{matrix}$

Der grosse Wärmeverrat der Atmosphäre in diesem Herbst ist darin deutlich ausgesprochen.

A. SCHMAUSS.

SIR EDWARD FRY has asked (NATURE, December 21, 1911, p. 244) whether the unusually warm weather that prevailed in Western Europe last summer extended over the whole earth. It is possible to answer in the negative so far as Egypt is concerned, for the temperature here was below average from June to September. Indeed, on some days London had a higher maximum than Cairo, e.g. August 9, Greenwich 100°, Cairo 93°. The result was a retardation of the cotton harvest by some twenty days at the first picking.

As regards the cause of the cooler weather, there is a certain amount of evidence that the amount of solar radiation reaching the lowest stratum of the atmosphere here was less than usual, if any faith is to be placed in the indications of the black-bulb thermometer *in vacuo*. This phenomenon, of course, may be due either to diminished solar activity or to locally increased absorption in the upper strata, or to a combination of both. In any case, Sir Edward Fry's original query brings us face to face with what is probably the ultimate question in meteorology—given unit increase of solar radiation, calculate the effects at the earth's surface. The solution will not be identical for all parts of the earth, and so a small and temporary diminution of radiation may at one place cause increase of temperature, while at another the reverse is the case.

J. I. CRAIG.

Giza, Egypt, December 31, 1911.

English v. Continental Microscope Stands.

REFERRING to the interesting article on the merits of English *versus* Continental Microscope Stands in NATURE of December 21, 1911, I notice that whilst reasons are given on both sides for the distinctive peculiarities of the respective models, and a general suggestion is made as to how the present well-recognised types have come about, curiously enough, no reference has been made to what seems to me to be the real origin of the most important differences between the two types—I refer, of course, to the substage arrangements as a whole. Why is it that the English model provides for the exact centring, and frequently for fine adjustment focussing of the substage optical system, whilst the Continental model does not? Why is it that the Continental models, on the other hand, provide rackwork mechanism for moving the iris diaphragm of the condenser out of centre, with means for rotating this whole arrangement—a feature absent in the English model?

These things are clearly the outcome of the different theories which prevailed at one time in England and Germany on the question of microscope illumination. On the Continent, it must be remembered, the general recognition of the utility of substage condensers dates from the time when Abbe worked out his epoch-making theory of

the microscope image. But, fruitful as that theory immediately was in so many respects, it led Abbe in the first instance, as we now know, to undervalue the importance of the substage illumination in certain aspects, for which statement the fact that only a chromatic form of condenser was originally supplied is sufficient evidence. Further, as is well known from the controversies at the time, it led Abbe at first to favour a narrow cone of light from the substage condenser. Thus the latter became merely a tool by which the object might be studied by means of a beam or pencil of light impinging on it at various degrees of obliquity and in different azimuths.

The Continental substage was designed for this purpose; indeed, it has been explicitly stated by Prof. H. Ambronn¹ (*Zeitschrift für Wissenschaftliche Mikroskopie*, January, 1905) that the construction of the illuminating apparatus named after Abbe, and of which the arrangements connected with the diaphragm carrier constitute the chief novelty, was really only designed by its originator for the testing of objectives and for experiments on the effects of diffraction.

Strange to say, although it is a long time since the utility of achromatic condensers and wide illuminating cones for general microscopic observations has been recognised on the Continent, most Continental makers still cling to the old form of substage construction, preferring to modify other arrangements to adapt them to this construction rather than change their model.

In England, substage illuminators were in general use long before this was the case on the Continent; originally they were looked upon—as the name “condenser” implies—simply as a means of concentrating light on the object; but at the time when Abbe brought out his theory of microscopic images, the value of precise centring arrangements for the condenser and the use of wide-angled cones of light had been so well recognised by Nelson and others that the new theory did not induce English microscopists to recede from their previous experience in these respects. On the contrary, it led in this country to a campaign on behalf of the wide-angled cone of light from the condenser, and the mechanically moveable iris diaphragm was not adopted by English makers. The simpler method of the shallow carrier above the iris diaphragm, into which stops for dark-ground illumination, for oblique illumination, or various stops for experimental purposes could be dropped, was found to render all the service necessary. Hence the general lines on which the construction of the present-day English substage arrangements have developed.

Those who have worked with both forms will be in little doubt as to which is the more convenient.

JULIUS RHEINBERG.

London, December 30, 1911.

The Photography of $H\alpha$ during Solar Eclipses.

WITH regard to Mr. Butler's letter on this subject (*NATURE*, vol. lxxxviii., No. 2199, p. 244), I may say that I was unaware that $H\alpha$ had been photographed in the “flash” spectrum in former total solar eclipses. As I have also been, so far, unsuccessful in my search in the preliminary reports of the eclipse observers of 1893 and 1898, in the Proceedings and in the Philosophical Transactions of the Royal Society, in finding any specific mention of $H\alpha$, would Mr. Butler kindly supply the needed references? I may add that in the photograph taken by Father Pigot under my direction in the last eclipse, $H\alpha$ does not appear as an isolated arc, such as might be recorded on an isochromatic plate, but as the strongest impression crossing a continuous band which extends from $H\alpha$ well into the ultra-violet. A modification of my original statement in this sense might meet Mr. Butler's criticism.

A. L. CORTIE.

In reply to Father Cortie's note, I give the detailed references he requires, abstracted from the papers mentioned in my previous letter:—

(1) *Total Eclipse of the Sun*, April 16, 1893.

Phil. Trans., A, 187, pp. 551–618, 1896.

¹ *Vide also Journal of the Quekett Microscopical Club*, 1905, pp. 157–8.

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P. 574.—On negative 17 the image of $H\alpha$ was obtained even at mid-eclipse, although the plates were not specially sensitive to red.

P. 617.—The line $H\alpha$ is indexed in the table of chromospheric lines as having been recorded on three photographs, Nos. 17, 18, 19. On No. 19 it is given as intensity (3) on a scale of 10, which is quite remarkable considering that the plate employed was not specially red-sensitive.

(2) *Total Eclipse of the Sun*, January 22, 1898.

Phil. Trans., A, 197, pp. 151–227, 1901.

P. 199.—The line was so prominent that it was utilised for wave-length determinations.

“For the purposes of reduction the spectrum has been divided into two parts, one extending from $H\alpha$ in the red to λ 3900 in the violet. . . .”

P. 226.—In the table of chromospheric lines determined from photographs, the line $H\alpha$ is given as intensity (5) on a scale of 10. The plates on this occasion were isochromatic, but still not specially red-sensitive, and the greater relative intensity of the image of $H\alpha$ compared with that on the 1893 plate is probably due to this.

Plate 6, spectrum strips *a* and *b*.—Inspection of these two strips will at once show the presence of $H\alpha$ as a strong line; in fact, the best description of it is exactly similar to that given by Father Cortie for the impression on Father Pigot's plate. It is the strongest impression (in that region) crossing a continuous band which extends from (beyond) $H\alpha$ well into the ultra-violet.

One of the other results to which I referred is that given in the report by J. Evershed, “Wave-length Determinations, &c., at the Solar Eclipse, January 22, 1898.”

Phil. Trans., A, 197, pp. 381–413, 1901.

P. 410.— $H\alpha$ strong on No. 7 plate.

P. 413.—Spectrum No. 7 ($H\alpha$).

Plate 11, Fig. 5, Spectrum No. 7.— $H\alpha$ shown and lettered as a strong line.

CHARLES P. BUTLER.

Meteor-showers.

THE following meteor-showers become due during the remaining part of January:—

Epoch January 11, 20h. 30m., twentieth order of magnitude. Principal maximum, January 13, 21h. 20m.; secondary maximum, January 12, 1h. 45m.

Epoch January 15, 9h. 30m., second order of magnitude. Principal maximum, January 14, 21h. 50m.; secondary maximum, January 14, 3h. 30m.

Epoch January 15, 4h. 30m., approximately fourth order of magnitude. Principal maximum, January 15, 12h.; secondary maxima, January 16, 16h. 10m., and January 17, 7h. 25m.

Epoch January 21, 18h., approximately eleventh order of magnitude. Principal maximum, January 20, 19h. 30m.; secondary maxima, January 19, 0h. 5m., and January 21, 3h. 35m.

Epoch January 22, 8h., thirteenth order of magnitude. Principal maximum, January 23, 14h.; secondary maxima, January 23, 2h. 50m., and January 24, 3h. 50m.

Epoch January 26, 11h., approximately eleventh order of magnitude. Principal maximum, January 27, 13h. 15m.; secondary maxima, January 24, 14h. 20m., and January 27, 10h. 30m.

Epoch January 26, 19h. 30m., thirteenth order of magnitude. Principal maximum, January 28, 1h. 5m.; secondary maximum, January 28, 8h. 40m.

Epoch January 30, 0h., approximately twenty-eighth order of magnitude. Principal maximum, January 30, 8h. 40m.; secondary maximum, January 31, 11h. 20m.

There is a considerable degree of meteoric activity in the latter half of January. The most important days during the period January 9–31 are January 14–15, January 16–17, January 20–22, January 24–28, and January 30–31. The most noteworthy epoch of this period is that of January 26, 19h. 30m., as it resembles in type that of November 17, 1911, 3h. 30m., to which attention has previously been directed. The epoch January 15, 9h. 30m., comes next in importance as a slight variant of the same type, though its intensity is apparently much greater.

Dublin, January 8.

JOHN R. HENRY.