OUR ASTRONOMICAL COLUMN.

THE PHOTOGRAPHY OF FAINT MOVING CELESTIAL OBJECTS.—An ingenious but simple method of photographing unseen or very faint moving but known celestial objects has recently been suggested by Prof. Barnard (*Astr. Nachr.* No. 3453). Every one knows that in order to photograph a faint celestial object, it is only necessary to prolong the exposure until a sufficiently burnt-out image is recorded on the photographic plate. If, however, the object has a rapid motion, then the image will not remain on one part of the plate a sufficiently long time to record its impression, since the clockwork of the instrument is regulated to counterbalance the apparent motion of the stars. Prof. Barnard's idea is to use, in the eyepiece of the guiding telescope for following the object in question, two guiding cross wires attached to a light frame which can be moved by a delicate clockwork (the works of an ordinary watch are sufficient), the speed of which can be regulated to the motion of the object. Arrangements can also be made that its direction of motion can be regulated to any position-angle. When adjusted to the eye end of the guiding telescope, the instrument is set so that the amount and direction of motion of the cross wires shall coincide with that of the comet or minor planet.

A star in the field of view is then bisected by the cross wires, and the mechanism set in operation, the star being kept bisected by the ordinary slow motions for star guiding. It will thus be seen that although the operation is exactly the same as if the star itself were being photographed, it is the image of the comet which will remain stationary as regards the photographic plate, while the stars will produce trails. Prof. Barnard mentions that the device will be very serviceable for photographing visible comets with ill-defined nuclei, as these have no definite points to guide by, and it is for this work that he is going to have an instrument of this kind made.

SUNSPOTS AND THE WEATHER.—Although nearly every one is agreed that sunspots do influence our weather, the relation between them is evidently not a very simple one. Statistics of the weather from places situated in moderate latitudes do not, at any rate, bring out very clearly direct indications of such a connection; but when they are gathered from a large region near the equator, such as India, then the effect of the sunspot cycle on the weather is more decisive. The first effects of solar disturbances would be felt at the equator, and as the mean temperature does not vary very much from the extremes, a general small increase or decrease would make itself apparent. In more northern latitudes local disturbances seem to tend to a great extent to mask the effects of a variation in the amount of solar radiation.

Mr. Alexander MacDowall has, however, examined a number of weather statistics from several European stations—viz. Bremen, Paris, Geneva, Greenwich—and he finds that they are suggestive of a relation to the sunspot cycle (*Quarterly Journal of the Royal Meteorological Society*, vol. xxiii. No. 103).

In making out his curves he says he has used smoothing methods freely, sometimes smoothing with averages of five and sometimes with additions of five. In this investigation the author has compared corresponding portions of successive years, such as the winter half, summer half, the four seasons, &c. To sum up the inquiry in his own words, he says: "In the climate of Western Europe there is apparently a tendency to greater heat in the summer half and to greater cold in the winter half near the phases of minimum sunspots than near the phases of maximum; the contrast between the cold and heat of the year thus tending to be intensified about the time of minimum sunspots. . . . If we accept the view to which direct observation of the sun seems to lead, that solar radiation of heat is greater about the time of maximum sunspots, we appear to have a direct explanation why, on the one hand, our winter cold should thus be moderated; and as to the contrary effect in the summer half, it is not difficult to conceive that solar activity may, by increased evaporation, bring about the presence of more cloud, and so give us cool, rather than hot, summers."

The conclusions drawn by Mr. MacDowall are exactly what would be expected, and they corroborate those that were formed many years ago. Thus, for instance, in a pamphlet published in 1879, and submitted to the Indian Famine Commission, we read: "For it is an acknowledged and readily accountable fact that presence of cloud in the summer is associated with coolness, and in the winter with warmth; and in like manner that a clear sky, which in the summer, by promoting solar radiation, favours the development of great heat, in the winter, by giving free scope to terrestrial radiation (in the then comparative absence of solar radiation), tends to produce excessive cold. The fact, therefore, that clouds are more prevalent in the *summers* of maximum sunspot years, and in the *winters* of minimum sunspot years, is only another way of saying that both summer and winter are *cooler* at the former epoch and *warmer* at the latter."

COMET PERRINE, OCTOBER 16.—The following is a continuation of the ephemeris of this comet, computed by Herr. J. Möller (*Astr. Nachr.*, No. 3454) from the observations of October 16, Mount Hamilton; October 18, Strassburg, and October 20, Hamburg (two observations).

12*h*. *Berlin M.T.*

1897.	R.A. h. m. s.	Decl. ° ′	log *r*.	log Δ.	Br.
Nov. 7	19 25 54	+75 21·9	0·1563	9·9387	1·0
8	15 59	74 19·4	1550	9429	1·0
9	7 31	73 17·0	1537	9473	1·0
10	19 0 19	72 15·0	1524	9517	1·0
11	18 54 10	71 14·0	1512	9563	1·0
12	48 51	70 14·1	1500	9609	1·0
13	44 13	69 15·4	1488	9656	1·0
14	40 10	68 18·0	1477	9703	0·9
15	36 36	67 22·0	1466	9751	0·9
16	18 33 30	+66 27·5	0·1456	9·9799	0·9

The following comments relate to the appearance of this comet:—

Karl Mysz: 6-inch refractor in Pola. October 18, comet 10 mag.; axis of tail, 200°; nucleus appears sometimes double or oblong. October 19, same appearance and brightness as yesterday; nebulosity has diameter of 5′.

J. Möller: 8-inch refractor in Kiel. October 20, nucleus 10·3 mag., oblong and hazy; fan-shaped tail of about 2′ in length, having a position angle of 200°.

Schorr and Ludendorff: Hamburg refractor. October 20, comet has faint nucleus, 10·5 mag.; tail, 0′·5 towards south. October 24, fainter than October 20; no distinct nucleus.

Picart: at Bordeaux, October 20. The comet has a very feeble tail; its general form is that of an elliptical nebula.

THE DIRECTOR OF THE LICK OBSERVATORY.—We regret to read in the *Astronomische Nachrichten* (No. 3454) that, after a continuous connection with the Lick Observatory for twenty-three years, and a service at Mount Hamilton since the year 1888, Prof. Holden has resigned his post, and will terminate his official relations with the Observatory December 31, 1897. His address after October 1 will be Smithsonian Institution, Washington.

RELATION BETWEEN INDIVIDUAL AND RACIAL VARIABILITY.[1]

MR. BREWSTER'S memoir refers to "allied races" without defining that phrase, but apparently basing it on the idea of divergent races sprung from a common source. The mean (or typical) characters of these races differing from one another, as individuals of the same race differ among themselves, two systems of variables exist in respect to each and every character: (1) a single system, referring to the means of the different races; (2) several separate systems, referring alike to the individual values of the same character; in each and every race. He supposes the ordinary law of frequency to be approximately applicable to both systems, so that the peculiarities of every series admit of being roughly expressed by its own mean and quartile (=probable error). In order to reduce the variability of each series to a common scale, he works, not with the observed quartiles, but with what may be called *reduced quartiles*, namely the indices formed by dividing each quartile by its corresponding mean. These being comparable on equal terms, are his "measures of variability."

The first and more important part of the memoir deals with eighteen different characters in eight human races, the data being derived from Weisbach's *Körpermessungen*. The number of individuals in each of the selected races is unfortunately very small, ranging from eight to twenty-six, though he is able to

[1] "A Measure of Variability and the relation of Individual Variations to Specific Differences." By Edwin Tenney Brewster. (*Proc.* Amer. Acad. Arts and Sciences, May 1897.)