per crocetta).* That method, which is of unknown antiquity, is open to two very grave objections. The first is that the result is obtained from the right. The second is that the attention must be continued from the first to last. As a consequence of this last objection no one but a very clever computer can use the method with any success.†

D. N. Lehmer.

University of California.

CURRENT NOTES ON METEOROLOGY.

ECLIPSE METEOROLOGY.

That interesting subdivision of meteorology which is concerned with the meteorological phenomena of solar eclipses is developing rapidly. Professor F. H. Bigelow, of the Weather Bureau, devotes the whole of 'Bulletin,' a quarto of 106 pages, to 'Eclipse Meteorology and Allied Problems.' In this memoir he gives the results of a critical study of the direct meteorological phenomena of the solar eclipse of May 28, 1900, as well as a discussion of certain relations between solar and terrestrial meteorology in connection with the magnetic and electric fields in the atmospheres of sun and earth. Professor Bigelow has devoted himself very largely for several years past to this latter subject, and his work along these lines has already become well known to those who have a special interest in them. Professor Bigelow has persistently maintained that investigation of solar magnetic and allied problems is an essential to the further advance of scientific meteorology, and he has labored steadily and enthusiastically towards the solution of some of these complex problems.

The portion of the 'Bulletin' which is more immediately related to the purpose of these Notes concerns the meteorological work done by the eclipse expedition to Newberry, S. C.; the special meteorological observations at sixty-two Weather Bureau stations, and a considerable number of voluntary special observations. On the basis of these data Professor Bigelow has made studies of the variations in pressure, temperature, vapor tension and wind caused by the passage of the shadow; of the shadow band phenomena, which appear to be due to meteorological conditions exclusively; and has also computed the number of calories of heat per kilogram absorbed at the earth's surface by the shadow. As to the variations in pressure, it appears that the *mean* curve, based on pressure readings made at a number of stations, is so smooth that it cannot be positively asserted that the eclipse caused a rise shortly before totality, or a drop later. The temperature curves show clearly defined variations, the greatest lowering of the temperature being about 3.5° in the total shadow. The vapor pressure curves are very irregular, but the means show that there was a decrease of vapor tension of about 0.01 inch at the time of the maximum cooling of the air. There was a decrease in the wind velocity of about one mile per hour caused by the eclipse shadow, but Professor Bigelow's results as to wind direction seem to him to indicate 'that there was no definite change in the azimuth which could be attributed to the eclipse.' The facts seem to Professor Bigelow to 'exclude the possibility that any sort of a true cyclonic circulation was generated by the action of the cooling effect of the moon's shadow on the atmosphere.' In this, Professor Bigelow is not in agreement with Mr. H. H. Clayton's results (*Annals Harv. Coll. Obsy.*, XLIII., Part I., 1901, 1–33. See also Science, April 12, 1901, 589–591; May 10, 1901, 747–750), to a discussion of which some attention is given. Professor Bigelow

* Cantor, 'Geschichte der mathematik,' Band 2, p. 286. Also 'Das Rechnen in 16. Jahrhundert,' von P. Treutlein, *Zeitschrift für Math. und Physik*, Suppl. zu XXII., 1877, p. 49.

† Since writing the above my attention has been called by Professor D. E. Smith to a method described by El-Hassâr about the 12th century, which has some points in common with mine. For an account of his work see an article by Suter, 'Das Rechenbuch des Abû Zakarîjâ El-Hassâr' in *Bibliotheca Mathematica*, II_3 p. 16 (1901). El-Hassâr obtains his product from the left, but adds each cross product as he obtains it, thus making the work complicated and confusing.

computes that the number of calories absorbed increased to 4.40 at 15 minutes after totality, and then decreased to zero at about 93 minutes after the totality. From 15 minutes after totality to 45 minutes after totality there was very little change. A study of the shadow bands leads to the conclusion 'that the shadows were crescent shaped, and had a flickering motion as if struggling through two or more conflicting movements in the atmosphere itself.' This, as above stated, makes it appear to Professor Bigelow that the phenomenon is due exclusively to meteorological conditions.

RAINFALL VARIATIONS.

A VALUABLE study of the variations of rainfall during long periods of time has recently been made by Hann ('Die Schwankungen der Niederschlagsmessungen in grösseren Zeiträumen,' *Sitzungsber. Wien. Akad.*, CXI., IIa, 1902). The data used as the basis of the discussion are the monthly and yearly mean rainfalls for Padua (from 1725 to 1900); Klagenfurt (from 1813 to 1900) and Milan (from 1764 to 1900). For the past hundred years (1801–1900) the annual extremes expressed in percentages of the general mean are as follows:

	Padua.	Klagenfurt.	Milan.
Driest year,	58	42	62
Wettest year,	152	151	152

Classifying the wet and dry years during the last century according to their percentage departures from the general mean, the following table is obtained:

Character.	Very Dry.	Dry.	About normal.
Per cent.,	51–70	71–90	91–110
Number,	8	26	37

Character.	Wet.	Very Wet.	Extraordinarily Wet
Per cent.,	111–130	131–150	over 150
Number,	22	6	1

It is seen that the dry years number 34 per cent. and the wet years 29 per cent. The rainfall of the wet years, however, departs to a greater extent from the mean annual value than does that of the dry years. When the mean epochs of these dry and wet periods are determined, it appears that they show a 35-year periodicity, the maxima and the minima coming in the following years:

Wet,	1738	1773	1808	1843	1878	(1913)
Dry,	1753	1788	1823	1859	1893	(1928)

This period accords with the 35-year climatic period of Brückner.

NOTES.

ACCORDING to recent information received from Mr. Maxwell Hall, who has long been well known for his work in connection with the meteorology of Jamaica, it appears that the work of collecting the statistics of rainfall, etc., has been transferred to the Island Chemist's office, and that Mr. Hall has been relieved of his duties by the Governor's order.

A FULL account of the new meteorological observatory at Aix-la-Chapelle, and of its equipment and formal opening, is given in Vol. VI. of the *Deutsches Meteorologisches Jahrbuch* for 1900 (Aachen). The same volume also contains the fifth instalment of an article on the climate of Aix-la-Chapelle, and a paper (illustrated) on two halos observed during 1900.

IN the April number of *Climate and Crops: California Section*, Professor A. G. McAdie points out that Sir Francis Drake was quite accurate in his description of the climate near San Francisco, where he anchored in June and July, 1579, as cold and foggy. Professor McAdie also criticizes the erroneous statement embodied in the article on Drake in the 'Dictionary of National Biography,' to the effect that "to speak of the climate near San Francisco or anywhere else on that coast in July in these (*i. e.*, Drake's) terms is not exaggeration, but a positive and evidently willful falsehood (Greenhow: 'History of Oregon and California')." Tables are given to show the prevalence of fog in the locality in question.

R. DEC. WARD.

*MEMORIAL OF HALLER.**

TRÉS HONORÉ COLLÈGUE:

Dans la séance du 17 septembre 1901, le Congrès de physiologie réuni à Turin a

* Letter addressed to Professor H. P. Bowditch, of the International Committee of the Congress of Physiology.