

supposing the carbonic acid and water equally efficient as absorbing agents of the vibratory energy (although each has a specific absorption for certain qualities of rays), then the decomposition of the two compound molecules may take place continuously side by side, owing to the equality of the thermal equivalents of carbonic oxide and hydrogen. We already know, from the laborious researches of Tyndall, how thoroughly aqueous vapour retains thermal radiations; and Janssen has further shown that the same substance has a strong absorptive action on the rays of light of low refrangibility (just those rays that are in part selected by chlorophyll), producing the well-known atmospheric lines of the solar spectrum. The presence, therefore, of varying quantities of aqueous vapour in the atmosphere in all probability produces a considerable difference of rate in the decomposition effected by the leaf, and may, in fact, end in carbonic acid and water being attacked in another ratio than that given as the fundamental equation of decomposition. Thus the same plant in different atmospheric conditions may elaborate different substances.

2. On the Rainfall of the Continents of the Globe. By Alexander Buchan, Secretary of the Scottish Meteorological Society.

This paper was illustrated by two large charts of the world showing, by ISOHYETAL LINES, the rainfall over the different continents in January and July; two large charts showing the months of least and greatest rainfall in Europe, north Africa, and west Asia; and by six sets of smaller charts of thirteen each, showing, by isohyetal lines, the monthly and annual rainfall of Europe, Asia, Australasia, North America, Africa, and parts of South America. The data laid down on these eighty-two charts were taken from a Table comprising about 2000 good averages of rainfall, calculated or collected by the author.

On comparing the results of the rainfall with the author's charts of Atmospheric Pressure and Prevailing Winds, published in the Society's Transactions,* the broad principles regulating aqueous precipitation are chiefly these:—

* Vol. xxv. p. 575, *et seq.*

1. When the prevailing wind has previously traversed a large extent of ocean, the rainfall is moderately large.

2. If the winds are at the same time advancing into colder regions, the rainfall is largely increased; and if a range of mountains lie across their onward path, the rainfall is also thereby largely increased on the side facing the prevailing winds, and reduced over the regions lying on the other side.

3. If the winds, though arriving from the ocean, have not traversed a considerable extent of it, the rainfall is not large.

4. If the winds, even though having traversed a considerable part of the ocean, yet on arriving at the land proceed into lower latitudes, or regions markedly warmer, the rainfall is small or *nil*.

3. On the Lunar Diurnal Variation of Magnetic Declination at Trevandrum, near the Magnetic Equator. By J. A. Broun, F.R.S.

The author gives the results derived from different discussions of nearly eighty thousand observations, made hourly during the eleven years 1854 to 1864. They are as follows:—

1. That the lunar diurnal variation consists of a double maximum and minimum in each month of the year.

2. That in December and January the *maxima* occur near the times of the moon's upper and lower passages of the meridian; while in June and July they occur six hours later, the *minima* then occurring near the times of the two passages.

3. The change of the law for December and January to that for June and July does not happen, as in the case of the solar diurnal variations, by leaps in the course of a month (those of March and October), but more or less gradually for the different maxima and minima.

4. While the lunar diurnal variation changes the hours of maxima and minima more gradually than the solar diurnal variation, it also makes the greatest change at different times; thus the solar diurnal variation changes completely during the month of March, or from February to April, while the lunar diurnal variation makes the greatest change from April to May. The second