membrane while effecting osmotic propulsion may possibly, therefore, be of a reparable kind.—In other respects chemical osmose appears to be an agency particularly adapted to take part in the animal economy. It is seen that osmose is peculiarly excited by dilute saline solutions, such as the animal juices really are, and that the alkaline or acid property which these juices always possess is another most favourable condition for their action on membrane. The natural excitation of osmose in the substance of the membranes or cell-walls dividing such solutions seems therefore almost inevitable. In osmose there is, further, a remarkably direct substitution of one of the great forces of nature by its equivalent in another force—the conversion, as it may be said, of chemical affinity into mechanical power. Now what is more wanted in the theory of animal functions than a mechanism for obtaining motive power from chemical decomposition as it occurs in the tissues? In minute microscopic cells the osmotic movements being entirely dependent upon extent of surface may attain the highest conceivable velocity. May it not be hoped therefore to find, in the osmotic injection of fluids, the deficient link which certainly intervenes between muscular movement and chemical decomposition?

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**Meteorology of the Second Quarter of 1854, at the Highfield House Observatory, Nottinghamshire, England.**

| Month. | Mean Elastic Force of Vapour or Mean Amount of Water mixed with the Air. | Mean Pressure of the Gases, or Dry Air. | Mean Pressure of the Gases and Water, or Mean Height of the Barometer. | Greatest Height of the Barometer. | Least Pressure of the Barometer. | Monthly range of Pressure. |
|---|---|---|---|---|---|---|
| | Inch. | Inches. | Inches. | Inches. | Inches. | Inches. |
| April | 0·251 | 29·758 | 30·009 | 30·437 | 29·120 | 1·317 |
| May | 0·330 | 29·310 | 29·640 | 30·141 | 28·879 | 1·262 |
| June | 0·387 | 29·326 | 29·713 | 30·071 | 29·316 | 0·755 |
| Mean | 0·323 | 29·465 | 29·787 | 30·437 | 28·879 | 1·558 |

The elastic force of vapour in April was slightly less than the average; in May an eleventh of an inch above the amount of 1853 and ·021 inch above that of 1852; and in June ·029 inch above that of 1853, and nearly equal with that of 1852. The pressure of the atmosphere in April was a quarter of an inch greater than the average of the last seven years; in May 0·183 inch less, and in June 0·033 inch less than the average of the past seven years.

| Month. | Adopted Mean Temperature. | Mean Temperature of the Wet Bulb Thermometer. | Mean Temperature of the Dew Point. | Mean Weight of Vapour in a Cubic Foot of Air. | Mean Additional Weight required to saturate a Cubic Foot of Air. | Mean Degree of Humidity. | Mean Whole Amount of Water in a Vertical Column of the Atmosphere. |
|---|---|---|---|---|---|---|---|
| | Degree. | Degree. | Degrees | Grains. | Grains. | (1·000) | Inches. |
| April | 45·4 | 42·6 | 38·5 | 1·89 | 1·00 | 0·742 | 3·47 |
| May | 50·0 | 49·1 | 46·7 | 3·62 | 0·67 | 0·851 | 5·66 |
| June | 55·3 | 53·3 | 51·1 | 4·39 | 0·87 | 0·834 | 5·35 |
| Mean | 56·3 | 48·7 | 45·4 | 3·33 | 0·85 | 0·809 | 4·83 |

The mean temperature in May and June has been exceedingly low. In April it was below that of 1853 by 0·4°, above that of 1852 by 0·1°, and below the mean of 42 years by 1°. May was 0·4° below that of 1853, 1·5° below that of 1852, and nearly 6° below the mean of the last 42 years. June was 3° below that of 1853, and 1·7° below June, 1852, and 3½° below the mean of the last 42 years. It is to be feared that this great cold will affect the yield of the wheat crop. The mean temperature of the dew point was in April ½° below, in May 1½° above, and in June 1½° below the mean of the past seven years. The mean weight of vapour in a cubic foot of air was, in April, 1·2 grains below, in May 0·2 grain above, and in June 0·4 grain below the average of the past six years. The whole amount of water in a vertical column of the atmosphere was about equal to the average in April and June, but 1·7 inches above the average in May.

| Month. | Mean Weight of Cubic Foot of Air. | Maximum Heat in Shade. | Greatest Cold of Night. | Monthly Range of Temperature. | Mean Maximum Temperature. | Mean Minimum Temperature. | Diurnal Range of Temperature |
|---|---|---|---|---|---|---|---|
| | Grains. | Degrees. | Degrees. | Degrees. | Degrees. | Degrees. | Degrees. |
| April | 553·0 | 74·8 | 23·4 | 45·4 | 59·2 | 35·1 | 24·1 |
| May | 532·4 | 73·0 | 31·4 | 41·6 | 62·8 | 37·7 | 25·1 |
| June | 528·1 | 79·0 | 41·0 | 38·0 | 65·2 | 46·8 | 18·4 |
| Mean | 537·8 | 79·0 | 29·4 | 49·6 | 62·4 | 39·9 | 22·5 |

The mean weight of a cubic foot of air was in April 13 grains more than the average of the past six years. May, two grains less, and June two grains more than the mean. The greatest heat in shade was in April 5° more than in 1853, and 1° less than in 1852; in May 9° less than in 1853 and 6° less than in 1852; and in June 3° less than in 1853 and 2° more than in 1852. The greatest cold of night in April and May was about the average, and in June 4° warmer than in 1853, and 1° warmer than in 1852. The mean of all the *maximum* readings of the thermometer in April was 2° above that of 1853, and slightly below that of 1852; in May about equal to the average temperature; and in June 6° below that of 1853, and about 4° below that of 1852. The mean of all the *minimum* readings of the thermometer in April was 3° below that of 1853, and slightly above that of 1852; in May 2° below that of 1853, and 5° below that of 1852; and in June 1½° below that of 1852 and 1853.

| Month. | Greatest Cold on Grass. | Mean reading of a Minimum Thermometer on Grass. | Mean Maximum Heat of a Thermometer in the Sunshine. | Amount of Evaporation. | Amount of Rain. | | Number of Days on which Rain fell. |
|---|---|---|---|---|---|---|---|
| | | | | | 2 feet above the ground | 25 feet above the ground. | |
| | Degrees. | Degrees. | Degrees. | Inches. | Inches. | Inches. | |
| April | 18·4 | 30·3 | 73·2 | 4·703 | 0·480 | 0·457 | 5 |
| May | 26·2 | 34·2 | 71·9 | 4·585 | 2·176 | 1·952 | 19 |
| June | 34·2 | 43·6 | 74·1 | 5·023 | 1·002 | 0·955 | 14 |
| Mean | 18·4 | 38·0 | 73·1 | 4·772 | 1·219 | 1·121 | 13 |

In April there were 15 nights' frost on the grass, and in May 14. The amount of evaporation for the quarter was 14·316 inches. The amount of evaporation in April was an inch above the average of the last six years, in May half an inch less, and in June about equal to the average. The amount of rain in April was 1·2 inches less than the average of the last 10 years, in May 0·2 more, and in June 2·0 inches less than the average. April, 1844, was 0·1 inch drier than in 1854, and April 1850, equal to that of 1854; in 1846 the amount was 11 times that of April, 1854; in all other years the fall was from 0·8 inch to 3·8 inches more than in April, 1854.

| Month. | General direction of wind. | Strength of the Wind. | Mean Amount of Cloud. | Temperature of Evaporation. | No. of Days Thunder or Lightning occurred on. | Solar or Lunar Halos occurred on. | Hail or Snow fell on. |
|---|---|---|---|---|---|---|---|
| | | (0—6) | (0—10) | Degrees. | Days. | Days. | Days. |
| April | E.N.E. & N.E. | 0·3 | 4·9 | 42·9 | 3 | 3 | 1 |
| May | S.W. | 0·2 | 6·6 | 47·6 | 11 | 1 | 5 |
| June | N.E. & S. | 0·7 | 8·4 | 52·1 | 4 | 2 | 0 |
| Mean | S.W. & N.E. | 0·4 | 6·6 | 47·5 | 6 | 2 | 2 |

A violent gale for this season of the year occurred on the 26th of June from the S., and afterwards from the S.W. The average amount of cloud for April (from seven years' observations) is 6·7, for May 6·0, and for June 6·6. This year, April was very free from clouds, one-fifth of the sky being less cloudy than usual. May was in a slight degree more overcast than the average, and June was much more overcast, one-fifth part of the sky being more overcast than the average of that month. The Chiff-chaff arrived on the 1st of April, four days earlier than usual; Ribes sanguineum came into bloom on the 1st of April, one day earlier than usual; the Swallow arrived on the 14th o April, its average time; Daphne cneorum was in bloom on the 16th of April, 11 days earlier than usual; the Landrail arrived on the 2nd of May, 17 days earlier than usual: the Cuckoo on the 8th of May, 11