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On Phyto-Phenological Observation

W. C. Crawford

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without which there cannot be richness of colour. I doubt if even in their native Indian mountains they are more gorgeously magnificent.

On Phyto-Phenological Observation. By W. C. CRAWFORD.

(Read 8th May 1884.)

(*Abstract.*)

The number of observations on the budding and flowering of plants, the ripening of fruits and the like, in relation to climate and weather, yearly increases; and an attempt is being made in Germany to co-ordinate them and give them a scientific value.* Phenological maps, with lines in the fashion of isothermal lines to indicate the places where vegetation is equally advanced at certain dates, have also been published; but little new knowledge, apart from that indicated on an ordinary physical map, was thus indicated.† Attention was directed to some very careful researches of Professor Hoffmann of Giessen on the flowering of plants, in which he analyses the phenomenon into its separate factors, such as the mean temperature of the air, sunshine, rainfall, temperature of the soil, &c. He shows that the most important of these is underground temperature.‡ To give these researches a local application, the accompanying diagram has been constructed. In it a graphic curve gives averages of the times of flowering of forty plants in the Royal Botanic Garden, originally chosen for observation by the late James M'Nab, and continued records of which have been accumulated by his successors for ten years. II. 9, under 1882, means the 9th February, that being the mean of all the dates for the year, when the first blossoms expanded. The other curve is that of the mean underground temperature as given in the Registrar General's reports for the same period. The two curves run exactly parallel. Apparently, then, the present methods of taking large averages from selected plants, or general observations and records of the annual progress of vegetation, are of little value, and afford no

* *Beiträge zur Phænologie*, Hoffmann und Ihne, Giessen, 1884.

† Petermann, *Mith.*, 1881, i.; 1882, ix.

‡ *Gartenflora*, 1882.

information which ordinary meteorological reports do not contain.

ANNUAL AVERAGES OF THE TIME OF FLOWERING OF FORTY PLANTS,
Observed at the Royal Botanic Gardens, Edinburgh: compared with the Mean Temperature of the Soil 3 inches deep.