

*Thymelacææ.*

Daphne Laureola, S.

*Euphorbiacææ.*

Euphorbia Peplus, S.

,, Helioscopia, S.

Mercurialis perennis, S.

*Urticacææ.*

Parietaria diffusa, R.

Urtica urens, S.

*Amentiferææ.*

Corylus Avellana, S.

## ENDOGENS.

*Liliacææ.*

Galanthus nivalis, S.

*Graminææ.*

Poa annua, S.

Triticum repens, R.

In conclusion, my object in presenting these notes to your readers is threefold; first, to suggest an agreeable, easy, and yet useful occupation for winter walks; second, to indicate the value for phenological purposes if a great number of such series of observations could be made for a long series of years at various parts of our country; third, to show how great is the difference, even within the limits of the British Isles,<sup>1</sup> in the time of flowering of common plants, and yet how little we know upon the subject. Should any desire to assist in work of this kind, I would gladly forward free a copy of our printed form, containing lists and suggestions for observations, both of flora and fauna. The work is carried on in connection with the phenological branch of the Meteorological Society, of which the Rev. T. A. Preston, M.A., of Marlboro', is the efficient Secretary.

Bootham, York

J. EDMUND CLARK

## Colours of Low-growing Wood Flowers

No one can enter our English woods just now without being struck with the lovely way in which they are starred with the yellow of the primrose, the white of the anemone and strawberry, and the light blue of the dog violet. It will be noticed that the tints of these flowers seem positively to shine in the low herbage and among the semi-shade of the trees and bushes. After twice going through the descriptions of flowers growing in similar situations, given in Hooker's "Student's Flora of the British Islands," I find that nearly all our dwarf wood flowers are white, light yellow, and light blue. None appear to be red. Three are purple—one form of the Sweet Violet and the Ground Ivy (*Nepeta Glechoma*), both of which are scented; and the Bugle (*Ajuga reptans*).

If the white and yellow tints of flowers fertilised by night-moths are of service in guiding the moths to them, may not the like tints in low plants in thickets and woods be similarly advantageous to the plants by tending to secure fertilisation? The more lordly foxglove, the ragged robin, and other higher growing flowers, erect above the low herbage, and enjoying more light, are conspicuous enough, but how would a small flower of the colour of a foxglove attract attention when hid among the grass? The purple of the bugle I cannot account for. The ground ivy has a pungent scent. The purple of the sweet violet is certainly inconspicuous, but here the scent may be the attraction, or the habit of the plant in forming cleistogamous flowers, may secure its multiplication. Hence it may be questioned whether the white form of the sweet violet does not mark a gradual transition towards that colour. If the white forms are more conspicuous, and secure easier cross fertilisation, they may in time preponderate. Perhaps the existence of the sweet violet in the purple and in the white form may throw light on the origin of the general lightness of tint in dwarf wood subjects.

The low flowers in dark places which were lighter and made themselves best seen, would more readily secure fertilisation, and through natural selection would tend to have still paler tints. The change might be aided by the bleaching of flowers in shade, as described by Mr. J. C. Costerus (NATURE, vol. xxv. p. 482). In this connection it may be noted that the wood anemone has a rare purple form—perhaps a survival—and that *Anemone Apennina* is light blue. The Potentillas, close allies of the strawberry, but mainly growing in the open, have as a rule yellow flowers; sometimes red ones. The various mountain primroses of this and other countries, and those that grow in meadows (like our own Bird's Eye Primrose, *primula formosa*), have mostly reddish, lilac, or rosy flowers. The common primrose, when growing in exposed hedgebanks has often reddish, lilac, or purple flowers. Its sports in cultivation are often white, so it may be progressing towards that tint in woods. The cowslip, which grows in meadows, has a deeper tinge of yellow than the ox-lip, which grows in copses. The cowslip is also far darker than

<sup>1</sup> At Wigton, Cumberland, for instance, although on the West coast, Mr. J. E. Walker noticed only fourteen wild flowers.

the primrose, and sometimes has a scarlet or orange-brown corolla—perhaps the germ of the dark rich polyanthus of our gardens. The primrose family may have originated in woods, and have been originally light, gradually darkening as the flowers multiplied in the open; or, which is more probable, the tribe originated in exposed situations, creeping by slow degrees into the woods, and bleaching as it went.

Bexley, March 30

J. INNES ROGERS

## Vignettes from Nature

MR. BUDDEN is perfectly right in querying the locality of the specimens of sharks' teeth which I mentioned as having seen from a South American digging. In consequence of a slight deafness, I misunderstood my friend's account of them; and knowing them to be American, assigned the word "South" to "America," instead of to "Carolina," in the coprolite pits of which they were found.

WILLIAM B. CARPENTER

ECONOMIC GEOLOGY OF INDIA<sup>1</sup>

## II.

IN a former notice of Prof. Valentine Ball's important work on the "Economic Geology of India," the subjects of the gold supply and of that form of carbon known as the diamond, were treated of. In the present notice it is proposed to give a brief account of that more important form of carbon known as coal, as well as to allude to the valuable information given in the chapters on Iron, Salt, and Building-stone. The rocks, which in Peninsular India probably correspond, as regards the time of their formation, to the true carboniferous rocks of Europe, are not coal-bearing, and the oldest coal-measures in the country belong to a period which is well included within the limits of the Upper Palæozoic or Permian, and the Lower Jurassic formations. All the useful coal of the peninsula may conveniently be described as being of Permian-Triassic age, and, with two exceptions, it may be added, these measures do not occur beyond the limits of the peninsula. In the extra-peninsular area, coal is found in various younger deposits, and there are numerous deposits in Afghanistan, the Punjab, at the foot of the Himalayas, in Assam and Burma, of undoubted Lower Tertiary, Nummulitic, or Eocene coals and lignites; but it is only quite exceptional that such deposits possess any great value (the chief noteworthy exceptions occur in Assam and Burma).

According to the somewhat liberal estimates of Mr. Hughes, the areas in India, in which coal-measures occur, including those unsurveyed, amount in all to 35,000 square miles, but the thickness of a vast number of the seams of coal in these basins is very varied. For over one century the coal-mining industry of India has been in operation, and there has been a steady increase in production and consumption, especially within the last ten years. Still the coal resources of the country cannot be regarded as yet developed. Out of over thirty distinct coal-fields in Peninsular India, only four or five are worked at all, and even of these, but two have arrived at an output of from 1 to 2000 tons a day, and this though in these two fields the coal-pits are numerous.

It is very important that the reasons for this state of things should be well understood, and they are not far to seek. Most of the coal-fields are very remote from the centres of manufacture and from the seaports, and at these places the native produce has to compete with a better quality of coal sea-borne from Europe. With the extension of railways in India, the home coal will have a better chance, as the facilities of carriage will enable the coal to be brought to the iron-mines, which are mostly too at long distances from the ports, and when used in the reduction of metallic ores, the demand for coal would increase.

<sup>1</sup> "A Manual of the Geology of India. Part III. Economic Geology." By V. Ball, M.A., F.G.S., Officiating Deputy Superintendent, Geological Survey of India. Published by order of the Government of India. (Calcutta, 1881.) Continued from p. 510.