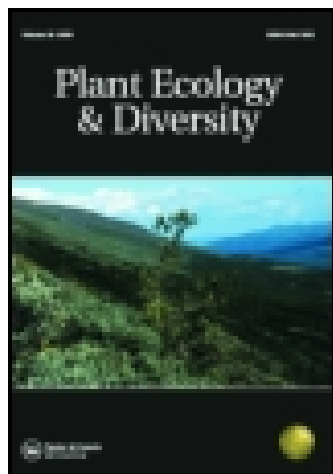


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III. STEM-RINGING EXPERIMENTS ON BROAD-LEAVED
(DICOTYLEDONOUS) DECIDUOUS TREES. By A. D.
RICHARDSON.

The experiments detailed here were made, at Professor Balfour's suggestion, in the winter of 1893-94, in order to ascertain what effects would be produced on broad-leaved trees possessing a heart-wood (duramen), as compared with those possessing no heart-wood, by the removal from their stems of a cylinder of bark along with a certain amount of the underlying wood. At the same time the familiar operation of ringing the bark was performed for purposes of comparison.

For the experiments ten trees, consisting of five kinds, viz., two maples, two beeches, two horse-chestnuts, two laburnums, and two oaks (common and Turkey) were selected. From one tree of each kind there was removed a cylinder of bark (rind) and wood about six inches long, and from the other a cylinder of bark of the same length. The thickness of the cylinder of bark and wood varied with the kind of tree. In the maple, beech, and horse-chestnut its cross-sectional area amounted to one-half that of the whole stem (including bark) at the part operated upon; but in the oak and laburnum it consisted of the bark and underlying sapwood (alburnum) only, which in the oak amounted to two-thirds, and in the laburnum to one-third of the cross-sectional area of the stem.

Briefly, the results which followed these experiments were:—

In no case, as was to be expected, was any perceptible effect upon leafage produced by the removal of bark only; nor was any perceptible effect produced by the removal of both bark and wood in the case of those kinds which form no true heart-wood, viz., maple, beech, and horse-chestnut. Foliation and defoliation took place in these cases quite normally, and the density of the foliage did not seem in any instance to be less than usual. The oak and laburnum from which both bark and wood were removed fared differently. The oak was killed above the part operated

upon, but continued to live below that part. The laburnum, however, was killed outright.

The results of these experiments point to the following conclusions:—

- 1st. In those species which form no true heart-wood, the water ascends freely through the central portion of the stem as well as through the outer portion.
- 2nd. In those species which form a true heart-wood (duramen), the ascent of the water is confined to the region of the sapwood (alburnum).

The results are the outcome of one year's observation only, but the subsequent fate of the trees will be recorded.

The following appearances were produced during the succeeding summer on the stems at the parts which had been operated upon:—

Horse-chestnuts (*Æsculus Hippocastanum*, Linn.).—Where the bark only had been removed, a callus was formed at the cut edge of the cambium both above and below, and from the under one a thick crop of shoots was produced. Where both bark and wood had been removed, a callus was formed both above and below, but from the under one a few shoots only were produced.

Maples (*Acer Pseudo-Platanus*, Linn.).—Where the bark only had been removed, a callus was formed above, but none was formed below. Where both bark and wood had been removed, a callus was formed both above and below, and a few shoots were produced from the under one.

Beeches (*Fagus sylvatica*, Linn.).—Where the bark only had been removed, a callus was formed both above and below (principally above), but no shoots were produced. Where both bark and wood had been removed, a slight callus was formed below, but none was formed above. No shoots were produced.

Oaks (*Quercus Cerris*, Linn., and *Q. Robur*, Linn.).—In the Turkey oak, from which the bark only had been removed, a callus was formed both above and below, but no shoots were produced. (It may be interesting to note that in this case small isolated patches of phloëm, which had been left adhering to the stem in the operation of barking, developed a well-marked callus all round their edges. The supplies of nourishment which these received

must have been conveyed through the medullary rays.) In the British oak, from which the bark and all the underlying sap-wood had been removed, no callus was produced below, although the stem beneath continued to live and to send out shoots from its sides.

Laburnums (*Laburnum vulgare*, Presl).—Where the bark only had been removed, a callus was formed above and a very slight one below, but no shoots were produced.

IV. ON PLANTS IN THE PLANT HOUSES. By R. L. HARROW.

The dull days of November have brought a large reduction in the number of flowering plants in the houses of the Royal Botanic Garden, not more than fifty species having during that period produced their flowers. In the cool houses, the chrysanthemums, acacias, and other winter-flowering plants have done much to relieve the dense green of the foliage. The mild weather experienced during that time having considerably hastened the blooms of several of the late winter and spring flowering plants. A group of *Cypripediums* and the deciduous *Calanthes*, especially *C. Veitchii* and *C. vestita*, var. *oculata*, have given a rather pretty effect. Among the most interesting of the plants that have flowered are:—

Bignonia venusta, Ker-Gawl. A Brazilian species, ranking amongst the most lovely of the genus; and, although introduced to cultivation in 1816, seldom seen in our gardens. It is a vigorous growing climber, shoots nearly thirty feet in length having this year been made in the Palm House. The foliage at the base of the shoots is occasionally ternate, while at the extremities tendrils only are often produced. The inflorescences are clustered on short axillary branches, the flowers being of a rich orange colour, the tube of the corolla about two inches long.

Melastoma malabathricum, Linn. This also is seldom seen in cultivation, and is a native of India and Malaya. In the "Botanical Magazine," t. 529, this species is stated to be the one upon which the genus was founded by Professor Burman. The habit is shrub-like, the foliage