

11

For Retention

DR MCKINNELL

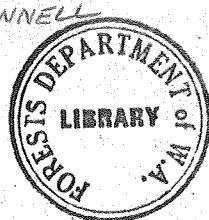
BULLETIN NO. 11.
(2ND EDITION).

Western



Australia.

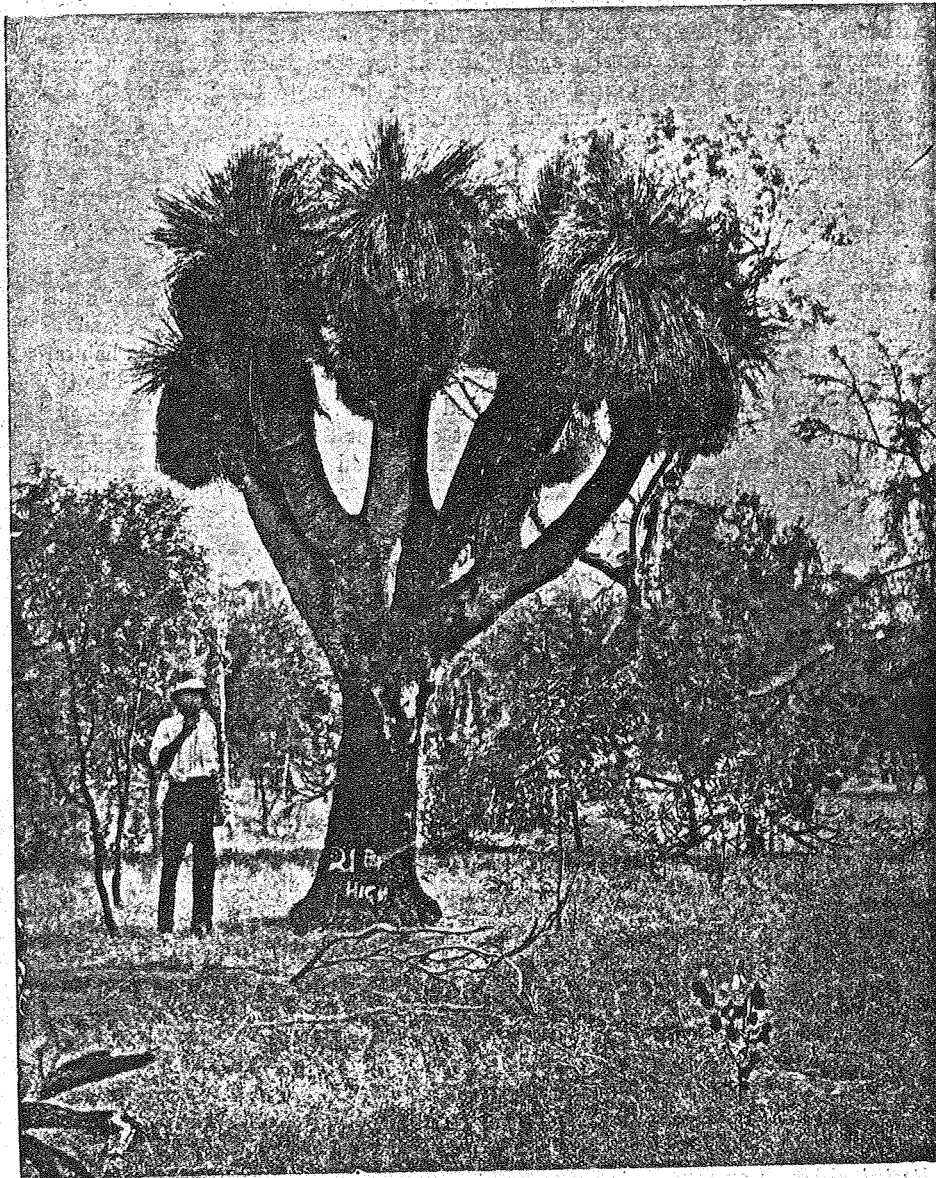
1148



22 JUL 1958

FORESTS DEPARTMENT.

BLACKBOY.



Prepared under the direction of
S. L. KESSELL,
Conservator of Forests.

Issued under the authority of the Minister for Forests:
THE HON. PHILIP COLLIER, M.L.A.

8 6585

BLACKBOY.

The vegetation of Australia is remarkable for many curiosities of the plant world. Among the most conspicuous are the *Xanthorrhoeas*. The name has its origin in two Greek words, indicating a "flow of yellow material," and was applied to the first discovered variety of Botany Bay, which yields a yellow exudation. Although generally designated "Grass-tree" in the Eastern States, *Xanthorrhoeas* are known in Western Australia as Blackboys. In this State, the term "Grass-tree" is limited to *Kingia australis*, a plant very similar to the Blackboy in appearance, but differing in its drumstick form of inflorescence, which immediately distinguishes it from the species of *Xanthorrhoea*. The latter bear long cylindrical spikes of white flowers, giving rise after fertilisation to a black spike of seed capsules. Five different species have been definitely discovered and named in Western Australia. A sixth species that may prove to be *Xanthorrhoea thorntoni* has recently been located near Wiluna.

The common Blackboy, *Xanthorrhoea Preisii*, which is confined to the South-West portion of the State, attains a height of some 15 feet, and its external diameter varies from six to 12 inches. It is characteristic of the Jarrah forest, and its habitat extends (northwards) to near Gingin. Only one of the other species is tall like the common Blackboy, and this has been named *Xanthorrhoea reflexa*, the reflexed Blackboy. It is a species attaining a height of about 20 feet in good specimens, and is to be seen at its best in the Avon district. Odd plants are to be found as close to Perth as Greenmount, but generally *Xanthorrhoea reflexa* occurs in open formation around Popanyinning and East of Narrogin, and can be distinguished in the field by the fact that the dead leaves develop a tendency to hang around the stem in the form of a skirt. The remaining species are not arborescent. *Xanthorrhoea gracilis*, a form with a tuft of grass-like leaves and a graceful, slender stalk, has long been known and is common around Perth. *Xanthorrhoea brevistyla*, a much more localised species with a short trunk, seldom, if ever, greater than one foot in length, occurs between Cuballing, Wagin and Yilliminning. Another dwarf-like variety, *Xanthorrhoea nana*, which produces a short stem seldom exceeding a height of nine inches, is located on the sand plain between Bending, Merredin and Tammin. Although the *Xanthorrhoea* often grows under poor soil conditions, it is able to elaborate many complex chemical substances to such an extent that not only are some of them different from those found in other plants, but the constituents of the individual species are widely divergent. The rate of growth is slow, but under favourable conditions quite an appreciable stem development, amounting to several inches, may occur in a decade.

The only species of commercial value are *Xanthorrhoea Preisii* and *Xanthorrhoea reflexa*. Both these arborescent species discharge a large quantity of gum. *Xanthorrhoea nana* has a certain amount of yellowish gum in its short stem, but not enough to render it of other than academic interest. The resin of the *Xanthorrhoea Preisii* is dark red, and is exuded in moderate quantities, the exudations being either found on the stem or in bubble-like lumps upon and even in the ground around the plant. *Xanthorrhoea reflexa* does not appear to exude the same quantities. The resin of the latter is often very much the same colour as *Xanthorrhoea Preisii*, although on sand heaths the species has been known to produce a yellowish resin. This would seem to indicate that the colour of the resin varies with the soil of the locality. Blackboy resin is found in the outer layers of the stem cementing together the leaf bases, of which the zone is composed. The bases of the individual

leaves vary in shape, and are an important factor in identification. They commonly form flattened, thickish flakes, composed of a light fibrous skeleton and skin; these serving as a support for and container of resin, which forms the main mass of the flake. Exudations and veins of resin often occur in the stem.

Apart from habit, the most striking differences between the two arborescent species are the horizontal and straight leaf bases of the *Xanthorrhoea Preisii* and the erect and then sharply reflexed leaf bases of *Xanthorrhoea reflexa*. The stem, or caudex, consists of a core of fibrous, somewhat spongy tissue, often hard enough to be called wood. It is surrounded by a thick coating or "husk," formed by the persistent bases of old leaves, lying very closely packed together, and more or less cemented by resin into a hard coherent mass. When the outer coating or husk is broken up and beaten, the brittle resin is readily reduced to powder, and can be separated from the fibrous parts by sieving and winnowing. From experiments conducted by prominent analysts some idea of the potentialities of the Blackboy has been ascertained. Among the products obtained have been glucose, treacle, scents and certain tar products, from which two dyes have been extracted. Picric acid, essential to the making of certain explosives, is also derived from the plant, the gum on treatment giving up to 50 per cent. of its weight in the form of picric acid.

Professor E. Rennie and Messrs. W. T. Cooke and H. H. Finlayson, acting as a Special Committee of the Commonwealth Institute of Science and Industry, made an investigation of the resin from species of *Xanthorrhoea* not previously examined, and the following summary of results obtained, which was made available in 1920, is of interest from a technical standpoint:—

- (1) The *Xanthorrhoea* resins from Kangaroo Island and Western Australia, in common with other species examined by various chemists, contain p-coumaric acid, either in the free state or in the form of an ester, and p-hydroxybenzaldehyde.
- (2) By steam distillation from a strongly alkaline solution, the following substances (not hitherto found in *Xanthorrhoea* resin), have been obtained:—

A: *Red Resin from Kangaroo Island* (Sp. ?)—(a) A small quantity of fragrant liquid of vanillin-like odour; (b) paeonol (2-hydroxy-4-methoxyacetophenone); (c) traces of material of higher boiling point.

B. *Yellow Resin from X. Tateana* (Kangaroo Island). (a) A small quantity of fragrant liquid of vanillin-like odour; (b) Paeonol in much larger quantity than in the red resin; (c) hydroxypaeonol in quantity about two-thirds of that of paeonol; (d) a small quantity of material of higher boiling point.

C: *Red Resin from X. Preisii* (Western Australia). (a) A small quantity of fragrant liquid not identified; (b) l-citronellol; (c) paeonol; (d) hydroxypaeonol; (e) a compound, possibly methoxy-diphenyl ether; (f) a small quantity of so far uncrystallised material of very high boiling point.

Recent experiments show that the core or inner part of the stem of *Xanthorrhoea Preisii* contains about 10 per cent. of sugars, which are equally fermentable and yield alcohol to the extent of 0.5 to 1.26 gallons per bushel of 60lbs. The average was equivalent to 19 gallons of 95 per cent. alcohol per ton of core. It was estimated that for each shilling which the core cost per ton delivered at the distillery, the expenditure involved in the raw material would be 0.63d. for every gallon of spirit produced.

A number of investigators have turned their attention to Blackboy, pursuing inquiries into its chemical constituents, their commercial value and utility. The outside sheathing is valuable, yielding, among other substances, drying oils, and turpentine substitutes suitable for the manufacture of paints and varnishes, and other purposes. The yield varies according to the moisture content of the material when treated. The following are given by one experimenter as the extreme limits of yield per ton of material used:—

35-45 gallons of water.

25-30 gallons of liquor containing 12-15 per cent. of acetic acid, and 4-5 per cent. of methy alcohol and 2-3 per cent. of light spirit.

25 gallons of crude oil, containing 10 per cent. light oil, 10 per cent. medium oil, 15 per cent. phenols and acids, 60 per cent. pitch, 4 per cent. loss (approximately.)

8 cwt. of coke residue of high calorific value and 5,000 cubic feet of gas.

The coke residue, which is of high quality, can be made into briquettes with any suitable matrix. It has been stated that the gross value of the products derivable from the low-temperature retorting of Blackboy is greater than that from any other naturally occurring material in Australia.

Large supplies of Blackboy exist on Crown lands, but they are not at present being commercially exploited. With the extension of agriculture, the available resources are decreasing, and there is little chance of a subsequent crop being raised by artificial means.