crystals are then washed thoroughly on a glass filter with boiling 98 per cent ethyl alcohol until free from potassium acetate, and dried in a vacuum desiccator over phosphorus pentoxide.

Microscopic examination shows that practically no amorphous material is present. As shown in the photomicrograph, the crystals are very thin optically anisotropic plates. In the polarizing microscope they exhibit remarkably beautiful red-blue optical dichroism.

When the five-times recrystallized material is precipitated in exactly the same way with potassium acetate at 0° C. as at 95° C., although a few crystals are formed, the bulk of the precipitate is amorphous.

The simplest explanation of the effect of temperature on the crystallization would seem to be that a large steric factor or entropy decrease is involved in the crystallization process, and that raising the temperature consequently favours the rate of formation of crystalline more than that of the amorphous material. If this explanation is correct, one would expect that many substances of high molecular weight would crystallize better at high temperatures than at the customary temperature of 0° C., particularly in salting-out procedures and in methods involving precipitation from aqueous solution by addition of organic solvents.

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Rutin in Two Eucalypts

MAIDEN[1] in 1887 and Smith[2] in 1897 noted the presence of rutin (identified by Perkins[3]) in the leaves of *Eucalyptus macrorryncha* (F. v. M.) or red stringy bark, which occurs abundantly through the hilly country of Victoria and New South Wales. The increasing importance of rutin in the treatment of capillary fragility has led to the possibility of using *E. macrorryncha*, or other eucalypts in which it might occur, as an economic source of rutin.

Samples were collected from natural stands in the Australian Capital Territory, New South Wales and Victoria. The material was examined by a method based on that of Sando and Bartlett[4], wherein the bulk of oils and pigments are first removed by ether, then the rutin is extracted with boiling ethyl alcohol, the alcohol removed by distillation, the rutin crystallized from water and recrystallized from water and alcohol as recommended by Couch *et al.*[5]. The results were calculated as the percentage of recrystallized rutin in the dried sample.

Rutin isolated in this way crystallizes in tiny pale yellow needles, sintering at 189–190° C. and melting at 214° C. Samples of rutin kindly assayed by Dr. Couch by a spectrophotometric method[6] yielded 98–99 per cent rutin after the removal of some alcohol-insoluble material. No quercetin was detected.

Samples assayed green, dried at room temperature, in a drier at 46° C. for six hours and in an oven at 90° C. for six hours, showed that the decomposition of rutin in the leaf during drying was insignificant. In this respect, *E. macrorryncha* differs markedly from buckwheat, wherein Couch, Naghski and Krewson[7] found considerable losses on slow drying at low temperatures.

By taking whole branches of mature trees and dividing the leaves into four samples based on their physiological age, it was found that the rutin content was highest in the young leaves (average 15 per cent, highest result 24 per cent) and decreased as the leaves matured to about 6 per cent in two-year-old leaves. Any differences in the rutin content due to season or geographical location were masked by this leaf-age relationship. Contrary to expectations, young regrowth from cut stumps contained only 2–5 per cent of rutin, and coppice growth had a lower rutin content than mature trees from the same area. The youngest twigs contained about 6 per cent rutin, but the content decreased rapidly as the stem matured. Rutin was isolated in small amounts (about 2 per cent) from young flower buds, but none could be obtained from bark or wood.

Rutin was isolated and identified by melting point, mixed melting point and examination of the products of hydrolysis in four samples of *E. Youmani* (Blakely and McKie) collected in the Guyra district of New South Wales. The yields (6·8–11·0 per cent) were comparable with those obtained from *E. macrorryncha.*

The following eucalypts were tested for the presence of rutin with negative results : *E. dives*, *E. capitellata* Sm. (brown stringy bark), *E. Muelleriana* Howitt (yellow stringy bark), *E. eugenioides* Sieb (white stringy bark), *E. obliqua* (Messmate) and *E. Tinghœnsis.*

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Thermionic Emission from the BaO–CaO System

DURING our work on the available thermionic emission from mixtures of the alkaline earth oxides (barium, strontium and calcium oxides), we have studied the properties of the system barium oxide – calcium oxide. The accompanying diagram shows that a variation of emission with composition is obtained, as in the case of the barium oxide – strontium oxide system[1], which we have remeasured at the same time.

These measurements have all been carried out using an indirectly heated cathode standard diode, and measuring the maximum space-charge limited pulsed (2-μsec., 50-cycle) emission. Each of the coating mixtures was tested in at least four tubes and the average readings used to plot a Richardson line, from which the graph recorded here was taken.

After a study of the thermionic properties of the oxides, the tubes were opened in an atmosphere of