Curr. Sci. **39** 25–26 (1970)

The red oleander and the purple petrea

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The oleanders, known botanically as *Nerium* and classed in the group *Apocynaceae*, are flowering shrubs which no Indian garden is without. They are graceful, large, spreading bushes growing to a height of three metres or more, with a number of cane-like stems starting from the ground and bearing narrow evergreen, lanceolate leaves. The shrubs grow to perfection in sunny situations and in sandy or stony soils. The flowers are produced very freely throughout the year in great profusion in large terminal clusters. There are several varieties, with single or double flowers, which may be pure white, or exhibit colours ranging from pink to a deep red or crimson.

Viewing the red oleander held in a bright light through a pocket spectroscope and comparing the spectrum with that of the light diffused by a sheet of white paper, it is seen that the wavelengths greater than 600 mμ do not suffer any loss of intensity. There is a very marked absorption of the region of wavelengths between 500 and 600 mμ, in other words of the green and yellow sectors of the spectrum. Wavelengths less than 500 mμ continue to be visible, though with noticeably reduced intensity. The colour is readily extracted from the flower petals by immersing them in acetone, followed by vigorous shaking. Placing the acetone extract in a five-centimetre long column, and viewing a bright source of light through it, the absorption spectrum exhibits the features which may be expected to be observed in these circumstances. A maximum of absorption in the green is clearly seen as a darker band at about 540 mμ, superposed on a general absorption extending on either side of it. This covers the yellow of the spectrum upto 600 mμ, beyond which the red region is seen with undiminished intensity.

A spectrophotometric record of the absorption by a rather dilute acetone extract from a red oleander is reproduced as figure 1. Three features marked with the respective wavelengths in Å units, viz., 5010, 5320 and 5620 are seen in the record. These appear in the same positions as those observed in the acetone extract from a red rose reproduced as figure 1 on page 504 of the issue of *Current Science* for November 5, 1969. It is evident that the origin of the red colour of the oleander is the same as that of red rose, viz., the presence of florachrome B in the petals of the flower in each case.

Petrea volubilis belongs to the botanical order *Verbenaceae*. It is a shrub which can be described as a woody vine with a grey bark and characterised by stiff and rough leaves of some size. Being a strong climber, the plant will attain great height

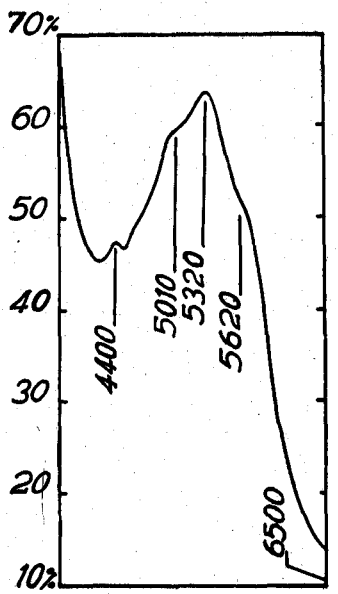

Figure 1. Absorption by acetone extract of red oleander.

and cover a considerable area if left unpruned. It bears bluish-purple five-petalled stars in long elegant wreath-like sprays and hence has been given the popular name of purple wreath. Racemes of these stars, some 15 or 20 cm in length, crowd the plant in the flowering seasons, covering it up in a mass of colour. Given a support of adequate size on which it can climb and establish itself, the plant then makes an impressive show. The five-petalled stars which might be mistaken as flowers are actually only the calices which remain after the true flowers have fallen off. The latter are much smaller and have five petals of a deeper colour. They may be seen resting in two or three of the end calices. One of the five petals in each flower carries a white splash in the middle.

Examined *in vivo* through a pocket spectroscope, the five-petalled stars exhibit a spectrum in which the most noticeable feature is the nearly complete extinction of the yellow region of the spectrum, accompanied by a noticeable reduction of the intensity of the green sector. The blue region of the spectrum, on the other hand, appears without any great diminution of brightness. The red end of the spectrum is also seen with nearly its normal intensity. On account of their small size, the spectroscopic examination *in vivo* of the true flowers is somewhat difficult. But they appear to exhibit the same features as the calices, but in a more accentuated degree.

The material which is responsible for the colour exhibited by the calices of *Petrea volubilis* is readily extracted by shaking them in a glass-beaker with

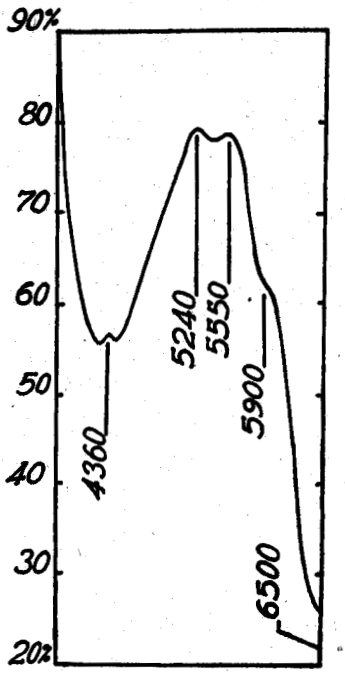

Figure 2. Absorption by acetone extract of purple petrea.

acetone. The absorption spectrum exhibited by a column of the extract of 1 cm depth is reproduced as figure 2. It exhibits features which are very similar to those observed in the spectrophotometer records obtained with the acetone extracts of the purple flowers of *Lagerstroemia indica* and of the purple verbena, which were reproduced in earlier issues of *Current Science*. These records illustrate the immensely important role played by the yellow sector of the visible spectrum in the perception of light and colour. The absorbing material may be identified as florachrome B, with a possible admixture of florachrome A. The presence of the latter would serve to intensify the bluish-purple colour actually observed.