

ART. XXV.—*The Refractive Index of Canada Balsam*; by
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THE refractive index of Canada balsam, as it occurs in the thin sections made for the U. S. Geological Survey, was determined on the request of Mr. F. C. Calkins, who had found* that the index, or n , was not absolutely constant but varied between two extremes. By the examination of 300 slides, he found n to reach and even slightly exceed ω of quartz (1.544), though n was found greater than 1.544 only in the proportion of one slide in a hundred. The excess was very small and the balsam was decidedly yellow. The lowest value found by him was about $1.535 \pm .002$.

The value of n for sodium light was determined on an Abbe-Zeiss refractometer by total reflection on three kinds of slides, which were (1) not cooked as much as usual, (2) cooked as ordinarily done, and (3) over-cooked. The differences found between (1) and (2) are very slight, and, in fact, the individual values show almost as much variation as between the different groups. The values obtained are:

$$\begin{array}{ccc} (1) & (2) & (3) \\ n = \begin{cases} 1.539 \\ 1.538 \\ 1.539 \end{cases} & n = \begin{cases} 1.536 \\ 1.538 \\ 1.539 \end{cases} & n = \begin{cases} 1.543 \\ 1.540 \\ 1.540 \\ 1.542 \\ 1.541 \end{cases} \end{array}$$

The average values are for (1), 1.5387; for (2), 1.5377; for (3), 1.5412, or, as the average of all, 1.5395, which is almost identical with the value (1.5393) given by Beckert† in 1898. A determination of n in a slide six years old gave the value 1.5390. These values show that, in general, n lies very close to 1.539 and that this value may well be used in a study of a thin section, while the actual possible variation was found by Mr. Calkins to be from 1.535 to 1.545, though the extreme values are but seldom reached. The uncooked, liquid balsam has a refractive index of 1.524, which, after cooking, rises to 1.54. The older a slide, the higher the index of the balsam becomes, which after a time, especially if the air has access, reaches towards the highest value, or 1.545.

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* Science, vol. xxx, p. 973, Dec. 31, 1909.

† This Journal [4], v, p. 349.