# THE MEDULLARY RAY CELLS IN RHAMNUS PURSHIANA AND IN RHAMNUS CALIFORNICA.

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Ever since Cascara Sagrada, Rhamnus Purshiana, D. C., became a prominent therapeutic agent it has generally been conceded that it could be distinguished from its near ally, Rhamnus Californica, Esch. by the character of its medullary rays as seen in a cross section of the bark. Prof. Henry Kraemer, in a study of the bark of Rhamnus Purshiana, (Journal of the American Pharmaceutical Association, Vol. 1, page 846, August, 1912) makes the following statement: "It is usual to attempt to differentiate between the barks of Rhamnus Purshianus and Rhamnus Californicus by reason of the apparent difference in the number of cells comprising the width of the medullary rays." This has reference to the ray as seen in the cross section of the bark. It is possible that most authors, in the study of this work, have relied chiefly upon the number of cells in the width of the ray to distinguish it from R. Californica; but it is not the chief character. The two barks can readily be distinguished in cross section by comparing the rays without reference to the number of cells in their width, although those of R. Purshiana generally have fewer cells. The rays of R. Californica are fewer, probably not over one-half or two-thirds as many and, therefore, have much wider spaces between them; they are more curved and irregularly grouped, and as the ends are not even with the rest of the tissues, as they are in R. Purshiana, the cambium edge of the section presents a very pronouncedly wavy or lobed line, that of R. Purshiana being even. Prof. Kraemer also calls attention to the fact, which most investigators have either forgotten or overlooked, that the tangential-longitudinal section alone gives the general outline as to height and width of the medullary ray and lays great stress upon the importance of this section, which should be in the cambium region, in furnishing the distinguishing characters in the medullary ray, if such there be, between closely related species. Rhamnus Purshiana is illustrated showing the bark in all three sections, cross, radial-, and tangential-longitudinal; Rhamnus Californica is not illustrated as Prof. Kraemer did not have authentic material for investigation. Upon reading Prof. Kraemer's paper, I immediately took steps to obtain authentic bark of Rhamnus Californica for investigation. A supply was obtained in the fall of 1912 but as no fruit or leaves from the same shrub accompanied the bark, for its identification botanically, nothing was done with it. In the spring of the present year, the collector was again approached, and this time he furnished another supply of the bark, together with flowering branches from the same shrub that furnished the bark. This proved to be typical Rhamnus Californica and a comparison of the twig bark with that of the bark in bulk showed the two to be of the same species. In the cross sections of the barks the rays of both species, in the sections examined by me, were from one to four cells wide but in Rhamnus Purshiana those of one and two cells in width were quite frequent while they were rare in Rhamnus Californica. As to the character of the rays, themselves, which is more important than the number of cells, the dis-

tinctions as outlined above were seen to be well defined. In the tangential-longitudinal section I found the ray in Rhamnus Purshiana to be from one to five cells in width, commonly three or four; in Rhamnus Californica the ray in from one to seven cells wide, commonly four or five. In the former the cells are pretty evenly arranged in lines, and are of about the same size; while in the latter, when more than four cells wide, the cells are irregularly arranged in the center of the ray and of variable size.

Perhaps it will not be amiss before dismissing the subject to make a few remarks upon the cultivation of Rhamnus Purshiana in Michigan. The plant, according to the *Kew Bulletin,* has been, for several years, cultivated with success in Ireland. In 1907, at my request, Messrs. Parke, Davis & Co. procured about eighty seedlings of Rhamnus Purshiana from Oregon. These were transplanted in October of that year on the lawn in front of the laboratory. The trees are not protected with winter buds so it was a question as to whether or not they would withstand the rigor of our climate. In order to make a thorough test they were planted near the Detroit river and ran inland or in a line at right angles with the river bank. Most of them would be directly exposed to the freezing winds from the icy river while a few would be more or less protected by near-by buildings. The first winter the transplanted seedlings were well protected by wrappings of straw and sacks while the ground was covered with plenty of straw; in the following winters they were not protected. During the six years since they were planted about eighty-five percent have died or all that were not protected from the cold winds from the river. The more vigorous trees are about 12 feet in height and 4 inches in diameter at the ground. They have blossomed this year for the first time but no fruit has developed. The plants were planted in made ground consisting mostly of blue clay and some greyish clayey loam. The inference is that Rhamnus Purshiana can be successfully cultivated in Michigan in situations where it can be protected from the direct blasts of the cold icy winds.

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## NOTE ON THE ACIDITY OF HYDROGEN PEROXIDE SOLUTION.

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The acidity of solutions of hydrogen peroxide may be due to one or more acids, free phosphoric, sulphuric, or hydrochloric acid usually being present. To determine quantitatively how much free acid is present has been studied by many, and with varying success. The choice of an indicator for the titration must be made, and it has generally been attempted to select one indicator suitable for all cases. Of course the amount of free acid in solution of hydrogen peroxide for general medicinal use does not need to be controlled very closely, so perhaps one indicator for all acids is sufficient. But by following out a suggestion published