Methods

Approximately one gram of dried material from the roots, leaves, and flowers, respectively, of *Psoralea subacaulis,* collected from a cedar glade near Murfreesboro, Rutherford county, Tennessee, were ground with a mortar and pestle and defatted with 100 ml of petroleum ether (b. p. 30° - 60°C) for 24 hours. After the petroleum ether was removed by filtration, the solid material was extracted for 24 hours with 100 ml 95% ethanol. Appropriate amounts of the ethanolic extracts were chromatographed in triplicate in comparison with an authentic sample of psoralen in 10% acetic acid on Whatman No. 1 filter paper and in benzene: methanol: acetic acid (48:8:4 v/v/v) on thin-layer plates coated with silica-gel G (Warner Chilcott Laboratories, Richmond, California). The chromatograms were examined under ultra-violet light both before and after exposure to ammonia vapor.

Results and Conclusion

After both thin-layer and paper chromatography of the alcoholic extracts of *Psoralea subacaulis,* several spots were seen under ultra-violet light. One of the spots from each plant part examined had an R_f value and light blue color identical with that of an authentic sample of psoralen (Table I). From these data it was concluded that psoralen is present in the roots, leaves, and flowers, as well as in the seeds of *P. subacaulis.*

Table I

R_f Value of Psoralen and A Component of Ethanolic Extracts of the Roots, Leaves, and Flowers of *P. SUBACAULIS*, Obtained upon Paper Chromatography and Thin-Layer Chromatography

	Solvent	R_f: Material from roots, leaves and flowers of *P. subacaulis*	R_f: Authentic psoralen
Paper	10% HAc*	0.57	0.57
Thin-layer	BMAc*	0.91	0.91

* Specified in text.

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ON SOME MATHEMATICS ABOUT DRIVING A CAR

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Frietag and Frietag (1967) in a recent article presented an interesting though elaborate solution to the following problem: A man decided to go over a mountain in his new automobile. In this instance the distance up to the top of the mountain was exactly equal to the distance down the other side. The man went up at 30 miles per hour and then decided to go on down the other side at such a rate as to average 60 miles per hour. He failed and blamed the car. His wife blamed his driving. His son, a freshman in college, told him in effect that he was trying the impossible, that he would have had to descend at an infinite rate of speed to attain his objective.

Was the son right?

The answer may be obtained directly from Frietag and Frietag's equation (1).

$$\frac{d}{r_1} + \frac{d}{r_2} = \frac{2d}{r} \qquad (1)$$

where d is the distance up the mountain (and also the distance down the other side), r_1 is the average uphill speed, while r_2 is the average downhill speed required to give an overall average of r. Does a (finite) value of r_2 exist such that $r_1 = 30$ and $r = 60$? On substituting these values into equation (1) it is seen that the first term on the left is equal to the right-hand-side. Hence $d/r_2 = 0$. Since $d \neq 0$, r_2 is infinite.

As indicated by Freitag and Freitag, for any value of $r<2r_1$, a value of r_2 exists. It is equal to $r_1r/(2\,r_1-r)$ as can be obtained by rearranging equation (1) after dividing by d. For $r = 2\,r_1$, as shown above, r_2 is infinite. For $r > 2\,r_1$, r_2 is negative, which has no physical meaning in our world.

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Freitag, H. T. and A. H. Freitag. 1967. Some Mathematics About Driving a Car. J. Tenn. Acad. Sci. 42:112-3.