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Letter to the Editor

Legal Status of Peyote: Forensic and Botanical Aspects

Sir:

The point at issue in this letter is rooted in and arises from the confusion inherent in botanical nomenclature. Plant taxonomy is probably one of the oldest disciplines in the sciences and, unfortunately, one of the least understood by other scientists. In the early stages of development, it was very common in plant taxonomy to have several scientific names published for a single species or to have a single species represented under several generic names. This was the result of authors in different geographical areas having little or no communication. Today, however, with mass communication the load of the plant taxonomist has been somewhat lightened. Among many other functions, he finds his job not only that of naming and describing new species but also that of returning to the literature and correcting the discrepancies of the old species. The following list of synonyms and references published [*1*] for the peyote plant will assist in illustrating the problems the plant taxonomist faces.

Lophophora williamsii (Lemaire) Coulter, Contr. U.S. Nat. Herb. **3**:131. 1894

Synonyms:

Echinocactus williamsii Lemaire ex Salm-Dyck in Otto & Dietr., Allgem. Gartenzeit **13**:385. 1845

Anhalonium williamsii Rumpler in Forster, Handb. Cact. ed. **2**. 233. 1886

Anhalonium lewinii Hennings, Gartenflora **37**:410. 1888

Mammillaria williamsii Coulter, Contr. U.S. Nat. Herb. **2**:129. 1891

Ariocarpus williamsii Voss, Vilmorin Illustrite Blumengartneri 368. 1894

Echinocactus lewinii K. Schumann, Nat. Pflanzenfam. **3**. Abt. 6a: 173. 1894

Lophophora williamsii var. *lewinii* Coulter, Contr. U.S. Nat. Herb. **3**:131. 1894

Lophophora lewinii Rusby, Bull. Pharmacy **8**:306. 1894

Mammillaria lewinii Karsten, Flora Deutsch. ed. 2. **2**:457. 1895

Echinocactus williamsii var. *lutea* Rouhier, Trav. Labouret Mat. Med. Pharm. Galen **17** (pt. 5); 65. 1926

Lophophora echinata var. *lutea* Croizat, Desert Plant Life **16**: 44. 1944

Lophophora echinata Croizat, Desert Plant Life **16**:43. 1944

Lophophora williamsii var. *lutea* Soulaire, Cactus et Medecine 121. 1947

Lophophora lutea Backeberg, Die Cactaceae **5**:2901. 1961

Lophophora williamsii var. *echinata* H. Bravo, Cact. Sucul. Mex. **12**(1): 12. 1967.

Peyote, which was one of the earliest known hallucinogenic drugs, appears to be of Aztec origin; it derives its name from "peyotl." Other names for peyote are pelote, challote, mescal button, and devil's root. The plant is native both to the sandy stretches of northern Mexico and to the Rio Grande area of Texas. The narcotic use of peyote dates back centuries to the pre-Columbian era, when the hallucinogenic effect was basic to the religious practices of several Aztec and Mexican Indian tribes. The northern spread of the peyote plant and its use started around the late 19th century. At that time several Indian tribes north of the Rio Grande, in an attempt to resist the fierce presentations of missionary groups, started using the drug. Thus the peyote religion was incorporated into the Native American Church. Since then the use of peyote has spread widely throughout North America and has become in our time an abused hallucinogen.

In the Comprehensive Drug Abuse Prevention and Control Act of 1970, peyote is classified under the Controlled Substances Act, Schedule I. The scientific definition of peyote

was not in the law until 22 April 1975, when the Drug Enforcement Administration [2] defined peyote:

> Meaning all parts of the plant presently classified botanically as *Lophophora williamsii* Lemaire, whether growing or not; the seeds thereof; any extract from any part of such plant; and every compound, manufacture, salt, derivative mixture or preparation of such plant, its seeds or extracts.

This definition was published in the *Federal Register* on 28 April 1975 and 28 Jan. 1976.

The scientific name *Lophophora williamsii* Lemaire as presented in the above definition for peyote is invalid according to the International Code of Botanical Nomenclature; it is nonexistent in the botanical literature. A brief survey of the history and the nomenclature of this plant will assist in illustrating this contention. In 1845 *Cels Catalog* records the introduction of peyote by Lemaire under the genus *Echinocactus* as *Echinocactus williamsii*. No plant description was proffered at this time. However, later in that same year, Salm-Dyck [3] presented a Latin description for peyote, which was subsequently published in Otto and Dietrich's *Allgemein Gartenzeitung* along with other species of *Echinocactus*. Thus, the correct scientific name for peyote was accepted as *Echinocactus williamsii* Lemaire ex Salm-Dyck. The new genus *Lophophora* was established in 1894 by Coulter to separate peyote from the genus *Echinocactus*. The reason for the separation based on Coulter's [4] original citation was that "the genus *Lophophora* differs from *Echinocactus* in the suppression of the spine-bearing areolae and the naked ovary." Therefore, according to the *International Code of Botanical Nomenclature* [5], the correct scientific name for peyote should be treated as *Lophophora williamsii* (Lemaire) Coulter.

In accordance with the *International Code of Botanical Nomenclature*, published by the International Association for Plant Taxonomy, the scientific name for peyote as set forth in Controlled Substances Act, Schedule I is a misrepresentation and therefore jeopardizes law enforcement with regard to this hallucinogen.

If we assume that the law governing the control of the peyote plant were corrected to the appropriate scientific name, our legal problem with this plant would not be altogether alleviated. Recent botanical evidence from Anderson [1] in conjunction with chemical data from Todd [6] describes the existence of two distinct species of *Lophophora*. When fresh plant material is used the two species *Lophophora williamsii* (Lemaire) Coulter and *Lophophora diffusa* (Croizat) Bravo H. are readily distinguishable based on the following key [1]:

1. Plants blue-green, usually with well-defined ribs and furrows; tufts of trichomes usually equally spaced on the ribs; flowers pinkish or rarely whitish; not Queretaro.
   1. *Lophophora williamsii* (Lemaire) Coulter
1. Plants yellow-green, usually lacking well-defined ribs and furrows; tufts of trichomes usually unequally spaced on prominent podaria; flowers commonly whitish to yellowish white; Queretaro.
   2. *Lophophora diffusa* (Croizat) Bravo H.

Thus we see that there exist two distinct species under the genus *Lophophora* that are easily differentiated in their fresh, growing states but are indistinguishable in the dried or powdered states (which are seen most often in the forensic science laboratory). Here, again, because of the ambiguity of law a problem is created for the forensic scientist.

To avoid the confusion, the peyote should be defined as any species of genus *Lophophora* Coulter. Furthermore, in the future, the authorities should, before attempting to define any controlled dangerous substance of botanical origin (such as peyote or coca leaves), work together with the plant taxonomists.

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References

[1] Anderson, E. F., "The Biogeography, Ecology, and Taxonomy of *Lophophora* (Cactaceae)," *Brittonia*, Vol. 21, No. 4, 1969, pp. 299–310.
[2] *Federal Register*, Vol. 41, No. 19, 1976, p. 33.
[3] Salm-Dyck, in Otto, F. and Dietrich, A., *Allgemeine Gartenzeitung*, Vol. 13, No. 49, 1845, p. 385.
[4] Coulter, J. M., "Preliminary Revision of the North American Species of *Cactus Anhalonium*, and *Lophophora*," *Contributions of the United States National Herbarium*, Vol. 3, No. 2, 1894, p. 131.
[5] Lanjouw, J., *International Code of Botanical Nomenclature,* International Association for Plant Taxonomy, Utrecht, The Netherlands, 1964, pp. 44–50.
[6] Todd, J. S., "Thin-Layer Chromatography Analysis of Mexican Populations of *Lophophora* (Cactaceae)," *Lloydia*, Vol. 32, No. 3, 1969, pp. 395–398.