A redistillation of this oil through a fifteen-inch Vigreux column yielded:

TABLE III.

Fraction.	Boiling point.	Volume.
1	83–120°	19.4 cc.
2	120–130	26.4
3	130–132	19.8[1]
4	132–135	14.3
5	135–140	16.1
6	140–150	14.1
7	150–160	28.1
8	160+	12.7

[1] Odor of amyl alcohol very apparent.

Fraction 130–132° was dried over Na_2SO_4 and treated with 5 Gm. of α-naphthyl-isocyanate according to Neuberg and Kansky (7). After standing for twelve hours, 4.0 Gm. of a crystalline product were obtained. Crystallization from petroleum ether yielded a product melting at 61°. Repeated crystallization caused no change in the melting point.

Neuberg and Kansky state that the α-naphthyl-urethane of isobutyl carbinol (isoamyl alcohol) melts at 67–68°. Hence a urethane was prepared from a sample of isoamyl alcohol from Eastman Kodak Company and found to melt at 61°.

A mixture of the two melts at 60–61°, hence it may be concluded that isobutyl carbinol is present in American peppermint oil.

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THE BOTANICAL IDENTITY OF MA HUANG.

BY OLIVER ATKINS FARWELL.

In the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION for August 1926, Vol. XV, pages 625 to 639, Chen and Kao present a review of the work that has been done on *ephedrine* and *pseudoephedrine;* the former is obtained from Ma Huang which has been known in Chinese medicine for 5000 years and which is identified as *Ephedra vulgaris* Rich, var. *Helvetica* Hook. f. and Thompson and the latter is obtained from a European plant identified by Arthur Meyer as *Ephedra vulgaris* var. *Helvetica*. Also, they say: "It appears, therefore, probable that the plant *Ephedra vulgaris* var. *Helvetica* yields *ephedrine* when grown in China, but *pseudoephedrine* when grown in Europe. Such analogy can be found in Oil of Turpentine, for the French and Spanish oils contain *l-α-pinene* whereas the American and Greek oils the dextrogyrate modification."

The statement in the quotation above that a species or variety will produce one plant base in one region and a different one in some other region is very surprising, to say the least. It is more reasonable to believe that the species are distinct and that the botanical identifications are wrong and ought to be more thoroughly investigated. As to the Oil of Turpentine, that produced in America is from *Pinus palustris* Mill. and *P. Taeda* Linn, while that of Europe is from *P. sylvestris* Linn, *P. Pinaster*, Ait. and of other species none of which are the same as the American, so that the analogy suggested is true *only and if* "Ma Huang" *is not identical* with *Ephedra Helvetica* of Europe. The European plant producing *pseudoephedrine* is *E. Helvetica* C. A. Meyer; by some it is considered as a "variety" or "subspecies" of *E. distachya* Linn (*E. vulgaris* Rich).

Not being able to trace the name *E. vulgaris* var. *Helvetica* Hook. f. and Thompson as given to the Ma Huang by Nagai according to Chen and Kao, I wrote to the Director of the Royal Botanic Gardens at Kew, England, for information concerning it, which was very courteously supplied. I quote from the Director's letter as follows: ".....The name *Ephedra vulgaris* var. *Helvetica* appears to have originated in the Kew Herbarium where certain specimens of Hooker & Thompson's Indian herbarium bear this name. It has also been found in a manuscript list of the same herbarium. It was apparently supposed that the specimens were identical with *Ephedra Helvetica* C. A. Meyer and that *E. Helvetica* was only a variety of *E. vulgaris* Rich, but that supposition proved to be erroneous. The specimens have since been named by Dr. Stapf as *E. intermedia* Schrenk and C. A. Meyer, var. *Tibetica*."

From the above quotation, it will be observed that *Ephedra Helvetica* C. A. Meyer, the European plant, is not identical with the Asiatic *Ephedra intermedia* var. *Tibetica* (*Ephedra vulgaris* var. *Helvetica* Hook. f. and Thompson). Also that the name *E. vulgaris* var. *Helvetica* Hooker and Thompson is only a MS name, has never been properly published and therefore cannot be invoked to designate "Ma Huang," which has been referred to also as *Ephedra equisetina Bunge*. Dr. Stapf was unable to identify Ma Huang as no material had ever been sent him. At his suggestion, this oversight was promptly remedied. The following quotation from the report of Dr. Stapf on samples of commercial Ma Huang indicates that it is an undescribed species, of which flowers and fruits are still unknown and that it may pass for commercial purposes under the provisional name of *Ephedra Sinica* Stapf. "It differs from all the Chinese *Ephedras* I have ever seen in the combination of the following characters—low tufted growth, scanty branching above the base, slender almost smooth pale branches, the conspicuous (though short) subulate spreading or recurved blades of the sheath leaves and the membranous whitish sides of the sheaths. I have seen neither flowers nor fruits and I have therefore hesitated to describe the plant. It is very desirable that these should be procured. If a provisional name is required in the meanwhile for trade purposes *Ephedra Sinica* might be used." Dr. Stapf says also that Ma Huang is identical with a specimen collected by F. N. Meyer in August 1913 near Tan hwa, province of Chili.

DEPARTMENT OF BOTANY,
PARKE, DAVIS & CO.,
DETROIT, MICH.