

A MICROSCOPICAL COMPARISON OF SOME OFFICIAL HERBS AND THEIR SUBSTITUTES.*

BY FANCHON HART.

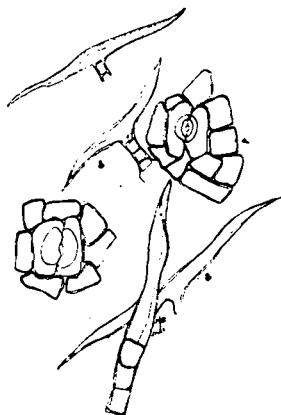
The frequency with which some of the official herbs are adulterated in the powdered form has led me to undertake a description of the histological elements of a few common herbs, their adulterants and substitutes.

The first, *Artemisia Absinthium* and *Fallacious Species of Artemisia*.

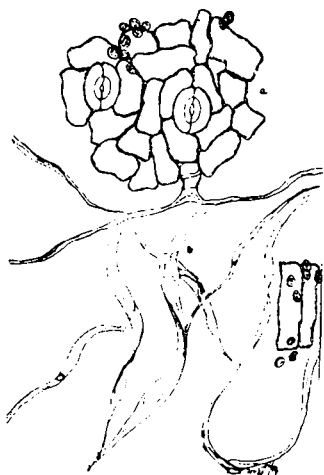
The second, *Arnica Montana* and *Its Substitutes*.

Bearing in mind that the characteristic and diagnostic elements of the genus are the trichomes apparent on the leaf epidermis, stoma and modifications of the epidermal cells, I shall limit my discussion to the anatomical features of these elements.

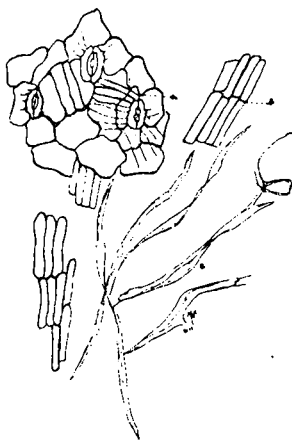
Artemisia Pontica, commonly called *Absinthium Petite*, is an inferior and worthless species imported from Europe and Asia. The two-armed or T-shaped hairs of this variety are about three times the length of the official absinth. The terminal cell of the *Pontica* trichomes are many times twisted, giving the appearance of cotton fibers. Although the hairs are distorted, the rigidity of the cell-walls prevent their collapse. This gives the trichome a jointed aspect. The terminal cells separate from the basal cells in powdering, while in the



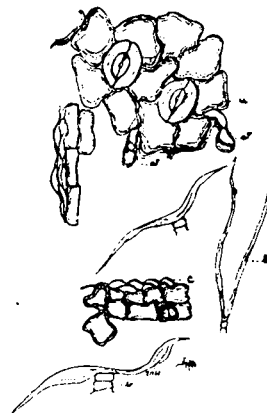
Artemisia Absinthium.—a, epidermis; b, trichome.



Artemisia Pontica.—a, epidermis; b, trichome.



Artemisia Maritima.—a, epidermis; b, palisade tissue; c, trichome.



Artemisia Abrotanum.—a, epidermis; b, trichome; aj, glandular hair; c, papillae.

Artemisia Absinthium the terminal prolongations cohere to the basal portion. The epidermis of *Artemisia Pontica* is beaded and wavy. The guard cells surrounding the stoma are nearly as large as the true epidermal cells.

*Scientific Section, A. Ph. A.

Artemisia Maritima is a native of the Mediterranean region.

The epidermal cells of the leaves of this plant present distinctive characters from those of the other *Artemisias*. The walls are more wavy than *Artemisia Absinthium*, but not beaded as in *Artemisia Pontica*. The long narrow palisade cells of the mesophyll adhere to the transparent epidermal cells, giving the latter a striated appearance. The guard cells of the stoma are manifestly smaller than those of *Absinthium Pontica*. The trichomes are similar to the trichomes of the latter in that they are thin and cotton-like, but differ from that variety in lack of rigidity of cell-wall.

Artemisia Abrotanum, known as Southern Wood, Sweet Benjamin, Smelling Wood and Citronella, has a lemon odor.

The trichomes that are present, differ from the above species in unity of the cells of the basal portion. Many papillae protrude from the wavy and striated epidermis. This species presents the greatest number of glandular hairs and stoma.

SUMMARY.

Artemisia Absinthium:

Trichomes—eight to ten times the width, broadest of the four varieties.

Epidermis—smooth and slightly wavy. Two oblong cells surround the guard cells.

Artemisia Pontica:

Trichomes—fifteen to thirty times as long as wide, tubular and twisted, cotton-like.

Epidermis—wavy beaded walls.

Artemisia Maritima:

Trichomes—cotton-like but collapsible, shorter by one-half than *A. Pontica*.

Epidermis—not striated and wavy, with adhering palisade tissue.

Artemisia Abrotanum:

Trichomes—basal and terminal portions intact, similar to *A. Absinthium*.

Epidermis—papillose and wavy, many glandular hairs.

Arnica Montana is frequently replaced by and adulterated with the flowers of *Inula Helenium*; *Inula Britannica*; *Heterotheca Inuloides*, false Arnica.

The trichomes and pollen grains present diagnostic variations.

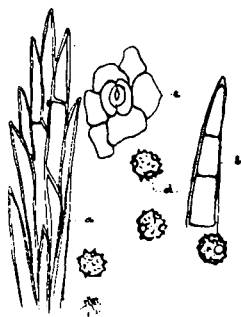
Arnica Montana is largely composed of multicellular, multiseriate pappus trichomes. These are from five to six series wide, with the apical cells broadly acute. A number of multicellular, uniseriate hairs are also present.

The pollen grains have three large distinct pores. The cell is spherical, covered with large spines.

Inula Helenium.—The flowers of this plant have fewer pappus hairs. The apical cell of each series is thicker walled, coming to a rounded apex. This trichome differs from that of *Arnica Montana* in that the former is not as greatly laterally seriate. The pollen grains are smaller, spinose and papillose and devoid of pores.

Inula Britannica.—The tendency of the lateral processes to curve toward the base of the hair is peculiar to this species of *Inula*. Fewer series make up the trichome, and the component parts of each element are short with an acute apex.

The pollen grains are twice the size of *Inula Helenium*. They are three-lobed and sharply spinose.

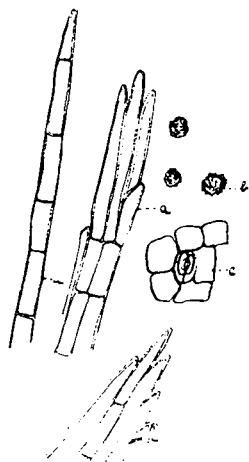


Arnica Montana.—*a*, trichome; *b*, trichome; *c*, epidermis; *d*, pollen.

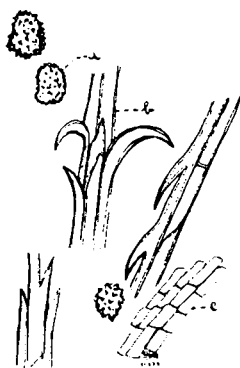
Heterotheca Inuloides, native of Mexico.

The multicellular trichomes are many more times seriate than the other false *Arnicae*. The uniseriate hairs are composed of as many as twelve cells.

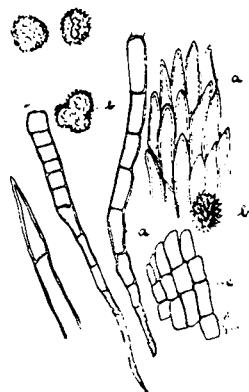
The pollen grains are three-lobed and thickly spinose.



Inula Helenium.—a, trichome; b, pollen; c, epidermis.



Inula Britannica.—a, pollen; b, trichome; c, parenchyma.



Heterotheca Inuloides.—a, trichome; b, pollen; c, parenchyma.

SUMMARY.

Arnica Montana:

Trichomes—five to six series wide, apex acute.

Pollen—spinose, spherical and three pored.

Inula Helenium:

Trichomes—thick-walled apical cell, two to three series wide.

Pollen—small, spinose, papillose not pored.

Inula Britannica:

Trichomes—short, curved apical cells.

Pollen—large three-lobed sharply spinose.

Heterotheca Inuloides:

Trichomes—many times seriate, rounded apical cells. Large many-celled uniseriate hairs.

Pollen—three-lobed, many short spines.

(To be continued)

DEPARTMENT MATERIA MEDICA,
COLUMBIA UNIVERSITY,
SCHOOL OF PHARMACY.

INTERNATIONAL CONGRESS OF PHARMACY.

The general meeting of the International Pharmaceutical Federation will be held in London, on July 23, 1923. The sessions will be held in the Great Central Hotel, Marylebone Road, N. W., where the British Pharmaceutical Conference will also meet. The Pharmaceutical Society of Great Britain invites the delegates and their ladies to attend the meeting of this pharmaceutical congress, which will

be held from July 23 to 27, 1923, as well as the dinners, receptions and excursions which will take place on this occasion.

The secretary of the Local Committee of the British Pharmaceutical Conference, 17 Bloomsbury Square, London, W. C., will be pleased to supply members taking part in the general meeting with full particulars regarding accommodation in the Great Central Hotel, and to retain rooms for them in this or any other hotel in London.