

due to ethyl butyrate, when a drop of the first fraction was heated with several drops of ethyl alcohol and one drop of concentrated sulphuric acid. The material at hand was insufficient to prepare salts of the acids for further macroscopic confirmation.

## SUMMARY.

(1) The bark of mountain maple (*Acer spicatum*) was found to be almost entirely substituted for true cramp bark (*Viburnum opulus*).

(2) All samples of black haw (*Viburnum prunifolium* or *Viburnum lentago*) proved to be genuine with the exception of one, obtained from a non-official *Viburnum* species.

(3) The preparations of black haw were made from *Viburnum* barks, while those of cramp bark were mostly manufactured from *Acer* species.

(4) The tannins in the barks give different color reactions with iron salts; blue in the case of *Acer* and green in that of the *Viburnum* species. These reactions can be used to distinguish the barks as well as their preparations.

(5) The tannins are distributed in the parenchymatic tissue, but can most easily be seen in the medullary rays.

(6) Maple bark can furthermore be readily distinguished from the *Viburnum* barks by the intense red coloration when the inner bark is treated with phloroglucin-hydrochloric acid solution; in the case of *Viburnum* barks, more than a faint reaction, if any, is rarely obtained.

(7) Among the differentiating tests of interest are those which were used to obtain and identify valericianic acid, yielded by the *Viburnum* barks but not by the *Acer* barks.

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## WILD ANTHEMIS—A POSSIBLE MATRICARIA ADULTERANT.\*

BY C. W. BALLARD.

Roman Chamomile or *Anthemis nobilis* L., was official in a previous edition of the U. S. Pharmacopoeia and this authority specified that the drug be obtained from cultivated plants. The product of wild growing plants contains more volatile oil and bitter principles. It is probably more active than the cultivated product. As the drug is used almost entirely as a carminative, the milder and more agreeable flavor of the cultivated flowers has resulted in their displacing wild anthemis. It is recorded that anthemis infusions will, in some instances, cause nausea and it is probable that if wild anthemis were used in their preparation this undesirable property will be more marked.

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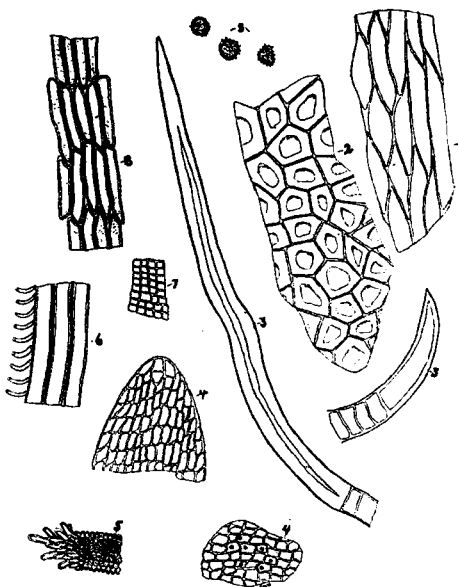
The writer recently had occasion to examine a sample of wild anthemis which was first offered under the designation "chamomile" or "Spanish chamomile." The title "chamomile" is manifestly erroneous, as in the present revision of the Pharmacopoeia the terms "chamomile" and "wild chamomile" are stated as synonyms for *matricaria*. The title "Spanish chamomile" is also untenable because the National Dispensatory reserves this as a synonym for *Anacyclus Pyrethrum*. The materials of the sample were finally classified as *Anthemis nobilis* (wild), by different pharmacognosists. This article is rarely seen upon the market and because of its appearance it would hardly be accepted in crude drug circles as Roman chamomile, although it might be mistaken for the so-called Hungarian or German chamomile (*Matricaria*). The drug trade has been accustomed to handling the cultivated anthemis which was formerly official; their customers recognize this variety as Roman chamomile and possibly know no other.

Wild anthemis flowers in the whole state show a degree of similarity to those of *matricaria* and this likeness might possibly cause confusion and errors in labelling. The most apparent characters of these flowers are the size and peculiar odor. They are of the usual composite type with a single circle of white ray florets and the yellow disk florets crowded upon the receptacle. Although the inflorescence is similar, it is about three times larger than that of *matricaria*. The odor is very penetrating and resembles that of amyl acetate, being very different from the mild and pleasant odors of *matricaria* and cultivated anthemis.

The botanical points of difference and relationships between cultivated anthemis, wild anthemis and *matricaria* might be summarized as follows:

	Anthemis cultivated.	Anthemis wild.	Matricaria.
Type of inflorescence.....	Compound; white ray-flowers in many series	Compound; white ray-flowers in single series	Compound; white ray-flowers in single series
Involucre.....	Bracts elliptical and pubescent; 2-3 series	Bracts obtuse and pubescent; scarious margins; imbricated in many series	Bracts oblong obtuse (oblanccolate), imbricated in many series
Receptacle.....	Conical or convex; solid; chaffy	Conical or convex; solid; chaffy at apex	Ovoid-conical; hollow; not chaffy
Ligulate florets.....	Numerous; in several series; pistillate; 3 toothed, 4 veined	Numerous (12-18) in one series; pistillate; 3 toothed, 3-6 veined	Numerous (10-20) in one series, pistillate; 3 toothed, 4 veined
Disk florets.....	None or few; perfect	Numerous; perfect	Numerous; perfect
Achene.....	Oblong; obtusely three-angled; pappus none	Oblong; pappus none	Obovoid; 3-5 ribbed; pappus none or mere membrane

Powdered wild anthemis shows resemblances to both anthemis and *matricaria* in that the characteristic trichomes of the former and the numerous pollen grains



Wild anthemis (X 65). 1, Bract tissue. 2, Petal tissue from ligulate floret. 3, Trichome from bracts (X 80). 4, Petal tissue from stem. 5, Stigma from disk floret. 6, Fibrovascular tissue of stem. 7, Tissue of filament. 8, Anther tissue. 9, Pollen.

of the latter are present. At first sight it would appear as if the material consisted of a mixture of both chamomiles. The tissue elements present are those of the involucre, ligulate florets, disk florets and stems.

*Involucre.*—Fragments of this tissue appear as long, white, polygonal cells without papillate surface. Simple multicellular trichomes with long, terminal cells similar to those commonly found in anthemis are attached to the outer surfaces of the bracts. In powdering, these trichomes become detached and appear free in the field.

*Ligulate Florets.*—This tissue appears in the form of irregular, white cells bearing prominent papillae and identical with the corresponding tissues of anthemis. Many of the cells contain small rosette crystals. The papillae on the surfaces and margins of the ligulate florets of matricaria are broader than those of anthemis and wild anthemis but are not as prominent.

*Disk Florets.*—The tissues of the disk florets include a membranous calyx similar in structure to the chaffy bracts. Corolla fragments with attached remnants of both androecium and gynaecium are also present. Referring to the botanical summary it will be noted that the receptacle of wild anthemis is chaffy and the same condition prevails in the cultivated anthemis. Trichomes of a type similar to those described under the involucre tissues, may be attached to portions of these chaffy scales. The corolla fragments are composed of irregular yellow cells which, with the possible exception of the lobes of the tube, are sparingly papillate. The stamen tissues appear as fragments of long, deep yellowish, pitted and striated cells. Pollen grains are fully as numerous as in matricaria and are of the spinose and three-pored type. The stigma and style tissues consist of thick fragments showing small, yellow, rectangular cells with their exposed surfaces covered with papillae. The papillae of the stigmatic surfaces are especially large.

*Stem.*—The stem tissues include short, thin-walled fibers, spiral vessels and an epidermis showing few stoma but numerous trichomes of two types. One variety of trichome is very similar to those found attached to the bracts but is rather smaller. The second type of trichome is curved, multicellular and with thick-walled terminal cell.

The present revision of the Pharmacopoeia does not include a histological description of matricaria but the details of its microscopical structure will be found in most of the standard reference books on pharmacognosy. Anthemis is similarly described in these texts. By reference to such descriptions it will be apparent that the histologic distinctions between wild anthemis, cultivated anthemis and matricaria may be covered in the following brief statements:

Wild Roman anthemis chamomile is most easily distinguished from Roman chamomile (Anthemis, cultivated) by the numerous spinose pollen grains and the abundance of yellow stamen and disk floret tissues.

Wild Roman chamomile may readily be distinguished from the wild, Hungarian or German chamomile (Matricaria, U. S. P.) by the numerous trichomes of the anthemis type.