Showing Hydrastis beds of Dr. G. W. Homsher, Camden, Ohio.

THE CULTIVATION OF HYDRASTIS.*

JOHN URI LLOYD, PHAR. M.

NAMES. Hydrastis is known under the name *Golden Seal,* by reason of the yellow, seal-like scars on its fresh rhizome. The name *yellow root* is extensively employed by collectors, while the name *yellow puccoon,* once common, is now practically obsolete. The following names have also been employed to designate Hydrastis, for obvious reasons; *eye balm* and *eye root,* because of its use in eye affections; *Indian paint, yellow paint* and *Indian dye,* because the North American Indians used the root for coloring purposes; *Indian turmeric, wild turmeric, golden root, curcuma, Ohio curcuma,* and *wild curcuma,* because the drug resembles curcuma; *jaundice root,* because of its yellow color; *yellow eye,* because of the yellow scars (eyes) above alluded to; and *ground raspberry,* because of its red berry, resembling a raspberry. The name most used, from the beginning to the present date, is *Golden Seal.*

NATIVE DISTRIBUTION. Originally, Hydrastis was more or less abundant over the wooded portions of Ohio, Indiana, Kentucky and West Virginia, Cincinnati

* This article is written in the first person, and, by request of the editor, gives facts concerning Hydrastis culture as observed in my own experimentations, corroborated by others known to me personally. No attempt has therefore been made to embody the experiences of persons who have heretofore printed articles on the subject, nor have my own previous publications, or my own photographs and detail notes been used at all, excepting briefly. The cuts, excepting those showing the Hydrastis farm of Dr. Homsher, are from *Drugs and Medicines of North America,* 1884, or from others of my previous prints on the subject. The object being to present the problem so as to save to others experimental wanderings, I must yet urge the reader who proposes to enter the field of Hydrastis culture, to study carefully the Bulletins issued on this subject by the Agricultural Department of the United States Government, especially the admirable pamphlet of Miss Alice Henkel and G. Fred Klugh, of the *Bureau of Plant Industry.*—L.

being nearly the geographical center of its original commercial area. Pockets of it were also found in Southern Illinois, Southern Missouri, Northern Arkansas and Central and Western Tennessee, these sections occasionally yielding the drug in quantity sufficient for collection. It was scarce throughout most of Illinois, Northern Indiana, Southern Michigan, the Southern Peninsula of Ontario, Pennsylvania and Western New York, and was occasionally found near the base and along the ravines of the Allegheny Mountains. Its area of distribution in former years is illustrated by the accompanying map (Fig. 3), reduced from *Drugs and Medicines of North America,* 1884.

Fig. 1.
Hydrastis Fruit.
(One-fourth Size)

The natural location of Hydrastis is in rich, open woods, where leaf mold is abundant. Although easily cultivated (as shown hereafter), it has no power to adapt itself to destructive, altered natural conditions, being quickly exterminated by cultivation of the soil. Even cutting off the trees for woodland pastures, especially in clay soil, causes the wild plant to disappear in a few years. Its greatest enemy is grass sod, which smothers it from existence. The plant will, however, stand extremes of temperature, as is evidenced by its natural distribution. A small but very luxuriant garden bed of Hydrastis was shown me some years ago by a friend in Detroit, while in my own garden in Cincinnati it grew and throve in a glazed-over, grass-free bed, even though exposed to the blazing, direct rays of the sun.

COMMERCIAL HISTORY. In 1793, the American Philosophical Society published in its Transactions (p. 224), a paper by Mr. Hugh Martin, read before that society under the title, *"An Account of Some of the Principal Dyes Employed by the North American Indians."* In this we find the first reference to Hydrastis, Mr. Martin stating that the bright yellow dye of the Indians was obtained by the use of a plant that he said might well be called *"radix flava Americana."* Rafinesque, 1828, in his *Materia Medica,* devoted much space to the drug, while the early commentators on American medicinal plants slightingly mentioned it. The editor of the *Thomsonian Recorder,* 1833, added it to the Thomsonian materia medica, and Wooster Beach introduced it in his practice, but the drug was neglected by the first edition of the *United States Dispensatory,* 1833. The second edition, 1834, gave it a slighting reference, which was carried, unchanged, for ten years. *The Electic Dispensatory,* King and Newton, 1852, made Hydrastis conspicuous, and it thereafter became much employed, becoming official, in 1860, in the Pharmacopoeia of the United States.

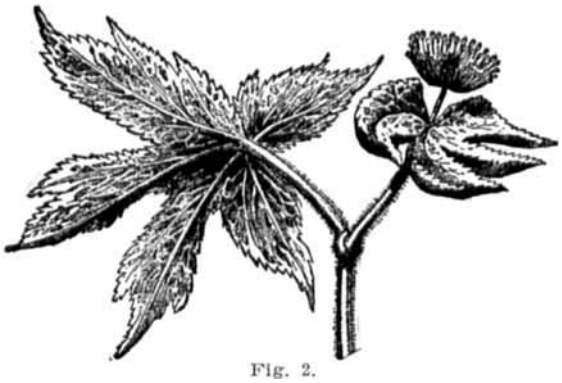

Fig. 2.
Leaf and Flower of Hydrastis.
(One-third Size)

During this entire period the drug was abundant, the price ranging from eight cents to twelve cents per pound. I knew of one lot of 15,000 pounds offered in Cincinnati about 1870, at eight cents a pound, but refused. However, even then, far seeing people perceived that the march of civilization must soon result in the extermination of this uuique and helpless American plant. In 1884, in *Drugs and Medicines of North America,* I called attention to the fact that, as a wild drug, Hydrastis must, within a reasonable time, become extinct, and I then not only took steps for self-protection, but advised parties concerned to prepare for the coming famine. Let me quote from the article cited:

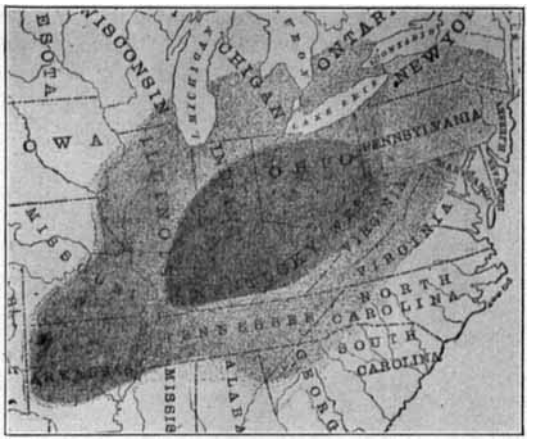

Fig. 3.

Map, showing natural distribution of Hydrastis in 1884. Drugs and Medicines of North America. The heavily-shaded portions indicate the territory in which Hydrastis was then abundant. The lighter-shaded portions indicate territory in which the drug was found, sometimes as an article of commerce. The unshaded portions indicate an absence of Hydrastis growth.

The Past and Present Supply.—Only a small area of country can yield the drug in amount sufficient to repay collection at present prices, and of this section of country, but a limited portion actually contributes any of it to the market. It does not necessarily follow, however, that the plant will not disappear in sections where it now grows abundantly, but which have never yielded the drug to commerce. Hydrastis is so sensitive to climatic influence that even a partial destruction of the timber causes it to shrink away, and one turn of the soil by the plow blots it from existence. If it were like Podopyllum, content to thrive in woodland pasture, the future would be brighter; as it is, each year witnesses a shrinkage in area and a loss to the world (without economic return), of this peculiarly interesting American plant. Hydrastis has nearly vanished from the rich hillsides bordering the Ohio river, and is no longer found in the populous sections of our valley. *Drugs and Medicines of North America,* 1884, page 93.

How well the prophecy then made has been fulfilled, is evidenced by the Hydrastis famine now prevailing among those who failed to read the lesson aright.

CONCERNING THE CULTIVATION OF HYDRASTIS. Contrary to the usual opinion, Hydrastis is easily cultivated, providing the soil be suitable, and the bed kept free from grass, which not only prevents its increase by the delicate adventitious buds on its slender roots, but even smothers the mother plants. For this reason, rather than from the absolute necessity of deep shade natural Hydrastis abounds in rich, soft, loamy woodlands, and consequently, artificial growing must, if success is to be hoped for, recognize these conditions. Scientific study and care in the artificial cultivation of the drug will unquestionably improve on natural methods, but nature is an excellent teacher. In this connection, the experiments of Dr. H. T. Grime, of New Carlisle, Indiana, are very interesting. He writes me, in substance, as follows, his letters bearing date of November 10, 1906, and May 1, 1908:

Cuttings in boxes five feet above the geenhouse floor, well mulched with rotted horse manure and sawdust, grew thriftily. In ordinary hothouse benches, the plants close together grew so fast as to exhaust the soil in one month. I never saw such rapid growth and such early maturity. I discarded wild soil, because of its contamination with insects, worms and other pests, snails being the worst, replacing same with artificial soil fertilized by henyard refuse, ashes, butcher-shop waste and bone manure. The cuttings started in the greenhouse were transferred to rows in this artificial garden, which was shaded by beans on poles with barrel slats overhead, as well as by fruit trees, with grapevines planted at frequent intervals. Occasionally the plants were sprayed by Bordeaux Mixture. The result proved that the Hydrastis grew rapidly and unfortunately exhausted the soil quickly, being in this respect *worse than tobacco*. Many of the leaves grew to the exceptional size of twelve inches in diameter.

CHARACTER OF THE RHIZOME. Fresh, full-grown, wild Hydrastis rhizome is from 1½ inches to 2 inches in length, and from ¼ inch to ¾ inch in diameter, usually subdividing if of 1½ inches in length. (Fig. 4.) It then not infrequently forms knotty clumps.

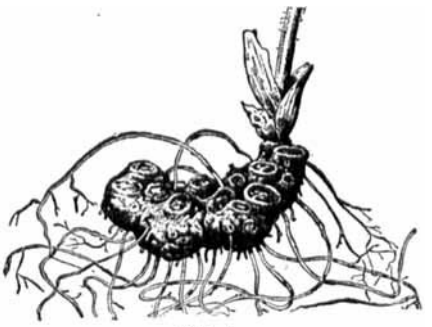

Fig. 4.
Rhizome of Hydrastis.
(One-half Size)

When dry, the diameter is from ⅛ inch to 1-3 inch. (Fig. 5.) The weight of the fresh rhizome, with attached roots, averages from 80 to 175 grains, but in drying it loses about two-thirds of its weight, or even more. After a growth of from four to six years, the rhizome gradually decays at the older extremity, while at the growing end it creeps through the earth, after the manner of Trillium. The older portions are inferior in quality, hence great age is not accompanied by a proportionate increase in size. Seventy prime, full-sized, green Hydrastis rhizomes (wild), gathered by me October 20, 1907, weighed eighteen ounces. Sixty, of inferior quality, weighed ten ounces.

Fig. 5.

INCREASE BY ROOT BUDS. In studying natural clumps of Hydrastis in the woodlands, I was struck with the fact that the patches under the beech trees, where it luxuriated to best advantage, spread uniformly outward in the woodlands, creeping often to a considerable distance. Again, a parent stem would be surrounded with plants more or less developed, the sports sometimes reaching several feet from the parent stem. I was somewhat perplexed to account for this method of increase, because it surely had not come from the seed, which are very scarce in their natural condition, being enclosed in a small, red berry resembling a red raspberry that is greedily eaten by birds and squirrels. (Fig. 6.) Nor does the rhizome divide itself. But original experimentation in the Kentucky woodlands, as well as in our cold frames at home, demonstrated that some of the delicate root fibres, creeping close beneath the ground, threw up adventitious buds (Fig. 7),

Fig. 6.
Berry of Hydrastis
(Natural Size)

which became new plants from the decay of the connecting rootlet (Fig. 8). Some of these root fibres spread to a considerable length, often two or three feet, or more, following soil avenues of least resistance, frequently cast up more than one bud from the same rootlet (Fig. 9.) Creeping alongside decaying limbs and roots, even penetrating their substances, the natural plant bed thickens and spreads, regardless of the seed.

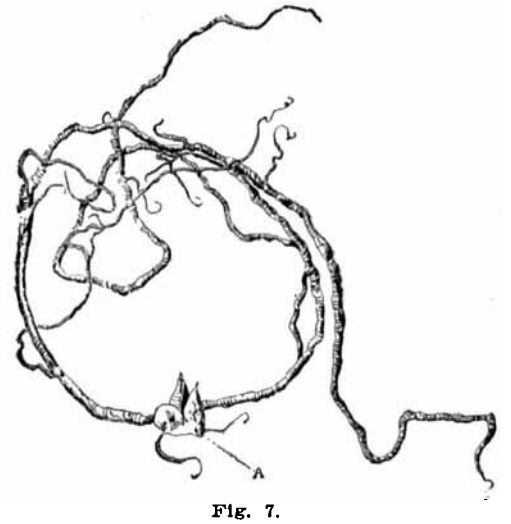

Fig. 7.
(A shows bud on rootlet)

These, however, when dropped by birds or otherwise scattered, serve as nuclei for new patches, but do not, in my opinion, materially account for the increase of old clumps. Indeed, though propagating by seed is possible in a home-made bed protected from birds and squirrels, I found it necessary, both in a natural woodland of large extent and in my exposed plant beds at home, to bag each clump of green berries, in order to secure seeds enough for experimentation.

INCREASE BY CUTTINGS. Every full-grown rhizome of Hydrastis is studded with rootlets and many undeveloped buds. As each eye of a potato will, under proper cultivation, make a plant, so each of these Hydrastis buds, provided there be a good root attached, will produce a Hydrastis plant. If a rhizome be sliced transversely into parts, each portion carrying its bud and a few fibrous roots, and these be planted a few inches apart, in rows, in shaded, grass-free beds, in moist soil fitted to its growth, most of the young plants are certain to make a thrifty start, unless an unfortunate drought prevails just after the setting (Fig. 10). Even here, the experience of Dr. Homsher shows that cuttings that have apparently succumbed to untoward conditions, may still be alive, throwing out root fibres and producing a strong underground bud the first season, to come up the second season as vigorous young plants. The rapid rate at which a Hydrastis bed may be increased by means of cuttings is indicated by the fact that the seventy old roots mentioned above yielded 345 eye-cuttings with rootlets, and forty

Fig. 8.
(Bud on rootlet, fully developed)

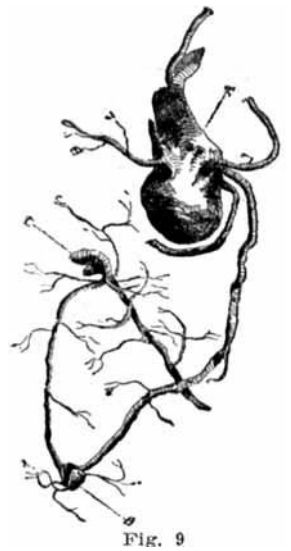

Fig. 9
(Young rhizome A, on rootlet, two buds (B and C) set on same rootlet. Rootlet shortened in cut from 18 inches long in order to show buds.)

eyes without fibres. The sixty inferior plants gathered at the same time, yielded 240 eye-cuttings, with rootlets, and seventy eyes without fibres. I have found it best to plant the cuttings an inch beneath the soil, a few inches apart, and thus allow them to remain for two years, when they should be transplanted into rows, or into beds of any shape or size designed for the purpose, it being better, however, that these should be patterned after the manner of flower beds, with walks between, so as to enable a person to reach the center, without stepping on the bed. One thousand cuttings potted in April, one each in a two-inch pot, the whole lot being set in the earth to form a solid bed in a shady ravine, developed nearly the entire setting. This plan, in my opinion, is the best method of starting a new bed. In five years the transplanted plants, six inches apart, in rows twelve inches apart, will be ready for gathering.

Fig. 10. (Cutting of Hydrastis. Rhizome sending up stalk from eye.)

GATHERING THE CROP. The parent rhizome (four to six years old), after the leaf has withered but can still be located, should be lifted from the earth and three-fourths of it cut off, the growing end, carrying the terminal bud, being replaced in the earth, thus leaving in the bed a full-grown plant to continue the future. In addition, the small plants that have arisen from the rhizome can be removed to new localities, thus rapidly increasing the Hydrastis crop. The parent bed remains thus preserved in a luxuriant setting, the plants themselves, as well as the root buds, contributing to the increase. Had collectors of the natural drug adopted these precautions, the woodlands yet remaining in its native sections, would be studded with beds equal, if not superior, to the original supply. To illustrate the rapidity with which a Hydrastis crop can be produced under favorable circumstances, attention is called to the following letter from a successful grower of Hydrastis, in whose efforts I have been much interested. An eclectic physician, he naturally became concerned in the subject, and listening to my arguments some years ago to the effect that a Hydrastis famine was near at hand, began experimenting accordingly.* (Fig. 11.)

Fig. 11.
Showing woodland Hydrastis culture by Dr. G. W. Homsher, Camden, Ohio.

* Dr. Homsher was first more interested in *ginseng* than in *Hydrastis* cultivation.

CAMDEN, OHIO, December 1, 1911.

Friend John Uri Lloyd:

You asked me to write you briefly in regard to my experience in the cultivation of Hydrastis.

In the fall of 1903 I commenced the garden cultivation, planting under artificial shade, about 800 to 1000 roots. In 1907 I bought twenty-five acres of ideal woods, had my men cut and grub out the underbrush and prepared my beds, 4½ feet to 5 feet wide, the soil being rich and loamy. In the fall I transplanted all the stock from the garden to its native woods, thus going back to nature. During the year 1907 my men succeeded in gathering about 5000 wild plants, which I divided and planted, six inches each way, in rows. Every year since, I have added from 5000 to 8000 plants.

As regards cuttings, I will say that I find it is best to *break* (not cut) the roots, and to see that sufficient fiber roots are left with each piece of root. My cuttings are accomplished in September. The next spring, it may be that not more than half of the plants from these cuttings come up, but the *second* year, nine-tenths of these young plants send up a top. I have found cuttings to send out strong fiber roots during the summer and germinate a bud, *although no top appeared until the following year.* After the cuttings are placed, the beds should be well mulched with rotten wood or decayed leaves, not too heavy, about one and a half inches thick. (See photographs accompanying.) G. W. HOMSHER, M. D.

RECAPITULATION. Hydrastis Canadensis can be easily cultivated, and after the time necessary for the maturity of the beds, may prove a profitable investment, as well as a pleasant avocational side issue for doctors, druggists and others in rural sections.

The photographic views of the woodland beds of Dr. Homsher, together with his report, are fully comprehensive.

The investigations of Dr. Grime demonstrate:

1. That Hydrastis can be propagated by hothouse methods as a quick starter.
2. That the rhizomes, transferred to artificially enriched soil, in a garden shaded by bean and grape vines and a few trees, grew more rapidly than the wild plants.
3. That Hydrastis rapidly depletes the soil, even though it be very rich.

The difficulty at the present time lies in the fact that the natural drug has been exterminated from all sections of the country, thus preventing the obtaining of green plants for cuttings. Parties raising the drug are utilizing the increase thereof to enlarge their own beds. However, most druggists in the Central West can, in their own neighborhoods, obtain enough of the wild plants to make a start (a few plants will answer), and as has been shown by this article, under proper conditions and *care,* the increase will be rapid. A rich, loamy garden, shaded, will answer every purpose, but a deeply shaded natural woodland is ideal.

The greatest trouble with natural woodland cultivation comes from the poacher, who considers everything that grows in the woodlands free, and who loses no opportunity to encroach upon the property of his neighbors, this being particularly true at the present high price of Hydrastis.

Let me say in closing, that the exhorbitant price now demanded for Hydrastis is altogether owing to ordinary man's improvident disposition and destructive vandalism. The present scarcity is unnecessary, but promises to be cruelly lasting, there being seemingly little prospect of cultivated Hydrastis drifting into market in the very near future, in quantity sufficient to bring the price to a normal condition. Without a doubt, cultivated Hydrastis must command a good

commercial return, but prices that prevailed in the olden times, of eight or ten cents a pound, will never again be accomplished.

In this connection, I again plead for government and state intervention in such directions as this. If it is proper to preserve a lingering group of bison, or to search the land over for our vanished wild pigeon, why is it not proper to conserve, with the help of the strong hand of authority, America's valued flora from absolute extermination?

THE AMERICAN PHARMACEUTICAL ASSOCIATION—ITS ORIGIN, RESULTS AND POSSIBILITIES.

JOHN F. HANCOCK, PHAR. D.

History is supposed to be a narrative of facts and events, arranged in chronological order, with an explanation of causes and effects.

It may be that some of the members of the American Pharmaceutical Association are not familiar with the causes and influences that brought the Association into existence and have made it a factor in the aims of those who are loyal to the highest ideals in pharmacy.

It has an interesting history that pays compliment to its founders and supporters.

The birth of the American Medical Association, whose members were practically interested in pharmacy, exerted an influence for the betterment of pharmacy and made possible official co-operation.

These two branches of medicine have been, and will always be, independent, and they should be harmonious in the endeavor to bring about the rest results to both.

The American Medical Association was organized in 1847, and the American Pharmaceutical Association was organized in 1852. When the Medical Association came into existence, there were many medical colleges throughout the borders of its territory; when the Pharmaceutical Association was organized in 1852, there were within the limits of the United States, the Philadelphia, New York, Massachusetts, Maryland and Cincinnati Colleges of Pharmacy. These colleges, through their accredited delegates, were the active agents in perfecting the organization.

To revert to the primary object, it is necessary to make detailed statements of conditions then existing in the drug trade of the United States.

At this time, pharmacy was becoming more than ever a distinct and independent branch of medicine. Its commercial interest had become important and the colleges of pharmacy were educating students for a higher plane of usefulness.

In all the ages of the world, medicine, including its special branches of practice, has been, to a degree, in advance of the civilization of the times, and influenced by the advancement or retrogression of the learning and civilization of the ages.

It is doubtful that an unalterable science of medicine, or an unchangeable method of practice, will ever exist for a long period of time, but we may con-