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from the Author.

ON THE ACTION OF FOOL'S PARSLEY

(*ÆTHUSA CYNAPIUM*).¹



BY JOHN HARLEY, M.D. LOND., &C.

SYNONYMS.—*Lesser Hemlock. L. Cicutaria fatua, Cicuta minor. G. Gleisse, Hunds-petersilie, Kleiner Schierling. F. La petite Ciguë.*

A CORRECT knowledge of the action of our indigenous plants on the human body, is a want which the Coroner's Court from time to time reveals to the discredit of scientific medicine. Between the well-known poisonous plants, with the properties of most of which we are fully acquainted, and the harmless ones, there is a class suspected but not proved to possess noxious qualities. So long as our knowledge of these is imperfect we shall be liable to form wrong conclusions, under shelter of which the poisoner may successfully elude justice. Society is already largely indebted to her medical members for numberless safeguards, and when the personal safety is still further ensured by the knowledge of the class of plants to which I have referred, we shall again deserve her thanks. In the endeavour to set forth the true character of one of our reputed poisonous plants, the following observations will, I trust, be received as a contribution to this knowledge. I was led to the investigation by the hope that I might find qualities that could be turned to medicinal use. How far my expectations have been satisfied, will be apparent from the sequel.

Fool's Parsley early obtained a place amongst the poisonous umbellifers, and has maintained it, unquestioned, for more than 300 years. Thus Lobel gave it the specific appellation

¹ Some portions of this paper were read in abstract at the Meeting of the British Association, July, 1873.

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of *fatua* (*Cicutaria fatua*), and states¹ that it is "*equidem noxia et invisā olitoribus.*" And Bauhinus² has the following remark, and quotation from Dalechamps:—" *Venenosam et perniciosam esse plantam (cicutariam apii folio) testatur Dalechampius dicens; Esu Cicutæ quæ Apii hortensis specie incautum fefellerat, ego quendam novi ad extremum usque vitæ dementem factum.*"

Blair³ attributes the following effects to the plant: vomiting, pains in the stomach and bowels, swelling of the body, and death.

Linnæus⁴ admonishes "*ut caveant coqui, ne Æthusæ folia loco apii petroselini in cibum adhibeant, cum dementent esā.*" And he branded the plant with the name *Æthusa* (*αἰθυσσω*) to indicate its burning properties. Add to this Lobel's appendage, and we have *Æthusa fatua*—a complete definition of an acrid narcotic.

Haller⁵ makes the following statement:—" *Multa exempla reperio anxietatis, singultus, etiam trimestrium deliriorum, soporis, stuporis, impotentiae, vomitus, faucium constrictarum, spasmodum ventriculi, convulsionum, mortisque, quæ omnia mala Æthusæ tribuuntur.*"

Henceforward, the bright green livery of *Æthusa* was regarded with suspicion, and sometimes with horror. Botanists, medical men, and toxicologists, unanimously accepted the statements of the great observers whose words I have quoted, and in conveying them to succeeding generations they took nothing from their force, while some transcribers have tintured them with the glow of their own excited imaginations. Thus, P. R. Vicat,⁶ M.D., who writes only a few years after Haller, says "*Æthusa cynapium* has been principally confounded with Parsley. So great is the number of tragic accidents occasioned by this

¹ '*Stirpium Adversaria nova,*' p. 327. London, 1570.

² '*Historia Plantarum,*' vol. iii, p. 180. Ebroduni, 1651.

³ '*Pharmaco-botanology,*' Decad. v, p. 213. Lond., 1727. The four "Experiments" by which "the pernicious effects of *Cicuta minor Petroselino similis* were made known to this author," illustrate the easy manner in which *Æthusa* has been repeatedly convicted of poisonous properties. People died or were ill after an ordinary meal, or a "diet drink" of green herbs; *Cicuta minor* grew in the garden which supplied the pot-herbs, and it was therefore *suspected*. This was enough; *conviction* followed at once, as a matter of course, and without an iota more of evidence.

⁴ '*Flora Suecica,*' p. 84. Stockholmiae, 1745.

⁵ '*Hist. Stirpium Indig., Helvetiæ,*' vol. i, p. 336. Bernæ, 1768.

⁶ '*Hist. des Plantes Vénéneuses de la Suisse.*' Yverdon, 1776. Ebrodunum again!

unfortunate error that the great botanists, Haller and Trew, think that the accidents which are attributed to Hemlock, mistaken for parsley, ought almost always to be referred to the lesser hemlock; this conjecture is very probable" (p. 254). He then gives a list of the symptoms "produced by the root, and still more by the herb," which is not only longer but also much more terrible than any I have previously quoted. Another botanical author goes so far as to state that "*Æthusa* is a very dangerous caustic," even "when applied externally." A more modern writer ('Chambers's Cyclopædia,' Ed. 5) remarks, the "*lesser* hemlock is not less dangerous than the *greater*; it is even supposed to be more violent, as well as more hasty in its operation."

To-day the little plant is found in every work on toxicology associated with the apparent victims of its reputed deadly power; and as a history and critical examination of the cases in which it is thus associated form a necessary preface to my own observations, I will first give a brief account and analysis of them, and hope that this will not prove altogether uninteresting.

I take them in chronological order:—

1. "Two boys, the one 6, and the other 4 years of age, residing in Ratisbon, ate the root of fool's parsley in April. The elder was quickly seized with severe pain over the stomach. When he was brought home, the whole body was frightfully swollen and livid; the respiration was difficult and short, and he died about midnight. The younger boy vomited, and exhibited some confusion of speech, but was soon well."¹

These two cases are evidently those related by Vicat (see 3).

2. Riviere² relates that a whole family fell ill from eating the plant. The father was taken the same day with headache and stupefaction, vomiting and diarrhœa, and small weak pulse. All the rest were more or less ill. The next day a daughter, aged 7 years, died first, and then the father, whose death was preceded by cold extremities and an imperceptible pulse. A blackish fluid was found in the stomach; the liver was hard and yellow; the spleen livid; the mouth black. A second

¹ 'Commercium literaricum noricum,' Norimb., 1731. 'Sem. Prius. Spec.,' 25, p. 178, quoted by Dr. Karl Wibmer, 'Die Wirkung der Arzneimittel und Gifte,' vol. i, p. 62.

² 'Hist. de l'Acad. Roy. des Sciences à Montpellier,' 1766, tome i, p. 170.

daughter, aged 16, also died the same day, after great restlessness, headache, vomiting, and fever. The mother and three other children shared in the poisoning, but were saved by theriaca.

3. "A lad, 6 years old, having at 4 p.m. eaten this herb, which he had mistaken for parsley, commenced immediately afterwards to utter agonising cries, and complained of cramps in the stomach. While they carried him from the country to his father the whole body became excessively inflated and livid; the respiration every minute more difficult and short, and he died about midnight. Another child of four years of age, who was poisoned in the same manner, fortunately vomited the herb. This, however, did not prevent him from becoming delirious, holding extravagant propositions, and believing that he saw a number of dogs and cats; and although the physician arrived the day after, he was still in sufficient time to save the patient."¹

The following three cases are given by Dr. Rudolph Buchhave in his treatise on "The Noxious Effects of *Æthusa cynapium* on the Human Body."² They are very interesting, as showing how readily the effects of one plant may be mistaken for those of another:

4. A woman, æt. 40, took, according to prescription, three fluid ounces of a decoction of hemlock (one ounce of the herb in thirty-two ounces of water) daily for three or four weeks, at the end of which time she complained "that the medicine always caused tremors, vertigo, heaviness of the eyes, headache, nausea, colicky pains, vomiting, and muscular weakness." Dr. Buchhave "*tantorum malorum anxius, herbasque rudi modo inscisas inspiciens, facile detexit magnam Æthusæ partem conio esse admixtam.*" "Hence," he remarks, "the cause of these untoward symptoms was apparent." The apothecary was put on his guard, other conium leaves were procured, and used as before. The above-mentioned effects were no longer experienced, and "the malignant ulcers," with which the patient was afflicted, "yielded laudable pus," and healed within two months."

5. A young woman in the advanced stage of phthisis took three ounces of a decoction of hemlock (one ounce and a half

¹ Vicat, 'Hist. des Plant. Vénén. de la Suisse,' p. 225, 1776.

² 'Acta Regiæ Societatis Medicæ Hauniensis,' vol. i, p. 51. Hauniæ, 1783.

boiled in thirty-two ounces of water to two pounds) every two hours for fourteen days, when she complained of increased difficulty of breathing, headache, colicky pains, nausea, vomiting, and lassitude and torpor of the limbs. "Mindful of the fraudulence of the apothecary, I did not hesitate," Dr. Buchhave says, "to ascribe these strange effects to the decoction. Therefore, having put the cut herb into water, when the leaves were expanded, those of Conium and *Æthusa* were easily distinguished" (p. 56). She was now supplied with the "true herb," and no longer experienced any unpleasant symptoms.

6. For a young man, æt. 20, affected with syphilis, Dr. Buchhave prescribed mercurial sublimate dissolved in spirit of wine and decoction of hemlock, prepared and used in the same way as in the first case. After a time the same symptoms arose, viz. colicky pains, nausea, headache, anorexia, giddiness, and great languor and debility of the whole body, symptoms which were increased by each dose of the medicine. This time the druggist was exonerated:—" *Pharmacopolæ male credere nequivi, quoniam de patrata admonitus fraude, sincerius in posterum agere promiserat. Herbæ præterea admodum minutim erant inscisæ, adeo ut indagationi locus non esset*" (p. 58). After two months the patient returned home, and, following out the original prescription, took on a certain morning three ounces of a decoction prepared from another sample of hemlock. This produced the same symptoms in a greater degree—very great debility, giddiness, tremor, spasms, convulsions, and faintness; such, however, was the mother's account of her son's condition, and it was doubtless overdrawn, for, without seeing the patient, Dr. Buchhave, in order to assure himself that the decoction was the cause of these symptoms, directed a repetition of the same dose next day. It was taken, and the symptoms reappeared. The suspected hemlock was now set aside, and the next sample proved innocuous.

It appears from these three cases—1st, That a certain train of alarming but evanescent symptoms uniformly followed the draught of hemlock decoction, and that they ceased or returned on using a sample of the herb different from that which originally produced them; 2ndly, That the herb was both dried and finely divided, and obtained from an apothecary who, independently of Dr. Buchhave's admonition, was doubtless

well acquainted with the characters of hemlock; and 3rdly, That one patient (6) was actually taking corrosive sublimate with the hemlock decoction; that another was the subject of syphilitic ulceration or lupus—"diu afflixerant ulcera faciei collique carcinomatica, ichor valde fœtens fundentia, margine dura, locaque vicina continuo magis magisque depascentia" (p. 53)—and had been treated with a variety of drugs, of which corrosive sublimate was most likely one; and, lastly, in reference to the second case (5), that nausea, vomiting, and colicky pains are not uncommon associates of advanced phthisis.

Now, with regard to the symptoms above mentioned, they are clearly and unmistakably those of hemlock. Their severity and evanescence are highly characteristic. "Tremor, convulsions, and faintness" (6), are a mother's words expressive of the weak, shaky, staggering, and expressionless condition of a person under the influence of hemlock. The gastro-intestinal irritation is accounted for, in two cases at least, independently of conium; but they may, nevertheless, have been caused by it. I have myself observed them when I have prescribed preparations which contain a large quantity of the nauseous oleo-resin of the leaf; or when the conia is set free by an alkali, the former acting as an irritant. Schroff¹ notices gastro-intestinal irritation as an effect of the internal use of conia.

The non-occurrence of the symptoms on exchanging one sample of hemlock for another is, moreover, in strict accordance with what we know of the activity of the freshly dried plant, and the inertness of that which has been kept for a time.

But Dr. Buchhave did not believe that hemlock produced these effects, although he tells us that his contemporaries attributed identical effects to this plant. He was too much impressed with his own idea, that some other umbelliferous plant was the cause, to recognise any other. The following passage is worthy of quotation, because it proves how easily a careful observer may, by the force of a preconceived idea, evade the truth. He remarks—"Symptomata enim infausta conio, interne adhibito, a novissimis observatoribus imputata, sunt: appetitus abolitus, debilitas totius corporis, brachiorum præcipue et pedum, vertigo, tremor oculorum et totius corporis, visus de-

¹ 'Reil Mat. Med. der Chem. Pflanzenstoffe,' p. 135.

bilitatus. Hæc vero cum apprime convenient cum dictis, ab *Æthusa* excitatis, malis haud falso videmur ratiocinari, si *Æthusæ*, vel aliæ ejusdem faraginis plantæ, per ignorantiam substitutæ, eadem adscribamus. Innumera si addas, tum veterum tum recentissimorum, *de Conii innocentia testimonia*, quæ, ut perquam nota, hic enumerare supersedere possum, rem extra omnem dubitationis aleam invenias positam, certissimeque de Conio colligas: si non juverit, sane non nocuerit,¹ etiam magna dosi porrectum. Fida edoctus experientia hoc adfirmo: Ipse namque ægris decoctum Conii fortissimum ad unc. vi, et succum ejus recenter expressum ad unc. ii sæpius quotidie exhibui, nihilque inde mali unquam vidi. *Infortunia igitur in ægris meis visa, non sane Conio, culpa omnimode vacuo, sed Æthusæ merito et debite sunt imputanda*" (p. 65 et seq.).

It therefore appears conclusively that so long as hemlock did not produce coneism,² Dr. Buchhave regarded the plant in use as "*herba vera*," and that when it did, as "*herba admixta*."

But since there is nothing in the foregoing to preclude the supposition that *Æthusa* may produce effects identical with those of conium, and even be the more potent plant of the two (p. 65), it will be necessary to inquire into the evidence of admixture. I have quoted Dr. Buchhave's own words. On one occasion he easily detected, by a rough inspection of the cut herbs, that a large quantity of *Æthusa* was mixed with the conium. On another we learn *how* he satisfied himself that *Æthusa* was present:—"In aquam igitur tepidam missis herbis inscisis foliisque inde expansis, facile distinguebantur Conii et *Æthusa*" (p. 56). When the cut and dried leaves were expanded in water he was able to say, "This leaflet is hemlock, and this one fool's parsley."

Now, if we compare the uninjured leaflets of the fresh plants, laid out side by side upon a sheet of paper, we shall see that the distinction, even then, cannot be made hastily. The accompanying figures were carefully drawn from nature by Mr. Fitch. The leaflets compared with *Æthusa* are those of the radical leaves of a yearling conium; but if the stem leaves of the biennial plant be used instead, the distinction is still more difficult, and,

¹ Stoerkus, Lib. i, De Cicut., pp. 6, 12; Lib. ii, pluribus in locis. Continuat. Exper., pp. 79, 206, 236. Hallerus, 'Hist. Strip. indig. Helvet.,' T. i, p. 342.
² ὀνικιον, hemlock.

in the case of the dried plants at best but doubtful, turning, as it does, upon the single fact that the incisions of the leaflets are a trifle more acute in conium. When, therefore, Dr. Buchhave uses the words I have quoted respecting the dried and incised leaves, and I find the druggist on his guard, I am obliged to reject the evidence of admixture as unsatisfactory.

7. John Stevenson relates¹ the following case:—Two ladies, of Castle Donnington, ate the leaves of the lesser hemlock “with some salad, wherein it had been put by mistake with common parsley, for which it had grown and been gathered.” The following alarming symptoms soon appeared:—Nausea, headache, giddiness, somnolency interrupted by frequent startings and excessive agitations, a sensation of pungent heat in the mouth, throat, and stomach; dysphagia, thirst, anorexia, numbness and tremor of the lower extremities, and general lethargy. The herb grew in a garden shaded by spreading trees and surrounding buildings. These are the whole of the facts narrated, and we have here an undoubted case of vegetable poisoning. Mr. Stevenson clearly distinguishes “that dangerous narcotic herb, that pernicious vegetable, the lesser hemlock,” from its allies; but I think that a more pernicious vegetable was at work in this case. It is more probable that a leaf or two of aconite was gathered with the salad, than that the ladies should have eaten such a large quantity of salad as, granting a fair proportion of *Æthusa* having poisonous properties in a moderate degree, would be required to produce the symptoms. This explanation receives support from the following statement:—“Had the mistake remained undiscovered it is probable that the error would have produced the most tragical event.” How was the mistake discovered? No doubt by the speedy tingling of the mouth and throat.

8. The following case is given in ‘Rust’s Magazin der Heilkunde’:²—A girl, æt. 12, ate a little handful of the plant. In the evening she experienced nausea, headache, and vomiting of greenish matter, vertigo, heat, confusion, and inability to maintain the erect posture. Pulse full and quick; the face speckled, red, and swollen. On the third day there was pain in the left side of the chest, and leeches were applied. On the

¹ ‘Medical and Physical Journal,’ vol. xiv, p. 425, 1805.

² 1826, 21, Band 2, Heft 8, 248.

fourth day anxious breathing, breast pain, and prostration. On the fifth day, following a purge, relief, and speedy convalescence.

Here the early symptoms of an attack of pleurisy or pleuropneumonia are attributed to vegetable poisoning. (See also Case 13.)

9. Meyer¹ relates the following:—In the forenoon of an August day, in the year 1824, nine children, from one and a quarter to seven years of age, ate of the root of *Æthusa cynapium*. They soon became alarmed and restless, complained of pains in the head and belly, and experienced vomiting and painful purging. About midday one was found unconscious, and another with green matter about the mouth and anus, both suffering with blood-stained mucus purging. Notwithstanding treatment the two youngest children, each one and a quarter year old, died in violent convulsions, the one at four and the other at eight o'clock. When first seen by the medical man, at midnight, all had a moist tongue, dryness of the fauces, and a bitter taste, and all complained of moving pains in the pit of the stomach and œsophagus; the belly was more or less swollen and sensitive, especially in the hepatic region. Frontal pain, thirst, alarm, and exhaustion were present; the pulse was quick, small, hardish, and irregular; the breathing was scarcely affected; the temperature was raised in two; the face of most flushed, changeable, collapsed; the eyes motionless, glazed, injected; the pupils tolerably sensitive to the light ("nur bei diesen dilatirt"). There was no sign of convulsion or unconsciousness, and the speech was free. The corpses of the two youngest children were already rigid and nearly cold. Two hours later most of the patients were tranquil. Later on in the day five were convalescent, having only a little frontal headache, which continued for the following two days. The two other children still complained of colic and diarrhœa, but they recovered in the course of a few days.

At the post-mortem examination of the younger children the abdomen of one was greatly swollen and purple; in the other these effects were less conspicuous; the brain, meninges, and sinuses were congested with black fluid blood; the lungs normal; the right heart gorged with black fluid blood. The stomach was reddish externally, and contained, in the one case,

¹ 'Neue Breslauer-Samml.,' 1829, S. 178, 1 Band.

some milk and root-fibres; in the other there was only yellowish mucus. There was a patch of congestion in the one and many red spots in the other. The whole of the small intestine was finely injected; the liver and spleen much engorged; the abdominal viscera were stained with bright yellow spots.

10. The next case is related by Wittke.¹ Two children, aged respectively four and eight years, got, "through enjoyment of the fresh juice of the root (durch den Genuss des frischen Safts der Wurzel)" of *Æthusa cynapium*, the following symptoms of illness:—The youngest, severe epileptic convulsions, flushed face, dilated pupils; pulse small and frequent; great heat of the body. The elder, pallor of the face; violent vomiting of frothy milk-white matter; eyes fixed and vacant, pupils widely dilated and insensible; cold extremities; unconsciousness. Both recovered under suitable treatment.

Some succulent tuber quite different from the woody root of *Æthusa* must have been eaten in this case (see p. 79).

The next two cases² form the text of M. Lalé's "*Mémoire sur l'action délétère de la petite ciguë, Æthusa cynapium*," presented to the Académie Royale de Médecine, January, 1830. The patients are said to have eaten the fool's parsley in a salad, and, as I gather from the account, at the same meal.

11. In the one case, vertigo, nausea, coma, cold sweats, coldness of the extremities, and death, followed an hour after the meal. Large ecchymoses upon the whole of the body, inflammation of the stomach and peritoneum, engorgement of the spleen, and plethora of the heart and lungs, were found at the necroscopy.

12. In the second case "the *Æthusa* was rejected by vomitings, but the patient was attacked with a chronic gastritis, *avant son empoisonnement*, and died some weeks afterwards. The body was extremely emaciated; there was inflammation of the peritoneum and intestines; suppuration of the internal membrane of the stomach; sloughy spots upon several points of the small intestine, and scirrhus masses in the mesentery,"—or, in more modern language, ulceration of Peyer's patches, enlargement of the mesenteric glands, and the usual effects of enteric fever.

¹ 'Hufeland's Journal,' 1829, Sept., S. 122.

² 'Archiv. gén. de Méd.,' 1830.

Here are two individuals, members, it appears, of the same family, clearly suffering from latent enteric fever. After a meal the one dies of perforation of the bowel within an hour,—an accident which has often happened, and will often happen again under the same circumstances. No mention, it is true, is made of ulceration of the intestines, but, as peritonitis presented itself on opening the abdomen, probably the intestines were not opened. The other effects of enteric fever are mentioned. On the assumption of poisoning we are asked to believe that *Æthusa* caused peritonitis within an hour, an effect which neither corrosive sublimate nor arsenic could produce in ten times that period, and which no vegetable irritant could induce until it had previously destroyed the mucous membrane by ulceration.

The following is a communication from Mr. Lowe, a surgeon at Preston, to Mr. Curtis:¹

13. Mr. Freckleton, æt. 35, a strong, healthy man, a publican, ate a handful of fool's parsley with about as much lettuce; severe colic came on within ten minutes; there was so much languor that he had difficulty in walking home; giddiness, confused and double vision followed. After seven hours he took an emetic, which "brought up, he thought, all the fool's parsley, but none of the lettuce." He was relieved, but passed a restless night; next day he had much pain in the head and eyes, which were inflamed and bloodshot; and the face was affected with a patchy cellular inflammation, passing into regular erysipelas. He was told that he had eaten hemlock, but, to be satisfied, Mr. Lowe "accompanied him to the garden, where he had gathered the plant, and found it to be *Æthusa cynapium*."

Here we have the proprietor of an inn, only forty years ago, eating a handful of fool's parsley, and meantime deceiving his sight, taste and smell, with the idea that he was all the while eating parsley. Impossible! Those who eat handfuls of parsley at a sitting have acquired a taste for the herb which cannot be thus readily deceived. I fancy I hear the medical attendant say to his patient, "Oh! it cannot be the parsley which has disagreed with you; see here, there is plenty of *Æthusa* about, and a most poisonous plant it is; you must have gathered some of it with your parsley and lettuce." However this may have

¹ Stephenson and Churchill's 'Medical Botany,' art. "*Æthusa*," vol. i, 1834.

been, I take this case to be one of gastric disturbance, preceding, as usual, an attack of erysipelas. (See also Case 8.)

14. A family ate for supper the leaves of *Æthusa cynapium* by mistake for parsley. All soon fell ill and experienced giddiness, ringing in the ears, nausea, trembling of the limbs, followed by a cold sweat; the intellect and visual powers were disordered, and fainting followed. They were all speedily relieved by emetics, excepting one young girl, who had spasmodic convulsions of the arms, intermittent pulse, dilated pupils, and pallor, except the thigh, which was covered with violet spots. When consciousness was restored she complained of excessive headache, slight colic, and numbness under the thick of the limbs, with a feeling of enormous weight. The patient recovered, notwithstanding, the next day.¹

The symptoms above detailed so exactly agree with those induced by aconite, that I do not hesitate to attribute them to this plant.

15. "A woman gave two of her children some soup in which she had boiled the root of *Æthusa cynapium*, mistaking it for parsley. They were both seized with severe pain in the abdomen, and the next morning one of them, a boy, aged eight years, was in a state of perfect unconsciousness, and his jaws were spasmodically fixed. The abdomen was swollen; there was bloody mucus, with obstinate purging, the extremities were cold, and the whole body convulsed. He died in twenty-four hours. The only appearances met with, were redness of the lining membrane of the gullet and windpipe, with slight congestion of the stomach and duodenum."²

In elucidation of the cause of poisoning, we may ask why the woman intended to use parsley root? Was it early spring time, when the plants had not yet repaired the injuries of winter, and leaves were scarce? If so, there were no *Æthusa* roots with which to confound those of parsley.

16. In the month of May three children, all under six years of age, ate the "bulbs" of *Æthusa cynapium* for young turnips.³ They were suddenly and simultaneously attacked

¹ 'Compte-rendu des travaux de la Société de Méd. de Lyon depuis le 11 Août, 1830, jusqu'au Janvier, 1833,' quoted 'Schmidt's Jahrbücher,' vol. xx, 1838, p. 368.

² 'Taylor on Poisons,' 2nd edn., p. 815, quoted from 'Medicinisches Jahrbuch.'

³ 'Medical Times,' 1848, vol. xii, p. 408.

with pain in the epigastrium, nausea, and griping. Delirium and trismus followed in the eldest, aged five years, and he died insensible an hour after the symptoms appeared and before he was seen by a medical man. The two younger children, aged three years, vomited, and were well the next day. Mr. Evan Thomas remarks, "I had my doubts whether the substance alluded to (the bulbs of *Æthusa*) was the cause of death, till the corroborative evidence with reference to the survivors was brought forward at the coroner's inquest." What this evidence was he does not mention. Mr. Thomas afterwards, through Professor Forbes, made himself acquainted with *Æthusa cynapium*, in order to make some experiments on its action. Having obtained some bulbs in May and expressed the juice, he injected it, in quantities of two ounces, into the stomachs of dogs and cats through wounds in the œsophagus, which was afterwards ligatured. Only one animal survived, the others died in from one to four hours, violent spasms and efforts to vomit being the only observable symptoms.

From these experiments (see also one by Orfila¹) nothing more can be inferred than that the poison, whatever it was, had no local irritant action, and that ligature of the œsophagus, like ligature of the intestine, is usually a fatal operation, and is necessarily attended with some amount of disturbance to the alimentary canal. But the main question is, "What root have we to do with here?" The little tapering root of *Æthusa*, which at its junction with the stem at no time exceeds a goose-quill in size, could not be mistaken, even by a child of six years of age, for a young turnip, nor would it suggest the idea of a bulb to any person; moreover, in the most succulent condition of the plant it is so woody and dry that it would take an immense number to furnish a single ounce of juice. Add to this the statement that juice in abundance was obtained from the bulbs in May, at the time when the little annual plant is springing up, and has a root about the thickness of a stout thread, and then the conclusion will be obvious, that no blame or virtue can be attributed to the root of *Æthusa* in this case. (See Cases 10 and 15.)

Dr. H. S. Kane relates² "a rare case of poisoning," and concludes that the child had eaten the leaves of *Ænanthe crocata* or

¹ 'Traité des Poisons.' Tome ii, p. 314. Paris, 1818.

² 'Medical Times and Gazette,' 1869, vol. ii, p. 379.

Æthusa cynapium; but there is absolutely no evidence of the ingestion of either, and the symptoms are typical of the action of strychnia.

In conclusion of this part of my paper I transcribe the following from the most modern of complete works on chemistry,¹ article "Cynapine:"—"A poisonous alkali, contained, according to Ficinus ('Magazin für Pharmacie,' xx, p. 357) in *Æthusa cynapium*. It is said to crystallize in rhombic prisms, to have an alkaline reaction, to be soluble in water and alcohol, and to form a crystallizable sulphate." This is brief enough, but it nevertheless overpasses the mark, for on turning to 'Gieger's Magazine' I find that the word *poisonous* is an embellishment of the transcriber. Ficinus says nothing about its poisonous properties, nor, in fact, did he ever, as far as we know, make any attempt to ascertain its effects on the animal body.

Such are the charges which I find made against *Æthusa cynapium*. I have already commented on some of the evidence in passing, but it will be well, I think, to take now a general review of the whole, in order to come to a just conclusion.

In the foregoing sixteen cases of reputed poisoning, thirty-eight persons were involved, and ten died. Of the fatal cases all but four were young children, varying in age from fifteen months to eight years. Leicestershire, if not Lancashire, Montpellier, and Ratisbon, mark the extreme limits of the area within which the accidents have occurred. Twenty-one persons are said to have eaten the leaves or a decoction of them (Cases 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, and 14), and eighteen the root or a decoction of it (Cases 1, 9, 10, 15, and 16); eleven mistook the leaves for parsley.

In only two cases (5 and 6) is any direct evidence of the identification of the *Æthusa* offered, and in these I have shown that it is unsatisfactory. In Case 16 means were taken to identify the plant subsequently, and for the purpose of collecting the roots; but if it be granted that the plant was identified, it is clear that the roots were not, otherwise the medical man would not have called them bulbs.

The first-recorded cases (1, identical with 3, and always quoted) of poisoning occurred before Linnæus distinguished the plant, as *Æthusa*, from amongst a number of umbelliferous

¹ 'Watts's Dictionary,' vol. ii.

plants commonly confused; and the five succeeding cases happened during the next forty years. We may, therefore, very properly apply to these cases the criticism which Buchhave has used to prove "*ut conium nunquam nocuisse.*"

"His predecessors," he says, "attributed noxious properties to Conium, because they confused it with *Æthusa cynapium*, *Cicuta virosa*, *Chærophylum*, *Phellandrium*, and other plants, having never been taught the botanical characters by which the umbelliferous plants were to be distinguished." Now, if this observation were applicable to Hemlock, famous since the days of the Athenian Republic, and not only the most distinguished, but also the most distinguishable plant of the umbellifers, how much more was it applicable to the lesser hemlock, one of the humblest plants of its order—the obscure little *Æthusa*. But even granting that the medical men of the eighteenth century possessed as much botanical skill as those of the nineteenth, it will be neither uncourteous to the latter nor unfair to the former to say that not one in ten were able to distinguish the *Æthusa* from hemlock and several other umbelliferous plants; and it would be a severe stretch of imagination to assume that all the recorded cases of poisoning happened only in the practice of men who were specially skilled in botany. Nor, indeed, would it be disparaging to the attainments of the most accomplished botanist to assert that it would be needful for him to make a very close and careful comparison of the chewed or half-digested fragments of the leaves of the umbelliferous plant in question with those of other members of the order, before he could positively declare the identity of the former. What evidence of this identification have we in cases before us? Almost none. We know that Dr. Buchhave (Cases 4 and 5) settled the question by a "rough inspection" of the incised plants; we see Mr. Lowe (Case 13) walking in the garden with his suffering patient, and recognising the growing *Æthusa*; and we learn from another (Case 7) the extraordinary fact that *Æthusa* was grown, gathered, and eaten for parsley. This is the whole of the evidence respecting the identification of the plant. I have already commented on it. In all the remaining cases we have the bare assertion that *Æthusa* is the poison present. A little examination of Cases 1 and 16—the first and last, the circumstances attending which may be regarded as common to

several others (especially 9), and to similar instances of poisoning generally—will serve as an illustration of the kind of evidence which we are called upon to believe. In the first case two children are left alone in the garden or open country, and they eat some poisonous plant; the eldest is too young, if not too ill, to give a reliable account of the cause of the accident. They are taken home to the father. *The day after*, the doctor appears on the scene for the first time, when the elder child is dead and the younger is recovering. No post-mortem examination of the body is made. How did the medical man find out that *Æthusa* was the cause of the poisoning? He does not tell us, and we can only infer that he learnt it from the father, that the father learnt it from the neighbours, and the neighbours from the victim himself—a child six years old. If we are to believe the one account (1), the accident happened in April, and the *roots* were the cause; if we adopt the other report (3) as the more accurate, we must substitute the *herb* for the root, and assent to the statement that a child six years of age had already acquired a taste for raw parsley. The time of year, however, is fatal to both accounts. Spring is not, I believe, earlier at Regensberg than in England, and we certainly should not find fool's parsley, as a developed plant, in either garden or hedgerow in England at that time of year.

Turning to the other cases, we find that several of them are unmistakably referable to some other causes. Thus, as I have shown, the evanescent symptoms in 4, 5, and 6 are due to hemlock; those of cases 7 and 14 are attributable to aconite. In 11 and 12 the ingestion of the herb was in each case but an incident—harmless, probably, in itself—in the course of an attack of enteric fever; and the symptoms in 8 and 13 may be regarded as premonitory, in the one of an attack of pleuropneumonia, and in the other of an attack of erysipelas.¹ In five (3, 9, 10, 15, and 16) of the seven remaining cases it is

¹ If we consider how very insidiously ulceration of the stomach and intestines often progresses until perforation impends or actually occurs, and how often the event is determined by a meal; and again, that febrile affections of all kinds are not uncommonly preceded by violent gastric disturbance, we shall not feel surprised that a suspicion of poisoning should first attach itself to such cases, and that this suspicion should easily pass into conviction if it can be shown that anything of a doubtful nature has been taken as food.

remarkable that the poisoning is ascribed to the root. I have already shown, under Case 16, that this charge is not tenable. Case 10 strengthens the remarks which I have made, for it is clear that some succulent tuber, such as that of *Ranunculus bulbosus* or *Ficaria*, must have been eaten, since the root of *Æthusa* is too small and too dry to furnish any enjoyment of its root.

In conclusion of this portion of my investigation I am bound to say that there is no evidence of poisoning by *Æthusa cynapium* in any one of the fifteen or sixteen instances adduced. To an indolent and unreflecting mind the evidence of poisoning by *Æthusa* will probably be considered satisfactory in every case, for persons of this temperament are always the willing slaves of prejudice and the easy victims of error; but that such evidence should be accepted by the learned profession of medicine, and adopted as an article of its faith, is as serious an imputation against its judgment and intelligence as can well be made. Yet I cannot say that the imputation is unjust; and I fear we must acknowledge that in this matter, as in many others, tradition and the habit of easy belief, to which we are all so carefully trained, have so involved our perception in their deep, broad shadows, that our judgment has been thoroughly and imperceptibly betrayed.

I now gladly turn from this ungrateful task of criticism to the more agreeable occupation of detailing the results of my own observations on the properties of *Æthusa*.

They have been made with the juice of the entire plant; with tinctures prepared from both ripe and green fruit; with a fluid extract prepared with the view of separating any cynapine or other active principle that may have been left in the plant after the expression of the juice; and with the oleo-resin.

THE JUICE.—On the 20th August, 1867, Mr. Buckle, of Gray's Inn Road, expressed for me the juice from a bundle of the herb, which had been gathered in Essex the previous day. The plants were entire, including the small, woody, tapering root, and the fruit was just forming. Although a pressure of about 100 tons was applied, and the marc was quite dry, the yield of juice was small, amounting to only 50 per cent. The crude juice was thick, turbid, of a dingy green colour, acid,

and of sp. gr. 1070. It had a faint, not unpleasant odour, of the bruised plant. After standing twenty-four hours there was a clear, dark, sherry-coloured fluid, only the eighth of an inch in depth. The filtrate abounded in sugar and albumen, and contained phosphates, sulphates, and chlorides. Amongst the bases magnesia and lime were abundant. When boiled with either acids or alkalies the juice evolved no remarkable odour. The turbid juice was mixed (as in the preparation of the *Succus Conii*, P. B.) with rectified spirit, in the proportion of three volumes of the former to one of the latter, and, without any separation of the solid matter the mixture was given in this form to the patients. When filtered this preserved juice had the colour of dark brandy. It was pleasantly bitter-sweet, like some kinds of sherry; its peculiar flavour, which was at first not unpleasant, adhered to the palate, and became rather disagreeable. A fluid ounce of the filtered juice yielded 52 grains of hard, yellow-brown extract, soluble in water. Potash failed to elicit the faintest odour of Conia¹ (see also Tincture of the fruit).

Observation 1.—J. W—, a weakly young man, troubled with frequent seminal emissions, took three and a half fluid drachms of the *Æthusa* juice, and, having sat still for the first hour, strolled out during the second. At the end of an hour the oscillating pupils contracted a very little more than they were observed to do before the dose, but beyond this there was no effect whatever. Four fluid drachms of *Succus Conii* produced a moderate effect upon this patient.

Observation 2.—John T. B—, æt. 22, the subject of sexual debility from excessive self-abuse, but otherwise strong and healthy, and in whom six drachms of *Succus Conii* produced moderate coneism, took the *Æthusa* juice for a time in doses increased from ninety minims to four drachms, an hour before breakfast every other day. No effects whatever followed.

Observation 3.—Clara L—, an active but slightly developed child, æt. 7, the subject of interstitial keratitis, and in whom

¹ "Conium maculatum, Phellandrium aquaticum, et *Æthusa cynapium*, sont extrêmement dangereuses. Elles renferment le principe toxique coniin ou cicutine." 'Étude sur la Ciguë,' par Martin-Damourette et Pelvet. Paris, 1870; and 'Gazette Hebdom.,' Oct., 1871, p. 615.

six drachms of Succus Conii produced only moderate effects, took two doses, one of three drachms and the other of four drachms, of the *Æthusa* juice about two hours after breakfast, on separate days. Beyond a slight temporary rise of pulse, due to the alcohol, there was no effect. The patient subsequently took Tincture A of the fruit. (See Observation 10 on Tincture A.)

Observation 4.—W. W—, æt. 19, an active healthy lad, troubled with frequent seminal emissions. Six drachms of Succus Conii, thirty minims of Succus Belladonnæ, and a grain of Opium, always produced their appropriate effects in a moderate degree upon this patient. Beginning with one drachm and a half, and rapidly increasing the dose to one ounce, he took the latter quantity of *Æthusa* juice every second or third day for about a month. Effects were carefully looked for, but none were appreciable, either to the patient or to myself.

Observation 5.—Henry H—, æt. 17, a strong, active youth, troubled with frequent seminal emissions, took conium for some time, and a fluid ounce of the Succus always produced moderate coneism. On one occasion I gave him seven drachms of the *Æthusa* juice, and kept him sitting under my observation for two and a quarter hours. Just previously he had walked to my house, and the pulse was 86, the pupils slightly oscillant, and contracting to $\frac{1}{6}$ ", and the tongue whitish and moist, with an acid secretion. After 45" the pulse was 82, full and regular, as at first. The pupils and tongue were unchanged. After an hour and a half the pulse was 80 and otherwise unchanged. The pupils were now oscillating between $\frac{1}{6}$ " and $\frac{1}{7}$ ". After two and a quarter hours the pulse was 74, regular, and of natural volume and force; the pupils were $\frac{1}{6}$ ", dilating a little, as before the draught; the tongue unchanged, and the secretion acid still.

Two days afterwards nine drachms of the *Æthusa* juice were taken, the pulse being 86 and the pupils $\frac{1}{6}$ ". After 45" the pulse was 88, full and soft; the pupils fairly steady, and contracting to $\frac{1}{7}$ ". After one hour the pulse was 80, otherwise unchanged; the pupils still $\frac{1}{7}$ ". After two and a quarter hours pulse 72, regular, of initial volume and power; the pupils $\frac{1}{6}$ ". The tongue remained unchanged throughout.

After an interval of eight days I gave him eleven drachms of

the *Æthusa* juice, two hours after a hearty meal, and watched for effects under the same conditions as before, the pulse being 84 and the pupils $\frac{1}{8}$ ". After an hour and a quarter the pupils were unchanged and the pulse had risen to 82, but was not appreciably altered in volume or force. After two hours it was 80, and of initial volume and power, and the pupils were still $\frac{1}{8}$ ". At the end of this time the patient passed f3iiiss of urine (having emptied the bladder just before taking the dose), of sp. gr. 1032; excepting that it contained an excess of uric acid it was normal. Neither on this nor on any previous occasion did the patient himself experience any effect.

Observation 6.—George W—, æt. 17, a well-developed and moderately strong young man, the subject of epileptic aura. Upon this patient thirty minims *Belladonna* juice, one thirtieth of a grain of *Atropia*, four drachms of tincture of *Henbane*, six drachms of *Succus Conii*, and a mixture of four drachms each of tincture of *Henbane* and *Succus Conii*, severally produced their proper effects in a moderate degree. Failing to get benefit from either of these remedies or the bromides, I gave him the *Æthusa* juice, beginning with one-drachm doses every morning before breakfast for eight days, then three drachms increased to four drachms for six days more.

A fortnight afterwards in the evening I gave him a single dose of seven drachms, and he remained quiet for the next two hours. The pulse before the draught and after a walk to my house was 84, the pupils $\frac{1}{8}$ ", the tongue clean, and wet with alkaline mucus. After 45" the pulse was 85, unchanged. After two hours the pulse was 70, and of natural volume and force; the pupils and tongue remained unchanged throughout.

After an interval of six weeks the juice was again given in doses of one ounce, increased to one ounce and a half every other morning an hour before breakfast for a month. During the next nine days he took three doses, each consisting of two ounces of the thick juice. Effects were carefully watched for as often as the dose was increased, but both the patient and myself failed to observe any.

During the eight months which partly preceded and included the time of this treatment, the daily fits averaged 4.6, never exceeding 5, nor falling below 2. On the days when he took

the largest doses (two ounces) of *Æthusa* juice he had the full number (5) of fits, and on the intermediate days 4. This was probably due to the alcohol.

Observation 7.—E. B—, æt. 21, a strong healthy young man, in whom six drachms of *Succus Conii* produced slight coneism, took the *Æthusa* juice for a fortnight in doses increased from one ounce to two ounces every other morning before breakfast. The patient failed to experience any effect, nor could I detect any, excepting after one dose (an ounce and a half) a doubtful contraction of the pupil.

The following observations were made after a dose of two and a half ounces taken with as much water, the pulse being 78, pupils $\frac{1}{6}$ ", and the tongue clean and moist. After taking the dose the patient strolled out for 45", and then sat quietly during the rest of the time. At the end of an hour the pulse was 78, regular and of initial force and power, the pupils were slightly contracted (?), the tongue unchanged. After two and a quarter hours the pulse was 68, otherwise unchanged; the pupils slightly contracted, measuring nearly $\frac{1}{7}$ ", the mouth unchanged.

Observation 8.—George L—, æt. 19, the subject of chronic spasm of the right arm, but otherwise healthy, and in whom six drachms of *Succus Conii* produced moderate effects, took two fluid ounces of the *Æthusa* juice, and three days afterwards four fluid ounces for a dose. On both occasions effects were carefully watched for during the three hours following each dose. Excepting slight somnolency, due to complete rest of mind and body during this interval, and to some extent probably to the alcohol, no effects were appreciable either to the patient or myself. This patient took other preparations of *Æthusa*. See Obs. 14, 16, and 18.

TINCTURE OF THE FRUIT.—The fruit was gathered by myself in three different localities and in three different seasons. **TINCTURE A** was prepared from fruit gathered on 22nd of August, 1869, from plants growing in an exposed situation by ditch sides, between Sompting and the beach near Worthing. The fruit was nearly ripe, and the deeply keel-ridged carpels were parting and beginning to hang each on its own carpophore.

The light green colour was nearly all replaced by a faint

brown, and the pair of brown caliper-like vittæ were conspicuous on the still paler commissure. The fruit was finely ground, and after prolonged maceration in a mixture of equal parts of rectified spirit and water, was finally exhausted by percolation. One part by weight of the fruit furnished four parts by measure of tincture. It was very bright and of a brownish-orange colour, and faint, but peculiar fatty odour and taste; mixed with water it became slightly opalescent. A fluid ounce yielded eleven grains of hard extract, 0.4 grain of which was reddish-brown, bitter oleo-resin. Rubbed with solution of potash and heated, no odour of conia was evolved.

Observation 9.—I took this tincture in doses varying from half a fluid drachm to six fluid drachms without experiencing any effect.

Observation 10.—The subject of Observation 3, a little girl, seven years old, took this tincture diluted with a little water, in doses increased from half a fluid drachm to half a fluid ounce. Excepting a slight rise of pulse at the end of an hour, due to the alcohol, no effects followed any dose.

On one occasion, just after she had walked a distance of two miles, and two hours after breakfast, the pulse being 120, and the pupils $\frac{1}{8}$ ", I gave her six fluid drachms, and kept her sitting during the next two hours. After one hour the pulse was 98 and normal, and after two hours 96. The tongue and pupils were unchanged throughout, nor were any effects felt by the patient.

Observation 11.—Two fluid drachms of the tincture were evaporated over a water-bath at 110° Fahr. to fifteen minims, the oleo-resin being kept in solution by the addition of three minims of alcohol towards the close of the operation. The whole was then injected beneath the skin of a kitten two months old, and weighing about thirty ounces. The animal was so tranquil and sleepy for the two hours following the dose that I thought there was a slight hypnotic effect; there was no effect on the pupils, and the resp. was 40 and the pulse 160 throughout.

Observation 12.—A fluid ounce of the tincture was evaporated in the same way, and the residue injected beneath the skin

of another kitten four months old, and weighing three pounds. The animal was carefully watched for four hours, but no effects were observed. She was quiet and rather drowsy, but did not actually sleep during the whole of the time.

TINCTURE B was prepared from ripe fruit gathered September, 1870, from plants growing in a northern aspect, by the side of a low quick-set hedge, on the roadside near Monkton, Thanet. The same proportion of fruit was used, but the menstruum was rectified spirit two parts, water one part, acidulated with dilute sulphuric acid ($\frac{1}{40}$), and the maceration was prolonged for more than a year.

The tincture was nearly colourless, and contained so much oleo-resin that it became milky when mixed with water. The peculiar fatty odour and taste were proportionately stronger. A fluid ounce yielded ten grains of extract, 1.5 grain of which was reddish-brown oleo-resin. Rubbed with potash, the mixture, either cold or hot, failed to evolve any odour of conia.¹

Observation 13.—I have taken this tincture in doses ranging from half a fluid drachm to a fluid ounce, without experiencing the slightest effects.

Observation 14.—George L— (see Observation 8) took, on one occasion, six fluid drachms of the tincture, and on another a fluid ounce. No effects followed either dose.

TINCTURE C.—This was prepared from the green unripe fruit, the bulk of which was reaching maturity. I collected it on the 25th August, 1873, from plants growing along a hedgerow on the northern side of an exposed turnip field, between Knole Park and the Wilderness, Sevenoaks. The fruit was macerated in enough rectified spirit to cover it, for three months, and was subsequently exhausted by dilute spirit, faintly acidulated with sulphuric acid. A tincture was thus obtained, a fluid ounce of which represented 165 grains of the green fruit, and yielded eighteen grains of hard extract, of which two grains were soft oleo-resin, of a brownish green colour, bitterish, and tasting and smelling of stale fish-oil. Potash merely intensified this odour.¹

¹ "According to Walz, conine is probably contained in the ripe seeds of fool's parsley (*Æthusa cynapium*).'' Watts's 'Dic. Chem.,' vol. ii, art. Conine, p. 2.

Observation 15.—I took a fluid ounce of this tincture, and experienced no effects.

Observation 16.—George L— (see Observations 8 and 14) took two fluid ounces of this tincture, and sat still for the three hours following. Excepting the slight stimulant effect of the alcohol, there were absolutely no results.

Observation 17.—A fluid ounce of the tincture was evaporated over a water-bath to about half a drachm, a few drops of alcohol being added towards the close to keep the oleo-resin in suspension, and the whole was injected beneath the skin of a kitten two months old, and weighing thirty ounces. Excepting that the animal was a little dull during the remainder of the day no effects were observed.

THE EXTRACT, prepared from the woody fibres left after expression of the juice.—In order to remove every trace of active matters from the plant, and to dissolve any that might have been deposited in a solid form, the marc was thoroughly exhausted with water slightly acidulated with sulphuric acid. The fluid was then percolated, and the residue freely washed with water. Twelve pints of light, yellowish-brown, opalescent fluid were thus obtained. It was spread over a wide area on flat dishes, and evaporated at a temperature never exceeding 110° Fahr. to the consistence of a soft extract, brown, of strong acid reaction, and containing much crystalline matter (chiefly sulphate of potash). It weighed 1050 grains.

The greater portion (750 grains) was nearly neutralized with milk of lime, and the mixture evaporated to dryness on a water-bath. The residue was now exhausted by boiling alcohol, and the alcoholic filtrate evaporated to five fluid drachms. It contained a large quantity of rich brown oleo-resin, and possessed an acid reaction. This was the fluid extract, and contained any cynapine that may have remained in the marc. On evaporating it to dryness and washing the residue with water the oleo-resin was separated. The aqueous solution left only a brown uncrystallizable extract on evaporation. The resin is similar to that obtained from the fruit.

Observation 18.—George L— (see Observations 8, 14, and

16) took the fluid extract in doses of half a drachm, one drachm, and two drachms; not the slightest effect followed either dose.

My observations at present extend no further. I may mention that no trace of gastric irritation or any other effect, immediate or subsequent, occurred in any case. The results, therefore, are merely negative. The slight contraction of the pupil observed in some cases was probably due to the stimulant effect of the alcohol in steadying an oscillating pupil.

The largest dose of the juice given was four ounces of the spirituous mixture, which is equivalent to three ounces of the fresh juice and to six ounces of the fresh herb, a quantity greater, I believe, than was taken, or assumed to have been taken, in any of the above-quoted cases of poisoning.

The maximum doses of the tincture of the *ripe* and *nearly ripe* fruit was a fluid ounce, equivalent, in either case, to ninety grains of the fruit.

The largest dose of the tincture of the *unripe* fruit was two fluid ounces, equivalent to more than 300 grains of the fruit.

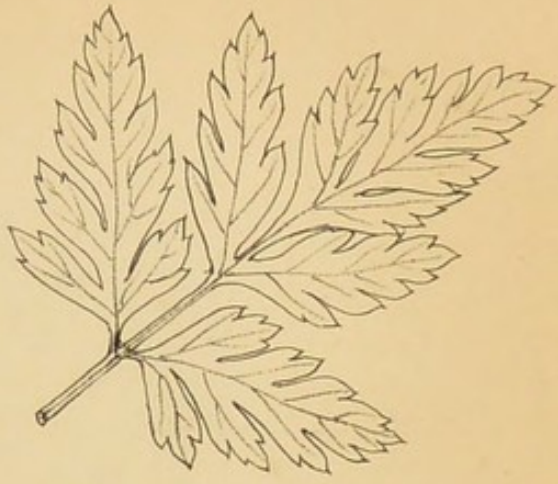
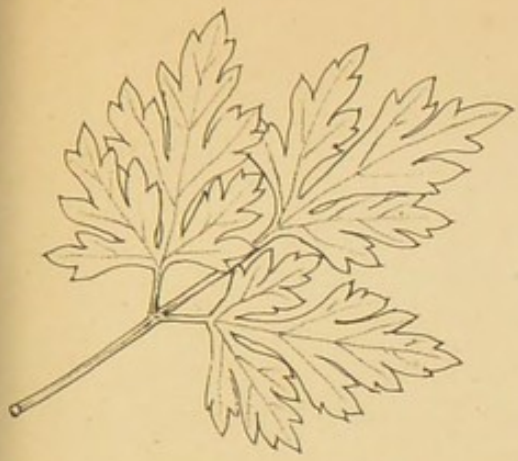
THE OLEO-RESIN, bitter, soluble in alcohol, and then possessing a feeble and evanescent acidity of taste.

Observation 19.—Ten grains, obtained partly from the herb and partly from the fruit, were taken in solution by a healthy adult. No effects whatever followed.

In conclusion, I think it will be granted that these facts strongly corroborate the inference which I have deduced from my analysis of the so-called cases of *Æthusa* poisoning, namely, that the symptoms described are in some wrongly, and in the remainder most unsatisfactorily, attributed to the action of *Æthusa cynapium*. Taken alone, the facts which are included in Observations from 1 to 18 prove, I think conclusively, that *Æthusa cynapium* is a harmless plant; and, I may add, in reference to the footnotes at pp. 82 and 87, that it does not contain the least trace of conia. It may be objected that my observations on the *herb* have reference to only that of one season and locality; but, in answer to this, I may say that, from all we know of the constitution of plants, their activity is variable only in proportion to the quantity of water they con-

tain. In other words, that the quantity of active principle contained in a plant, grown under its native conditions, varies but slightly or not at all; but that the quantity contained in a given ounce of the expressed juice varies with the succulency of the plant, and the succulency will depend, of course, upon the season and locality. In reference to this question I have only to add that the herb employed in this investigation was grown in an exposed situation, and that its juice was of unusually high specific gravity.

Leaving now the question of poisonous properties, it only remains for me to say that I am unable to attribute any therapeutic influence to the plant. This, which is but the natural consequence of the foregoing conclusion, is disappointing. Still, I shall consider that my labours have been well rewarded, if it be found that I have established, what I am myself convinced is truth, namely, that *Æthusa cynapium* is a harmless plant.



usa cynapium.

Conium maculatum.

