

them with a wet blanket for ten minutes, and afterwards exploding the vapor at the mouth of the holes with a torch. Against onion, cabbage, and radish maggots this substance may also be used, by punching a hole with a sharp stick at the base of the plant and pouring in a teaspoonful of the liquid, covering afterwards with earth.

THE ARSENITES.

London purple, Paris green and white arsenic are of the greatest service against all mandibulate insects, such as larvae and beetles; and they furnish the most satisfactory means of controlling most leaf-feeders, and the best wholesale remedy against the codling moth. Caution must be used in applying them on account of the liability of burning or scalding the foliage.

The poisons should be thoroughly mixed with water at the rate of from 1 lb. to 100 250 gallons of water, and applied with a force pump or hand-spray nozzle. First make a thick paste with a small quantity of water, and then dilute. When freshly-mixed, either London purple or Paris green may be applied to apple, plum, and other fruit-trees, except the peach, at the rate of 1 lb. to 150-200 wood gallons, the latter amount being recommended for the plum, which is somewhat more susceptible to scalding than the apple. White arsenic does little, if any, injury at the rate of 1 lb. to 50 gallons of water. Lime with the mixture of London purple and Paris green may be safely applied at the rate of 1 lb. to 125-150 gallons of water, but it cannot be added to white arsenic, as it makes that poison too active.

Elecampane and its Therapeutic use.

BY C. J. S. THOMPSON.

The antiquity of elecampane root in medicine is very great, it having been employed in the treatment of disease from even remote times. Although latterly almost obsolete as a remedial agent, it has lately been brought into prominence by the recommendation of one of its active principles, helenin, in the treatment of phthisis and tuberculous disease. Ancient writers in the time of the Romans were acquainted with its medicinal uses. According to Hanbury, Vegetius Renatus about the beginning of the fifth century calls it *inula campana*, and St. Isidore, in the beginning of the seventh century, names it as *inula*.

It is frequently mentioned in the Anglo-Saxon writings on medicine current in England prior to the Norman conquest, and it has also been identified as the *mar-chalan* of the Welsh physicians of the thirteenth century, it being both well known and largely used throughout Europe during the Middle Ages. In France it was known as *Annee commune*, in Germany as *Alant Alantwurz* or *Helenin Krant*, and in Spain as *Enula Campana*. At one time it was included in nearly all the pharmacopœias of Europe, and enjoyed a considerable reputation as

a remedial agent, but it has gradually died out of use in medicine in this country, except in veterinary practice.

The plant *Inula helenium* is a perennial which is found in almost every country of the world, and grows wild in the South of England and Ireland. It was at one time commonly cultivated in gardens for medicinal and culinary purposes, for which it was largely employed during the last century. It was prescribed by the physicians of the time for its great healing virtues, and its properties as a tonic, diuretic, sudorific, expectorant, anthelmintic, and emmenagogue. It always seems to have had a reputation in treating asthma and pulmonary complaints. The forms in which the drug was exhibited were many and varied. Thus we find conserves, aromatic powders, syrup, aqueous extract, decoction, wine and tincture, besides entering as an ingredient into a large number of unofficial preparations. Two favorite formulas much used in the last century will serve as examples.

A PECTORAL MIXTURE (GASSICOURT).

R	Ext. elecampane	.....	2 scruples.
	Gum arabic	.....	2 drachms.
	Hyssop water	.....	1 ounce.
	Oxymel squills	.....	
	Syr. hyssop	.....	1½ ounces.
	Misce.		

A COMPOUND TINCTURE.

R	Asarabaca root	.....	3 parts.
	Iris flor.	.....	5 parts.
	Elecampane	.....	10 parts.
	Sweet flag	.....	16 parts.
	Liquorice	.....	10 parts.
	Aniseed	.....	5 parts.
	Proof spirit	.....	50 parts.

Infuse without heat several days, and strain; then add camphor, one part. This compound was much valued as a remedy for asthma.

With regard to the chemical composition of elecampane root, it was observed as early as 1660, that when a small portion was subjected to distillation with water, a crystallisable substance collected in the head of the receiver, but which soon passed over. Crystals can also be extracted from the root by exhausting it with alcohol and precipitating it with water. Kallin showed in 1874, that these crystals chiefly consisted of the anhydride of alantonic acid. The anhydride is accompanied with a little helenin and alant camphor, the crystals of the former having a bitter taste but no odor, and melt at 110°. It is a difficult matter to obtain helenin in a pure state, as it is nearly always mixed with a proportion of alant camphor, both substances being soluble to the same extent in alcohol or ether. When reduced to powder the root has an odor resembling a mixture of orris and camphor. Alantonic anhydride may be obtained on distilling it with water, but it is impregnated with alantol. Elecampane contains a large quantity of inulin, at some periods of the year to the amount of 44 per cent.

Valenzuela in 1883 seems to have been the first to call attention to the therapeutic properties of helenin, and its value in treating tuberculosis, early phthisis, per-

tussis, &c. In 1885 Korab observed that helenin possessed a powerful antagonism to the bacillus tuberculosis, and that it also exercised great antiseptic and deodorant properties, one part being sufficient to arrest putrefaction in 10,000 parts of urine. Also that larger proportions of carbolic, boric and salicylic acids were required to produce the same result. A few drops of the solution of helenin were found to kill organisms in ordinary infusions, and also in cultivations of the tubercle bacillus immediately. Internally he had given it in malarial fevers, tubercular, infantile and catarrhal diarrhoea with success. Balza, about the same time, reported he found the drug extremely useful in diminishing the secretions, especially in the trachea and larynx, and he corroborated the observations of Korab as to its antiseptic properties. In the same year helenin was extensively used in the general hospital of Madrid for treating tuberculosis, chronic broncho-pneumonia and whooping cough. It is stated to have been found exceedingly useful in the treatment of these diseases, especially whooping-cough, where it was observed to diminish the attacks of the cough, relieve the dyspnoea and pains in the chest; without causing any symptoms of narcotism; the expectoration at the same time diminishing and becoming almost gelatinous. It is further said to exert a decided tonic action on the digestive organs, and improve the appetite in phthisis. In 1886, Obiol recommended helenin as a local application in diphtheria, to be used in the following manner: Camphor in fine powder having first been applied with the end of the finger to the diphtheritic spots, the surface afterwards should be painted with a solution of helenin in almond oil. This application repeated every four hours is said to quickly destroy the membrane. Helenin is described by Obiol as a perfectly white substance, flocculent like sulphate of quinine when pure, with an aromatic odor and bitter aromatic taste; insoluble in water, to which it should impart no opalescence. Very soluble in alcohol, also in ether, the solution being clear, colorless, and without sediment. It is soluble in oil of sweet almonds to the extent of 2 per cent. A year afterwards Marpmann made a further investigation into the chemical composition of helenin, and stated he found it to consist of two bodies, alantonic and alantonic acid, both of which were useful in medicine. They acted as expectorants and caused death of the bacilli in tubercle nodules. According to still later and more complete investigation, the root contains the following distinct bodies, though some are only isolated with great difficulty:

Helenin, C_6H_8O , in white crystalline needles.

Alant, camphor, $C_{10}H_{16}O$, a white crystalline mass.

Alantonic anhydride, a crystalline body.

Alantol, a yellow liquid.

Bokenham, in the course of a series of experiments on the therapeutic activity of