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## HOOKWORM DISEASE.

### THE USE OF OIL OF CHENOPODIUM IN ITS TREATMENT.

By MURRAY GALT MOTTER, Technical Assistant, Hygienic Laboratory, United States Public Health Service.

Among the inconveniences entailed by the European wars is the failure of the supplies of thymol, used so largely in the southern hookworm campaign. As a substitute for this drug, now almost unobtainable, American wormseed oil (*Oleum Chenopodii U. S. P.*) has been suggested.

As indicated by the name, wormseed has long had a reputation as an anthelmintic. The plant from which the oil is distilled grows "in waste places from New England to Florida and westward to California." It has, however, been cultivated particularly in Maryland, and the oil has been known as Baltimore oil, in contradistinction to the western oil, which is no longer much of a commercial factor. While the oil is almost wholly a Maryland product, it is said that the seed is harvested in considerable quantities in Florida, where the plant is one of the most pestiferous of the weeds.

Renewed interest in the possibilities of American wormseed oil, especially against round worms, seems to date from the publications of Brüning, in 1906, who, with Gockel, Kobert, Linke, Schmitz, Thelen, and others, has investigated the pharmacology of the oil. The chemistry of oil of chenopodium has been studied in Germany by Wallach and others and in this country by Kremers and Nelson, of the Department of Agriculture.

Clinically, its value, especially for the treatment of round worms, was well established. In 1912, Schüffner and Vervoort presented to the Fifteenth International Congress on Hygiene and Demography a paper in which they sought to demonstrate the superior advantages of oil of chenopodium in the treatment of hookworm disease as compared with other vermifuges. These authors, in the course of eight months, had given oil of chenopodium in 1,457 cases. Giving eucalyptus oil a coefficient of 38, naphthol 68, and thymol 83, oil of chenopodium surpassed them all with a coefficient of 91.

Toxicologically, a search of the Index Catalogue and the Index Medicus revealed but 12 published cases of poisoning by wormseed oil in something over 50 years, the first having been published in 1852 and the last in 1903. Of these cases 8 were fatal. The report of one of the fatal cases is cited by Wood, with the added comment: "It is plain that the wormseed was not the direct immediate cause of all these symptoms or of the fatal result." All of the reported cases, however, show a certain general similarity, indicating that the toxic action is exerted particularly upon the central nervous system. Salant, in a preliminary report of his studies on the pharmacology of this oil, notes the possibility of cumulative action, indicated by the

fact that nontoxic doses, when repeated in a day or two, were fatal in the rabbit. In the reported cases of poisoning the dose appears to have been excessive and, in some cases, repeated. Brüning asserts that when properly used this remedy does not cause any unpleasant secondary actions, an experience confirmed by that of subsequent workers.

It is to be noted that oil of chenopodium is a paralyzant, rather than a parasiticide. It narcotizes the parasite, which must then be got rid of by free purgation. Moreover, and here it differs radically from aspidium and thymol, it is probably best administered with castor oil. In the case of aspidium and thymol the coincident or subsequent use of any oil is to be avoided, because, their constituents being soluble in oils, they are thereby rendered more toxic to the human subject. With reference to chenopodium, which in itself appears to be constipating, the castor oil does not add to its toxicity, but offers a ready method of ridding the host both of the parasites and the drug.

Schüffner and Vervoort administered 16 drops of oil of chenopodium with sugar every two hours for three doses. Two hours thereafter they gave a tablespoonful of castor oil with a teaspoonful of chloroform. Gockel gives the single dose as 8 to 16 drops, according to age—6 to 8 years, 8 drops; 9 to 10 years, 10 drops; 11 to 16 years, 12 drops; over 16 years, 12 to 16 drops. Should untoward symptoms arise, particularly inordinate sleepiness or depression, the chenopodium should be withdrawn at once, active purgation induced, and stimulation begun with strong hot coffee by the mouth or by the rectum.

Owing to its increased vogue in continental medicine, the demand for this product has increased in the past few years. Schimmel reports that the acreage put to wormseed increased from about 90 acres in 1910 to perhaps 225 acres in 1912, while the yield rose from 2,800 pounds in the former to 6,700 pounds in the latter year. In view of the fact that October is the time of harvest and that, with the diminished or disappearing supply of thymol, the demand will probably be still further increased, every effort should be made not only to husband this year's crop to the best advantage, but to provide for a largely increased seeding next spring.

Physicians having hookworm cases under their care should give this remedy a thorough trial and report promptly their results in the medical journals. Case notes should be accompanied by information as to the sources of the oil used and, if possible, as to the method of its distillation; it has been alleged that chenopodium grown in different localities, and oils distilled by different processes have shown varying degrees of efficacy. For use in the South, where the plant grows as a weed, the possible efficacy of a decoction, made by boiling

1 ounce of the fresh plant in a pint of milk or water, administered in wineglassful doses, should be remembered and tried under careful supervision. Data of this kind should aid in rehabilitating a truly American remedy, said to have been used by the Indians as a vermifuge before the landing of Columbus, and in helping the American profession to do without some of the products which, hitherto, have been almost wholly "made in Germany."

## PLAGUE-ERADICATIVE WORK.

### CALIFORNIA.

The following report of plague-eradicator work in California for the week ended September 12, 1914, has been received from Surg. Long, of the United States Public Health Service, in charge of the work:

SAN FRANCISCO, CAL.		RATS IDENTIFIED—continued.	
Premises inspected.....	1,095	Mus rattus.....	53
Premises destroyed.....	12	Steamers <i>Hlonian</i> and <i>China</i> fumigated and searched for dead rats. None found.	
Nuisances abated.....	165		
Poisons placed.....	13,200		
Average number of traps set daily.....	1,734		
<b>RATS COLLECTED AND EXAMINED FOR PLAGUE.</b>		PORT COSTA, CAL.	
Collected.....	372	Rats trapped in warehouses.....	22
Found dead.....	1	Rats trapped on water front.....	7
Examined.....	241	Rats trapped in sugar refinery.....	9
Found infected.....	None.	Poisons placed in warehouses.....	4,300
		Poisons placed in sugar refinery.....	2,500
		Rats examined.....	30
<b>RATS IDENTIFIED.</b>		<b>RATS IDENTIFIED.</b>	
Mus norvegicus.....	200	Mus norvegicus.....	16
Mus musculus.....	59	Mus musculus.....	3
Mus alexandrinus.....	60	Mus alexandrinus.....	14
		Mus rattus.....	8

### Record of plague infection.

Places in California.	Date of last case of human plague.	Date of last case of rat plague.	Date of last case of squirrel plague.	Total number rodents found infected since May, 1907.
<b>Cities:</b>				
San Francisco.....	Jan. 30, 1908	Oct. 23, 1908	None.....	398 rats.
Oakland.....	Aug. 9, 1911	Dec. 1, 1908	do.....	126 rats.
Berkeley.....	Aug. 28, 1907	None.....	do.....	None.
Los Angeles.....	Aug. 11, 1908	do.....	Aug. 21, 1908	1 squirrel.
<b>Counties:</b>				
Alameda (exclusive of Oakland and Berkeley).	Sept. 24, 1909	Oct. 17, 1909, wood rat.	Aug. 7, 1914	286 squirrels, 1 wood rat.
Contra Costa.....	May 17, 1914	None.....	Aug. 25, 1914	1,563 squirrels.
Fresno.....	None.....	do.....	Oct. 27, 1911	1 squirrel.
Merced.....	do.....	do.....	July 12, 1911	5 squirrels.
Monterey.....	do.....	do.....	Apr. 10, 1914	6 squirrels.
San Benito.....	June 4, 1913	do.....	July 3, 1914	35 squirrels.
San Joaquin.....	Sept. 18, 1911	do.....	Aug. 26, 1911	18 squirrels.
San Luis Obispo.....	None.....	do.....	Jan. 29, 1910	1 squirrel.
Santa Clara.....	Aug. 31, 1910	do.....	July 23, 1913	25 squirrels.
Santa Cruz.....	None.....	do.....	May 17, 1910	3 squirrels.
Stanislaus.....	do.....	do.....	June 2, 1911	13 squirrels.

### PLAGUE-INFECTED SQUIRREL.

Contra Costa County, Aug. 25, 1914, Moraga grant, Moraga, sec. 12, T. 1 S., R. 3 W., 1 squirrel.