

Data are presented to show that *calculations* of Clonorchis worms present in the bile passages, *based on the average number of eggs per worm per diem* in an infection in a particular species of host are more reliable than those based on the average number of eggs per gram of feces (Stoll method). Minimum daily egg-production per worm *per diem* is always sufficient to provide 100 eggs per gram of formed feces, *i. e.*, 1 egg per microscopic slide in decinormal NaOH dilution (Stoll technic), except in very bulky stools such as occur at times in dogs.

This modified Stoll technic, which we have utilized in detecting the presence of Clonorchis ova in experimental animals, is recommended for use in human cases suspected of having Clonorchis infection, and as a check following treatment for clonorchiasis.

### 3080

#### Experimental therapy in clonorchis infections.

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Utilizing the method worked out by Faust and Khaw, as presented in the preceding paper, for estimating the number of Clonorchis worms present in the bile passages of laboratory animals, on the basis of the average daily egg count from weighed samples of stools, the authors have tested the effect of gentian violet and mercurochrome on cats and dogs. Both mercurochrome and gentian violet, administered orally in the form of salol coated pills, have a direct effect on egg-production in Clonorchis, in that they greatly accelerate the speed of production. Under these conditions eggs are immature when laid and are frequently imperfect and non-viable.

This phenomenon of hyperproductivity of Clonorchis ova after therapeusis is not directly dependent on the clonorchicidal effect

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of the dye. In the mercurochrome series living worms with empty uteri were recovered some days after hyperproduction of ova had been observed, in numbers consistent with the previous worm estimate. This appears to refute the idea that the immature eggs in the feces are due to the disintegration of dead worms.

Mercurochrome in doses lethal to the host has no apparent clonorchicidal value. On the other hand tolerated doses of gentian violet will apparently cause the death of all *Clonorchis* worms in those parts of the bile passages which can be reached by the dye. In light infections this may constitute the entire number of worms (complete cures), as determined by autopsy findings. In heavy infections eradication up to 90 per cent or more of the worms can be secured whenever the host is able to tolerate intensive treatment.

Oral administration of gentian violet in small doses requires prolonged treatment to secure similar results. Doses of gentian violet (Grübler) administered *per os* to cats and dogs, within the limit of tolerance as determined by continued good appetite, absence of nausea or emesis, and sustained or increased body weight, consist of not more than 35 mg. *per diem* per kilo of body weight are toxic to the host and cause death if repeated frequently.

The effect of gentian violet as a clonorchicidal agent is probably indirect. The continued excretion of the dye into the bile passages either from intensive or from prolonged treatment ultimately provides a concentration of the dye in the milieu of the fluke sufficient to cause its death. When the egg count has been reduced to zero a few worms may still be present in bile passages or outpocketings of the bile tracts which are reached with difficulty by the dye. A single maximum tolerated dose will frequently kill these remaining worms, resulting in complete cure.

The results obtained in the administration of gentian violet in experimental animals indicate the possible advantage of utilizing gentian violet therapy in human clonorchiasis.