

Phenothiazine

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PHENOTHIAZINE or thiodiphenylamine as it is known chemically, has been a recognized chemical entity since 1885. It was not until 1935, however, that it was first used as an insecticide. In 1938, research was begun testing it as an anthelmintic. Phenothiazine is a coal tar derivative related chemically to the miracle drug sulfanilamide and is made by combining diphenylamine with sulfur. Phenothiazine is the mother substance of the two well-known dyes, Lauth's violet and methylene blue.

Chemistry

Phenothiazine occurs as a bulky crystalline or amorphous powder of greenish color which darkens on prolonged exposure to light. It is insoluble in hot and cold water and only slightly soluble in chloroform, methanol, benzene, and ether. It is fairly soluble in acetone.

Much research has been carried on studying the efficacy of this drug as an anthelmintic in the domestic animals. The results indicate that it may be a very valuable agent in combating some of the important parasites of our domestic animals.

Harwood et al reporting on work done on four animals (three horses and a mule) found that phenothiazine was 94.5% efficient on strongyles and 100% on the cyclicostomes. They observed no toxic symptoms at any time during the experiment.

Swanson et al in treating heavily parasitized cattle, found that phenothiazine removed 100% of the *Haemonchus contortus* and *Trichostrongylus axei*. It was also 99.8% effective in the removal of *Oesophogostomum radiatum* from calves treated. An efficiency of 84% was noted in the removal of *Ostertagia ostertagii*. Phenothiazine was but slightly effective against the *Trichuris* and the *Moniezia* species.

Harwood reports that in experiments with ten heavily parasitized sheep, phenothiazine was 76% efficient in removing hookworms and 90% efficient in removing nodular worms. It was 100% effective in the removal of *Haemonchus contortus* and *Ostertagia ostertagii*. Commercial phenothiazine containing 95% phenothiazine was used in dosage of 0.5 gram per pound of body weight. Sheep eliminate the drug through the urinary tract, the urine when first passed being normal in color, however, on standing exposed to the air, it turns red. The red color will dye the wool which is a decided disadvantage in treating sheep in closely crowded quarters. Some lesions were also reported indicating possible toxic effects from the drug. These consisted of an inconstant, superficial necrosis of the rumen and a moderate congestion of the duodenum. In some cases there were also petechia on the kidneys. However, these lesions may not have been due to the phenothiazine.

In swine, phenothiazine is said to be effective against ascarids and nodular worms. In poultry, it is between 95% and 100% efficient in removing cecal worms. This is of great economic importance since cecal worms are a vector for the causative organism of blackhead in turkeys. The drug is apparently non-toxic to poultry in large dosage.

Conclusions

Phenothiazine is a new therapeutic agent, and naturally its exact fields of application as an anthelmintic are yet to be definitely established. From the available experimental data it is apparently a remarkably efficient anthelmintic for many of the internal parasites of domestic animals, but possesses certain disadvantages in regard to solubility and the necessity for large bulky dosage.

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Cystic Calculus in a Bitch

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On Aug. 31, 1940, a three year old Pekingese bitch was presented for a pedicure. While clipping the nails it was noticed that the bitch was dribbling urine. The owner stated that this had been going on for about a month. The abdomen was palpated and a large object felt in the posterior abdominal region. A diagnosis of cystic calculus was made.

Operation

On Sept. 3, 1940, the dog was returned for treatment. The bitch was given $\frac{1}{4}$ gr. of morphine and $\frac{1}{75}$ gr. of atropine sulfate as a basal narcotic. The operative

site was shaved, cleaned with ether, and swabbed with tincture of metaphen. Nembutal was used to obtain surgical anesthesia. A median incision, about two inches in length, was made posterior to the umbilicus through the skin, muscle, and peritoneum. The bladder was brought up through the incision. The bladder was then incised and the calculus forced through. The bladder incision was closed with a Connell suture using No. 1 catgut. The abdominal incision was closed with three interrupted silk sutures. A roller bandage was applied and the dog returned to the kennel.

The dog remained quiet most of the day. The next day she was apparently quite normal, showing no general symptoms. The abdominal wound was dry and was swabbed with metaphen and the roller bandage left off. On Sept. 7, the sutures were removed since the bitch was voiding urine normally. The wound was swabbed daily with tincture of metaphen for another week, at which time the pa-



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