THE COMPARATIVE EFFECT OF TWO IRON SALTS ON PARASITIC ANEMIAS IN PUERTO RICO[1]

A COMPARATIVE study has been carried out on the effect of iron ammonium citrate (ferric) and iron sulfate (ferrous) on the anemias associated with hookworm disease and with schistosomiasis mansoni.

The response to large daily doses per os of iron ammonium citrate (6 gms) in hookworm anemia has been reported by several investigators.[2,3,4] Rodríguez-Molina and Pons[5] have studied the effectiveness of this drug in the anemia associated with the intestinal phase of schistosomiasis mansoni. This condition is produced by a unisexual blood fluke living in the portal vessels of its most common host, man. It produces chronic dysentery, and later, fibrous and papillomatous growths in the lower intestinal tract, cirrhosis of the liver with splenomegaly and anemia.

In hookworm disease the administration of each of the therapeutic agents used (6 gms iron and ammonium citrate; 1 gram iron sulfate, daily) during a period of thirty days without removal of the worms resulted in a rise of the red cell count and hemoglobin percentage to a practically constant subnormal level accompanied by definite clinical improvement. After removal of the worms the blood values rapidly rose to normal levels (5 to 7 days).

In schistosomiasis mansoni, however, 2 gms of iron sulfate were required to produce improvement in the red cell count and hemoglobin percentage, compared to that obtained with the use of 6 grams of ammonium citrate.

From the above evidence, it is suggested that the administration of iron sulfate (in the solid form) is easier and less bothersome to the patient than the use of a solution of iron ammonium citrate. Gastrointestinal disturbances such as diffuse abdominal pain and diarrhea have been observed during the administration of both drugs, but are less frequent when iron sulfate is administered.

The difference in the quantity required of the two drugs employed in this study might possibly be explained in terms of degree of oxidation of the iron or a difference in its assimilability in the gastrointestinal tract.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

RAISING THE PRAYING MANTIS FOR EXPERIMENTAL PURPOSES

PHYSIOLOGISTS and psychologists have long sought an insect suitable for experimentation. Grasshoppers, bees and cockroaches have been the subjects of various investigations but have definite limitations, either being too small for satisfactory operative techniques or flying or jumping, making accurate observation difficult. A number of generations of the praying mantis have been raised in this laboratory over a period of four years, and this insect has proved ideal for experimental purposes. At the moment it is being used in an investigation of the functions of various ganglia and in studies on insect vision. It is therefore felt that a brief description of the insect and methods for raising it might be of interest to those seeking material for psychophysiological experiments.

The species used is *Mantis religiosa*—a species accidentally introduced into this country from southern Europe. The adult female is four to five inches in length, the male being somewhat smaller and slimmer. Both sexes possess wings, but these are rarely used. In general mantids move but little unless hungry or disturbed, though they are able to run at a considerable speed. They are positively phototropic though not markedly so, and are negatively geotropic, usually hanging upside down from the top of a container. They are entirely carnivorous, the food consisting of living insects which are captured with the modified first pair of legs and torn to pieces by the powerful mandibles. Unfortunately, the adults are cannibalistic, and must be kept in separate containers. Almost alone among insects the mantis is able to move the head in any direction. The eyes are large and vision relatively acute, and three different types of response to moving objects have been detected. Also there are a number of complex cleaning and copulatory reflexes in addition to simpler segmental avoiding reflexes, all of which make the mantis valuable material for observation and experimentation on insect behavior. Further details can not be given here, and reference should be made to papers by Binet[1] and Roeder.[2]

Mantis religiosa belongs to the order Orthoptera, and anatomically the nervous system is of a generalized insect type. The ventral ganglia are widely separated

[1] From the Department of Medical Zoology and University Hospital of the School of Tropical Medicine of the University of Puerto Rico under the auspices of Columbia University.

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[3] C. P. Rhoads, W. B. Castle, G. C. Payne and H. A. Lawson, *Medicine*, 1934, 13: 317, 1934.

[4] R. Rodríguez-Molina, *P. R. Jour. Pub. Health and Trop. Med.*, 11: 49, 1935.

[5] R. Rodríguez-Molina and Juan A. Pons: Unpublished observations.

[1] L. Binet, "La Vie de la Manté religieuse," Vigot Freres, Paris, 1931.

[2] K. D. Roeder, *Biol. Bull.*, 69, p. 203, 1935.