

Schistosomiasis *Mansoni* in the Republic of Santo Domingo¹

With a Report of Six Cases Studied

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THE INVESTIGATION on intestinal schistosomiasis, carried out by Dr. I. González Martínez in 1904, is undoubtedly the first contribution on this subject appearing in the New World. After this date, there followed innumerable publications reporting the finding of an egg, with a lateral spine, in feces but not in urine, which testified to the appearance of a new type of parasitism in the area of the Caribbean Sea and northern South America. Whatever literature has come out on the subject from the Dominican Republic will be outlined here briefly, with the principal findings, in order to dismiss once and for all the much discussed existence of this disease prior to January 19, 1942.

In 1925, Dr. Héctor Read,² Professor of Medicine of the University of Santo Domingo, reported the finding of *S. mansoni* eggs in the feces of a native of Antigua, residing in the Dominican Republic. Dr. Manuel F. Pimentel Imbert,³ Professor of Parasitology of the above-named university and present Director of Laboratories of the "Hospital Internacional" of Ciudad Trujillo, wrote the author about having found *S. mansoni* ova in a patient hospitalized in said institution, who had lived elsewhere for twenty years.

In 1933, when commenting on Dr. I. González Martínez' studies, Faust⁴ suggested that Santo Domingo might be considered an endemic area as of July 2, 1905. Two years later, Faust⁵ admitted further that this region was comprehended in the geographical distribution for intestinal schistosomiasis, hence the writer's surprise, on reviewing the bibliography of schistosomiasis, to find that Faust,⁶ in 1939, excluded the country from the endemic zones. However, in 1943, both he and Meleney⁷ admitted the possibility of schistosomiasis occurring in Santo Domingo.

1. Received for publication March 15, 1946.

2. H. Read, Schistosomiasis. *Listin Diario*, Ciudad Trujillo, D. R., January 25, 1925.

3. M. F. Pimentel Imbert, *Personal communication*, September 9, 1943.

4. E. C. Faust, Studies of schistosomiasis *Mansoni* in Puerto Rico. 1. History of schistosomiasis in Puerto Rico. *Puerto Rico J. Pub. Health & Trop. Med.*, 9:154-162, 1933.

5. *Idem.*

6. E. C. Faust, *Human Helminthology*, 2nd ed., p. 129 (Philadelphia: Lea & Febiger, 1939).

7. C. F. Craig and E. C. Faust, *Clinical Parasitology*, 3d ed. p. 363 (Philadelphia: Lea & Febiger, 1943).

In March 1943, a very interesting paper on schistosomiasis by Dr. Enrique Koppisch,⁸ of the School of Tropical Medicine of Puerto Rico, who failed to include the Dominican Republic in the geographic distribution of this disease, called forth a letter of inquiry into his reasons for such a conclusion. In a reply,⁹ Dr. Koppisch informed the writer that he had not included the Dominican Republic as one of the endemic foci of schistosomiasis because the literature from Santo Domingo, in which the few cases had been reported, did not prove that such infections had not been contracted outside of that country. The foregoing information, together with other data gathered by prominent investigators, has led the writer to believe that the cases from the Dominican Republic, previously reported as autochthonous, did not occur among natives of this country.

It was on January 19, 1942 that the writer discovered the first genuine case of schistosomiasis in a Dominican. Since then, he has studied more than a dozen patients and read numberless articles dealing with schistosomiasis *Mansoni*—its symptomatology, diagnosis, and so forth—and in so far as he has been able to prove, all of the cases came from the Hato Mayor area of the Dominican Republic, which would indicate the definite existence of the disease in that part of the country and might lead, in the future, to the formation of other endemic foci.

Fortunately, schistosomiasis does not as yet constitute a definite nosological tropical entity in Santo Domingo so as to have become a familiar problem among physicians there. Schistosomiasis has not yet become a public health problem, as it is in Africa and other countries of tropical America. However, in the writer's thesis¹⁰ for the Faculty of Medicine of the University of Santo Domingo, and again in a paper read at the Plenary Session of the Dominican Medical Congress on the celebration of the one hundredth anniversary of the Republic,¹¹ he stressed the dangers inherent in the existence of such a disease.

CASES

1. T.C.N., a 9-year-old white schoolboy of Hato Mayor, where he lives, came to the Outpatient Clinic of San Antonio Hospital on

8. E. Koppisch, *Manson's schistosomiasis*. *J.A.M.A.*, 121:936-942, 1942.

9. E. Koppisch, *Personal communication*, September 29, 1943.

10. A. M. Ponce Pinedo, *Schistosomiasis Mansoni* in the Dominican Republic. Thesis, University of Santo Domingo, D. R., 1944.

11. A. M. Ponce Pinedo, Six autochthonous cases of schistosomiasis *Mansoni* in the Dominican Republic. Dominican Medical Congress, 1944.

January 9, 1942. His grandmother, who accompanied him, gave the following information.

History. The patient had been ill for about three months with a low-grade fever and complained frequently of pain in a continually swelling abdomen. There was diarrhea, accompanied by tenesmus, the stools appearing like "ground liver."

Physical Examination. This revealed a white child, pale and somewhat emaciated, timid and in a very bad humor. Lungs and heart revealed nothing abnormal; abdomen was prominent, with a pronounced hepato-splenomegaly and slight ascites. Temperature—38.3° C. Patient was hospitalized for the necessary laboratory tests and more careful observation.

Laboratory Findings

Blood: Hemoglobin.....	45%
R.B.C.....	2,500,000 per cmm.
W.B.C.....	9,400 " "
Polymorphonuclear eosinophils..	15%
Urine.....	Normal
Feces.....	Eggs of <i>S. mansoni</i> , hookworm, and <i>T.</i> <i>trichiura</i> .

Course in Hospital. Patient was administered the first dose of fuadin. During the first seven days in hospital, there was a constant rise and fall in the daily temperature; the abdominal pain continued. On the tenth, the temperature went down to normal, when a decided improvement set in. The patient's appetite gradually returned; liver and spleen slowly went back to normal, and the pain, which had bothered him continually, disappeared. Patient was discharged after 27 days.

Follow-up. Patient was followed up in the Outpatient Clinic during a normal convalescence. Stools became negative for *S. mansoni* ova, after which other parasitisms were treated.

2. A.B. de V., a 23-year-old creole girl, living in Hato Mayor, appeared at the Outpatient Clinic on March 25, 1943.

History. Patient told of frequent spells of dizziness, palpitations, and gastrointestinal disturbances.

Physical Examination. This revealed normal lungs and heart, tenderness in region of ascending colon. Neither the liver nor spleen could be palpated. Temperature—37.2° C.

Laboratory Findings

Blood: Hemoglobin.....	65%
R.B.C.....	3,800,000 per cmm.
W.B.C.....	10,000 " "
Polymorphonuclear eosinophils..	8%
Urine.....	Normal
Feces.....	<i>S. mansoni</i> ova

Treatment. Patient was prescribed the regular dose of tartar emetic.

Follow-up. Patient returned to the Outpatient Clinic for examination, at which time feces were negative for *S. mansoni*, and there was no pain in ascending colon.

3. O.M., a 16-year-old "mestizo" boy from Hato Mayor, his present home. He came to the Outpatient Clinic on July 16, 1943.

History. For more than a year, patient had been noticing abdomen gradually swelling; there was daily diarrhea, and his general malaise worsened after a purge. He had been in the habit of bathing in "Las Guamas" creek, which runs close to the town of Hato Mayor, but had always noted that either during or after the bath, his body began to itch. Because of this, some of his friends had stopped bathing in the stream.

Physical Examination. This revealed normal lungs and heart; abdomen highly distended in the form of an inverted cone, due to the degree of hepato-splenomegaly present and some ascites; extreme tenderness on palpation over hepatic region. Hepatic hypertrophy more accentuated on left side some 6 cm. under the costal border at right mid-clavicular line. Spleen extended about 9 cm. under costal border at left mid-clavicular line. Temperature—38.2° C.

Laboratory Findings

Blood: Hemoglobin.....	70%
R.B.C.....	3,300,000 per cmm.
W.B.C.....	12,000 " "
Polymorphonuclear eosinophils..	18%
Urine.....	Normal
Feces.....	<i>S. mansoni</i> ova, hookworm, and <i>T.</i> <i>trichiura</i> .

Course in Hospital. Patient was hospitalized in order to give him regular fuadin treatment. Final examination revealed disappearance

of hepato-splenomegaly and ascites, when he was discharged with recommendation to appear at Outpatient Clinic every two or three months. His present condition is satisfactory.

4. J.R., a 13-year-old creole girl, resident of Hato Mayor, came to the Outpatient Clinic on August 17, 1943.

History. Two or three years previous, patient began having headaches, gastrointestinal disturbances, and feeling dizziness. She tried various remedies with no improvement.

Physical Examination. This revealed nothing which might have led to a diagnosis of schistosomiasis.

Laboratory Findings

Blood: Hemoglobin	80%
R.B.C.	4,000,000 per cmm.
W.B.C.	6,000 " "
Polymorphonuclear eosinophils	20%
Urine	Normal
Feces	Eggs of <i>S. mansoni</i> , hookworm, and <i>T. trichiura</i> .

Treatment. Fuadin.

Follow-up. Last October, patient visited the Outpatient Clinic, stating that she felt perfectly well.

5. B.M., a 10-year-old "mestizo" boy, resident of Hato Mayor and brother of Case 3, came to the Outpatient Clinic on September 8, 1943, with low-grade fever, diarrhea, anorexia, and a "ball that went up and down in his stomach and almost suffocated him." Purgatives worsened his condition.

History. Patient's sister, who accompanied him, reported that three years previous he had had chills and fever, but that with a medicine—presumably, quinine—he had improved considerably. A short while later, however, patient noted that his abdomen was gradually swelling, with passage of much gas. Patient had bathed in "Las Guamas" creek but had stopped because of the itch that followed bathing.

Physical Examination. This revealed normal lungs and heart; prominent abdomen with the characteristic form of an inverted cone; extreme tenderness on palpation over hepatic region; no signs of ascites. Hepatomegaly more marked at left lobe, reaching some 7 cm. under costal border. Spleen, which was somewhat tender on pressure, extended 7 cm. under costal border. Temperature—37.8° C.

Laboratory Findings

Blood: Hemoglobin	60%
R.B.C.	3,750,000 per cmm.
W.B.C.	11,600 " "
Polymorphonuclear eosinophils	30%
Urine	Normal
Feces	Ova of <i>S. mansoni</i> , hookworm, <i>B. coli</i> , and <i>T. trichiura</i> .

Treatment. Patient was discharged after submitting to the regular fuadin treatment and being cured of other parasitisms.

Follow-up. Later examinations revealed that all abdominal tenderness and hepato-splenomegaly had almost disappeared. Eosinophils went down to 10%, and *S. mansoni* ova disappeared from feces.

6. M.O., an 18-year-old "mestizo" housemaid, living in Hato Mayor; came to the Outpatient Clinic on November 28, 1943, suffering from a low-grade fever, abdominal pains followed by either diarrhea or constipation.

History. Patient had the habit of bathing in "Las Guamas," which flowed some 50 meters from her house; felt itchy after bath. Waters from this stream were also used for laundry and washing floors.

Physical Examination. This revealed a woman of normal appearance, not looking either acutely or chronically sick and weighing 105 lb.; some pigmented spots on face and arms. Temperature—37.2° C.; pulse 74 per min.; respiration, 20. Nothing abnormal in heart (pressure—120/85) or any other organ. Abdomen not distended but soft and a little painful over region of ascending colon. Pressure over hepatic area produced some pain only; no signs of hepatic hypertrophy. Spleen not palpable.

Laboratory Findings

Blood: Hemoglobin	70%
R.B.C.	3,850,000 per cmm.
W.B.C.	7,600 " "
Polymorphonuclear eosinophils	19%
Urine	Normal
Feces	<i>S. mansoni</i> and hook- worm ova.

Treatment. Fuadin.

Follow-up. Patient is enjoying good health.

EXPERIMENTAL WORK

Material and Methods Employed. These studies were begun with the sole purpose of verifying the life cycle of the adult parasite. The methods and techniques used for the experimental infection were those employed by Faust, Hoffman, and others¹² at the School of Tropical Medicine of Puerto Rico. Fecal specimens were obtained from patients coming from Hato Mayor to the Outpatient Clinic of San Antonio Hospital, and were analyzed in accordance with the concentration technique recommended by Hoffman, Pons and Janer¹³ and DeRivas.¹⁴ The pH of the rainwater used for all trials varied from 7.2 to 7.4 and was obtained from the laboratory faucet.

After the first case of schistosomiasis was discovered in Hato Mayor, the writer traveled to this town for the purpose of interrogating the patient's family as to his habits, inspecting the streams in which he had bathed, and so forth. Accordingly, he was told that the patient used to bathe daily in a small creek called "Pañe-pañe," which empties during the rainy season into another stream called "Las Guamas," both of which flow very close to the town. A search along the banks of "Pañe-pañe" and "Las Guamas" revealed numberless snails of the *Australorbis glabratus* variety, fluctuating from 18 to 23 mm. in diameter. These snails were placed and kept alive in laboratory receptacles, filled with water from the faucet and some vegetation from their native habitat.

An examination of the snails revealed that 5 percent of them were infected with the fork-tailed cercaria. As some authors claim that the morphological differentiation of the parasite is not sufficiently consistent for definite identification of the mature cercaria, and that the final proof is the development of the worm in experimental animals, adult rabbits were infected. After 40 to 60 days, these animals were sacrificed in a lethal chamber. The mesenteric veins and intrahepatic portal branches were carefully examined for adult worms that were flushed out with a 2 percent solution of citric sodium.

12. E. C. Faust and W. A. Hoffman, Studies on schistosomiasis *Mansoni* in Puerto Rico. III. Biological studies. 1. The extra-mammalian phase of the life cycle. Puerto Rico J. Pub. Health & Trop. Med., 10:1-48, 1934.

E. C. Faust, C. A. Jones, and W. A. Hoffman, Studies on schistosomiasis *Mansoni* in Puerto Rico. III. Biological studies. 2. The mammalian phase of the life cycle. Puerto Rico J. Pub. Health & Trop. Med., 10:133-197, 1934.

13. W. A. Hoffman, J. A. Pons, and J. L. Janer, The sedimentation-concentration method in schistosomiasis *Mansoni*. Puerto Rico J. Pub. Health & Trop. Med., 9:283-298, 1934.

14. D. DeRivas and C. R. DeRivas, *Clinical Parasitology and Tropical Medicine* (Philadelphia: Lea & Febiger, 1935).

SUMMARY AND CONCLUSIONS

1. Herewith are presented the first autochthonous cases of schistosomiasis *Mansoni* encountered in the Republic of Santo Domingo.
2. The region of Hato Mayor (Seybo) has been found to be a focus for this disease, since all of the cases originated in this area. The waters of "Pañe-pañe" and "Las Guamas" creeks were found infested and harboring the snail *Australorbis glabratus*.
3. Five percent of the snails collected were found infected with cercariae, thus proving that *A. glabratus* is the common vector of the disease and host for *S. mansoni* in Santo Domingo.
4. The number of infected persons found to date reveals a percentage of 0.27 among a total of 4,500 whose feces were examined. The majority were children and adolescents. A differential diagnosis was considered in every instance where hepato-splenomegaly and gastrointestinal disturbances were present. All positive cases were treated either with fuadin or tartar emetic in accordance with established rules.
5. *S. mansoni* was proved experimentally, by following the complete life cycle of the parasite from the egg to the adult stage.

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