

headache, weakness and abdominal cramps. Since calcium in large doses (up to 60 to 90 grains [4 to 6 Gm.] daily orally plus 10 cc. of 10 per cent calcium gluconate intravenously three times a week) failed to relieve his symptoms, he was admitted to the Massachusetts General Hospital for medical management.

Physical examination on admission revealed a husky male complaining bitterly of headache and abdominal pain. Except for tenderness on palpation of the abdomen and posterior neck muscles, there were no abnormal physical findings. Careful neurological examination brought out no palsy. The patient walked awkwardly and insisted he could not lift heavy objects or perform simple jobs, such as hammering a nail. These complaints were hard to evaluate, since C. S. had been sick for two years and had many hostile reactions to the failure of treatment to effect complete cure. He was receiving compensation, which undoubtedly complicated the evaluation of subjective complaints. Of great interest was the discovery that the patient's drinking water supply on his farm contained amounts of lead above the permissible level (0.36 p.p.m.; safe level considered to be 0.10 p.p.m.). Further, his two sons were excreting 0.28 and 0.13 mg. of lead per liter of urine, indicating considerable intake above the level considered

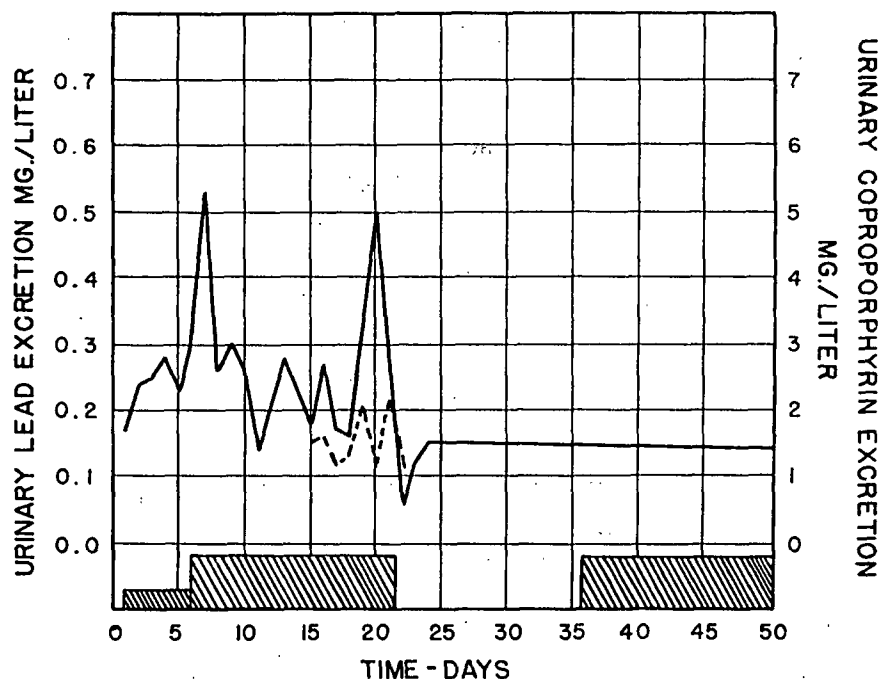


Chart 4 (case 4, patient C. S.).—The solid line represents urinary lead; the broken line, urinary coproporphyrin. The striped blocks represent oral sodium citrate therapy with a low calcium diet and are explained in the text.

normal, 0.00 to 0.08 mg. of lead per liter. The chronicity of this man's course and his failure to stay well after earlier response to calcium and dimercaprol therapy were explained by his continual intake of lead in his drinking water, plus the lead he may have stored and not completely excreted during his seven years' working in the steel plant.

By giving sodium citrate in doses of 4 Gm. four times per day by mouth, the symptoms were controlled. Earlier doses of 2 Gm. three times per day were not sufficient, and atropine sulfate, barbiturates and even codeine sulfate had to be used to keep the patient comfortable. During the sodium citrate therapy, C. S. was restricted to a low calcium diet. When the sodium citrate therapy was stopped, symptoms reappeared promptly, but in view of this man's reaction to his long illness, it was difficult to interpret this response. After his return home, the patient was persuaded to change the pipes delivering drinking water from his well to prevent further lead absorption. His family physician continued the sodium citrate therapy for a matter of weeks. Renal lead excretion continued at the levels shown in chart 4. C. S. continued to complain of inability to work and of vague fleeting joint pains, but he no longer