

## A SEVERE CASE OF TROPICAL SPRUE

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This paper is an attempt to express the point of view of both physician and layman in the course of a typical case of sprue. The statement of the patient, Dr. Lord, follows and will be succeeded thereafter by a clinical account of the case by his physician and co-author.

### A PRELIMINARY STATEMENT OF THE CASE

In the words of the old adage, "Every man is either a fool or a physician at forty"; and I, at that age, thought that I was not a fool. Up to that time, and for some dozen years after, I had enjoyed practically perfect health: indeed, except for a tendency to tonsillitis, which apparently was outgrown, and some rather serious trouble with hemorrhoids, which had been overcome with the aid of a skilled specialist, I had never known a day's illness. My weight was always a little less than the average for my height and years. I had found that I could, through minor changes of diet, keep it unchanged, and having fixed upon a standard (174 pounds) I held to that figure with practically no variation. For physical exercise, a daily walk of four or five miles sufficed. Being extremely busy, I kept long hours—at my office from nine in the morning to nine at night, as a rule. My work was of absorbing interest, and I felt no hint of weariness, even at the end of the longest days.

For nearly six years, 1902 to 1908, I lived in Porto Rico, where, as Assistant Commissioner of Education, I worked and lived much as in the North, with perfect health. I suffered from none of the diseases so common to Americans resident in the tropics. Returning to Boston in 1908, I undertook the task of organizing a college—a task which proved to be extremely difficult, and mentally and physically wearing, but was ultimately successful; since then, I have devoted my efforts to the needs of that institution. With Day, Evening, Saturday, Extra-mural, and Summer sessions, with branches established in Cuba and in Porto Rico, all calling for constant supervision; with frequent lecture trips to all parts of the United States; with additional heavy responsibilities during the World War, and with constant writing and administrative work, my time was fully occupied, but my health remained marvelously good.

As to diet, I gave the subject slight attention, except for occasional slight modifications to keep my weight at the approved standard. I ate what I liked, about the ordinary Yankee ration, with perhaps special emphasis on New England baked beans, doughnuts and pie, but never, I believe, in excess. I seldom ate salads or green vegetables; I drank no liquor, and smoked in moderation—and that only after I was forty.

Except for lecture trips I seldom left Boston. I took no vacations for many years, and felt no need for extended periods of rest. After 1920, the

branch colleges organized in Cuba and Porto Rico called for two or three brief visits each year, and the short sea trips, providing a welcome change in the continuous routine, seemed to serve as sufficient vacation.

Then, in January, 1928, there came a sudden change. I experienced a period of unusually persistent constipation; mouth and tongue became sore—so sore that I could not eat with comfort. Weight increased to about 180 pounds. Interest in my work flagged, although the need for constant effort and intense study of troublesome problems was greater than ever. Dietary changes, intended to restore normal conditions, had no effect. Simple remedies availed nothing. In short, I realized that I was no physician. Then, about the middle of the month, the constipation changed to acute diarrhea, with an immediate loss of weight, a condition which soon became so serious that I sought medical aid, but wholly without benefit.

I continued my usual work until April, when, my weight having fallen to 160 pounds and the pathologic conditions having increased in intensity, I went to a hospital for observation and treatment. There I was subjected to tests of every sort. I was measured and charted and X-rayed, painted and punctured and pumped out, flooded and flushed, fed one day and fasted the next; I swallowed rubber tubes and sucked clinical thermometers and while every test gave a negative result, I continued to fade away. No one was able to diagnose my disease, and death seemed near at hand.

During most of this time I was kept on a liberal general diet, and urged, almost compelled to eat: yet my soul loathed food, and every meal was followed by extreme evacuation, foul in odor and almost liquid in form. Occasionally, when I was left alone with a tray of food before me, I succeeded in surreptitiously throwing it into the hopper of the adjoining toilet, and so saved one operation and considerable discomfort—though I was always rewarded for my prompt disposition of the meal by an extra lunch of milk or broth an hour or two later.

The weight chart showed a loss in May of twenty-six pounds, but it can only suggest the corresponding diminution of strength and courage. I was about to insist on leaving the hospital, when, near the end of May, a heaven-sent messenger, Dr. David I Frankel, came to me and diagnosed my disease as Sprue, a disease almost wholly unknown to New England practitioners. Suitable treatment and diet were established, with immediate effect, although the loss of weight continued, at a less rapid rate, for six months more. It fell, indeed, until in November it reached a minimum of 110 pounds, a figure at which it remained, with little variation, until the following April.

During these months I ate sparingly, mostly of fruits with a little lean meat. I drank two to three quarts of milk each day. For my own reference I kept a record which varied but slightly from day to day, but proved helpful in establishing a standard diet. As a specimen, I quote an entry: "Grapefruit, 1; orange, 1; bananas, 4; strawberries,  $\frac{1}{2}$  basket; beef and liver stew, small bowlful; milk,  $2\frac{1}{2}$  quarts.

Bowels: marked constipation until 3:00 P.M.—then an explosive evacuation; again, very free and liquid, at 6:00 and 11:00 P.M.

Tongue, uncomfortably sore. Weight 112."

Early in April, 1929, my physician prescribed liver extract, with a more liberal diet. An increase in weight was an immediate result; but we decided

that, for further progress, a complete change of environment was desirable. So, before the end of that month I went to Porto Rico to be watched over by the Insular Commissioner of Health, Dr. P. N. Ortiz, a friend of long standing, and to receive personal treatment from Dr. Bailey K. Ashford.

In new surroundings, with appetite stimulated and strength returning, I ate freely of a general diet, only to meet a violent relapse before the end of the second week: in three days I lost twenty pounds, dropping from 141 to 121. Then Dr. Ashford put me on his restricted Sprue diet, eliminating all starches, sugars and fats, but allowing most native fruits and vegetables, meat, eggs and milk.

On that diet the weight curve turned upward again, and for fifty consecutive days the gain was a pound a day. There were no other breaks in the continual improvement, but the blood condition was persistently unsatisfactory until about the first of August, when that, too, responded to the treatment, hemoglobin rising from forty per cent to over eighty per cent, and red cells increasing from fewer than two and a half million to over six million.

In that, and in every other way, the return to health seems to be complete. I believe that I am in better physical condition than of old, and am beginning my regular work anew. But I have learned the lesson as to the need of dietetic variation and balance and frequent physical and mental relaxation. And when again I give a lecture, as I frequently have in the past, on "How to attain and maintain perfect health", I shall be able to make suggestions, based on personal experience, which may, I hope, be of some value to my hearers.

(Signed) EVERETT W. LORD.

#### DOCTOR LORD'S CLINICAL HISTORY

##### *Abstracted from history taken in the Massachusetts Homoeopathic Hospital in April 1928*

Admitted for a diarrhea and loss of weight of three months duration. Began suddenly after a laxative and has since been continuous. Three to six watery, yellowish, offensive, stools a day. No clay-colored or tarry evacuations. Appetite excellent but eats very little. No nausea, vomiting or pain; no excessive flatulence or jaundice.

Family history is colorless; all the men are tall and well-built. Habits normal for a temperate and well-balanced man. No diseases of childhood and no illnesses save measles at thirty-one years.

Patient has always been strong and well but "feels faint" on small provocation. His best weight was 182 and he weighed at this time 152. The facial color was poor and the muscles flabby. He was rather poorly nourished. The blood pressure was 106/62; peripheral vessels slightly thickened but elastic. No numbness of extremities, retarded reflexes or incoordination.

These were the only abnormalities after a most minute clinical examination.

The vital function reported showed:

*Urine*, normal save for greatly increased indican. No urobilogen.

*Blood*, Morphology: Hemoglobin ----- 85 per cent  
Color index ----- 1

Erythrocytes ----- 4,190,000 per cmm.

Trace of poikilocytosis

Very slight anisocytosis

Trace of anisocytochromia

No erythroblasts

Leucocytes ----- 5,300 per cmm.

Neutrophils ----- 51.5 per cent

Lymphocytes ----- 42.5 per cent

Endothelials ----- 4.5 per cent

Eosinophiles ----- 1. per cent

Unclassified ----- 2. per cent

Platelets ----- 260,000 per cmm.

No parasites.

Chemical analysis:

Non-protein nitrogen ----- 32 mgm.

Urea nitrogen ----- 15 mgm.

Uric acid ----- 4 mgm.

Creatinine ----- 1.5 mgm.

Sugar ----- 95.

*Basal metabolism*: plus 1.

The kidney function test, galactose tolerance and vital capacity tests were normal. The alveolar CO<sub>2</sub> was 46 mm.

A special neurological examination revealed no appreciable abnormality.

*Liver function*: 50 cc. of brown duodenal contents.

Fufurol number 70, Cholesterol ----- 51.0 mgm.

Alcohol-insoluble pigment ----- 5.4 mgm.

Alcohol-soluble pigment ----- 12.6 mgm.

Interpretation: Mild biliary disturbance.

Icteric index (plasma) 5.

Van den Bergh, quant. negative.

qual. "

Interpretation: Normal.

*X-ray report*:

Heart and Lungs negative.

Teeth; no apical abscesses.

X-ray diagnosis of digestive tract:

Graham test, intravenous—no filling consistent with gall bladder pathology.

Gastro-intestinal examination otherwise negative.

*Stool*: No ova, larvae or parasites found.

*Nose and throat:* Negative.

*Protein sensibility:* Negative to egg, milk, yeast, cheese, wheat, potato, beef, chicken, lamb, pork, bluefish, cod, haddock, salmon.

*Eye:* Congenital caract, right eye, otherwise normal.

*Electrocardiogram:* Sinus arrhythmia which was considered rather physiologic than pathologic. "The tracing does not contain reliable evidence of heart disease but merely certain suggestions of cardiac abnormality."

With continued diarrhea in a man of the patient's age and secondary anemia, malignancy was suspected. As the colon was imperfectly filled at twenty-four hours and he had lost thirty pounds in weight, this suspicion was apparently strengthened. No evidence of endocrine disturbance was presented but about the only definite thing seen was a functional liver disorder.

Later, Dr. Frankel's diagnosis of sprue was corroborated by the staff of this hospital. Thus, in spite of an unusually thorough observation of the patient and confusing negative findings, the correct diagnosis was finally attained.

From June, 1928 to April, 1929, the patient was treated by Dr. Frankel basically on a fruit and milk diet. Improvement took place as far as the active symptoms of sprue were concerned but no gain in weight, and rather a decided loss, occurred, the patient reaching 110 pounds, a figure which was sustained until about the 5th of April, 1929.

There is very little doubt that Dr. Lord's life was saved by this treatment but the low calorie value of a fruit diet can be very little aided by milk save when taken in enormous, and, generally, almost impossible quantities. Nutrition was at a very low ebb when he reached Porto Rico. On the way down to the Island he began to eat, and, finding that he suffered no serious inconvenience, as soon as he arrived, his personal friend, Dr. Pedro Ortiz, gave him every opportunity to indulge his appetite with the idea of building him up. A week or so after his arrival, I was called to see him for the first time. I cautioned against overindulgence in sweets, cereals and fats, but as he was symptomless and hungry, I had not the heart to put too many restrictions upon him. Only a few days after my first visit, and about three weeks after he had lifted the quarantine against prohibited articles of food, he appeared in my office with one of the most extraordinary and violent relapses I have seen. In three days he had lost twenty pounds, although strangely enough, the flux was not marked so much by frequency. The tongue was

raw, there was a fair amount of gas, and a white frothy diarrhea with six to eight movements a day. I found the liver decidedly small, and the typical symmetrical pigmentation of face, arms and shoulders. His hemoglobin was 56 per cent, reds 2,792,000, whites 4,800 and color index a bit over 1. I found that he had been taking liver extract for the first time, for about ten days before he arrived and if there had been any resultant reticulocytes I must have missed it, or the percentage elicited was the end of the reaction, i.e. 2. From the size of the cells and the slightly increased median, I came to the conclusion that his anemia had taken on a pernicious cast.

He was immediately placed on the diet I have found best suited for the treatment of such cases, with diluted hydrochloric acid twenty minutes before meals, and 0.3 each of pancreatin and takadiastase, 0.5 magnes, oxid., and 1. calcium carbonate, two hours after meals.

This diet is as follows:

*Breakfast:* Coffee with milk, no sugar; two poached or softboiled eggs; and any fresh fruit, save pineapples and alligator pear.

*Midday:* Half a pound of rare steak without butter or lard, fresh vegetables (excepting potatoes), and fruits, salads and milk.

*Dinner:* The same as at midday.

Milk is given at four P. M. and at bedtime and quantities of food are fixed to render from 2,500 to 3,000 calories. At times fish or chicken can be substituted for the beef in order to prevent monotony, and vegetables should be shifted about for the same purpose. All sugar of commerce and cereals are strictly prohibited and fats are reduced to their very lowest limit. Details are omitted in order not to prolong this history unduly, for not only the quantities, caloric values, and selection of food-stuffs, but their preparation, tasty combination, and serving would require a separate and long article.

This régime has been sustained to date with slight variation in the medicinal accompaniment, and remedies for passing indispositions which for now many months have ceased to appear.

The course of this case, accustomed as we are in Porto Rico to see rapid improvement in a good percentage of bad cases, has about overtopped anything so far observed. It is true that the patient had the unusual mentality and a very firm character, backed by a sublime, (I might almost say, reckless) optimism, but I was not prepared for such phenomenal gains in weight. On May 4th he appeared in my office with a violent bout of severe sprue weighing 128 pounds, having fallen from 148 pounds in three days. On June

8 he weighed 158; on July 10 his weight was 181. Within a week from beginning his new regime above recounted, all of his symptoms of sprue had disappeared save one, his anemia. From the very first I had applied liver extract without the slightest reticulocyte response, or improvement in blood values, although the hormone may have brought about a reticulocytosis in the ten days he had been taking it before he came to me; but before long I came to believe that liver extract was powerless to help him for the reason that his anemia seemed due to hypoplasia of the bone marrow. Sprue is essentially a wasting disease, and, in such extreme cases as this, tends toward cachexia. The regenerating powers of the blood had been exhausted. It was determined to drop liver extract definitely for a couple of months, feed him up on the high-nitrogen diet, and then try it again, in the hope that an ample supply of amino-acids would bring about a replacement of the missing megaloblasts. At that time the drilling of bone to determine the actual state of the marrow was not in our consciousness in Porto Rico and a fine opportunity for a bit of research was lost. But, fortunately, things seemed to work out according to the theory above expressed. In two months liver extract was resumed and the hemoglobin, which had heretofore obstinately refused to rise, began to climb, preceded by the erythrocytes. Indeed, as will be seen from the record to follow, a true polycythemia was produced. This record is as follows:

Hb percent	Erythrocytes	Color index	Av. diam. erythrocytes	Reticulocytes percent	Days after liver extract	Days after beginning treatment
56.....	2,792,000	1.05	.....	1.	10	.....
51.....	3,572,000	0.72	.....	2.	13	3
51.....	2,740,000	0.94	.....	1.7	.....	7
40.....	3,196,000	0.62	.....	0.1	.....	23
54.....	3,168,000	0.85	.....	.....	.....	31
45.....	2,448,000	0.92	.....	.....	.....	38
48.....	2,922,000	0.92	.....	.....	.....	42
43.....	2,624,000	0.82	.....	.....	.....	49
48.....	3,304,000	0.73	.....	.....	.....	57
53.....	4,050,000	0.65	.....	8.37	5	61
48.....	3,496,000	0.69	.....	1.5	.....	64
48.....	5,492,000	0.44	.....	.....	.....	68
58.....	6,168,000	0.47	.....	.....	.....	71
47.....	6,088,000	0.38	.....	.....	.....	75
50.....	4,896,000	0.51	.....	.....	.....	78
53.....	5,304,000	0.50	.....	.....	.....	82
63.....	4,576,000	0.69	.....	.....	.....	85
60.....	6,600,000	0.45	.....	.....	.....	89
66.....	6,312,000	0.52	7.04	.....	.....	93
61.....	6,624,000	0.46	7.09	.....	.....	100
73.....	7,964,000	0.46	.....	.....	.....	111
70.....	5,152,000	0.68	.....	.....	.....	114

It will be noted that no reticulocyte rise occurred after the second administration of liver extract, that the type of anemia changed to

"secondary", that the average diameter of the erythrocyte returned to normal, and that a polycythemia appeared.

As on the 2nd of September he was entirely well, as far as could be determined, weighed 181 pounds, and had a hemoglobin of 81 per cent and a red cell count of 7,472,000, he was discharged as apparently cured.

#### DISCUSSION:

The first question would naturally be: How did he acquire sprue? Personally, I believe that he carried *Monilia psilosis* North in his intestinal tract when he left the Island in 1908 and that under great strain connected with the founding and successful working out of the College of Business Administration of Boston University, he brought about a physiologic exhaustion of his digestive glandular and sympathetic nervous systems and produced, through indigestion and consequently heightened pH of his intestinal canal, a favorable medium for the rapid overgrowth of *Monilia psilosis*, which painted the picture we recognized as sprue. But this concept is somewhat vitiated by the thought that in one of his recent brief visits to the Antilles since that time he might have picked up the organism in question. This is a possibility, although not a probability; I have seen a large number of cases in which long latency in the North was followed by true sprue.

The next question is: Is he really cured? I think that anyone who could see him would think so but after seeing some three thousand cases I preferred to err on the side of safety and have insisted on his original diet. The idea is that at bottom, sprue is an exhaustion of the amylase—and lipase—function and that a diet which tends to spare these functions while it furnishes an abundance of nitrogenous building material, will end in restoring these functions by rejuvenation of glands which have stepped down to a lower level. His physician in the North mildly protested a too long continuance of a high nitrogen diet and stated that he had noted a blood pressure of 140 and some renal disturbance. I cannot blame this zeal which is a legitimate scruple, but I expressed my own fear in my reply to Dr. Lord: "I do not consider your blood pressure too high and think that the danger of returning to a high carbohydrate diet is far greater than that offered by the possibility, which is purely a supposition, that your blood pressure will rise still further." It has not risen still further and the urine seems normal



for a man of his age. During his stay in the North Dr. Lord had two blood examinations, one, September 24th., as follows:

Hemoglobin (Talquist)-----	75 to 80	per cent
Erythrocytes-----	4,600,000	
Poikilocytosis, very slight		
Anisocytosis, none		
Anisocytochromia, none		
Polychromasia, none		
Erythroblasts, none		
Leucocytes -----	6,850	
Neutrophiles-----	67	per cent
Lymphocytes-----	25	per cent
Endothelials-----	6	per cent
Eosinophiles-----	1	per cent
Basophiles-----	1	per cent
Reticulocytes-----	1.75	per cent
Blood Pressure-----	140/110	

Another, October 13th., as follows:

Hemoglobin from-----	80 to 90	per cent
Erythrocytes-----	5,230,000	
Poikilocytosis, slight		
Erythroblasts, none		
Reticulocytes-----	0.75	per cent
Leucocytes-----	7,800	
Neutrophiles-----	54	per cent
Lymphocytes-----	38	per cent
Endothelials-----	6	per cent
Eosinophiles-----	2	per cent
Blood pressure-----	138/92	

Two urinalyses revealed only a trace of albumin and one of them a few finely granular casts. On his arrival here again on the 10th of December, 1929, his hemoglobin was eighty-one per cent; his erythrocytes, 5,340,000, leucocytes 9,800 neutrophiles fifty per cent, lymphocytes forty-eight per cent; mononuclears 0; eosinophiles one per cent. Cytologically the blood seemed normal and the average diameter of the cells was 7.7 micra. I prescribed liver extract, six vials of Lilly's 343 a day, and in a week the hemoglobin was eighty-four per cent, and the erythrocytes 7,984,000 with an average diameter of 7.6 micra.

At the same time the following tests were made:

Blood chemistry: Non-protein nitrogen-----	30	mgm. per cent
Urea nitrogen-----	11.4	mgm. per cent
Uric acid-----	2.9	mgm. per cent
Creatinine-----	1.4	mgm. per cent
Sugar-----	133.3	mgm. per cent

This should be contrasted with a similar examination made here in April:

Non-protein nitrogen----	29.5 mgm. per cent
Urea nitrogen-----	10.9 mgm. per cent
Uric acid-----	5.4 mgm. per cent
Creatinine-----	0.8 mgm. per cent
Glucose-----	99.0 mgm. per cent
Chlorides-----	542.9 mgm. per cent
Cholesterol-----	129.4 mgm. per cent
Serum calcium-----	9.1 mgm. per cent
Diffusible Ca-----	5.2 mgm. per cent
Alv. CO <sub>2</sub> -----	59.8 mgm. per cent
Icteric index-----	3.2 mgm. per cent

*Analysis of gastric contents:*

Fractional estimation at fifteen minute intervals gave 9, 9, 12, 15, 19, 5 and 5.0 for total acidity. Free acid, none.

This analysis is practically identical with one made here in April, 1929. Urinalysis: Only traces of albumin and a few hyaline casts. The kidney function test was normal.

*Basal Metabolism:* plus 1.8.

Again he has been discharged in spite of abundant colonies of *Monilia psilosis* in his stool and with still the shadow of an achylia gastrica over us. All symptoms of sprue have disappeared, his blood is normal and his weight 194 pounds, but the hemopoietic system is believed to be far from robust and only a skillful adjustment of azote and carbohydrates to his point of tolerance will protect him from one of those lamentable relapses which might plunge him again into that condition which we still recognize as "pernicious anemia."