THE RELATION OF MONILIA PSILOSIS TO TROPICAL SPRUE AND AN EVALUATION OF FERMENTATION OF SUGAR AS A CRITERION FOR SPECIFICITY

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The writer first recognized the presence of tropical sprue in Porto Rico in the summer of 1908 and from that time, for five years, made persistent effort to connect the clinical history of the patient with some definite etiologic agent. In the latter part of 1913, a yeast found in bread and in the feces of sprue patients with gaseous distension of the intestine and diarrhea, enhanced by the ingestion of an excess of sweets and cereals, led him to investigate its pathogenicity in experimental animals where he discovered what he then considered ample reason for incriminating a definite yeast-budding fungus which he named *Monilia psilosis*.

The examination of a large number of cases of sprue with an equal number of those without this disease, to determine the relative frequency of this fungus in the stools of each of these two classes of patients, was then planned. The series of cases was begun early in 1915, commencing with that of a boy of six years of age suffering from sprue in whom the first specific monilia had been recognized. The intention was to assemble data from a thousand cases but inexperience made this plan too comprehensive. When one reflects that feces had to be planted in Petri dishes on solidified glucose agar, suspicious colonies fished, purified by the Koch three-plate method, examined microscopically for morphology, and each pure culture transferred to U-tubes containing a two per cent solution of each of some sixteen sugars, to litmus milk, to gelatin by stab and to a Sabouraud glucose agar slant, to be observed daily and recorded, it can be seen that a thousand cases would have taken at least five or six years.

The protocol also demanded that as soon as the sugar peptone water fermented, it must be tirated by the old $\frac{N}{20}$ sodium hydrate solution method. In those days pH and the rapid and easy method of watching acid fermentation by incorporating an indicator with the original medium was unknown and fermentation meant, currently, the production of gas only. If a yeast failed to produce

gas in two weeks, it was then titrated to determine any change in acidity. Of course, several careful titrations of the original medium before inoculation furnished the basis for determining the amount of gain or loss in acidity subsequently.

By this time, Castellani's first classification of Monilia, chiefly on the sugar-fermentations, fell into the hands of the writer but he soon found that classification of species by sugar-fermentation phenomena alone was productive of conflicting results. It was found that not only did *Monilia psilosis* ferment with great regularity glucose, levulose and maltose on first recovery, but that on subsequent subculture it would either fail to ferment maltose, or even ferment, in addition, saccharose and galactose, one or both. Viceversa, a yeast would be found now and then, which, on recovery from a case of sprue would not ferment maltose yet immediately thereafter in subculture in the same batch of medium would ferment it.

The result was that *Monilia psilosis* began to counterfeit many of Castellani's species and as that author gave no supporting morphology for his different species, considering their peculiarities in sugar fermentation the principal if not the only means of distinguishing them, skepticism as to their reality began to creep in. This was followed by conviction when from two cases of severe sprue, a small, irregular yeast with some stringy mycelium which failed to ferment maltose was converted into the large, brilliant yeast and stout mycelium, with fermentation phenomena typical of *Monilia psilosis*. And this mutation was secured by passage through laboratory animals employing huge daily intravenous doses. Moreover, a concomitant increase in virulence had taken place and the organism which had taken many days to kill, now killed in a few hours, even before colonization in the animal could have advanced very far.

These aberrances of *Monilia psilosis* are not uncommon, although as a rule it is the normal type that is seen, but the fact that this so-called typical reaction to sugars is so often replaced by such departures from what we choose to call the normal, makes it clear that the distinction between "species" can not rest on so mutable a basis.

From that time on, the writer has been convinced that fermentation tests *alone* can not be depended upon for the purpose of elevating a monilia to specific rank, and that while fermentation tests form one of a number of valuable means to determine the nature of a given monilia, many of those so far described by Cas-

tellani are not valid and are probably variations of the same species with shifting fermentative powers.

This paper is the result of the above-detailed train of thought and has only now received substantial backing from a totally new set of experiments which will conclude the rehearsal of these early attempts. It will begin with a description of what was done in this regard in the years 1915–1917. The results of this work have been briefed in a general way in previous papers, but the laboratory data has never before been published in connection with the clinical cases, chiefly because at the time such minutia was of no interest. To-day it should have a very poignant meaning to those who are engaged in solving this great disease-problem of the hot countries, particularly because it was done with such care. The writer has never studied the biochemical and biological characteristics of these fungi in relation to the clinical history of the host with more care than in this series. It may be said with truth that from 1915 to 1917 his entire time was devoted to a clinical and laboratory study of the cases, the vast majority of which were out-patients and, all save three were treated as his private patients.

The clinical part of this work was performed in his private office. The feces were sent to the laboratory with a key number and thereafter no connection with the clinical case was in evidence. Naturally, the relation of the number to the case was soon forgotten and thenceforth all mycological work was limited to laboratory findings without reference to the source of the culture. This was done deliberately to prevent any unconscious attempt to make the laboratory findings agree with the case. Thus the clinical diagnosis was strictly clinical and is referred to in the protocols as the "justifiable diagnosis."

As will be seen later, it is believed that *Monilia psilosis* is an extremely frequent saprophyte, especially on fruit. Only under propitious circumstances does it colonize in the intestinal canal. It is, therefore, entirely reasonable to suppose, and from Fairley and Mackie's studies to believe, that the organism may be cultivated from a large number of persons without sprue, provided that persistent effort be made to find them. These organisms can be found *en voyage* through the bowel of many persons without sprue. But, as will be seen, one fecal culture of such persons will reveal a stray organism in only about six per cent and then usually to the extent of only one or two colonies, unless, after a large meal of fruit or other contaminated food stuff, a shower of Monilia may be encountered.

On the other hand, cases of sprue cachexia are frequently free from *Monilia psilosis*. In this case it is the sequela of sprue with which we have to deal; with the downfall of glandular function and a hypoplastic bone marrow, and not a continuous increase in the number of infecting fungi. The efflorescence of the latter has been already controlled by a medically or instinctively enforced diet and perhaps in many cases by a terminal change in the pH of the intestinal canal, which depresses the colonization of such fungi.

Now, as a matter of fact, in all save this cachectic stage of sprue fecal cultures are wont to give a strikingly large number of colonies and in cases not sprue, these organisms are apt to be absent. In only twenty cases were cultures made more than once and then only after an interval of months: in ten cases of sprue in which Monilia psilosis had been found on the first occasion, the feces remained still positive on the second; in three cases not due to sprue, reculture of feces found negative on the first occasion were still negative on the second; two cases of sprue, negative on the first fecal culture, became positive on the second, and, vice-versa, one case of sprue and one of chronic indigestion, after having been positive on the first, were negative on the second; three cases of sprue were negative in both fecal cultures.

Anderson's method of contaminating solidified Sabouraud agar in Petri dishes at a given number of points and, after incubation noting the percentage of contaminated points yielding colonies was not then known, but the general statement can be made without the slightest fear of error that cases of active sprue yielded a high percentage of colonies and cases not sprue were generally negative.

This series remained unfinished, for before an equal number of cases not sprue could be collected to contrast with the cases of true clinical sprue, the World War took the writer hurriedly to France in June of 1917. Nevertheless, if there be any doubt as to the prevalence of *Monilia psilosis*, in persons without sprue, a later study of 178 healthy persons revealed on first fecal culture only 5.6 per cent of carriers of *Monilia psilosis*, and raised to sixteen per cent if possible aberrant forms are included. In ninety-nine of these cases fecal culture was negative for all fungi.

It can therefore be concluded that even in a sprue-ridden country like Porto Rico, a single fecal culture will only reveal from five to six per cent of *Monilia psilosis* carriers.

ANALYSIS OF THE CASES OF 1915–1917

While table I presents 266 mycological cases, in reality there are only 239 which are clinical. This is explained by the reapperance of the same case under a different laboratory number in twenty-five instances. In addition, two laboratory numbers were blank since the records were lost.

There were 163 cases of sprue. Twenty-three, or 14.1 per cent began at six years of age or under; eight were under one year. In twenty seven, or 16.5 per cent of the cases, the onset was acute, generally in the form of an entero-colitis, at times simulating dysentery. In 31.9 per cent of the cases other persons of the family suffered from sprue; in a few of these cases the mothers of infants with the disease had sprue. The diagnosis made was strictly a clinical one and had no laboratory basis whatsoever. Many of the cases of "chronic indigestion", "entero-colitis", and similar disorders of the gastro-intestinal tract may have been the beginnings of sprue or a mild form thereof. In some of these cases this was shown by subsequent history to have been the case. The justifiable diagnosis of sprue was made on the classical symptoms: sore tongue, burning in the epigastrium and gullet, excess of intestinal gas, and a light-colored, frothy diarrhea, with marked loss of weight and strength and a small liver. The diagnosis of sprue cachexia generally included a pernicious type of anemia. "Tongue sprue" and intestinal of "incomplete" sprue' signify that the signs of the disease were limited to tongue or intestine respectively.

Table II shows that there were ~~114~~ 141 cases from which *Monilia psilosis* was isolated; 127 of these, or ninety per cent were cases of sprue. The degree of these cases was as follows: Mild sixteen; moderate thirty; severe thirty-nine; cachectic thirty; tongue sprue seven; intestinal sprue five; total 127. Of the remainder, or fourteen cases, thirteen were suffering from gastro-intestinal disorders.

All of these strains were consistent in the morphology; all produced gas in glucose, levulose, and maltose bouillons, presented an inverted pine tree growth in gelatin stab, and failed to acidify milk. The 141 cases are represented by 152 cultures. Of 146, all save sixteen produced acid fermentation of saccharose, or enghty-nine per cent. Gas was produced in this medium in forty-six, or 31.5 per cent. Of sixty-seven cultures, all produced acid fermentation of galactose; twenty-one, or 31.2 per cent produced gas.

The average gain in acidity at time of fermentation in 151 glucose bouillon cultures was 3.7 (expressed in cc. of a twentieth

normal sodium) in 3.9 days; of 151 levulose bouillon cultures it was 3.3 in four days; of 152 maltose bouillon cultures it was 4. in 4.8 days; in sixty-seven galactose bouillon cultures it was 1.7 in 12.7 days; in 129 saccharose bouillon cultures it was 2.17 in 11.6 days, but in sixteen other cultures, there was a loss of acidity of 0.28 in 15.5 days. The growth of Sabouraud slant at the end of the first week was typed as follows:

"A". Smooth, shiny, creamy consistence with well-defined border. Growth raised; no marked mycelial extension, twenty-four cases, or 15.8 per cent.

"B". Growth raised, center verminous; border deeply ridged radially and well-defined. Much mycelial extension into the depths of the medium, seven cases, or 4.6 per cent.

"C". Same as "A" but with much mycelial extension into depths of medium and at border which is therefore hazy and indefinite, twenty-two cases, or 14.4 per cent.

"D". Same as "C" but border well-defined and little lateral mycelial extension, eighty-five cases, or 56 per cent.

"E". Same as "C" but border dull and radially guttered, two cases, or 1.3 per cent.

"F". Raised, puckered center; border smooth and well-defined; much mycelial extension into medium, ten cases, or 6.5 per cent.

"G". Honeycombed surface; border indefinite; mycelial extension, one case.

"H". Only a honeycombed surface, one case.

The outstanding macroscopic peculiarity of these Sabouraud glucose slants was the color: 126 were a cream with a green or faint green tint, suggesting the color produced on a fluroscopic screen; twenty six were a simple cream. Thus 82.9 per cent gave a greenish hue to the cream color but this was only noted on growing the cultures in the dark.

Table III shows that forty mycological cases herein detailed present thirty-seven clinical ones. Fourteen of these were cases of sprue, classified according to degree as follows: Mild three; moderate one; severe five; cachexia three; tongue zero; incomplete two; total fourteen.

All save six of the remaining twenty-three complained of indigestion or diarrhea. In general, the yeasts were small and granular in all, save on the frequent occasions of those fermenting a sugar. In glucose and levulose these were often large and typical but in maltose and saccharose small and rachitic or irregular in shape and

size. The mycelium was usually scanty, often limited to a few disjointed articles or long, thin, hyaline hyphae.

These strains can be divided into the following types according to the sugar-fermentation reactions:

(1) Gas in only glucose and levulose	29 cases (7 green)
(2) Gas in glucose, levulose and saccharose only	7 cases (3 green)
(3) Gas in levulose, maltose, and saccharose	1 case
(4) No gas in any of the sugars	1 case
(5) Glucose and maltose alone yielded gas	1 case (1 green)
(6) Gas in levulose only	1 case (1 green)

In case 255, two strains are detailed, one in which all four sugars were gas producers but which on gelatin stab yielded no mycelial extension despite the fact that fragments of mycelium were seen here and there in microscopical preparation; the other only fermented glucose and levulose with gas-production, but typical inverted pine-tree in gelatin stab was clear. Both gave a faint green growth on Sabouraud slant.

The average gain in acidity in thirty-nine cases at the time of gas production was 3.2 in 6.1 days for glucose; in thirty-eight cases in levulose 3.2 in 7.5 days. The average gain in acidity in thirty-two cases shown in maltose bouillon was 1.7 in 14.4 days; in two others there was neither gain nor loss; in six cases there was a loss of 0.22 in eighteen days. The average gain in acidity in thirty-four cases sown in saccharose bouillon was 1.47 in 14.2 days: in four more than the los was 0.45 in 13.2 days.

The type of growth on Saboraud glucose slant at the end of the first week was as follows: "A" twenty-eight cases, or 70 per cent; "B" two cases, or 2.5 per cent; "C" three cases, or 7.5 per cent; "D" four cases or 10 per cent; "F" two cases or 5 per cent; and "G" two cases, or 5 per cent.

The greenish-cream color appeared in only twelve, or thirty per cent; the rest were cream. In gelatin stab, the inverted pine-tree was noted in twenty-five, or 62.5 per cent; in nine the extension was short and close; in six no mycelial extension was noted although mycelium was found microscopically in scanty amount.

This table gives mycologic details of certain Monilia which it is reasonable to strongly suspect are temporary or permanent variants from Monilia psilosis. This is seen from the persistence in some of the characteristic greenish hue lent to the cream color in the Sabouraud slant, the frequent production in gelatin stab of long pine-needle extensions, and the typical morphology often found in

those sugar bouillon in which gas was produced. But the tendency of such atypical strains is toward a depression of the maltose fermenting function, a depression which may involve one or more of the other sugars; toward a shortening or disappearance of this extension of mycelium from the gelatin stab; toward a marked reduction in the size of yeasts which become granular and often lack of vacuoles with the customary motile body, as well as a great reduction microscopically in breath and frequency of mycelium.

Cases thirteen and fourteen presented all of these aberrations to an extreme degree and yet by passage through animals regained their perfect type, with all the characteristics of a normal *Monilia psilosis*. Another departure from the normal for typical *Monilia psilosis* is seen in the second table where 82.9 per cent of the Sabouraud slants presented a greenish or faint greenish hue to the cream color. In this series of forty, only thirty per cent presented this tinge.

Table IV shows that of the sixty-one cases in which *Monilia psilosis* was found, there were twenty-two cases of sprue, as follows: Mild six; moderate seven; severe three; cachetic three; incomplete three; total twenty-two.

A monilia was found in twenty-three of the sixty-one cases, in fourteen of the twenty-two cases of sprue and in nine cases clinically not sprue, but of which seven had some gastro-intestinal disorder. This monilia did not ferment maltose and was small and irregular, as a rule, although at times morphologically typical. The labor of attempting to endow all of these strains with the characteristics of *Monilia psilosis* by passage through animals was only performed in two, but in these (cases 13 and 14) it was entirely successful. All of the cultures herein referred to in this paper were subcultured and delivered to a well known laboratory in the United States when the writer left for France at the time of the Great War, a duplicate set being left in the laboratory of the Institute of Tropical Medicine of Porto Rico, with the assurance that they would be regularly transferred, but the conditions of war in the home country were such that they had to be abandoned and on my return were found to be non-viable. For this reason the attempt to convert them into typical Monilia psilosis can no longer be made. It is not, however, begging the question to presume that some of these aberrant strains might have been degraded forms of *Monilia psilosis*.

The clinical cases in Tables II, III, and IV, when totalled, tally

with the clinical notes of each case found in Table I. Table V is for the purpose of accentuating the coincidence of typical cultures of Monilia psilosis and those which we have referred to as possible atypical forms of the same species so often recovered from the same fecal culture. Here again we see that in the latter there are generally four oustanding differences from the type of organism we have been referring to as *Monilia psilosis:* (1) Maltose bouillon is not fermented; (2) The Sabouraud slant is more apt to strike a cream color without a greenish tinge; (3) The mycelial extension from the gelatin stab is shorter, heavier, more dense, and more branched—the "inverted firtree" and, at times, the "test tube brush" types; and (4) The yeasts are much smaller and more irregular and the mycelium is scanty and narrow. It is noticeable that in many cases the glucose and levulose cultures which ferment with gas, show perfectly typical forms of Monilia psilosis, while the maltose cultures not producing gas are the ones presenting the small and irregular forms. In at least a dozen instances such atypical forms have been converted into normal Monilia psilosis by passage. Such atypical forms of this organism, if indeed they are degraded from their normal type, are not usually pathogenic for anmals, save for enormous and repeated inoculations.

SUMMARY

Of 163 cases of clinical sprue, 127 or 77.9 per cent were positive for *Monilia psilosis;* fourteen more, or 8.5 per cent were positive for an atypical *Monilia psilosis;* still fourteen more, or another 8.5 per cent, were positive for a monilia similar to two strains (cases 13 and 14) which by passage were converted into *Monilia psilosis.*

To be severely exact, we can say that 77.9 per cent of these 163 cases of sprue were positive for *Monilia psilosis.* Admiting the possibility that in 8.5 per cent more, an atypical Monilia psilosis was found, this percentage of positives rises and we find that in from seventy-eight to eighty-six per cent or more this organism has been recovered.

On the other hand, of a total of seventy-six cases which were not sprue, *Monilia psilosis* was found in fourteen, or 18.4 per cent, but thirteen of these were manifestly suffering from indigestion or diarrhea. If atypical forms of the organism are included this frequency would rise to forty-eight per cent, but, again, seventeen of these cases also were suffering from the same vagaries of the intestinal

tract. In other words, of these thirty-seven cases thirty may have been in the early stages of sprue or suffering from an incomplete and mild form. At this point it is well to remember what appears previously, that of 178 presumably healthy persons only 5.6 per cent of carriers were found; while in these cases atypical forms were not included, they can be added by anyone who feels that they should be, without seriously disturbing the evident great disproportion.

Sprue is generally a most insidous disease. In the first place, it complicates many slow-going and fatal diseases of the tropics. It is not enough to say that a man has tuberculosis, or cancer, or dysentery, and not sprue. One must take a careful history of the digestive system. All of these and similar invading affections bring serious malnutrition, and malnutrition is usually the real basis for sprue; upon it is usually engrafted sprue. The very diet employed to cure dysentery may provoke sprue, so much so that some of the most violent discussions over this irritating disease have been founded on the theorem "Sprue is nothing but a form of dysentery." The din kept up for years until we found out what dysentery meant. In fact, the clamor is threatening to begin again with McCarrison's proof that a scurvy diet will produce the colonic lesions of dysentery without the slightest help from the bacteriologist. In the second place, "chronic indigestion", "chronic-entero-colitis", "diarrhea", etc., are terms loosely employed by many physicians to express all the way from a disfunction to a low-grade inflammation of the gastro-intestinal tract. Now, as we have seen, only about sixteen per cent of the cases of sprue begin acutely and ninety-nine chances out of a hundred, they are diagnosed otherwise. The rest begin, saving rare exception, with this very picture of chronic indigestion or chronic entero-colitis.

Thus the writer has come to much the same conclusion as Fairley and Mackie. In fifty per cent of these cases not clinically sprue, a typical *Monilia psilosis*, or some nearly related or atypical form thereof, has been found in the feces.

The writer has not presumed to draw a conclusion for the medical profession by diagnosing what is clinically a mere indigestion or diarrhea as sprue, simply because it was accompanied by *Monilia psilosis* in the feces. Fairley and Mackie have failed to state the exact condition of the digestive tract in fifty per cent of their cases clinically not sprue.

If sprue is an insidious disease usually beginning by gradually

failing digestion may we not suggest that some of these cases which present this clinical condition together with *Monilia psilosis* in the stools be classed as clinically unrecognizable cases of sprue? In short if the cause is not recognized and we do not accept this policy as to clinically unrecognizable cases how may we arrive at a diagnosis?

Sprue is not sudden or abrupt in its progress but to the contrary gains a stealthy and subtle headway upon the patient: So much so that a sprue patient may frequent the best medical centers of the North for months and not obtain a proper diagnosis of his case.

This does not prove that sprue is caused by *Monilia psilosis.* Favorable conditions offered by a diseased digestive system may offer a preferred medium for an entirely harmless saprophyte. But, as we have just seen, neither does the fact that half the patients suffering from other diseases that harbor the organism prove that *Monilia psilosis* is not a factor in producing the clinical picture that we recognize as sprue. If however, this organism is a proven pathogen elsewhere, such as in the tongue of thrush, the lung, the tonsils, the bone, the skin, we are apt to be guarded in stating that it is not related to sprue.

The second part of this paper is offered, merely as a suggestion that Monilia albicans, Monilia psilosis, Monilia Pinoyi, et al. may be one and the same yeast-budding fungus first described by Robin in 1853.

TABLE 1

SUCCINCT CLINICAL NOTES; CASES WITH TYPICAL MONILIA PSILOSIS

Case	Justifiable diagnosis	Remarks
1.....	Sprue, severe.....	Began at 3 years of age as acute entero-colitis; now 6 years old.
2.....	Sprue, mild	Sister has same disease. See case 192
3.....	Sprue, tongue.....	Has a typical and intermittent diarrhea; 2 years old
4.....	Sprue, cachexia	Severe gastric hemorrhage in course of disease. Died a year later. Severe anemia.
5.....	Sprue, severe.....	Mother has same disease. Began at 9 months of age with acute entero-colitis. Now two years old. Anemic.
6.....	Sprue, severe.....	Four years duration. Aunt died of same disease. Anemic. See case 186.
7.....	Sprue, moderate.....	Anemic.
8.....	Sprue, moderate.....	Duration 4 years.
9.....	Sprue, severe.....	Several of family had same disease. Duration 5 years.T
10.....	Sprue, cachexia.....	Duration 6 months. Extreme anemia.
11 N....	Sprue, cachexia.....	Extreme anemia; moniliasis of vagina. Died.
12 N....	Sprue, cachexia.....	Anemic. Six years duration. Sister-in-law has same disease. Died. See case 192.
13 N....	Sprue, severe.....	Anemia. Attacks like *petit mâl*. An atypical Monilia found which became typical M. psilosis after passage through guinea pigs. See case 158.
14 N....	Sprue, cachexia.....	Seven years duration. Died. An atypical Monilia found which became typical M. psilosis after passage though guinea pigs.
15.....	Sprue, cachexia.....	Fifteen years duration. Whole buccal cavity and lips raw. Thirty years old; weight 74 lbs. Anemic.
16.....	Sprue, cachexia.....	Began as an acute dysentery ten years ago. Anemic.
17.....	Sprue, moderate.....	Seven years old. Duration 4 years.
18.....	Chronic indigestion...	Three years duration: burning epigastrium, excess of intestinal gas and amall liver.
19.....	Sprue, cachexia.....	Anemic. Attacks of urticaria. Sick 3 years.
20.....	Sprue, severe.....	Acute case of two months standing. Began with sore tongue.
21.....	Sprue, severe.....	Sixteen years duration. See case 202.
22.....	Sprue, moderate.....	Four months duration. Began with pain over gallbladder, and fermentative diarrhea.
23.....	Sprue, or incomplete..	Duration one month. Sister of case 9. Sore tongue, burning epigastrium, excess intestinal gas and white stools but no icterus nor diarrhea. Anemia.
24.....	Sprue, severe.....	Began acutely with diarrhea and sore tongue 11 years ago. Uncle has same disease. See case 187.
25.....	Sprue, moderate.....	Son has same disease. Anemia. Four years duration.
26.....	Sprue, severe.....	Ten years duration. Incessant vomiting. Anemia. Began like an acute dysentery. Great ptoses abdominal viscera and emaciation.
27.....	Acute indigestion.....	One month duration. No diarrhea but sore tongue.
28.....	Sprue, cachexia.....	Nine months old. A violent entero-colitis after eating bread for the first time; fever at first. Tongue completely raw, stools white and frothy.
29.....	Sprue, severe.....	Began as acute entero-colitis at 2 years of age; is now 4 years old. Anemia.
30.....	Sprue, moderate.....	Began at 3 years of age with severe entero-colitis; now 6 years of age. Father died of sprue. Has moniliasis of vagina. Anemia.
31.....	Sprue, cachexia.....	Duration 6 years. Mother has same disease. Tongue only rarely sore. Anemia. Great emaciation.
32.....	Chronic indigestion...	No diarrhea nor sore tongue but burning in epigastrium and great excess of intestinal gas.
33.....	Adenoids.....	No signs of sprue.
34.....	Sprue, severe.....	Duration 9 months.
35.....	Healthy.....	No gastro-intestinal vagaries.
36.....	Chronic indigestion...	Burning in epigastrium and excessive intestinal gas. Only occasionally diarrhea. See case 210.
37.....	Pellagra.....	Typical case from St Thomas.
38.....	Sprue, cachexia.....	Severe anemia. Duration 8 months.
39 N....	Sprue, cachexia..... intestinal 4	Began acutely 8 months ago. Died.
40.....	Sprue, or incomplete..	Never had sore tongue. Much gas. Frequent attacks of white frothy diarrhea. Anemia. Emaciation. Sister has same disease.
41.....	Sprue, severe.....	Followed amebic dysentery contracted in St. Thomas five years ago. Anemia.
42.....	Sprue, severe.....	Acute case of one month duration. Is one and a half years old. Anemia
43.....	Sprue, moderate.....	Acute case developing one month after reaching Porto Rico form Santo Domingo.
44.....	Sprue, incomplete..... (or intestinal)	Has never had sore tongue but stools are typical. Anemia.
45.....	Sprue, moderate.....	Acute case in infancy.
46.....	Sprue, incomplete..... (or intestinal)	No tongue symptoms; diarrhea typical. Several cases of same disease in family.
47.....	.....	See case 62.
48.....	Sprue, mild.....	Generally constipation with periods of typical stools. Tongue typical Anemia. Mother and aunt have the same disease.
49.....	Sprue, mild.....	

N *—Signifies a resident of the temperate zone, i. e. Not native to the tropics.

TABLE 1—Continued

SUCCINCT CLINICAL NOTES; CASES WITH TYPICAL MONILIA PSILOSIS—Cont.

Case	Justifiable diagnosis	Remarks
50.....	Chronic indigestion...	
51.....	Psycasthenia.....	
52.....	Chronic indigestion...	See case 153.
53.....	Entero-colitis.....	Is two years old. Has geographic tongue.
54 N....	Sprue, incomplete.....	Six years residence here. Shortly after arrival began to digest food badly. Some loose fermented movements. Reculture case 180.
55.....	Sprue, moderate.....	Mother of case 48; has a sister with the same disease. Anemia. Indigestion for twenty years. Reculture case 207. Once had severe sprue.
56.....	Sprue, severe.....	Has had the disease since childhood.
57.....	Chronic indigestion...	
58.....	Sprue, mild.....	Frequent stomatitis but rarely typical stools.
59.....	Chlorosis.....	At times a typical diarrhea.
60.....	Sprue, mild.....	A mild relapse from a previous attack.
61.....	Orchitis.....	
62.....	Sprue, intestinal..... (or incomplete)	See case 47. Stools white but never diarrheal, now. Tongue typical. Anemia.
63.....	Sprue, mild.....	Has pituitary epilepsy coming on late in life.
64.....	Sprue, moderate.....	
65.....	.....	Clinical history suppressed as culture corresponding was lost.
66.....	Healthy.....	
67.....	Sprue, oncomplete.... (or intestinal)	Sister has the disease. Tongue always normal.
68.....	Sprue, severe.....	Duration one year. Severe anemia.
69.....	Chronic indigestion...	Diarrhea is chief symptom, alternating with constipation.
70 N....	Carbuncle.....	No indigestion.
71.....	Sprue, incomplete..... (or intestinal)	Has sore tongue and excess of intestinal gas but no diarrhea. Anemia.
72.....	Uncinariasis.....	
73.....	Sprue, severe.....	Six months old. Cases 77 and 89 are the mother and father. Began with vomiting and diarrhea at two months of age and soon developed a typical raw tongue.
74.....	Chronic entero-colitis.	
75.....	Sprue, severe.....	Aunt has same disease. Began in infancy with sore tongue and diarrhea and has continued same to date. Emaciated and anemic. Is 11 years old.
76.....	Sprue, moderate.....	Mother is case 43. Is 4 years old and has had the disease for 2 years.
77 N....	Sprue, incomplete.....	Mother of case 73. No stomatitis but typical diarrhea. Anemia and great emaciation.
78.....	Sprue, severe.....	This woman went into cachexia from a relapse and died of pernicious anemia as she was unwilling to sustain her diet in her attacks.
79.....	Sprue, moderate.....	Mother died of sprue.
80.....	Sprue, mild.....	Reculture case 231.
81.....	Sprue, cachexia.....	Son has same disease. Was diagnosed a case of gastric ulcer and operated upon. No ulcer found.
82.....	Chronic indigestion...	This is a sequela of sprue. All he has now is constipation with excess of gas and pruritus ani. Gives a perfectly clear history of severe sprue acquired in childhood and running up to four years ago. Reculture case 258.
83.....	Chronic indigestion...	Fermentative diarrhea but no sore tongue. Mother suffered from sore tongue.
85.....	Sprue, mild.....	Is 11 years old and has suffered from attacks of sore tongue and typical diarrhea at intervals since one year of age. Reculture case 246.
86.....	Catarrhal jaundice....	Has diarrhea.
84.....	P yca thenia.....	
87 N....	Sprue, severe.....	Duration 4 years. Anemic and emaciated.
88 N....	Sprue, mild.....	The tongue is not characteristic.
89.....	Sprue, mild.....	Acute; one month duration. Anemia. Father of case 73.
90.....	Sprue, tongue.....	Never had diarrhea. This exceptionally healthy looking man went about with only sore tongue for about five years and suddenly came down with a severe typical sprue from which he died in cachexia with a pernicious type of anemia. Reculture 222.
91.....	Sprue, cachexia.....	Three years duration.
92.....	Duration, since childhood.	
93.....	Sprue, severe.....	Two years old. Began seven months ago with acute entero-colitis. Since then typical sprue. Mother has the disease.
94.....	Sprue, moderate.....	Two months duration. Anemic.
95 N....	Sprue, cahexia.....	Four months duration. Severe anemia and rapid emaciation. Cured here and went North where he has had at least six serious relapses with a pernicious type of anemia.
96 N....	Sprue, moderate.....	
97.....	Sprue, cachexia.....	
98.....	Chronic indigestion...	Anemia. Weakness. Emaciation.
99.....	Chronic indigestion...	Emaciated, weak and anemic.
100.....	Appendicitis.....	Anemia, excess of intestinal gas, emaciated; at times light, foamy diarrhea.

N *—Signifies a resi dent of the temperate zone, i. e. Not native to the tropics.

TABLE 1—Continued

SUCCINCT CLINICAL NOTES; CASES WITH TYPICAL MONILIA PSILOSIS—Cont.

Case	Justifiable diagnosis	Remarks
101.....	Sprue, mild.....	Grandfather died of sprue; mother has same disease. Frequent bowels and soreness of tip and edges of tongue. Anemia.
102.....	Sprue, moderate.....	Attacks of character of petit mal coincident with development of sprue.
103.....	Diarrhea.....	Only symptom is diarrhea. Aunt has disease.
104.....	Sprue, moderate.....	Is 6 years old. Disease began a year ago. Brother has disease. Anemic. See case 194.
105.....	Chronic indigestion...	Underdeveloped.
106 N...	Sprue, severe.....	
107 N...	Sprue, severe.....	Anemia. Died of cancer of rectum.
108 N...	Intertrigo feet.....	
109.....	Sprue, mild.....	Sister has the same disease.
110.....	Sprue, cachexia.....	Very anemic.
111.....	Sprue, severe.....	Profound anemia. Father and sister have the disease.
112.....	Sprue, cachexia.....	Two and a half years old. Two years with sprue. Began with an acute entero-colitis.
113.....	Sprue, mild.....	Duration one year. Began suddenly with vomiting, diarrhea and and fever. Mother and father and four brothers died of same disease and one other brother now has it.
114.....	Sprue, cachexia.....	Profound anemia.
115.....	Sprue, mild	Two of her children had severe sprue in infancy and were patients of mine.
116.....	Lingua geographica	
117 N...	Sprue, moderate.....	Duration 2 years. Anemia.
118.....	Sprue, mild.....	
119.....	Sprue, tongue.....	Great excess of intestinal gas.
120.....	Sprue, tongue.....	No other symptoms.
121.....	Malaria.....	Has diarrhea only, in addition to usual symptoms of malaria.
122.....	Sprue, mild.....	
123.....	Sprue, mild.....	
124.....	Sprue, cachexia.....	
125.....	Malaria.....	No gastro-intestinal symptoms.
126.....	Chronic indigestion..	
127.....	Sprue, moderate.....	Clinical diagnosis made by another physician.
128.....	Sprue, moderate.....	
129.....	Sprue, severe.....	Duration six months; loss of weight 45 pounds. Father died of sprue. Has anemia and moniliasis of vulva and vagina.
130 N...	Sprue, evere.....	An old chronic case but tongue never very sore.
131.....	Sprue, moderate.....	Diagnosed by another physician; not seen by me.
132.....	Sprue, moderate.....	Mother-in-law taken ill after visit to her daughter-in-law.
133 N...	Sprue, mild.....	
134.....	Sprue, cachexia.....	Duration four years. Severe anemia. Died.
135.....	Sprue, cachexia.....	Duration four years. Died.
136.....	Sprue, severe.....	Duration five years. Sister had same disease.
137.....	Sprue, severe.....	Duration one and a half years. Age two years.
138.....	Nephric colic.....	
139.....	Sprue, cachexia.....	Died. See case 149.
140 N...	Sprue, severe.....	Recultures cases 141, 142, 143, 235, 236, 237. Wife of well-known mycologist; developed in the States after a visit here.
144 N...	Sprue, cachexia.....	Died.
145.....	Sprue, mild.....	Lived in house with case 30.
146.....	Gastric ulcer.....	Died. Diagnosis sustained at autopsy.
147.....	Pyscasthenia.....	
148.....	Sprue, cachexia.....	
149.....	.....	Same as case 139.
150.....	Chronic indigestion...	
151.....	Sprue, cachexia.....	Died, but of tuberculosis.
152.....	Sprue, cachexia.....	22 month sold. Sprue for last year.
153.....	.....	Same as case 52.
154 N...	Acute indigestion.....	Arrived from St. Thomas 4 months ago and immediately had diarrhea. Frequent vomiting. Asthenia. Effects of his indigestion have left him weak but has no diarrhea nor sore tongue.
155.....	Sprue, severe.....	Mother-inlaw has same disease.
156.....	Sprue, moderate.....	Is one and a half years old.
157.....	Sprue, moderate.....	Anemia.
158.....	.....	Same as case 13.
159.....	Sprue, moderate.....	Acute sprue; one month duration. Began abruptly with symptoms of dysentery with fever.
160.....	Acute indigestion.....	Severe diarrhea.
160.....	Acute indigestion.....	Severe diarrhea.
161.....	.....	Blank.
162.....	Sprue, moderate.....	
163 N...	Sprue, moderate.....	Duration one month; acute sprue.
164 N...	Sprue, severe.....	Duration two years. Daughter has disseae.
165.....	Pellagra.....	
166.....	Sprue, evere.....	
167.....	Sprue, moderate.....	Began as acute gastro-enteritis.

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TABLE 1—Continued

SUCCINCT CLINICAL NOTES; CASES WITH TYPICAL MONILIA PSILOSIS—Cont.

Case	Justifiable diagnosis	Remarks
168.....	Sprue, moderate.....	Anemia.
169.....	Chronic indigestion...	Anemia. Once had a severe case of sprue.
170.....	Chronic indigestion...	
171.....	Colotis.....	Stools contain large quantities of mucus and at times blood. No involvement of tongue.
172 N...	Sprue, evere.....	Anemia.
173 N...	Tuberculosis.....	
174 N...	Chronic indigestion...	
175.....	Acute laryngitis.....	
176.....	Salpingo-oophoritis...	
177.....	Sprue, moderate.....	Duration six months. Son has same disease.
178 N...	Chronic indigestion...	He developed sprue some years later.
179 N...	Sprue, cachexia.....	Duration one year and a half. Mother has disease.
180.....	.....	Re-admission of case 54. A persistent white, frothy diarrhea with excess of intestinal gas.
181.....	Sprue, mild.....	Anemia.
182 N...	Sprue, severe.....	Anemia.
183.....	Sprue, mild.....	He is convalescing from a severe attack of sprue. Age five and half. Mother has same disease.
184.....	Sprue, severe.....	Mother and sister have same disease. Anemia.
185.....	Sprue, severe.....	Her baby, and her brother and sister have the disease. Anemia.
186.....	.....	Same as case 6.
187.....	.....	Same as case 24.
188 N...	Psycasthenia.....	
189.....	Sprue, intestinal.....	Lived with a case of sprue. Never had sore tongue but persistence and character of diarrhea, great excess of intestinal gas, loss of weight and anemia warrant diagnosis.
190 N...	Chronic indigestion...	
191.....	Sprue, moderate.....	Anemia.
192.....	.....	Same as case 12.
193.....	.....	Same as case 2.
194.....	.....	Same as case 104
195.....	Chronic indigestion...	
196.....	Sprue, moderate.....	Four years old.
197.....	Chronic indigestion...	Anemia.
198.....	Chronic indigestion...	
199.....	Sprue, moderate.....	Anemia. Five children died of sprue.
200.....	.....	Same as 197.
201 N...	Sprue, moderate.....	Anemia.
202.....	.....	Same as case 21.
203.....	Chronic indigestion...	
204.....	Sprue, severe.....	Profound anemia.
205.....	Sprue, moderate.....	
206.....	Syphilis.....	
207.....	.....	Same as case 55.
208 N...	Sprue, severe.....	A self-diagnosed American physician who said that he contracted his disease in the Phillipines. Case not seen by the writer.
209.....	Sprue, mild.....	Anemia.
210.....	.....	Same as case 36.
211.....	Sprue, mild.....	Boy in charge of laboratory specimens from cases of sprue. Taken acutely ill.
212.....	Sprue, cachexia.....	Anemia and purpura. Duration one year.
213.....	.....	Same as case 182.
214.....	Sprue, moderate.....	Says that he never had sore tongue but has had aphthae. Mother died of the disease.
215.....	Sprue, severe.....	Anemia. Sister has the disease.
216.....	Sprue, severe.....	Anemia. Sister has the disease. Duration 4 years.
217.....	Sprue, severe.....	Baby ten months old. Duration od disease 4 months. Profound anemia. Began as acute entero-colitis.
218.....	Sprue, severe.....	Child two and half years old. Began as acute entero-colitis there months ago. Anemia.
219.....	Sprue, moderate.....	Has had disease for many years. Much sugar in urine and diabetes confirmed. From latter died.
220.....	Sprue, mild.....	Father has same disease.
221 N...	Pellagra.....	
222.....	.....	Same as case 90.
223.....	Sprue, severe.....	Anemia.
224.....	Acute indigestion.....	
225.....	Uncinariasis.....	
226 N...	Chronic indigestion...	
227.....	Chronic indigestion...	
228.....	Sprue, tongue.....	
229 N...	Sprue, severe.....	Daughter has disease.
230.....	Syphilis.....	
231.....	.....	Same as 80.
232 N...	Sprue, cachexia.....	Died.
233.....	Sprue, severe.....	Began seven months ago as a severe entero-colitis.

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TABLE 1—Continued

SUCCINCT CLINICAL NOTES; CASES WITH TYPICAL MONILIA PSILOSIS—Cont.

Case	Justifiable diagnosis	Remarks
234.....	Sprue, severe.....	
235.....	.....	Same as case 140.
236.....	.....	Same as case 140.
237.....	.....	Same as case 140.
238 N...	Sprue, cachexia.....	
239.....	Chronic indigestion...	
240 N...	Healthy.....	
241.....	Chronic indigestin....	
242.....	Psycasthenia.....	
243.....	Sprue, cachexia.....	
244 N...	Sprue, cachexia.....	Mother has the same disease. Died; Sister-in-law of case 12.
245.....	Dysentery.....	
246.....	.....	Same as case 85.
247.....	Chlorosis.....	
248.....	Sprue, tongue.....	
249 N...	Sprue, severe.....	Began acutely as an entero-colitis
250.....	Malnutrition.....	
251.....	Sprue, moderate.....	
252.....	Gastric dyspepsia.....	
253 N*..	Chronic indigestion...	
254 N*..	Malaria.....	
255 N*..	Catarrhal jaundice....	
256.....	Syphilis.....	
257.....	Sprue, mild.....	
258.....	.....	Same as case 82.
259.....	Psycasthenia.....	
260.....	Entero-colitis.....	
261 N*..	Sprue, severe.....	Mother died of sprue. Anemia.
262.....	Sprue, moderate.....	Anemia.
263.....	Sprue, cachexia.....	Severe anemia. Many of family died of sprue.
264 N*..	Chronic indigestion...	
265.....	Sprue, tongue.....	Her child has sprue.
266.....	Sprue, cachexia.....	Pernicious type of anemia. Died.

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TABLE 2

FERMENTATION REACTIONS, 1915-1917

CULTURES OF MONILIA PSILOSIS

GROSS APPEARANCE OF CULTURE AND MORPHOLOGY

MONILIA PSILOSIS VERSUS DISEASE

Case	Glucose			Levulose			Maltose			Saccharose			Galactose			Type Sab. slant.	Morphology	Disease
	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days			
1....	+	+3.3	6	+	+3.6	5	+	+6.9	6	−	+0.15	7	−	+1.5	14	A, faint green.	Typical.....	Sprue, severe
2....	+	+5.0	6	+	+3.8	5	+	+4.2	7	−	+0.5	7	−	+1.7	14	D, faint "	"	Sprue, mild
3....	+	+3.5	10	+	+3.7	7	+	+4.1	7	−	+0.15	7	−	+1.7	14	D, faint "	"	Sprue, tongue
4....	+	+5.0	6	+	+4.1	5	+	+4.7	7	−	+0.85	7	+	+1.8	14	D, faint "	"	Sprue cachexia
5....	+	+5.9	6	+	+3.2	5	+	+6.0	7	−	+0.05	7	−	+1.4	14	D, faint "	"	Sprue, severe
6....	+	+4.8	6	+	+4.2	8	+	+2.5	10	−	+0.05	7	−	+0.9	14	D, faint "	"	Sprue, severe
7....	+	+4.0	6	+	+4.6	5	+	+5.3	7	−	−0.05	7	−	+1.2	14	D, faint "	"	Sprue, moderate
8....	+	+6.3	6	+	+4.5	5	+	+5.5	7	−	+0.35	7	−	+1.9	14	D, faint "	"	Sprue, moderate
10....	+	+6.8	6	+	+5.0	5	+	+5.8	7	−	−0.35	7	−	+1.7	14	A, green.....	"	Sprue cachexia
11....	+	+5.1	6	+	+5.1	5	+	+5.7	7	−	+0.55	7	−	+1.5	14	D, faint "	"	Sprue cachexia
12....	+	+5.4	6	+	+4.0	5	+	+5.1	7	−	+0.15	7	−	+1.6	14	D, faint "	"	Sprue cachexia
15....	+	+4.5	3	+	+4.4	4	+	+5.4	3	+	+3.9	2	+	+2.8	14	C, green.....	"	Sprue cachexia
16....	+	+2.9	5	+	+2.8	4	+	+3.7	2	−	+6.0	20	−	+2.0	14	D, faint "	"	Sprue cachexia
17....	+	+3.4	4	+	+3.8	4	+	+1.1	1	−	+4.5	20	−	+1.9	14	H, very "	"	Sprue, moderate
20....	+	+3.4	3	+	+3.9	4	+	+5.0	3	+	+4.5	2	+	+3.6	2	A, cream.....	"	Sprue, severe
22....	+	+3.3	5	+	+4.1	5	+	+4.8	3	+	+4.7	12	−	+1.2	14	D, faint "	"	Sprue, moderate
23....	+	+3.4	5	+	+4.1	5	+	+3.7	3	+	+6.0	12	−	+0.6	14	D, faint "	"	Sprue, incomplete
24....	+	+2.9	5	+	+4.0	5	+	+4.9	3	−	+1.9	18	−	+1.1	14	D, faint "	"	Sprue, severe
25....	+	+3.4	5	+	+4.7	5	+	+4.2	3	−	+3.8	18	−	+0.8	14	D, faint "	"	Sprue, moderate
26....	+	+3.5	5	+	+4.0	6	+	+5.6	3	−	+4.2	18	−	+1.8	14	D, faint "	"	Sprue, severe
28....	+	+4.1	7	+	+3.5	4	+	+5.6	5	+	+4.1	2	+	+3.0	5	C, cream.....	"	Sprue cachexia
29....	+	+3.2	4	+	+3.4	5	+	+4.9	3	−	+4.3	18	−	+1.3	14	D, faint "	"	Sprue, severe
30....	+	+3.4	3	+	+3.3	3	+	+4.9	4	−	+3.3	20	−	+0.2	14	D, faint "	"	Sprue, moderate
31....	+	+5.3	4	+	+3.4	4	+	+4.2	3	+	+5.3	3	+	+2.1	5	B, faint "	"	Sprue cachexia
32....	+	+3.7	6	+	+3.2	5	+	+3.4	3	−	+2.6	15	−	+0.9	14	D, faint "	"	Chronic indigestion
34....	+	+4.3	3	+	+4.0	4	+	+5.1	2	+	+5.3	2	+	+3.1	3	B, cream.....	"	Sprue, severe
39....	+	+4.6	4	+	+4.1	4	+	+4.5	4	+	+4.0	4	+	+2.7	3	C, cream.....	"	Sprue cachexia
41....	+	+4.9	3	+	+4.4	4	+	+3.7	6	+	+4.0	3	+	+1.8	3	B, cream.....	"	Sprue, severe
42....	+	+3.4	3	+	+5.3	3	+	+4.0	4	+	+4.6	4	+	+3.2	3	C, faint "	"	Sprue, severe
43....	+	+3.5	4	+	+3.9	4	+	+3.7	4	+	+3.6	14	.....	.....	.....	D, faint "	"	Sprue, moderate
45....	+	+4.3	3	+	+2.7	4	+	+4.6	8	+	+3.7	4	+	+2.9	4	C, greenish....	"	Sprue, moderate
47....	+	+4.1	3	+	+3.8	3	+	+3.6	4	+	+3.8	3	.....	.....	.....	D, faint "	"	See case 62
48....	+	+3.9	4	+	+2.8	4	+	+3.9	4	−	−0.3	14	+	+1.4	14	D, faint "	"	Sprue, mild
49....	+	+4.7	3	+	+4.0	3	+	+3.7	4	−	+1.6	14	−	+1.1	14	D, faint "	"	Sprue, mild
50....	+	+2.9	4	+	+3.4	5	+	+3.5	4	+	+5.4	4	+	+0.8	3	D, faint "	"	Chronic indigestion
58....	+	+4.8	3	+	+4.1	15	+	+4.2	1	−	+0.3	17	.....	.....	.....	A, green.....	"	Sprue, mild
59....	+	+7.2	4	+	+1.7	12	+	+5.5	6	−	+1.0	17	−	+2.0	14	D, faint "	"	Chlorosis with diarrhea
60....	+	+2.8	7	+	+0.5	12	+	+4.8	6	−	+0.6	17	−	+2.5	14	D, faint "	"	Sprue, mild
62....	+	+3.7	5	+	+3.7	4	+	+3.3	6	−	−0.5	17	−	+0.8	14	F, faint "	"	Sprue, incomplete
63....	+	+3.7	4	+	+1.8	4	+	+6.7	6	+	+3.8	4	+	+1.1	14	C, faint "	"	Sprue, mild

64....	+	+3.5	10	+	+1.9	11	+	+6.6	6	—	+2.3	4	—	+1.5	14	F, faint	"	"	Sprue, moderate
67....	+	+3.4	4	+	+2.1	4	+	+7.9	6	+	+3.6	4	+	+2.5	14	C, cream	"	"	Sprue, incomplete
68....	+	+2.4	4	+	+1.7	4	+	+5.1	6	—	−0.2	17	—	+1.5	14	D, faint	"	"	Sprue, severe
69....	+	+4.3	4	+	+2.0	14	+	+5.5	6	—	−0.4	17	—	+1.0	15	A, faint	"	"	Chronic indigestion
73....	+	+2.25	4	+	+2.5	8	+	+5.2	6	+	+7.1	7	+	+2.2	14	E, cream	"	"	Sprue, severe
74....	+	+3.4	4	+	+4.1	4	+	+2.3	3	—	+0.2	14	—	+1.7	14	D, faint	"	"	Chronic enterocolitis
76....	+	+5.2	8	+	+2.0	12	+	+5.7	6	+	+0.5	8	—	+2.0	14	D, faint	"	"	Sprue, moderate
77....	+	+4.9	8	+	+2.8	12	+	+3.9	6	—	−0.2	16	—	+1.0	14	D, faint	"	"	Sprue, incomplete
78....	+	+3.6	8	+	+1.7	12	+	+5.9	6	—	+4.2	15	+	+1.7	14	F, faint	"	"	Sprue, severe
80....	+	+5.0	3	+	+4.8	3	+	+5.1	3	—	+2.3	14	.....	.....	15	D, faint	"	"	Sprue, mild
81....	+	+4.1	3	+	+4.1	3	+	+3.7	3	—	+0.7	14	—	+2.4	15	F, faint	"	"	Sprue cachexia
83....	+	+3.8	5	+	+4.4	3	+	+5.1	5	—	+0.1	14	—	+1.4	15	D, faint	"	"	Chronic indigestion
87....	+	+5.4	2	+	+2.7	2	+	+6.0	2	—	+0.4	16	.....	.....	.....	D, faint	"	"	Sprue, severe
89....	+	+4.2	3	+	+3.3	1	+	+3.1	2	+	+4.6	1	.....	.....	.....	A, green	.....	"	Sprue, mild
90....	+	+4.2	4	+	+4.1	4	+	+3.5	5	+	+3.7	15	—	+1.5	15	F, faint	"	"	Sprue, tongue
91....	+	+3.4	4	+	+5.5	8	+	+3.4	4	—	+4.1	15	—	+1.3	15	D, faint	"	"	Sprue cachexia
92....	+	+4.2	4	+	+4.2	4	+	+4.0	4	—	+1.6	15	—	+1.8	15	F, faint	"	"	Sprue cachexia
93....	+	+3.3	3	+	+3.8	3	+	+3.4	3	—	+4.7	15	—	+2.0	15	D, faint	"	"	Sprue, severe
94....	+	+6.4	2	+	+3.7	3	+	+3.2	2	+	+5.2	2	.....	.....	.....	D, faint	"	"	Sprue, moderate
95....	+	+4.9	2	+	+4.9	2	+	+6.7	15	+	+6.3	2	+	+2.4	15	D, faint	"	"	Sprue cachexia
96....	+	+3.3	3	+	+3.5	3	+	+3.2	4	—	+0.8	14	—	+1.6	15	C, faint	"	"	Sprue, moderate
97....	+	+3.6	5	+	+3.1	6	+	+4.1	5	—	+2.9	6	—	+1.2	15	D, faint	"	"	Sprue cachexia
99....	+	+5.0	2	+	+4.6	3	+	+4.0	4	+	+5.4	2	+	+4.2	15	C, faint	"	"	Chronic indigestion
100...	+	+4.0	3	+	+3.7	6	+	+3.7	3	—	+1.5	6	—	+2.1	15	F, faint	"	"	Appendicitis, chronic, with intermittent foamy Sprue, moderate
102...	+	+4.2	4	+	+3.2	3	+	+4.6	2	—	+2.7	6	—	+1.2	15	F, faint	"	"	
103...	+	+3.7	3	+	+3.4	3	+	+2.7	3	—	+0.7	6	—	+2.2	5	F, faint	"	"	Diarrhea
104...	+	+3.3	3	+	+3.9	7	+	+3.2	4	—	+0.5	6	+	+1.7	15	D, faint	"	"	See case 194
106...	+	+3.2	3	+	+4.7	7	+	+3.6	4	—	+0.8	6	—	+1.4	15	D, faint	"	"	Sprue, severe
107...	+	+3.2	3	+	+3.2	6	+	+3.7	4	—	+0.8	6	—	+1.3	15	C, cream	.....	"	Sprue, severe
109...	+	+3.9	4	+	+4.1	4	+	+4.0	4	—	+2.2	6	—	+1.2	15	D, faint	"	"	Sprue, mild
111...	+	+4.3	4	+	+4.1	3	+	+3.1	3	—	+1.6	16	+	+1.0	16	A, green	.....	"	Sprue, severe
112...	+	+4.0	3	+	+3.1	3	+	+3.6	3	—	+0.7	16	—	+1.5	15	D, faint	"	"	Sprue chexia
113...	+	+4.4	3	+	+5.3	2	+	+4.6	3	+	+4.8	12	+	+2.1	15	C, faint	"	"	Sprue, mild
114...	+	+3.5	4	+	+4.5	4	+	+5.0	4	.....	.....	.....	.....	.....	.....	D, faint	"	"	Sprue cachexia
119...	+	+3.5	4	+	+3.5	4	+	+3.5	7	—	+2.7	25	.....	.....	.....	D, faint	"	"	Sprue tongue
120...	+	+4.5	4	+	+3.0	4	+	+4.0	6	—	+1.1	25	.....	.....	.....	D, faint	"	"	Sprue tongue
124...	+	+3.5	4	+	+3.0	4	+	+6.5	5	—	+0.4	25	.....	.....	.....	A, faint	"	"	Sprue cachexia
128...	+	+4.0	6	+	+4.0	6	+	+5.0	6	—	+1.4	25	.....	.....	.....	A, faint	"	"	Sprue, moderate
129...	+	+4.0	4	+	+3.5	4	+	+5.0	8	+	+3.0	4	.....	.....	.....	C, faint	"	"	Sprue, severe
131...	+	+3.0	4	+	+3.5	4	+	+4.5	7	—	+0.7	25	.....	.....	.....	A, faint	"	"	Sprue, moderate
132...	+	+3.8	4	.....	.....	.....	+	+4.5	7	.....	.....	.....	.....	.....	.....	D, faint	"	"	Sprue, moderate
133...	+	+4.0	4	+	+3.5	4	+	+3.5	7	—	−0.2	25	.....	.....	.....	D, faint	"	"	Sprue, mild
134...	+	+4.5	4	+	+3.0	4	+	+5.8	8	—	+1.3	25	.....	.....	.....	G, faint	"	"	Sprue cachexia
135...	+	+7.5	4	+	+3.0	4	+	+4.0	7	—	+0.5	25	.....	.....	.....	D, faint	"	"	Sprue cachexia
136...	+	+3.5	4	+	+2.0	4	+	+4.5	6	—	+1.0	25	.....	.....	.....	D, faint	"	"	Sprue, severe
137...	+	+9.5	4	+	+8.0	4	+	+4.0	4	.....	.....	.....	.....	.....	.....	D, faint	"	"	Sprue, severe
139...	+	+4.0	4	+	+4.0	4	+	+4.0	6	—	+0.5	25	.....	.....	.....	D, faint	"	"	Sprue cachexia
142...	+	+3.5	4	+	+3.0	6	+	+5.0	6	—	+0.6	25	.....	.....	.....	D, faint	"	"	Sprue, severe
143...	+	+4.0	4	+	+3.0	4	+	+4.0	6	—	+0.6	25	.....	.....	.....	C, faint	"	"	See case 142
144...	+	+3.2	4	+	+3.0	2	+	+9.0	7	—	+0.3	13	.....	.....	.....	D, faint	"	"	Sprue cachexia

TABLE 2—Continued

FERMENTATION REACTIONS, 1915–1917

MONILIA PSILOSIS

GROSS APPEARANCE OF CULTIRE AND MORPHOLOGY

MONILIA PSILOSIS VERSUS DISEASE

Case	Glucose			Levulose			Maltose			Saccharose			Galactose			Type Sab. slant.	Morphology	Disease
	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days			
145...	+	+3.3	1	+	+2.8	1	+	+3.0	7	+	+3.0	7	.....	.....	.....	A, cream.....	Typical	Sprue, mild
149...	+	+3.0	14	+	+3.0	6	+	+6.0	7	−	+0.2	25	.....	.....	.....	D, faint green.	”	See case 139
151...	+	+3.0	4	+	+6.5	6	+	+3.5	7	−	−0.5	25	.....	.....	.....	D, cream.....	”	Sprue cachexia
152...	+	+3.5	4	+	+3.5	6	+	+5.1	6	+	+3.6	7	.....	.....	.....	A, faint ”	”	Sprue cachexia
154...	+	+0.3	2	+	+2.1	5	+	+4.0	4	−	+1.2	15	.....	.....	.....	D, faint ”	”	Acute indigestion
156...	+	+3.9	5	+	+4.1	6	+	+1.4	7	+	+4.7	3	.....	.....	.....	F, cream.....	”	Sprue, moderate
157...	+	+3.7	2	+	+3.2	3	+	+3.1	4	+	+2.3	4	.....	.....	.....	B, cream.....	”	Sprue, moderate
158...	+	+2.8	2	+	+1.8	4	+	+3.0	4	−	+0.3	15	.....	.....	.....	D, faint ”	”	Sprue, severe (see case 13)
159...	+	+4.2	3	+	+2.0	2	+	+1.4	4	+	+3.8	5	.....	.....	.....	D, faint ”	”	Sprue, moderate
162...	+	+3.3	8	+	+2.9	4	+	+1.8	5	−	−0.1	16	.....	.....	.....	D, faint ”	”	Sprue, moderate
163...	+	+2.7	2	+	+2.5	10	+	+4.3	8	−	+0.1	15	.....	.....	.....	D, faint ”	”	Sprue, moderate
164...	+	+3.3	2	+	+1.3	2	+	+3.0	7	−	−0.4	15	.....	.....	.....	D, faint ”	”	Sprue, severe
166...	+	+3.0	2	+	+1.9	2	+	+2.5	4	−	−0.2	15	.....	.....	.....	D, faint ”	”	Sprue, severe
168...	+	+3.2	4	+	+1.7	4	+	+4.7	4	+	+2.1	4	.....	.....	.....	D, faint ”	”	Sprue, moderate
169...	+	+2.5	3	+	+2.1	2	+	+3.3	1	+	+3.3	2	.....	.....	.....	C, faint ”	”	Chronic indigestion (previously had sprue)
172...	+	+1.7	2	+	+2.2	4	+	+5.1	5	.....	.....	.....	.....	.....	.....	A, cream.....	”	Sprue, severe
177...	+	+2.4	2	+	+3.3	3	+	+0.9	2	+	+3.4	1	.....	.....	.....	E, cream.....	”	Sprue, moderate
179...	+	+3.0	3	+	+4.2	2	+	+2.8	4	+	+2.1	1	.....	.....	.....	C, cream.....	”	Sprue cachexia
182...	+	+1.3	2	+	+2.3	2	+	+4.3	6	−	+1.7	16	.....	.....	.....	D, cream.....	”	Sprue, severe
183...	+	+3.7	2	+	+1.7	2	+	+2.2	4	−	+0.3	15	.....	.....	.....	D, faint ”	”	Sprue, mild
184...	+	+2.0	2	+	+3.7	3	+	+3.4	4	+	+2.1	3	.....	.....	.....	C, faint ”	”	Sprue, severe
185...	+	+2.0	2	+	+3.8	2	+	+2.9	4	+	+2.1	3	.....	.....	.....	C, cream.....	”	Sprue, severe
186...	+	+2.6	2	+	+2.2	2	+	+2.7	4	−	−0.2	14	.....	.....	.....	D, faint ”	”	Seee case 6
189...	+	+4.8	4	+	+2.5	2	+	+4.5	4	+	+5.1	4	.....	.....	.....	C, faint ”	”	Sprue, incomplete
191...	+	+3.5	5	+	+3.2	5	+	+5.1	7	−	+0.3	14	.....	.....	.....	D, faint ”	”	Sprue, moderate
192...	+	+4.1	2	+	+2.7	5	+	+2.9	4	−	−0.3	14	.....	.....	.....	D, faint ”	”	See case 12
193...	+	+3.9	2	+	+1.1	2	+	+2.1	4	−	−0.2	15	.....	.....	.....	C, faint ”	”	See case 2
194...	+	+3.5	5	+	+3.0	5	+	+3.1	4	−	+0.1	14	.....	.....	.....	D, faint ”	”	Sprue, moderate
196...	+	+5.3	5	+	+2.9	4	+	+2.3	5	−	+0.4	14	.....	.....	.....	C, faint ”	”	Sprue, modetare
197...	+	+2.2	1	+	+2.5	7	+	+3.9	4	+	+2.9	1	.....	.....	.....	C, faint ”	”	Chronic indigestion
199...	+	+1.5	2	+	+1.6	1	+	+2.8	4	+	+2.0	21	.....	.....	.....	D, faint ”	”	Sprue, moderate
201...	+	+1.5	2	+	+2.7	2	+	+3.0	4	−	+2.5	21	.....	.....	.....	D, faint ”	”	Sprue, moderate
204...	+	+4.1	2	+	+1.6	3	+	+3.6	5	−	−0.4	15	.....	.....	.....	D, faint ”	”	Sp.ue, severe
207...	+	+2.3	2	+	+2.0	2	+	+2.7	4	−	+0.9	21	.....	.....	.....	D, faint ”	”	Sprue moderate
209...	+	+3.5	4	+	+2.6	1	+	+4.3	1	+	+3.7	1	.....	.....	.....	A, cream.....	”	Sprue, mild
211...	+	+2.1	2	+	+2.2	1	+	+3.2	4	+	+2.2	3	.....	.....	.....	B, cream.....	”	Sprue, mild
212...	+	+2.2	2	+	+1.9	5	+	+2.8	4	−	+1.5	21	.....	.....	.....	A, green.....	”	Sprue cachexia
213...	+	+3.4	7	+	+2.0	4	+	+2.8	7	−	+0.1	21	.....	.....	.....	A, cream.....	”	See case 182
215...	+	+3.2	2	+	+1.8	4	+	+2.9	4	−	+1.1	20	.....	.....	.....	D, faint ”	”	Sprue, severe

216...	+	+3.3	1	+	+3.6	1	+	+4.1	1	+	+6.4	4	.....	.....	.....	A, cream.....	"	"	Sprue, severe
217...	+	+4.1	3	+	+4.9	3	+	+3.2	4	+	+3.0	4	.....	.....	.....	B, cream.....	"	"	Sprue, severe
218...	+	+3.4	5	+	+3.9	4	+	+2.6	4	−	+0.9	14	.....	.....	.....	D, faint "	"	"	Sprue, severe
219...	+	+3.0	1	+	+3.7	1	+	+2.9	1	+	+3.0	1	.....	.....	.....	A, cream.....	"	"	Sprue, moderate
220...	+	+4.3	7	+	+2.3	7	+	+0.7	7	−	+1.4	16	.....	.....	.....	A. cream.....	"	"	Sprue, mild
222...	+	+1.6	2	+	+2.7	2	+	+2.3	3	−	+0.9	16	.....	.....	.....	D, faint "	"	"	See case 90
223...	+	+2.6	6	+	+2.7	4	+	+4.0	4	−	+0.5	14	.....	.....	.....	D, faint "	"	"	Sprue, severe
228...	+	+2.1	7	+	+3.0	7	+	+0.8	7	−	+1.1	16	.....	.....	.....	A, cream.....	"	"	Sprue, tongue
229...	+	+3.5	4	+	+3.3	3	+	+2.4	4	−	+0.4	16	.....	.....	.....	D, faint "	"	"	Sprue, severe
231...	+	+2.3	2	+	+3.6	4	+	+2.9	4	−	+0.4	14	.....	.....	.....	D, faint "	"	"	See case 80
232...	+	+4.8	4	+	+2.7	4	+	+3.5	7	−	+0.5	14	.....	.....	.....	D, faint "	"	"	Sprue cachexia
233...	+	+4.1	5	+	+3.6	4	+	+1.9	4	+	+4.0	4	.....	.....	.....	C, faint "	"	"	Sprue, severe
237...	+	+4.2	4	+	+5.8	4	+	+4.3	4	−	+0.9	14	.....	.....	.....	D, faint "	"	"	See case 140
238...	+	+4.5	4	+	+6.1	5	+	+2.6	15	−	+0.4	14	.....	.....	.....	D, faint "	"	"	Sprue cachexia
240...	+	+4.0	5	+	+3.7	4	+	+2.9	7	−	+0.2	14	.....	.....	.....	D, cream.....	"	"	Healthy
243...	+	+3.6	4	+	+4.3	4	+	+3.2	7	−	+0.7	13	.....	.....	.....	D, faint "	"	"	Sprue cachexia
244...	+	+2.9	4	+	+3.5	5	+	+4.9	5	−	0.0	13	.....	.....	.....	D, faint "	"	"	Sprue cachexia
248...	+	+	.....	+	+1.3	6	+	+3.6	5	−	+0.5	16	.....	.....	.....	A, faint "	"	"	Sprue, tongue
249...	+	+2.8	4	+	+2.5	13	+	+4.5	7	+	+5.1	4	.....	.....	.....	B, faint "	"	"	Sprue, severe
261...	+	+3.7	2	+	+3.2	2	+	+5.5	4	.....	.....	.....	.....	.....	.....	D, faint "	"	"	Sprue, severe
264...	+	+3.5	4	+	+4.5	4	+	+3.0	4	−	+0.5	18	.....	.....	.....	A, faint "	"	"	Chronic indigestion
265...	+	+1.9	2	+	+3.8	2	+	+5.7	2	.....	.....	.....	.....	.....	.....	A, faint "	"	"	Sprue, tongue
266...	+	+1.4	4	+	+3.6	4	+	+5.2	5	−	+0.3	18	.....	.....	.....	A, faint "	"	"	Sprue cachexia

"G"=gas.

TABLE 3

FERMENTATION REACTIONS 1915–1917; ATYPICAL MONILIA PSILOSIS?

GROSS APPEARANCE OF CULTURE AND MORPHOLOGY; ATYPICAL MONILIA PSILOSIS (?) VERSUS DISEASE.

Case	Glucose			Levulose			Maltose			Saccharose			Galactose			Type, Sab. slant	Morphology	Disease
	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days			
.9....	+	+4.3	10	+	+4.9	15	—	+0.3	17	—	+0.1	7	..	.....	....	A, green.....	Typical yeasts and mycelium. Gelatin stab: short tufts.	Sprue, severe
13....	+	+4.2	9	+	+3.6	8	—	0.0	21	+	+3.1	7	..	.....	....	A, green.....	Yeasts small; mycelium scanty. Gelatin stab: No mycelial extension. Converted to M. p. by passage.	See case 158
14....	+	+4.4	7	+	+5.0	6	—	—0.3	21	+	+3.7	4	..	.....	....	F, green.....	Yeasts typical save in maltose where small; no my celium and none in stab. Converted to M. p. by passage.	Sprue cachexia
19....	+	+4.2	9	+	+5.0	11	—	—0.2	21	—	+4.2	20	..	.....	....	A, cream.....	Yeasts a. t. typical; a. t. small. Short, scanty mycelium. Gelatin: pine tree.	Sprue cachexia
27....	+	+2.7	5	+	+4.0	6	—	—0.1	21	—	+0.4	18	..	.....	....	A, faint green.	Yeasts small; mycelium scanty. Gelatin stab: pine tree.	Acute indigestion
36....	+	+3.1	4	+	+3.2	4	—	+0.4	16	—	+0.3	13	..	.....	....	B, cream.....	Yeasts small; mycelium scanty. Gelatin stab: no mycelium extension.	Chronic indigestion
53....	+	+3.7	5	+	+4.1	5	—	+0.3	14	—	+0.6	14	..	.....	....	G, cream.....	Yeasts small; mycelium abundant. Gelatin stab: pine tree.	Enterocolitis
55....	+	+4.3	4	+	+2.7	12	—	+2.1	16	—	+0.8	17	..	.....	....	G, cream.....	Yeasts small save in glucose; mycelium typical. Gelatin: pine tree.	See case 207
56....	+	+3.3	3	+	+2.0	15	—	+1.0	16	—	+2.5	17	..	.....	....	A, cream.....	Yeasts typical or small; mycelium typical. Gelatin stab: pine tree.	Sprue, severe
71....	+	+3.9	4	+	+3.9	4	—	+0.8	13	—	+3.0	14	..	.....	....	C, cream.....	Yeasts typical or small; mycelium scanty. Gelatin stab: short fuzzy tufts.	Sprue, incomplete
57....	+	+4.4	4	+	+1.6	12	—	0.0	17	—	—0.5	15	..	.....	....	F, light geern.	Yeasts small; mycelium scanty. Gelatin stab: pine tree.	Chronic indigestion
121...	+	+2.5	6	+	+4.0	7	—	+1.0	27	—	+1.3	25	..	.....	....	A, cream.....	Yeasts typical or small; scanty mycelium. Gelatin stab: pine tree.	Malaria with diarrhea
122...	+	+3.0	6	+	+4.0	6	—	+1.0	22	—	+0.8	25	..	.....	....	A, cream.....	Yeast typical or small; mycelium scanty. Gelatin: pine tree.	Sprue, mild
138...	—	+6.9	5	+	+8.5	6	—	+6.0	....	..	.....	....	..	.....	....	D, faint green.	Yeasts typical. Gelatin stab: pine tree.....	Nephric colic
147...	—	+4.6	13	+	+2.1	6	—	+5.3	16	+	+2.2	1	..	.....	....	A, cream.....	Yeasts typical or small; mycelium scanty. Gelatin stab: very short, heavy tufts.	Psycasthenia
150...	+	+7.2	3	+	+3.0	6	—	+3.4	5	+	+4.5	13	..	.....	....	D, faint green.	Yeasts typical; mycelium scanty. Gelatin stab: pine tree.	Chronic indigestion
155...	+	+2.5	1	+	+3.6	3	—	+7.4	13	—	+0.5	16	..	.....	....	C, cream.....	Yeasts typical save in maltose where small; mycelium same. Gelatin: short extension.	Sprue, severe
160...	—	+1.1	15	+	+3.4	7	+	+0.6	7	+	+1.7	14	..	.....	....	A, cream.....	Yeasts typical save in glucose where small; mycelium narrow. Gelatin: short extension.	Acute indigestion
171...	+	+2.6	5	+	+1.6	7	—	+0.7	20	—	—0.1	15	..	.....	....	A, cream.....	Yeasts typical but small; mycelium scanty. Gelatin stab: pine tree.	Colitis
174...	—	+1.4	15	—	+1.1	17	—	+2.1	17	—	—0.7	15	..	.....	....	A, cream.....	Yeasts typical but small; mycelium scanty. Gelatin stab: pine tree.	Chronic indigestion

180...	+	+2.9	4	+	+2.3	5	—	+1.2	4	+	+3.0	4	.....	.....	....	A, cream.....	Yeasts typical but small; mycelium scanty. Gelatin stab: pine tree.	Sprue, incomplete
190...	+	+4.1	6	+	+1.5	7	—	+0.8	17	—	+0.9	15	.....	.....	....	A, cream.....	Yeasts typical save in maltose where small; mycelium scanty. Gelatin stab: pine tree.	Chronic indigestion
198...	+	+2.5	4	+	+3.1	16	—	+0.7	17	—	+0.2	16	.....	.....	....	A, cream.....	Yeasts typical; mycelium scanty. Gelatin stab: pine-tree.	Chronic indigestion
200...	+	+1.3	3	+	+1.9	6	—	+0.8	17	—	+1.9	21	.....	.....	....	A, cream.....	Yeasts small; mycelium scanty. Gelatin stab: pine-tree.	See Case 197
202...	+	+3.0	4	+	+3.3	7	—	+0.2	16	—	+1.2	16	.....	.....	....	A, cream.....	Yeasts typical save in maltose where small; mycelium typical. Gelatin stab:short extension.	Sprue, severe
203...	+	+3.2	5	+	+2.1	4	—	+3.6	17	—	+0.5	14	.....	.....	....	A, cream.....	Yeast typical save in maltose and saccharose where small; mycelium scanty. Gelatin: no mycelial extension.	Chronic indigestion
221...	+	+3.0	4	+	+3.3	10	—	+0.8	14	—	+1.2	16	.....	.....	....	A, cream.....	Yeasts small; mycelium scanty. Gelatin stab: pine-tree.	Pellagra
230...	+	+2.5	4	+	+3.3	7	—	+0.6	14	—	+1.1	16	.....	.....	....	A, cream.....	Yeasts typical save in saccharose where small; scanty. Gelatin stab: pine-tree.	Syphilis
234...	+	+2.4	7	+	+1.8	4	—	+0.1	14	—	+0.1	14	.....	.....	....	A, cream.....	Yeasts typical save in maltose and saccharose where small. Gelatin stab: pine-tree.	Sprue, severe
239...	+	+1.5	5	+	+2.6	5	—	+0.4	18	—	+1.3	14	.....	.....	....	A, cream.....	Yeasts small; mycelium scanty. Gelatin stab: short mycelial extension.	Chronic indigestion
242...	+	+4.0	4	+	+2.4	5	—	+0.9	14	—	+1.1	13	.....	.....	....	A, cream.....	Yeasts small; mycelium scanty. Gelatin stab: pine-tree.	Psycasthenia
245...	+	+4.4	5	+	+2.7	6	—	+0.7	13	—	+0.6	13	.....	.....	....	A, cream.....	Yeasts typical a. t.; a. t. small; mycelium scanty. Gelatin stab: short extension.	Dysentery
246...	+	+0.1	7	+	+3.0	6	—	+0.3	13	—	+0.7	13	.....	.....	....	A, cream.....	Yeasts small; mycelium short and narrow. Gelatin stab: pine-tree.	Sprue, mild
247...	+	+2.0	5	+	+3.3	11	—	−0.3	15	—	+0.9	13	.....	.....	....	A, cream.....	Yeasts typical save in maltose where small; mycelium scanty. Gelatin stab: pine-tree.	Chlorosis
251...	+	+4.5	10	+	+2.6	2	—	+0.5	16	—	+1.0	16	.....	.....	....	D, faint green.	Yeasts typical save in maltose where small; mycelium scanty. Gelatin stab: pine-tree.	Sprue, mederate
253...	+	+1.6	6	+	+2.0	4	—	−0.2	16	—	+0.6	16	.....	.....	....	A, cream.....	Yeasts typical save in maltose where small; mycelium scanty. Gelatin: short extension.	Chronic indigestion
254...	+	+1.6	9	+	+1.6	7	—	+2.5	13	+	.....	5	.....	.....	....	C, faint green.	Yeasts small; mycelium scanty. Gelatin: no mycelium extension.	Malaria with diarrhea
255...	+	+4.4	2	+	+3.4	2	+	+4.4	4	+	+3.6	2	.....	.....	....	A, faint green.	Yeasts typical save in maltose where small; mycelium scanty. Gelatin: pine tree, in 2nd; no extension in 1st.	Catarrhal jaundice with diarrhea
	+	+3.3	8	+	+3.4	8	—	+1.2	15	—	+3.0	15						
257...	+	+2.4	13	—	+4.2	13	+	+3.4	6	—	+0.5	13	.....	.....	....	D, faint green.	Yeasts typical; mycelium scanty. Gelatin stab: pine-tree.	Sprue, mild
263...	+	+3.6	4	+	+6.0	4	—	0.0	18	—	−0.5	18	.....	.....	....	A, faint green.	Yeasts small; mycelium scanty. Gelatin stab: no mycelial extension.	Sprue cochexia

TABLE 3

FERMENTATION REACTIONS, 1915–1917

MONILIA PSILOSIS AND ATYPICAL MONILIA PSILOSIS (?) IN SAME FECAL SPECIMEN

GROSS APPEARANCE OF CULTURE AND MORPHOLOGY; MONILIA PSILOSIS VERSUS DISEASE

Case	Glucose			Levulose			Maltose			Saccharose			Galactose			Type, Sab. slant	Morphology	Disease
	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days	G	Change react.	Days			
169...	+	+2.5	3	+	+2.1	2	+	+3.3	1	+	+3.3	2	..	.....	....	C, faint green.	Typical	Chronic indigestion
	++	+2.5	2	+	+3.8	3	−	+1.2	14	−	+0.2	15	..	.....	....	A, cream.....	Typical or small; mycelium scanty	
	++	+1.7	7	+	+1.8	10	−	+0.9	14	−	+0.9	15	..	.....	....	A, cream.....	Typical or small; mycelium scanty	
182...	+	+1.3	2	+	+2.3	2	+	+4.3	6	−	+0.7	16	..	.....	....	D, cream.....	Typical	Sprue, severe
	−	+3.3	14	+	+2.9	7	+	+0.9	4	−	+1.1	16	..	.....	....	D, cream.....	Typical	
183...	+	+3.7	2	+	+1.7	2	+	+2.2	4	−	+0.3	15	..	.....	....	D, faint green.	Typical	Sprue, mild
	+	+3.2	4	+	+2.7	7	−	+3.5	14	−	+0.9	6	..	.....	....	C, faint green.	Typical	
185...	+	+2.0	2	+	+3.8	2	+	+2.9	4	+	+2.1	3	..	.....	....	C, cream.....	Typical	
	−	+4.7	16	−	+2.6	14	−	+2.6	14	−	−0.5	15	..	.....	....	A, cream.....	Yeasts small; mycelium scanty	Sprue, severe
187...	+	+3.5	2	+	+2.8	1	−	−1.2	14	−	0.0	14	..	.....	....	E, cream.....	Yeasts small; gelatin: no extension	
24....	+	+2.9	5	+	+4.0	5	+	+4.9	3	−	+1.9	18	−	+1.1	14	D, faint green.	Typical	Sprue, severe
	+	+4.0	3	+	+4.3	4	+	+6.5	3	+	+3.7	2	+	+3.0	5	C, green.....	Typical	
189...	+	+4.8	4	+	+2.5	2	+	+4.5	4	+	+5.1	4	..	.....	....	C, faint green.	Typical	Sprue, incomplete
	+	+3.9	2	+	+2.1	7	−	−0.4	17	−	+5.1	14	..	.....	....	C, faint green.	Yeasts small; mycelium scanty	
193...	+	+3.9	2	+	+1.1	2	+	+2.1	4	−	−0.2	15	..	.....	....	C, faint green.	Typical	Sprue, mild
	−	+0.3	17	−	+0.2	16	−	−0.4	17	−	−0.2	21	..	.....	....	B, cream.....	Yeasts small; mycelium scanty	
197...	+	+2.2	1	+	+2.5	7	+	+3.9	4	+	+2.9	1	..	.....	....	C, cream.....	Yeasts small; mycelium scanty	Chronic indigestion
	+	+2.5	7	+	+2.9	8	−	−0.3	14	−	+1.1	14	..	.....	....	A, cream.....	Yeasts small; mycelium scanty	
201...	+	+1.8	2	+	+2.2	3	+	+3.4	4	−	+2.3	17	..	.....	....	D, faint green.	Typical	Sprue, moderate
	+	+1.9	2	+	+3.9	2	−	+0.1	14	+	+1.8	2	..	.....	....	A, cream.....	Yeasts small; gelatin: no extension	
209...	+	+3.4	4	+	+2.6	1	+	+4.3	1	+	+3.7	1	..	.....	....	A, cream.....	Typical	Sprue, mild
	−	−0.1	16	−	−0.3	16	−	−0.5	16	−	+0.4	16	..	.....	....	A, cream.....	Yeasts small; gelatin: no extension	
215...	+	+3.2	2	+	+1.8	4	+	+2.9	4	−	+1.1	20	..	.....	....	D, faint green.	Typical	Sprue, severe
	+	+2.1	4	+	+1.7	4	−	+0.6	15	−	+1.3	17	..	.....	....	A, cream.....	Yeasts small; gelatin: short brush	
216...	+	+3.3	1	+	+3.6	1	+	+4.1	1	+	+6.4	4	..	.....	....	A, cream.....	Typical; yeasts small in saccharose	Sprue, severe
	+	+1.8	5	+	+2.4	1	−	+0.9	17	−	+0.7	21	..	.....	....	A, cream.....	Typical; yeasts small in saccharose	
219...	+	+3.0	1	+	+3.7	1	+	+2.9	1	+	+3.0	1	..	.....	....	A, cream.....	Typical; gelatin: short brush	Sprue, moderate
	+	+2.6	3	+	+3.5	3	−	+0.1	14	−	+1.1	16	..	.....	....	A, cream.....	Typical; mycelium scanty	
228...	+	+2.1	7	+	+3.0	7	+	+0.8	7	−	+1.1	16	..	.....	....	A, cream.....	Typical	Sprue, tongue
	−	+2.2	16	−	+1.4	16	−	−0.2	16	−	+1.9	16	..	.....	....	A, cream.....	Yeasts small	
233...	++	+4.1	5	+	+3.6	4	++	+1.9	4	−	+4.1	4	..	.....	....	C, faint green.	Typical	Sprue, severe
	++	+2.0	4	+	+2.9	4	++	+3.1	14	+	+2.6	4	..	.....	....	C, faint green.	Typical	
	++	+4.9	6	+	+1.4	2	−	+0.5	13	−	+1.0	13	..	.....	....	D, faint green.	Yeasts small; gelatin: short brush	
	++	+4.4	7	−	+1.2	13	−	+0.5	13	−	+0.8	13	..	.....	....	A, cream.....	Yeasts small; gelatin: scraggly hair	
236...	++	+4.2	4	+	+4.6	4	−	−0.3	14	−	−0.4	14	..	.....	....	A, cream.....	Yeasts small; gelatin: short brush	
237...	++	+4.2	4	+	+5.8	4	+	+4.8	4	−	+0.9	14	..	.....	....	D, faint green.	Typical	
140...	++	+3.5	4	+	+2.5	4	−	+1.0	22	−	−0.5	25	..	.....	....	B, cream.....	Yeasts small; gelatin: short bush	Sprue, severe
141...	++	+4.0	4	+	+4.0	4	−	+0.5	20	−	−0.7	25	..	.....	....	B, cream.....	Yeasts small; gelatin: no extension	
142...	++	+3.5	4	+	+3.0	6	++	+5.0	6	−	+0.6	25	..	.....	....	D, faint green.	Typical	
143...	+	+4.0	4	+	+3.0	4	++	+3.0	6	−	+0.6	25	..	.....	....	C, faint green.	Typical	

TABLE 4

CASES NEGATIVE FOR MONOLIA PSILOSIS;
FUNGI RECOVERED VERUS DISEASE

Case	Genus of fungus	Disease
18.....	Torulopsis.....	Chronic indigestion
33.....	Monilia (non-maltose-fermenting, small yeasts).....	Adenoids
35.....	Mycoderma.....	Healthy
37.....	Mycoderma.....	Pellag.a
38.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue cachexia
40.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, incomplete
44.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, incomplete
46.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, incomplete
51.....	Mycoderma.....	Psycasthenia
52.....	Saccharomyces.....	Chronic digigestion
61.....	Mycoderma.....	Orchitis
66.....	Mycoderma.....	Healthy
70.....	Red Torulopsis.....	Carbuncle
72.....	Mycoderma.....	Uncinariasis
75.....	Unclassified but one of the Blastosporales.....	Sprue, severe
79.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, moderate
82.....	Mycoderma.....	Chronic indigestion
84.....	Monilia (non-maltose-fermenting, small yeasts).....	Pycasthenia
86.....	Monilia (non-maltose-fermenting, small yeasts).....	Catarrhal jaundice
88.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, mild
98.....	Mycoderma.....	Chronic indigestion
101.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, mild
105.....	Monilia (non-maltose-fermenting, small yeasts).....	Chronic indigestion
108.....	Saccharomyces.....	Intertrigo, feet
110.....	Mycoderma.....	Sprue cachoxia
115.....	Monilia (non-maltose-fermenting, small yeasts.....	Sprue, mild
116.....	Mycoderma.....	Lingua geographica
117.....	Unclassified but a Monilia.....	Sprue, moderate
118.....	Monilia (non-maltose-fermenting, small yeasts.....	Sprue, mild
123.....	Unclassified but not a Monilia.....	Sprue, mild
125.....	Saccharomyces.....	Malaria
126.....	Saccharomyces.....	Chronic indigestion
127.....	Mycoderma.....	Sprue, moderate
130.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, severe
146.....	Mycoderma.....	Gastric ulcer
148.....	Monilia (non-maltose-fermenting, morph. typical).....	Sprue cachexia
153.....	Torulopsis.....	See case 52
165.....	Mycoderma.....	Pellagra
167.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, moderate
170.....	Monilia (non-maltose-fermenting, small yeasts).....	Chronic indigestion
173.....	Monilia (non-maltose-fermenting, small yeasts).....	Tuberculoiss, diarrhea
175.....	Myeoderma.....	Acute laryngitis
176.....	Torulopsis and Mycoderma.....	Salpingo-oophoritis
178.....	Mycoderma.....	Chronic indigestion
181.....	Monilia (non-maltose-fermenting, typical morph.).....	Sprue, mild
188.....	Red Torulopsis.....	Psycasthenia
195.....	Mycoderma.....	Chronic indigestion
205.....	Monilia (non-maltose-fermenting, small yeasts).....	Sprue, moderate
206.....	Torulopsis.....	Syphilis
208.....	Unclassified but not a Monilia.....	Sprue, severe
214.....	Torulopsis.....	Sprue, moderate
224.....	Torulopsis.....	Acute indigestion
225.....	Torulopsis.....	Uncinariasis
226.....	Monilia (non-maltose-fermenting; small yeasts).....	Chronic indigestion
227.....	Torulopsis.....	Chronic indigestion
241.....	Monilia (non-maltose-fermenting; nail stab in gelatin).....	Chronic indigestion
250.....	Mycoderma.....	Marasmus
252.....	Mycoderma.....	Gastric dyspepsia
256.....	Mycoderma.....	Syphilis
258.....	Torulopsis and Mycoderma.....	See case 82
259.....	Torulopsis.....	Psycasthenia
260.....	Monilia (non-maltose-fermenting; small yeasts).....	Entero-colitis
262.....	Mycoderma and Red Torulopsis.....	Sprue, mederate

NOTE:—In the 264 mycological cases (for although the number runs to 266 two cultures were lost), only 239 were clinical. This apparent disparity occurred because 20 cases were recultured, generally at a much later date than that of admission, and given a new mycological number. The following refer to the same case:

2 and 193	47 and 62	90 and 222
6 and 186	52 and153	101 and 194
12 and 192	54 and180	139 and 149
13 and 158	55 and 207	182 and 213
21 and 202	80 and 231	197 and 200
24 and 187	82 and 258	104 and 141, 142, 143, 235, 236 and 237
36 and 210	85 and 246	