

SYPHILIS OF THE STOMACH: A CLINICAL AND ROENTGENOLOGICAL STUDY, WITH A REPORT OF TWENTY-THREE CASES.*

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THE rarity of syphilis of the stomach is generally conceded, and it is largely on account of its rarity that the disease is of unusual interest. However, from my own observation and that of contemporaries it is safe to say that the condition has a greater incidence than is commonly supposed. Because of a more or less well-grounded skepticism, and because of the possibility of unfavorable criticism, the clinician is constrained to limit his reports to those cases in which the proof of the existence of the disease is most convincing. Objections to clinical diagnosis may be carried so far as to be unscientific. Evidence produced to support the specificity of the lesion in the absence of postmortem examination or microscopic study of resected tissue may be as logical and decisive as many other facts of medicine that are freely accepted.

The earlier literature of gastric syphilis has been thoroughly reviewed by recent contributors to the subject, the survey embracing the histopathological and gross anatomical descriptions and clinical classifications which constitute the basis of our present knowledge. For convenience, this literature may be divided into three periods, the first extending from the classical report of Chiari¹ in 1891 to the year 1905, the second, from 1905 to 1910, and the third, from 1910 to date. The literature of the first period deals largely with postmortem material. In that of the second period, though a number of cases are reported, the diagnosis rested largely on the history and antispecific treatment. During the third period serology and roentgenology proved useful agents in supplying the data necessary for diagnosis. In 1912, in a comprehensive review, Meyers² tabulated 58 cases, among which were included those reported by Birch-Hirschfeld, Fränkel, Dieulafoy, Fournier, Hemmeter, Flexner, Einhorn, Hayem, Rudnitzki and others. More recent articles dealing with the subject, and giving case reports, are those of Holitsch,³ Mills,⁴ McNeil,⁵ Myer,⁶ Morgan,⁷ Tuohy,⁸ Cronin,⁹ Brunner,¹⁰ Lensman,¹¹ Downes and Le Wald,¹² Brugsch and Schneider,¹³ Hausmann,¹⁴ Meuhlmann,¹⁵ Smithies,¹⁶ and Niles.¹⁷ To date, our own observations have included 23 cases, a number which seems sufficiently large to warrant certain conclusions.

SYMPTOMS AND DIAGNOSIS OF GASTRIC SYPHILIS. Syphilis of the stomach, as a rule, is a late manifestation of the disease both

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in the congenital and the acquired form, although in the former it may be present early in life. Briefly stated, the gross lesions are concerned chiefly with (1) the gumma in its various forms, and (2) diffuse syphilitic infiltration. It is generally conceded that the clinical picture as such may be much like that of non-specific gastric disease, but that usually the results obtained from therapy in the two conditions are different. Many clinicians suspect lues as the etiological factor in cases of atypical gastric disturbances that do not respond to ordinary dietetic and medical management, a suspicion very frequently justified. Heretofore no characteristic syndrome has been noted or suggested, largely because of lack of sufficient material and doubt as to whether the diagnosis of gastric syphilis was correct. In one instance, a circumscribed lesion, such as a gummatous infiltration of the pylorus, with cicatrization and resulting stenosis, may so closely simulate benign simple ulcer or even carcinomatous ulcer in all its clinical aspects as to defy differentiation. In another, owing to the presence of multiple lesions with their sequelæ or extensive involvement in one and the same organ, the symptoms presented may be so variable as to preclude proper clinical recognition or classification.

The diagnosis of syphilis of the internal organs is based usually on the past history with regard to the initial and secondary symptoms, on the demonstration of late syphilitic manifestations, Wassermann-Noguchi reactions, and the results of specific therapy. In gastro-intestinal cases the Wassermann test is the most helpful means of differentiating syphilitic ulcers, circumscribed or diffuse gummatous deposits, proliferative infiltrations and their sequelæ (cicatrices, ulceration and fibrous hyperplasia) from simple ulcers and other diseases of the stomach, particularly carcinoma. Often, however, the diagnosis of gastric syphilis is made accidentally. The absence of a history of syphilis, abortion, sterility, or a negative Wassermann reaction does not exclude the possibility of syphilis. Our own series of cases have taught us this fact plainly. On the other hand, while objective signs of active, latent, or obsolete syphilitic lesions elsewhere (in the bones, glands, skin, nasopharynx, aorta, special sense organs, stigmata) may suggest that the cause underlying the gastric disturbance is specific, such signs are usually absent or not apparent, except in cases of congenital syphilis. Of the greatest importance as indicating gastric syphilis is the combination of anacidity, subacidity, or achylia, with a syndrome approximating, but not exactly resembling, that of benign ulcer in some respects, and that of gastric carcinoma in others, and accompanied by roentgenological findings suggestive mainly of carcinoma. These factors in addition to a positive Wassermann reaction or a history of infection and other features to be mentioned later are strong presumptive evidence of gastric lues. However, the fallacy of concluding that a gastric lesion is necessarily luetic if

accompanied by a consistently positive Wassermann reaction must be avoided. The coexistence of syphilis with benign and malignant gastric disease having no obvious etiological relationship is not uncommon. On that account we have been obliged to discriminate closely in the presence of a positive Wassermann, excluding, as non-syphilitic, cases with a fairly regular syndrome, normal or increased acid values, in which the gross macroscopic appearance at the time of operation or the microscopic picture of the resected tissue was that of the usual chronic calloused gastric ulcer, and in which the improvement in gastric function was complete or satisfactory without antispecific treatment.

The criticism may be advanced that in making this distinction we have disregarded or overlooked the early uncomplicated syphilitic ulcer or circumscribed gumma, the former of which has been and is still regarded by many as the commonest form of gastric syphilis, and that, therefore, the material herewith presented represents only cases in which the disease was advanced. Such criticism is not justified by the facts to be presented herewith. The most accurate differentiation of early syphilitic gastric ulcer from non-syphilitic lesions of the stomach can be made only from the study of the symptomatology, gastric chemistry, serodiagnosis, gross pathology, roentgenology, and the results of specific therapy in both. Unfortunately our knowledge bearing on various problems of the subject is still incomplete because the cases reported have not been studied in all these phases. It may be said, however, that the role played by syphilis in the etiology of gastric ulcer is doubtful because of the following facts: (1) the rarity of cases in which the two are associated—only $\frac{1}{3}$ of 1 per cent. in our series of over 2500 operatively demonstrated cases of benign gastric and duodenal ulcer; (2) the results of Rosenow's¹⁸ research in regard to the streptococcal origin of gastric and duodenal ulcers; (3) lack of evidence to show that simple ulcer becomes gummatous in the presence of systemic or gastric syphilis, as stated by Brugsch and Schneider.

In view of our slowly increasing knowledge with respect to the pathology of visceral syphilis in general, and gastric syphilis in particular, there is some reasonable doubt as to the frequency of uncomplicated syphilitic ulcer; moreover, when this type of lesion presents itself, other factors are invariably associated which in our experience has not made the specific nature of the lesion difficult to establish in most instances. In accordance with the original view of Klebs, Fränkel and others we recognize as actually specific only those ulcers resulting from the degeneration of a gumma. Such have been reported in considerable number in the literature, yet only one was found in Chiari's postmortem material of 98 cases. There is, however, a considerable difference in the gross pathology of benign and gummatous ulcers that is quite apparent

to the experienced surgeon or pathologist on ordinary examination. The latter are invariably multiple, have a predilection for the cardia, the lesser curvature, and especially the pyloric portion of the stomach. Usually they are associated with perigastric adhesions, proliferative hyperplasia of the gastric walls and other sequelæ resulting in gastric deformity. To the clinician and roentgenologist these characteristics in conjunction with a markedly altered chemistry rather suggest carcinoma than benign ulcer callosum.

REVIEW OF CASES. The 23 cases that have come under my observation have been either operatively demonstrated or clinically observed, and therapeutically managed in the general surgical and medical divisions of the Mayo clinic during the last seven years. With one exception all were of the acquired type of gastric syphilis.

Clinical Consideration. Sex. In the 23 cases there were 17 males (74 per cent.) and 6 females (26 per cent.) or about 3 males to each female. This is almost the sex ratio of benign chronic gastric ulcer.

Age. The youngest patient in the series was twenty, the oldest fifty-seven years. More than two-thirds were below the age of forty. The average age of both males and females was thirty-five. It will be recalled that the average age of the patients having non-malignant ulcers was forty-three years and that of cancerous patients about fifty-four.

Etiology. The number of patients admitting luetic disease was 13, or a little more than one-half. Twelve (52 per cent.) admitted repeated gonorrheal infection; in 6 the blood serum had reacted positively. This appears to be of clinical significance. The number of patients without a history of lues but having positive Wassermann reactions was 9 (40 per cent.). Of the 23 cases 17 (74 per cent.), showed positive initial Wassermann reactions in the blood serum. Three of the operatively demonstrated cases in the earliest series antedated the use of the serological test, but responded definitely to the antispecific treatment. A provocative reaction was obtained in several instances. Of the 6 female patients, all of whom were married, the disease was admitted by 2, and a premarital infection was noted in 2 others. In the case of the remainder no history was obtainable, and it is most probable that they were infected after marriage. One before marriage had given birth prematurely to a syphilitic fetus. Four reported sterility, single or repeated spontaneous abortions and tendency to amenorrhea. All were childless except 1 and this one had had two miscarriages before the birth of a healthy child. Of the married male group, several reported that their wives had had miscarriages, 2 had healthy children, and the remainder were apparently sterile.

Time of Onset of Symptoms After Infection. Definite data bearing on this feature were obtainable in 16 cases. The earliest onset was 1 year, the latest 28 years, after the disease was con-

tracted. Only 3 gave evidence of the gastric malfunction attributed to the lesion present within the 5-year period, 6 between the 5 and 10-year period, and 7 between the 10 and 20-year period. The average was 11 years.

Duration of Symptoms. The shortest duration of the symptoms on admission was 7 months, the longest 7 years. Two-thirds fell within the 2-year period. The average duration was 3+ years. In striking contrast to this is the time-element in the benign ulcer group which so uniformly averages about $12\frac{1}{2}$ years. The significance of such a brief clinical course, in view of the extensive pathological changes and altered chemistry having such direct diagnostic and prognostic bearing will be referred to later.

Clinical Course. In 9 cases the course was continuous from the outset, beginning abruptly with pain and vomiting in 2 instances, definitely intermittent in 4; intermittent, remittent or irregular in the remainder, but becoming continuous in the latter group after an average of 10 months. A distinctly progressive course was characteristic in 20 cases (90 per cent.).

Significance of Clinical Symptoms. Pain. Almost invariably the pain was described as situated in the epigastrium or pit of the stomach; in 1 instance, however, it was felt in the left hypochondrium. Dorsal radiation was noted 4 times. In 9 instances (39 per cent.) the pain was characterized as a distress; in 6 (26 per cent.) as cramping or severe; and in the remainder as dull or gnawing. In three-fourths of the cases the pain ensued immediately after eating and its duration was variable. In 4 cases it was continuous and made worse by alimentation. Definite nocturnal pain was evident in 3 cases only. In the uncomplicated gummatous ulcer-type, the pain-features simulated those of benign ulcer, being intermittent, rather periodic and delayed in appearance after meals from 1 to 3 hours. It differed from benign gastric ulcer in that anacidity was present and the pain was either only slightly relieved or not relieved at all by food or alkalis. The scirrhus or infiltrated types were associated with pain immediately after eating, which continued until the stomach had emptied itself. Such patients, to avoid discomfort, ate semisolid or liquid foods frequently and in small amounts.

Nausea. Noted definitely in only 3 instances: transient in cases with retarded motility or stenosis or associated with acute seizures.

Vomiting. This second most important symptom was noted in 19 cases (83 per cent.), and in 10 was present from the outset. In 4 cases retained gastric contents were vomited although in lesser amount than in cases of benign obstruction.

Hematemesis and Melena. Recorded in only 1 instance: single hemorrhage by mouth of 1 liter of blood. In fairly authentic cases

reported in the literature, however, severe and even fatal hemorrhages have occurred.

Flatulency. Definite complaint in 65 per cent., and present mainly for a period of one hour after taking food.

Bowel Function. Marked constipation in 50 per cent.; moderate to normal in 30 per cent. Constipation alternating with diarrheal movements in the remainder, but the former predominating.

Appetite. Characterized as good in 60 per cent.; abnormal in 10 per cent. (owing to starvation); complete anorexia or "poor" in 15 per cent.

State of Nutrition. All the patients showed marked loss in weight, over 50 per cent. having lost between 50 to 75 pounds. However, the degree of cachexia and diminished strength was mild and out of proportion to the loss in weight. This condition is converse to that which usually obtains in gastric malignancy.

Blood Estimation. Of 14 patients examined the average hemoglobin percentage was 80, average red count, 4,640,000, average white 5400.

Results of Abdominal Examination. Definite tumor or mass was absent in 20 cases (90 per cent.) and present in 1 instance (4 per cent.). In 2 cases (9 per cent.) there was a suggestion of "ridge-feel," and in all, muscle-resistance with marked or moderate tenderness. Visible peristalsis was absent in the retention cases on brief observation. Several instances are on record in which palpable epigastric tumor possessing the physical characteristics and mobility of a tumor of the stomach were associated with a history of infection and positive Wassermann reaction. However, our own inability to definitely determine that this tumor had its origin in the stomach, by all the clinical and roentgenological methods at our disposal, made it necessary to eliminate these from our series, in spite of the fact that such tumors disappeared under salvarsan and other antiseptic therapy. Hausmann has pointed out that undoubtedly it has been often erroneously assumed without more definite proof that such tumors were gastric tumors; that gumma of the liver tied off by cicatrizing contraction, or diffuse syphilitic liver-tissue tied off by cicatrized gummatous tissue may simulate tumor of the stomach.

Significance of Gastric Analysis. All of the patients, with the exception of one, who refused the tube, underwent the test. The extract usually showed poor chymification, especially that of the anacid cases, and was below normal in amount. The mucus content was not remarkable.

The small amount of gastric extract recovered in most cases was explained by the pathological conditions present. The number of patients with achylia was 18, or 82 per cent. of those examined. Four had an average of 22 per cent. free hydrochloric acid; the

average total acidity was 36 per cent. In two of these cases, achlorhydria alternated with a low hydrochloric acid content. Hypersecretion was not noted even in the retention cases which numbered 6 (26 per cent.). Blood was found in the gastric extract in 25 per cent., and occult blood was present in the feces of 17 per cent. of those examined. Lactic acid and sarcines were noted in 2 of the retention cases; in one of these Oppler-Boas bacilli were demonstrated.

A consistent achlorhydria, in fact, achylia, seems almost exclusively characteristic of luetic gastric disease. Special study has been made of gastric chemistry in syphilis of the stomach by Barbier, Robin and others, but to date no definite conclusions have been reached, owing to the variable findings. In the majority of cases in which the diagnosis was verified by postmortem examination or through the study of resected specimens the gastric analyses reported by many competent observers showed absence of free and combined hydrochloric acid. The pathology ranged from circumscribed gummatous ulcers with or without stenosis to diffuse infiltrated and contracted types. On the other hand, fairly convincing case reports by recent contributors to the subject showed the presence of free acid in normal or subnormal amounts. It is reasonable to presume that the extent and the situation of the local involvement and the systemic influence of the syphilitic virus are factors determining the gastric chemistry. However, the preponderance of evidence favors marked reduction of the gastric secretion, either through inhibition of the function of the gastric glands or atrophy of the mucous membrane. This probably has its inception in a gastritis granularis which may be a manifestation of the secondary or tertiary stage, as the direct or indirect result of the infection. Virchow recognizes an acute syphilitic gastritis which appears in the form of inflammatory infiltration, reddening of the mucous membrane, swelling, etc., and which belongs to the secondary stage. Chiari has described a diffuse and gummatous gastritis as belonging to the congenital form. In gross gastric lesions the more or less diffuse gummatous infiltration of the submucosa which finally extends to the mucosa or the diffuse syphilitic infiltrated type would at an early period affect gastric secretion. An atrophic mucosa was characteristic of all our microscopic sections. Neugebauer recently made a study of the gastric contents of 200 syphilitic recruits. Sixty-two per cent. of them were in the secondary stage and all showed definite subacidity. In 17 per cent. there was complete absence of hydrochloric acid or mere traces. Brugsch and Schneider in a review of the gastric chemistry of 100 tertiary syphilitics conclude that the frequency of achylia in tertiary syphilis in all probability is due to a chronic gastritis, and that a benign gastric ulcer in the presence of systemic tertiary syphilis is

associated with diminished secretion of hydrochloric acid. The argument has been advanced that the absence or reduction of the hydrochloric acid and ferments occurs only in advanced cases; that it is due to the rapid emptying of the gastric contents and involvement of the fundic glands, especially in the high contracted or hour-glass types. This explanation does not suffice because the same findings are present in early uncomplicated cases. Moreover, the results of my observations on acid values in benign and even malignant hour-glass stomachs, in which similar mechanical conditions surely obtain, would further seem to controvert such assumption.¹⁹ Hausmann, who has made a critical study of 5 cases under his personal observation, regards anacidity as characteristic of syphilis. After reviewing 135 cases reported in the literature, he feels justified in considering as doubtful those cases with normal or increased secretion, and especially those incompletely studied. Patella,²⁰ in a review of the 140 cases of gastric syphilis he has found on record, states that the chemistry of gastric secretion was studied in only 11; in 9 of these there was anacidity, and achylia was noted in the cases especially examined. Clark,²¹ in one of the more recent contributions to the subject, emphasizes the importance of gastric achylia and absence of free hydrochloric acid.

SIGNIFICANCE OF PATHOLOGY. All the cases showed deformity of variable degree, usually quite marked, with a reduction in size and contour. This was primarily the result of multiple cicatrizing gummatous ulcers or of areas of proliferative infiltration, circumscribed or diffuse, in association with perigastric adhesions. The degree of involvement was invariably in direct ratio to the duration of infection and gastric disturbance. In 4 of the 10 surgically verified cases there was definite hour-glass deformity. One patient had a stricture at the cardia, at the mid portion and at the pylorus. In all the cases the pars pylorica was the most extensively involved, although in 5 instances the involvement extended up both curvatures to the esophageal opening. In addition there was marked thickening and stiffness of the walls. The roentgenograms of two others showed hour-glass contraction, the greater locus being above. In three instances, the ulceration and thickening seemed confined mostly to the posterior wall. In one of these cases the stomach was described as having a ruffled appearance due to the presence of multiple cicatrizing gummatous ulcers.

Grossly, there is no characteristic which readily enables the clinician to differentiate this form from some types of scirrhus carcinoma, linitis plastica, or sclerotic inflammation secondary to benign ulcer. Sailer²² has recently called attention to this fact. The final diagnosis often rests with the exploratory laparotomy or the postmortem. However, the latter two forms are quite rare.

Microscopically, the appearance of the tissue is unlike that of

benign ulcer or carcinoma. There is usually marked atrophy of the mucous membrane, hypertrophy of the submucosa, and a thickened muscularis owing to a dense connective-tissue infiltration or fibrous hyperplasia. It is quite evident from the microscopic sections that the alteration in structure and function of the gastric mucous membrane is caused partly by a disturbance in the blood supply. The bloodvessels are invariably obliterated; in addition there is a general contracture of the surrounding tissue, the result of marked fibrosis of the submucosa and muscularis (Figs. 3d, 7a, 7b and 7c). This thickening of the submucosa and muscularis somewhat simulates linitis plastica, but everywhere there is evidence of an obliterative endarteritis and perithelial lymphocytic infiltration which is the most characteristic feature of syphilitic tissue. Although the spirochetes have been demonstrated in congenital syphilitic tissues, we were unable to find them in these acquired cases.

Gross filling defects, mainly in the lower two-thirds, suggesting extensive disease or involvement were readily apparent in the other roentgenograms. The congenital case showed a small deformed stomach, the normal portion reduced to a sac at the cardia. To the roentgenologist, the combination of gross filling defect, tendency to hour-glass deformity, absence of palpable mass and six-hour barium residue, and the absence of a proportionate cachexia, suggest gastric syphilis. Technically, however, such findings cannot be differentiated from carcinoma.

The association of syphilitic lesions or their sequelæ in other parts of the body is added proof of the specific nature of the gastric lesion. In this respect, aortitis, aneurysm and gummata of the liver or hepar lobatum were noted in several instances. Lesions of the skin and mucocutaneous junctions, hyperplasia of the lymph nodes, tibial periostitis, degenerating gumma of the chest wall, and late gummatous meningitis, were also present in individual cases. Symmers,²³ in recent postmortem studies of 314 cases of late acquired syphilis, noted the frequency of interstitial orchitis and indurative atrophy of the base of the tongue. Such instances have not been recorded in this series.

RESULTS OF OPERATION AND TREATMENT. Of 10 patients operated on we were unable to get reports from 2. Three (13 per cent.) were cured and 5 (22 per cent.) were much improved. All these patients received antisyphilitic treatment in addition.

Of 13 patients not operated on, reports have been received to date from 12. Two (9 per cent.) are cured, 8 (35 per cent.), are much improved, and 2 are not improved. The total cured and improved number 16 (69 per cent.). This result exceeded expectations and is encouraging. Thorough treatment instituted during the exudative stages gives brilliant results. Advanced cases often require surgical interference because of stenosis or hour-glass deformity, the result of cicatrization or fibrous hyperplasia. If the involvement

is extensive, the result of even combined surgical and specific treatment may be disappointing. The desideratum is early diagnosis and intensive treatment.

SUMMARY AND CONCLUSIONS. 1. Syphilis of the stomach, though rare, is not as infrequent as is generally supposed. The aid of the Wassermann-Noguchi reaction and roentgen rays are necessary to establish the presence and the specificity of the lesion.

2. Denial of the disease, lack of evidence pointing to a primary lesion, or absence of positive Wassermann reaction does not exclude the possibility of gastric syphilis.

3. The diagnosis is based on a history of infection, a consistent positive Wassermann reaction, undisputable evidence of a gross gastric lesion, and—excluding cases showing irreparable extensive disease—a permanent cure by purely antisypilitic measures. The diagnosis is often accidental. The possibility of syphilis should be considered in every atypical case, or in those not responding to ordinary methods of medical management.

4. The symptomatology which is fairly characteristic of gastric syphilis in view of the cases reported herewith, is suggestive of benign gastric ulcer; the gastric chemistry and roentgen findings rather suggest carcinoma. The average age of patients with acquired syphilis of the stomach is about 35; the duration of the complaint averages 3 years. In most instances the condition is characterized by an initial intermittent course, followed soon by continuous symptoms and associated with epigastric pain of variable degree, felt shortly after taking food and not relieved by food or alkalis. From the outset there is a tendency toward emesis, a variable degree of flatulency, good appetite, infrequency of hemorrhage and palpable tumor, diffuse abdominal resistance, a progressive course, and marked loss in weight without cachexia.

5. Anacidity or achylia is characteristic of the majority, if not of all, cases of actual gastric syphilis. This can be explained by the influence of the pathological process upon the gastric mucous membrane.

6. Extensive gastric involvement is frequently present at the time when gastric disturbance first becomes manifest.

7. A gummatous ulcer, usually multiple, and especially a diffuse syphilitic infiltration with variable degree of contracture (fibrous hyperplasia), thickening, deformity, and perigastric adhesions chiefly involving the pyloric segment, is the usual pathological condition. Demonstration of the presence of *Spirocheta pallida* in the resected tissue would be final proof of specificity.

8. Results from antispecific treatment are encouraging in all but very advanced cases. Surgical interference is indicated in certain cases. Early diagnosis and intensive treatment invariably result in symptomatic cure and structural improvement.

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FIG. 1.—(108061) No retention from the six-hour barium motor meal. Hour-glass stomach. Roentgen diagnosis: Syphilis or ulcer of the stomach.

Male, aged 34 years. Genital chancre, skin and mucous membrane secondaries 20 years previously. Gonorrhea three times. Gonorrheal arthritis. Chronic urethritis. Moderate alcoholism. Gastric disturbances 2 years. Cramping epigastric pains promptly after meals. Nausea and vomiting. Appetite fair. Loss of weight, 51 pounds. Liver and spleen palpable. Wassermann 3 plus. Achylia. Intravenous salvarsan four times. Mercurial inunctions and iodids. Treatment was begun July, 1914. January 5, 1915, symptomatically cured with a gain of 60 pounds. February 2, 1915, Wassermann 3 plus.



FIG. 2.—(94691) No retention from the six-hour meal. Stomach small, showing high hour-glass constriction with marked narrowing and irregularity of the pars media and pars pylorica.

Male, aged 37 years. Syphilis 9 years previously. Gastric symptoms 3 years. Epigastric pain promptly after meals, lasting one hour or longer. Continuous complaint with brief periods of remission. Pyrosis, flatulency. Loss of weight, 35 pounds. Appetite good. Wassermann 3 plus. Hyperplasia of cervical glands, epigastric resistance and tenderness. Total acids 4, no free HCl. Intravenous neosalvarsan, six times. Markedly improved. Gain of 30 pounds.



FIG. 3a.—(92014) Retention of one-fourth the six-hour barium motor meal. High hour-glass constriction. Reflux of the meal into the esophagus.

Male, aged 33 years. Syphilis 7 years previously. Symptoms 3 years. Epigastric discomfort due to sense of fullness and heaviness immediately after meals. Generous meal induces pain; emesis necessary for relief. Liquid diet for past 2 years. Recent vomiting of retained food material. Wassermann, total inhibition. Achylia. Salvarsan and mercury caused symptomatic improvement, but moderate pyloric obstruction persisted. Operation advised and accepted.



FIG. 3b.—(92014) Resected gross specimen. Macroscopically, the resected pyloric portion of the stomach presents a smooth uniform mucosa with three small superficial erosions. Gross section shows marked thickening of submucosa and muscularis.

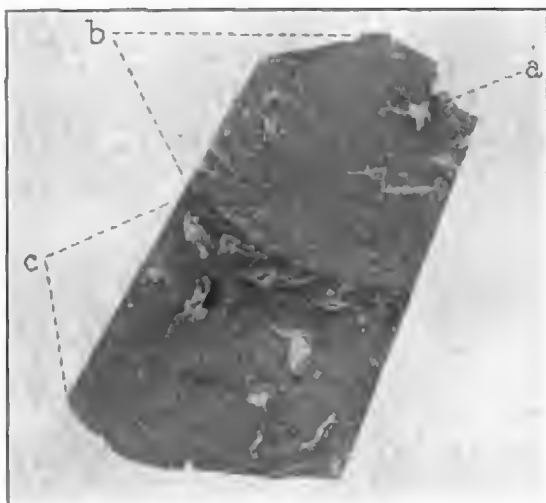


FIG. 3c.—(92014) Section of tissue from stomach magnified 4 times. *A*, atrophic mucosa, curling due to fixing solution; *B*, hypertrophied submucosa; *C*, thickened musculature.

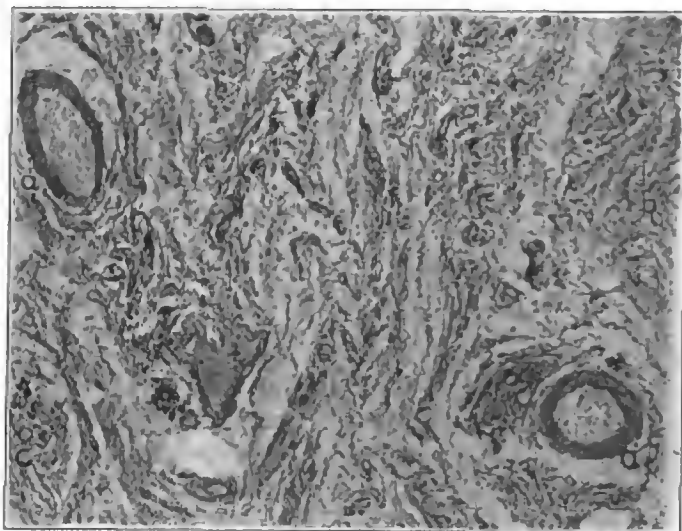


FIG. 3d.—(92014) Microphotographic section, magnified 100 times, of tissue from stomach. *A*, bloodvessels with thickened walls; *B*, dense connective tissue; *C*, nest of phagocytes. No evidence of cancer.



FIG. 4.—(145508) Stomach small, showing high hour-glass. Marked narrowing and irregularity of the pars media and pylorica. Pylorus gaping. No retention. Reflux of the meal into the esophagus.

Male, aged 25 years. Congenital syphilis. Exploratory operation on stomach 3 years previously. Gastric disturbances of 7 years' duration. Progressive course. Liquid or semisolid foods taken at frequent intervals. Regurgitation. Solid foods cause pain and emesis. Loss of weight 95 pounds. Numerous stigmata. Filtrate, 50 c.c.; achylia.



FIG. 5a.—(58949) Two views; First examination May 22, 1914. Roentgen examination negative.

Female, aged 27 years. Syphilis not admitted. Later it was learned that the husband was being treated for lues. Two miscarriages, one apparently healthy child. Gastric symptoms present $1\frac{1}{2}$ years. Dull, heavy epigastric distress immediately after meals, lasting 10 to 15 minutes. Two or three hours later, intermittent, sharp epigastric pains radiating through to back. Quantitative food distress. Occasional emesis; flatulency, anorexia, weakness, costiveness, loss of weight. No hemorrhages. Hyperplasia of cervical glands, degenerating gummata in the region of the fifth right costo-chondral and right sterno-clavicular articulations. Total inhibition hemolysis.



FIG. 5b.—(58949) Second examination August 31, 1914. No retention from the six-hour meal. Pylorus gaping. Narrowing of the pars media and cardiaca. Roentgen diagnosis: Lesion of the stomach.

Achylia. Wassermann persistently positive after repeated intravenous injections of salvarsan; but there was marked general improvement by November, 1915.

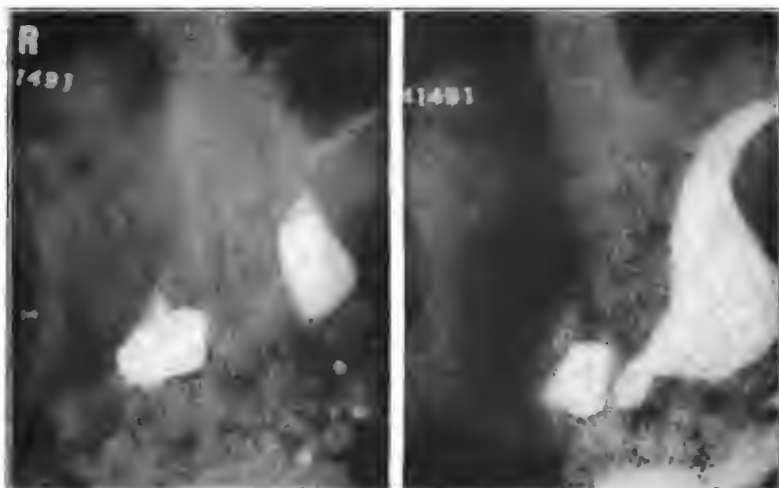


FIG. 6a.—(141491) Two views: September 11, 1915. No retention from the six-hour barium motor meal. Filling defect pyloric end of stomach with no corresponding palpable mass.

Female, aged 30 years. Married 3 years previously. Formerly a London barmaid. Genital chancre and oral mucous membrane secondaries about ten years previously. Two years later gave premature birth to viable syphilitic child. For one year weekly hypodermics of mercury salicylate and "pills" for two years. Gastric complaint of 8 months' duration prior to examination; epigastric discomfort soon after eating (eased by soda), even after partaking of a small meal. Gastric analysis by a local physician at outset showed absence of HCl. The acid prescribed disagreed and was voluntarily discontinued. Daily complaint. Appetite excellent. "I could eat all the time." Fresh fruits and soups seemed to agree. Chronically constipated; becoming worse. Ate small amounts frequently, but loss of weight was progressive; altogether 46 pounds. For the past month forced to vomit to relieve distress attributed to gas. Every third day regurgitation of small amounts of bitter-green fluid. Absence of diarrhea or unusual nocturnal pain (clinical signs of contracted stomach. Good color; hemoglobin 80 per cent. Epigastric resistance, but no palpable mass. Heart, lungs, etc., objectively negative. Wassermann reaction, total inhibition of hemolysis. Spinal fluid reacted negatively.

FIG. 6b.—(141491) Second roentgenogram taken November 27, 1915, shows marked improvement.

After the seventh intravenous salvarsan injection, and a three months' course of mercurial inunctions and potassium iodid, the reaction was strongly positive. Repeated gastric analysis showed persistent absence of free HCl; absence of peptic activity (Mettes' method) even after dilution of filtered gastric contents with $\frac{1}{2}$ normal HCl in proportion of 1 to 16. Average total acidity, 9. Symptomatically well after third intravenous salvarsan treatment. Treatment was begun September, 1915. Patient discharged as cured January, 1916. Gain of 35 pounds. Present health (May, 1916) excellent. Further antispecific treatment recommended.



FIG. 7a.—(68261) Multiple groups of lymphocytes and marked fibrosis of submucosa.

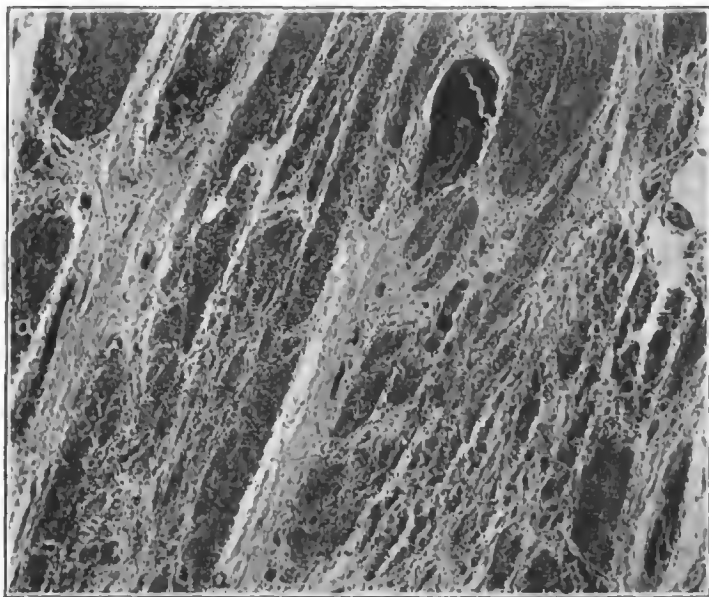


FIG. 7b.—(68261) (a) Marked fibrosis of gastric musculature.

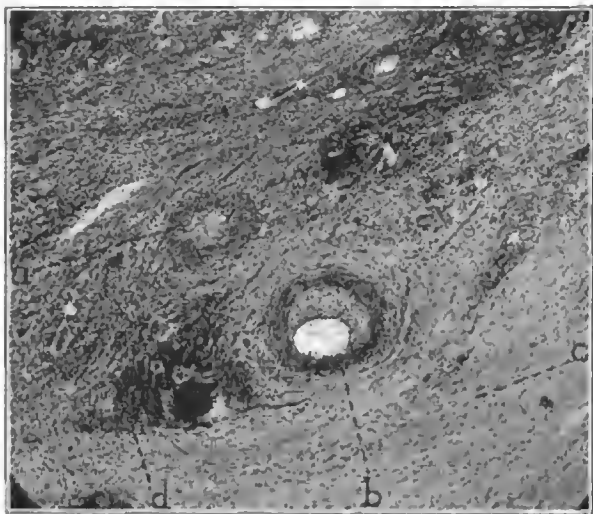


FIG. 7c.—(68261) (a) Obliterated bloodvessel; (b) partially obliterated bloodvessel; (c) fibrous tissue; (d) group of lymphocytes.

Male, aged 43 years. Lues 16 years' duration. Treated for 2 years. Gastric symptoms for 2 years and 3 months. At the outset at frequent intervals had "spells" lasting 3 or 4 days; left epigastric pain 15 to 20 minutes after meals lasting about a half hour. Trouble gradually progressive and daily pain becoming severe; also pyrosis and emesis. Acute pain seizures may last 2 to 6 hours. Absence of hyperacidity and stasis. Loss of 20 pounds in weight.

Upper abdominal resistance, tenderness in lower left epigastrium and no palpable mass. Anacidity. Preoperative diagnosis, carcinomatous gastric ulcer. On June 3, 1912, exploratory operation (W. J. Mayo): "Ulceration and thickening ($3 \times 3\frac{1}{2}$ cm.) on the posterior wall of the pyloric portion. Remainder of stomach above was small and hypertrophied. Syphilitic appearance." A partial resection was done. Wassermann reaction, after laparotomy, was strongly positive. Antisyphilitic treatment was given with marked improvement.