Association for the Relief and Control of Tuberculosis are doing an excellent work in this respect but they should not be expected to relieve the out-patient physician of his responsibility.

A STUDY OF THE GASTRIC CONTENTS IN TWENTY-ONE CASES OF TABES, IN THREE CASES DURING GASTRIC CRISES.*

BY M. P. SMITHWICK, M. D.

VARIOUS theories have been advanced to explain the production of gastric crises, in some the origin being central and in others peripheral. According to Sahli¹ the crisis or a good number of its phenomena are dependent upon hypersecretion with hyperacidity. Similar conclusions have been reached by other observers.² The acidity in reported cases seems to follow no fixed rule. Ewald,³ in 37 cases of gastric crises, found hyperacidity in 9, normal acidity in 9 and hyperacidity in 19. In one case during a crisis HCl was absent.

Following is a report of analysis of stomach contents in 21 cases of tabes. Three cases had gastric crises and in these analyses were made during attacks. The activity of secretory and motor functions in the different analyses is shown in tabular form. In estimating the amount of pepsin 25 cc. of filtered gastric contents was made normally acid with HCl and kept at 30° to 40° C. until it had digested .05 gm. of coagulated egg albumin. As most of these were cases in the neurological out-patient department of the Boston City Hospital, the unsatisfactory method of estimating the motor function by the amount of contents one hour after an Ewald test meal was resorted to. In every instance the the contents were removed through a stomach-tube with a very compressible bulb by siphonage compression and aspiration, no vomitus being included. After removal of contents successive measured amounts of water were introduced and measured on removal to determine the exact amount of contents.

W. J. G., male, forty-two years of age. Referred for examination by Dr. W. B. Bancroft, June, 1900. Well until two years before above date except for pneumonia in boyhood, grip six years ago and gonorrhea six times. Denies syphilis. 1896 had "rheumatic" pains in calves of legs one month. Exposed to venereal infection since fifteen years old. January, 1898, had severe epigastric pain with vomiting after supper of corned shoulder. Morphine was given by his physician. At first attacks would yield to $\frac{1}{4}$ gr. morphine subcutaneously and the interval was two weeks or longer. Now requires $\frac{1}{2}$ to $\frac{3}{4}$ gr. Food has no influence. Attacks usually come before breakfast, epigastric pain, nausea, vomiting. Never any food in vomitus of a morning attack. During month preceding my examination called the physician thirteen times for a subcutaneous injection. No digestive symptoms between crises except constipation.

* Contributed to the fifteenth series of Medical and Surgical Reports of the Boston City Hospital.

¹ H. Sahli Correspondenzb. f. Schweizer Aerzte, 1885.

² Maladies intrinsèques de la moelle épinière. Traité de Médecine. Tome IX, 1904.

³ P. Marie. Centralbl. f. d. gesamt. Therapie. Oct., 1904.

Examination.—Left pupil dilated, right small; neither react to light and both to distance. No paralysis ex. oc. muscles. No areas of anesthesia found. Knee jerks absent. No Romberg. Distinct circular scar on glans penis. (Patient has noticed it since his eighteenth year, but is ignorant of the cause.) Stomach gently inflated, is normally situated and extends to bottom of umbilicus showing moderate enlargement. No tumor felt before or after inflation. Physical examination otherwise negative.

First test, June 23, 1900.—No food since previous evening. At 5.45 A.M. gastric crisis began. At 7.20 A.M., while pain was intense, I gave $\frac{1}{4}$ gr. morphine subcutaneously and at 10 A.M., after cessation of pain, gave bread 30 gm., water 300 cc. One hour later removed 280 cc. brownish contents with odor of vinegar and rancid. Acid to litmus.

Free HCl absent. (Phloroglucin-Vanillin.)

Total acidity, .109%. (Phenolphthalein.)

Blood pigment, absent. (Webber. Müller.)

Combined HCl, absent. (Ewald-Sjovist.)

Acetic acid, recognized by odor.

Butyric acid, present.

Biuret, absent.

Lactic, intense reaction. (DeLong.)

Second test, July 9, 1900.—Had eaten freely of meat and vegetables for some days preceding this examination, the last meal being at 4.45 P.M., July 8. At 7 A.M., introduced and removed successively, several measured amounts of water, finding stomach practically empty. Washings were acid to litmus; no food macroscopically. Free HCl absent. (Phloroglucin-Vanillin and tropeolin.) Microscope showed occasional striated muscle fiber and connective tissue. No blood. Considerable squamous epithelium and frequently polynuclear leucocyte, and occasionally a salivary corpuscle. One hour after, bread 30 gm., water 300 cc., removed 30 cc., stomach not emptied completely. Contents acid to litmus.

Free HCl, present. (Phloroglucin-Vanillin) .05%. (Töpfer's reagent and tropeolin.)

Total acidity, .22%.

Filtrate, dextrin (IKI).

The patient died of pneumonia, in this hospital, Dec. 14, 1902, on the service of Dr. Henry Jackson, and the autopsy by Drs. Roberts and Southard confirmed the diagnosis of tabes. The autopsy records place the lower limit of the stomach 4 cm. below umbilicus, the wall rather thin but healthy, and contain the following description of the spinal cord: Envelopes normal. No increase of subdural fluid. On sections cervical and dorsal regions appear normal. The posterior columns of the lumbar region show small, irregular, grayish-white areas .5–1 mm. in diameter. Again, in places, small, darker areas are seen in each column, irregular in contour, about the size of the head of a pin. The dorsal horns appear set in from the lateral fissure and bend towards each other.

D. C. (history from patient and from his wife), seen Feb. 19, 1899, at Boston City Hospital in clinic of Dr. H. D. Arnold.

Syphilis, 1887. Internal treatment begun one year later and continued one year. Ptosis left upper eyelid, 1897, four months. Diplopia then and at times since. Also pain in left eye at times. Pain in knees occasionally; walks as well in dark as in light. Married, 1888. Three healthy children. First had rash at six months, while teething. Wife has not miscarried and is healthy. She says coitus averaged two or three times a night the first two years of married life. After that one or two times. The month before our examination, desire had apparently ceased.

Well, until October, 1895, when, during supper, severe pain began, referred to lower ribs and then to

epigastrium. Pain and vomiting lasted all night and for two weeks, except when morphia was given. After complete relief for six months, pain returned for one week and again after five months' relief. Pain is chiefly in epigastrium with chilly feelings and vomiting. May come several times daily. It often came immediately after eating, but might come at any time even after a day's fast. Has not ceased longer than two or three weeks at a time the past year. At times, pain will not yield to less than 2 gr. of morphia subcutaneously. No stomach trouble between crises.

We had reported that the analyses of gastric contents would not explain the attacks of pain before Dr. Arnold examined patient. Dr. Knapp confirmed his diagnosis of tabes.

First test. — (Some hours after a crisis relieved by morphia 1 gr. subcutaneously.) Ten A.M., Feb. 4, 1899. One hour after, bread, 1 oz.; water, 10 oz.; removed 12½ oz. contents of olive green color and slimy. Free HCl, .028%. Töpfer's reagent and tropeolin.

Combined HCl, .073%. Yeast increased. No blood or sarcinae.

Organic acids and acid salts, .014% fungus present; total acidity, .113%. Succinic acid present.

Twenty-five cc. of filtrate + gtt. iv dilute HCl + .05 gm. coag. egg albumin nearly digested in three hours at 37.5 C.

Second test. — Feb. 8 (some hours after crisis, relieved by two 1-gr. subcutaneous morphia) in morning. (No food since previous evening.) After removing from stomach 50 cc. slimy green fluid, gave bread, 30; water, 300, and in one hour removed 50 cc. contents showing following test: Free HCl (Phloroglucin-Vanillin, Töpfer's reagent, Tropeolin), .07%. Total acidity, .19%.

Third test. — No crisis for twenty-four hours, and no food for twelve hours. Emptied stomach and gave bread, 30; water, 300, and after one hour removed 30 cc. +. Free HCl (Phloroglucin-Vanillin and Töpfer's reagent), .09%. Total acidity, .20%.

Fourth test. — (Five hours after crisis.) Crisis at 7 A.M. relieved by morphia. Piece of bread and glass of water at noon, and removed two hours later. Amount 420 cc., faintly acid to litmus.

Free HCl absent. (Phloroglucin-Vanillin, Tropeolin and Töpfer's reagent gave yellow and congo-red paper gave no reaction.)

Biuret reaction, present.

Lactic acid, present. (Kelling and DeJong.)

Fifth test. — (During crisis.) Feb. 21. Before giving test-meal (Ewald), removed from stomach greenish fluid (fungus), acid to litmus. Free HCl absent. One hour after, bread, 30 gm.; water, 300 cc. Contents acid to litmus, showed:

Free HCl, absent. (Phloroglucin-Vanillin, Töpfer's reagent, tropeolin.)

Total acidity (Phenolphthalein), .07%.

Filtrate showed dextrose (IKI).

Biuret present. Succinic acid present.

Microscopic, no blood, no sarcinae.

Sixth test. — (Not during crisis.) Feb. 24. Amount contents one and one-half hours after, bread 30 gm., water 300 cc., 60 cc.

Free HCl (Phloroglucin-Vanillin, Töpfer's reagent, tropeolin), .058%.

Combined HCl (Alizarin), .043%.

Organic acids and acid salts, .050%.

Total acidity, .153%.

Seventh test. — (During crisis.) Feb. 26. At 4 A.M. emptied fasting stomach of 2½ oz. golden yellow fluid, and introduced measured amount of water and recovered the same. This fluid was acid to litmus. Free HCl absent. (Phloroglucin-Vanillin, Töpfer's

reagent, tropeolin.) No color with congo paper. Gave bread, 30 gm., water, 300 cc., and after one hour, during which the intense pain had continued, removed 6 oz. Acid to litmus.

Free HCl absent. (Phloroglucin-Vanillin, Töpfer's reagent, tropeolin.) No color with congo-red paper.

Biuret present.

Total acidity (phenolphthalein), .038%.

Filtrate gave achro-odextrin (IKI).

C. H. P., male, clerk. Thirty-two years of age at examination, November, 1898. Gonorrhea 1886. No history of syphilis. Since June, 1897, subject to severe, repeated attacks of painless nausea, and vomiting of one or several days' duration. The amount of vomitus was very large. Has been treated in several hospitals and by many physicians in this country and in Europe. Between attacks no digestive symptoms usually, except constipation. Bowels move every week-day, but patient considers them very sluggish. Says attacks always terminate when free catharsis is induced. Regulation of diet failed to prevent attacks, but regulation of bowels in this, and in one of the other two gastric crisis cases, seemed to act as a partial preventive. Treatment of the attacks was ineffective.

Examination. — Tall and poorly nourished. Pupils equal, react to distance, but scarcely at all to light. No nystagmus. Knee jerks present, but much diminished. No Romberg. No special ataxia. Tactile and painful sensation much diminished over an area to left of lower end of sternum. No bladder symptoms. No tremor or speech disturbance. Moderate ptosis or enlargement of stomach. Fecal masses in ascending colon. Urine normal. In March, 1899, this patient was referred to Dr. J. J. Thomas to determine if these attacks were tabetic crises, as I suspected. Dr. Thomas was inclined to consider it tabes.

Examination, November, 1905, showed pupils immobile to light, paralysis of right oculomotor nerve, absent patellar and achilles reflexes. Romberg. Gait ataxic and characteristic. Sexual desire and power nearly gone. No crisis since 1900. In March, 1899, Dr. Alexander Quackenboss found the fundi normal. One half dioptre of hypermetropic astigmatism in right eye, and one dioptre in left. Six degrees esophoria. Glasses did not influence attacks.

Examination. — Nov. 10, 1898. In morning, without food or drink since previous evening. One hour after, bread 30 gms.; water, 300 cc.; removed 35 cc.; contents not remarkable in appearance.

Free HCl (Phloroglucin-Vanillin), .12%.

Total acidity, .23%.

Examination, Dec. 15, 1898. — Patient had had anorexia three days and had a crisis nine days later. One and one-fourth hours after, bread, 30 gm.; water, 300 cc.; removed 120 cc. contents.

Free HCl (Töpfer's reagent and tropeolin), .12%.

Total acidity, .27%.

Microscopic examination of sediment showed no blood or anything abnormal.

Examination, Dec. 27. — (Third day of crisis.) Patient had been drinking water and vomiting three days. One and one-half hours after, bread, 30 gm.; water, 300 cc.; removed 415 cc.; rather slimy contents.

Free HCl (Phloroglucin-Vanillin), .029%.

Total acidity, .09%.

No blood or sarcinae in sediment.

CONCLUSIONS.

(1) In tabes gastric motor power and HCl and pepsin secretion are depressed more commonly than exalted.

(2) No degree of activity of these functions characterizes tabetics.

(3) In gastric crises of this series HCl secretion and motor power were more depressed than usual, and in the severe painful crises depression of acid secretion was extreme and continued for hours. In one case (C. H. P.) there was probably hypersecretion of gastric juice.

or is observed in the ordinary home treatment. Dr. Phillips made a plea for more climatological laboratories. They should be placed at sea level and on the elevated plateaus of the Rocky Mountains. Such institutions, established by philanthropically inclined citizens, would be of inestimable value.

	Hyperchlorhydria, .2 per cent +.	Euchlorhydria, .1 — .2 per cent.	Hypochlorhydria, — .1 per cent.	Anachlorhydria.	Pepsin normal, 3 $\frac{1}{4}$ hours or —.	Pepsin diminished, 3 $\frac{1}{4}$ hours +.	Hypermotility.	Normal motility, less than 75 cc.	Hypomotility, 75 cc. +.	Hyperacidity, total .30 per cent +.	Normal acidity, 2 — .3 per cent.	Hypacidity, total (less than .20 per cent).	Succinic acid.	Lactic acid.	Number of tests.
M. J.	2	...	...	...	1	1	...	1	1	2	...	...	1	...	2
C. A. E.	...	1	1	...	...	1	...	2	...	...	2	...	...	2	2
W. L.	...	...	2	2	1	...	...	1	...	...	2	...	...	...	2
L. H.	...	...	2	...	...	2	...	1	1	...	...	2	...	1	2
L. C.	...	2	...	...	...	2	...	...	2	...	2	...	1	...	2
S. J. W.	...	...	3	...	...	2	...	...	3	...	3	1	...	...	3
J. J. C.	...	...	1	...	1	...	...	...	1	...	...	...	...	...	1
G. F. C.	...	1	...	...	1	...	...	1	1	...	1	...	...	...	1
W. F.	1	1	...	...	...	2	...	1	...	...	2	...	...	...	2
W. H. S.	...	1	...	...	...	...	...	...	...	...	1	...	...	...	1
J. J. B.	...	2	1	...	...	1	...	...	...	...	3	...	...	...	2
M. R.	...	...	3	3	...	2	...	2	1	...	...	2	...	...	3
W. H. A.	...	...	2	...	...	1	...	1	...	...	1	1	...	...	2
A. D.	...	...	1	...	...	...	...	...	...	...	...	...	...	...	1
P. S.	...	1	...	...	...	...	...	1	...	...	1	...	1	...	1
G. L.	...	...	2	2	...	...	...	...	2	...	...	...	1	...	2
J. L.	...	...	2	...	...	...	...	...	...	...	...	2	2	...	2
W. J. G.	...	...	1	1	...	...	...	1	...	...	1	...	...	2	2
D. C.	...	...	7	...	1	...	...	4	3	...	1	4	7	...	7
C. H. P.	...	2	1	...	...	...	...	1	1	...	2	...	...	...	3
Mrs. M.	...	1	...	...	...	...	...	1	...	...	1	...	...	...	2
Totals.	3	12	29	8	5	14	...	19	16	2	23	12	13	5	45

Reports of Societies.

AMERICAN CLIMATOLOGICAL ASSOCIATION.

REPORT OF THE TWENTY-SECOND ANNUAL MEETING
OF THE AMERICAN CLIMATOLOGICAL ASSOCIATION
HELD AT DETROIT, MICH., JUNE 29, 30, 1905.

DR. W. F. R. PHILLIPS, in his presidential address, referred to the homage man pays to climate notwithstanding he can live at any latitude and endure an extraordinary range of cold and heat. Deprived of the provision that his intelligence gives him, man would be confined to narrow geographic regions and to still narrower climatic limits. The impress of climate can be traced in his art, architecture, literature, philosophy, religion and superstition. If climate impresses so profoundly man in health, why not equally so in disease? Dr. Phillips undertook to state the real position of climate in the therapeutics of tuberculosis. Empiricism is the foundation of knowledge, but scientific medicine is not satisfied with the best of empiricism. Definitions of climate were given. He showed that the sanatorium treatment must include climate, otherwise we exclude the air with its heat, its moisture, its motion, its pressure and the meteorological conditions which enforce themselves willingly or unwillingly upon all. The sanatorium treatment demands a life in the open atmosphere, more perfect in its details, more imperative in its implicit execution, than is enforced in any of the simple, so-called climatic health resorts

GEN. C. H. ALDEN, U. S. A., retired, presented a paper on

SOME SOUTHERN CALIFORNIA HEALTH RESORTS.

He reported the experience of eighteen months in Southern California. He agreed in the opinion of Otis that Southern California in the future will be visited not so exclusively by consumptives as heretofore, but by invalids from other causes, the aged and those simply wishing to escape a northern winter. With the exception of Idyllwild in the Strawberry Valley on San Jacinto Mountain, summer hotels in the mountains have not been developed in Southern California as they have been in eastern states. Resident Californians go chiefly to the seashore in summer, but it is too damp for many invalids. The interior towns are too hot in summer. The attitude of Southern Californians toward incoming tuberculous invalids has changed in recent years. Formerly such invalids brought in needed money and were welcome; now it is difficult for consumptives to obtain needed accommodations in hotels or boarding houses or by renting. The best resorts will not admit consumptives and so advertise. The residents of Southern California have a great burden thrown upon them in the care of a large number of destitute consumptives coming to their country and are meeting it generously. The Barlow Sanatorium at Los Angeles and the county hospitals are doing good work. The sanatoria at Monrovia, Loma Linda, Mentone and Altadena were referred to. Sanatorium treatment is the best for patients. The