bacteria, benign and pathogenic.* Pasteurization destroys the majority of virulent bacteria, it is true, but it also destroys the bacteriolytic trypsin; boiling is still more efficacious as a bactericidal agent, but it destroys both the trypsin and the adrenoxidase, thus annulling the immunizing properties of the milk.* Milk sterilized by either method, though seemingly capable of nourishing the infant, fails, therefore, to supply its blood with the antitoxin required to protect it adequately, and it is vulnerable to infection both in the respiratory tract and in the alimentary canal.*

Trypsin was found in cow's milk by Spolverini,[88] Nobécourt and Merklen[89] and others. Gillet[90] found cow's milk rich in oxidase (adrenoxidase), thus confirming the observations of other investigators. Indeed, the literature of the subject shows that young mammals are but prototypes of the infant in the protection afforded by the maternal milk. While Freudenreich[91] and others found, for instance, that cow's milk when fresh destroyed cholera, typhoid and other pathogenic bacteria, Metchnikoff, referring to the investigations of Ehrlich and Wassermann,[92] states that "earlier researches had shown that it was only when mice were very young that they could assimilate antitoxins from the alimentary canal, while adult mice acquired no immunity, the blood showing no increase of antitoxic activity." This clearly points to the need of antitoxin in the blood of young mice to increase its antitoxic activity.

Indeed, in the light of my views, it is probable that the ferments in maternal milk do more than protect the offspring against infection, *i.e.*, that they *actually take part in its cellular metabolism, its very vital process.* Thus, while Ehrlich in 1900 laid stress on the fact that human milk contained ferments which made it superior to all methods of artificial feeding, Moro[93] showed by careful experiments on infants that while they gained in weight constantly upon normal breast milk, when the latter was sterilized by heat, thus destroying the ferments, the increase in weight was almost imperceptible. The failure of Lunin's chemically perfect artificial milk—in which, however, the ferments were not taken into account—thus becomes self-evident. Referring to the fact that in Lunin's method of preparing this milk the unorganized ferments were destroyed, L'espérance[94] remarks, quite in keeping with the estimates of Jacobi: "This fact explains why sterilized milk and other sterilized foods have not fulfilled the general expectations of the scientific world."

Given now an infant fed on perfectly "sterilized, pasteurized, modified, cooled cow's milk," what have we at best? An organism vulnerable to infection not only by way of the *alimentary canal*, but *also by way of the lungs*. Hence the appalling mortality among infants not only from intestinal disorders, but also from pneumonia, bronchitis and other pulmonary diseases. Suggestive in this connection is the fact that, in a series of 237 cases reported by various observers and summarized

* *Author's conclusion.*
[88] Spolverini: *Loc. cit.*
[89] Nobécourt and Merklen: *Loc. cit.*
[90] Gillet: Jour. de physiol. et de pathol. gén., vol. iv, p. 439, 1902.
[91] Freudenreich: Bacter. World, Dec., 1891; Jan., 1892.
[92] Ehrlich and Wassermann: *Loc. cit.*
[93] Moro: Jahrb. f. Kinderheilk., Oct., 1902.
[94] L'espérance: Med. Record, Mar. 19, 1904.

by Holt,[95] and in which the bacillus dysenteriæ of Shiga was found, 26 were breast-fed—a condition which, as he says, practically excludes the possibility of infection through milk. The only other channel is the respiratory tract, the intestinal irritation being caused by the elimination of the bacillus through the intestinal mucosa.

Under these conditions the daily and continuous use of contaminated milk is not required to infect the infant, a *single day's milk* or even a *single feeding of milk* containing a few pathogenic bacteria suffices to do so, since its secretions, its blood and its lymph are unable to prevent their proliferation.* A single relaxation of vigilance on the part of the infant's attendant involving secondary contamination of the milk after sterilization, an error in reading the thermometer during Pasteurization, careless cleansing of the vessels or bottles, etc., may thus entail the pathogenic importance of an inoculation through the skin—where a minute quantity of infectious material may provoke general infection.* This is rendered possible by the fact that even milk drawn under the strictest antiseptic precautions contains over 300 bacteria per cubic centimeter; that ordinary fresh milk contains from 2000 to 40,000 bacteria in the same volume; and finally that the proportion of bacteria in the milk delivered in cities, especially during warm weather, ranges from 40,000 to 2,000,000 bacteria per cubic centimeter.

The proportions mentioned were obtained mainly from those published by Conn, in the bulletins of the Michigan State Agricultural College Experiment Station. The larger figures given may seem large, but they are probably below the average. Hamill,[96] for instance, states that "the number of bacteria sometimes found in ordinary market milks is almost incredible. As many as 100,000,000 per cubic centimeter have been found in the milk of Washington, D. C., and as many as 600,000,000 per cubic centimeter have been found in some milks in the city of New York. Of course," adds the author, "these figures are unusual, but a count of from 1,000,000 to 2,000,000 per cubic centimeter is not at all uncommon."

Among the pathogenic microörganisms that have been found in milk are streptococci, staphylococci, the bacilli coli and lactis aerogenes, and those which produce typhoid fever, diphtheria, glanders and tuberculosis. No special organism can be said to be the specific cause of infantile diarrhœa, but those most frequently found in the stools are the streptococcus, which occurs in the stomach, small and large intestine; the proteus vulgaris,

* *Author's conclusion.*
[95] Holt: Rockefeller Inst. for Med. Research, vol. ii, p. 185, 1904.
[96] Hamill: Proceed. Phila. Co. Med. Soc., vol. xxiv, p. 124, 1903.

found in severe cases, with putrid stools; the staphylococcus pyogenes; the bacillus pyocyaneus; the bacillus mesentericus; the bacillus enteridis, and finally a microörganism which has attracted considerable attention of late, the bacillus dysenteriæ of Shiga.

The presence of Shiga's dysentery bacillus in the stools of cases of summer diarrhœa, was pointed out by Celli and Valenti,[97] and confirmed by Duval and Bassett.[98] Flexner,[99] summarizing the results of observations in 412 cases studied bacteriologically by various investigators in four large cities, states that of this number 63.2 per cent. of all cases examined gave positive results. Holt[100] studied the clinical reports of 237 cases, and found the dysentery associated with every sort of intestinal disturbance accompanied by diarrhœa, with the notable exception of cholera infantum.

The lesions in the alimentary canal vary with the duration of the case. There may be slight gastritis with punctiform hæmorrhage. The upper portion of the intestine is rarely affected, the ileum, the ileo-cæcal valve and the colon bear the brunt of the morbid process. This may vary from hyperæmia to marked congestion, followed by ulceration of the enlarged follicles and Peyer's patches—the source of the typhoid symptoms witnessed. Bacilli are found both in the mucosa and submucosa and occasionally deeper. The two layers are sometimes involved in the necrotic process and become detached and voided in the stools as pseudo-membrane—a rare occurrence, as previously stated.

Treatment.—When infantile diarrhœa has developed, owing to any one of the morbid factors enumerated, the cardinal indication is to destroy the pathogenic elements both in the alimentary canal and in the blood. *Castor oil* has received the sanction of considerable experience, but it should be considered only as an eliminant. It starts the intestinal antitoxic process by increasing reflexly the secretory activity of the intestinal mucosa and a great step is made toward protecting the infant.* But this is inadequate to protect it properly.* Its adrenal system should be stimulated to unusual activity in order to increase the proportion of auto-antitoxin in its blood and intestinal juice.* *Calomel* is decidedly the best agent in this connection and should be begun as soon as the castor oil has produced its effect, $^1/_{20}$ grain (0.003 gm.) every half hour until 1 grain (0.065 gm.) has been given. If the stools have not resumed their normal color, it should be continued, avoiding, however, salivation, which indicates, as I have shown, that the proteolytic—and therefore bacteriolytic and antitoxic—properties of the blood have become excessive.* The *biniodide of mercury* is quite as effective.*

It is customary to combine the calomel with supposed antiseptics, such as resorcin, benzol-naphthol, etc., but they do more harm than good. It is a fallacy to believe that they act in the intestinal canal as they do in the laboratory. The alimentary canal being laden with adrenoxidase, these various drugs are broken up and their action is entirely modified.

I do not deem it necessary to submit evidence to the effect that castor oil and calomel are valuable in infantile diarrhœa. Reflecting only the prevailing knowledge as to their action, Blackader[101] writes: "For the evacuation of the intestinal tract two drugs especially commend themselves on account of their promptness and the very slight amount of irritation which they induce. These are castor oil and calomel." As to the biniodide of mercury, Luff[102] reported 80 cases, 72 of which were cured in two days as to the diarrhœa *per se*. He gave it in $^1/_{80}$-grain (0.0082 gm.) doses in a solution of potassium iodide. Illingworth has also reported excellent results.

To remove the exogenous pathogenic factor goes without saying. If the infant is hand-fed, the best curative food is the milk of a wet-nurse, which supplies its alimentary canal and its blood with the antitoxin it requires.* *Diphtheria antitoxin* suggests itself as an effective agent in this connection.*

The value of the homologue of maternal milk, that of a wet-nurse, under these conditions, is self-evident. The change for the better is almost magical. In one of my cases twenty-four hours of wet-nurse converted a very ill infant to one in normal health—aside from the temporary emaciation and weakness. I saved my only son by this measure after all others, carried out by a friend and colleague, had failed. I cannot find evidence to the effect that diphtheria antitoxin has been tried in such cases; that it must be valuable—in the light of my views at least—is apparent.

The loss of considerable serum in choleraic cases depletes the child's blood both of fluids and alkaline salts, and the osmotic and antitoxic properties of the body fluids and the migration of phagocytes to bacteria-laden areas are thus greatly compromised.* This should be counteracted by large *enema* of *saline solution* at not less than 102° F. (38.9° C.), daily, during the

* *Author's conclusion.*
[97] Celli and Valenti: Centralbl. f. Bakt., Bd. xxv, S. 481, 1899.
[98] Duval and Bassett: Amer. Medicine, Sept. 13, 1902.
[99] Flexner: Rockefeller Inst. for Med. Research, vol. ii, p. 121, 1904.
[100] Holt: *Loc. cit.*

* *Author's conclusion.*
[101] Blackader: Sajous's "Analyt. Cyclo. of Pract. Med.," vol. iv, p. 18, 1899.
[102] Luff: Brit. Med. Jour., Nov. 16, 1888.

period of serous discharge and once after its cessation. If the enema is at once voided with the stools, the solution should be given *subcutaneously,* 8 or 10 ounces (236 to 295 gm.) being injected very slowly.

Many clinicians wait until the stage of collapse before using the saline solution; this is supported by no sound reason whatever. It would be as wise to allow a man to starve until death is near before giving him food.

If after the stools are no longer foul, the serous flux persists notwithstanding all the foregoing measures, small doses of *morphine* are necessary to provoke contraction of the intestinal arterioles, the excessive dilation of which underlies the flow.

To obtain this result astringents are usually employed, but these agents arrest function by causing constriction of the capillary walls. The preparations of opium, on the other hand, influence precisely the torpid center and the arterioles it governs, namely, the sympathetic center.

During the first few hours of treatment, the diet should be limited to barley water; as soon as improvement occurs, however, an increase of food is required.* This may be met by boiling a very fresh egg until its yolk is so hard that it can readily be reduced to a flour-like powder.* This powder added to the barley water or to equal parts of barley water and boiled milk, or to any other liquid food that may be adaptable, increases greatly its value as a nutrient, and supplies the infant with all the constituents its organism requires for a prompt convalescence.* A change of air, especially if the infant can be taken to the seashore, hastens convalescence very greatly.

The convalescence is often protracted, owing to the fact that the food administered does not contain enough phosphorus to build up the myelin lost during the illness, and the entire nervous system is adynamic and stays so. As stated by Shoemaker,[103] yelk of egg (vitellus) "is highly nourishing, and, as it contains phosphorus, it is especially restorative to the nervous system."

ACUTE ENTERITIS.

Synonyms.—*Acute Diarrhœa; Simple Acute Catarrhal Enteritis; Acute Ileo-colitis; Acute Intestinal Catarrh.*

Definition.—Acute enteritis, a disorder characterized by diarrhœa, is due to a reflex reaction of the intestinal mucosa

* *Author's conclusion.*
[103] Shoemaker: "Materia Med. and Therap.," p. 918, 1906.

which has for its purpose to antagonize the harmful effects upon it of noxious substances contained in the ingesta, or in the substances which the mucosa itself eliminates.**

Symptoms.—The most prominent symptom of this condition is diarrhœa. The stools, which are at first fæcal, become yellowish or colorless, and finally watery and frothy, and occur with increasing frequency. Though offensive at first, they sometimes lose all odor. When examined microscopically, they are found to contain leucocytes, erythrocytes, broken-down columnar epithelium, various non-pathogenic bacteria, and the bacillus coli commune, food detritus and other substances which vary according to the segments of intestines involved. The salient symptoms are colicky pain, borborygmus, flatulence, some abdominal tenderness with gurgling on pressure, oliguria due to the loss of fluids, anorexia and sometimes slight fever.

Unless the diarrhœa be the forerunner of some graver condition, as is often the case during cholera epidemics, or the initial stage of chronic enteritis, the symptoms disappear gradually after the second or third day.

Pathogenesis and Pathology.—Enteritis is caused by any substance capable of irritating the intestinal mucous membrane. It represents, at first, a (vagal*) reflex increase of functional activity of the intestinal glandular and muscular elements by the irritant, having for its purpose the protection of the mucosa and the body at large. Intestinal juice containing autoantitoxin and mucus (the latter serving to protect mechanically the cellular elements of the mucosa), the former is produced in abundance, to disintegrate by cleavage the irritating substance and insure its elimination.*

The irritation of the intestines may be *exogenous,* i.e.,* caused by ingested materials, unripe fruit, fermented foods, an excess of food-stuffs, or foods containing a small quantity of leucomains (those containing a large quantity of leucomains, stale cream-puffs, ice-cream, cheese, etc., give rise to cholera morbus, in which the central nervous system is involved*), unripe fruit, impure drinking water, etc.; or *endogenous, i.e.,* produced by irritants originating in the body. Toxic wastes,

* *Author's conclusion.*
** *Author's definition.*

formed when the body is exposed to cold and damp or when the surface of the abdomen is suddenly chilled,* frequently cause enteritis. The temperature of the cellular trypsin being lowered, the cutaneous catabolic processes are inhibited, and as imperfectly broken-down wastes are poisonous, they irritate the intestinal canal while being eliminated through it.* The toxic substances of bacterial origin, of detritus, acids, etc., formed during typhoid fever and other febrile diseases, cancer, Bright's disease, tuberculosis, etc., produce enteritis by the same morbid action on the intestinal canal.*

Treatment.—In mild cases due to ingested irritants, a restricted diet, particularly if anorexia be present, usually suffices to insure early recovery, since the intestinal overactivity is thus to a great extent reserved for the disintegration and elimination of the offending substances. When a case presents any degree of severity, however, the auto-protective process should be aided by administering a purgative. *Magnesium citrate*, the entire bottle being taken in two doses, usually suffices for the purpose and materially reduces the duration of the diarrhœa. *Calomel*, in $^1/_4$ grain (0.016 gm.) doses for adults, every half hour until eight doses have been taken, is also very effective. By actively stimulating the adrenal center, it increases the activity of the pancreas, and therefore the antitoxic activity of the intestinal juice, while acting as a purgative.* Smaller doses are also efficacious, though *castor oil* is preferred by many clinicians.

After elimination of the irritant substances measures may be taken to arrest the diarrhœa. This may be done by giving small doses of *opium*, $^1/_2$ grain (0.03 gm.), to constrict the arterioles.* If there is any suspicion that the cause is not completely removed, *belladonna* is preferable, since it not only reduces the caliber of the arterioles, but enhances their propulsive activity, thus increasing the volume of arterial blood which circulates in the capillaries of the intestinal mucosa.* A granule of $^1/_{100}$ grain (0.00065 gm.) three times daily, then twice daily, suffices. If there is any degree of general adynamia, *thyroid gland* 1 grain (0.06 gm.) after each meal not only counteracts this condition, but while doing so, hastens resolution of any intestinal lesion that may be present.*

* *Author's conclusion.*

CHRONIC ENTERITIS.

SYNONYMS.—*Chronic Diarrhœa; Chronic Entero-colitis; Ulcerative Colitis; Mucous Colitis; Tropical Diarrhœa.*

Definition.—Chronic enteritis, a disorder characterized by persistent diarrhœa, is due to irritation of the intestinal mucous membrane by imperfectly digested food-stuffs, or by protozoa. The diarrhœa is the expression of a protective process having for its purpose the destruction and removal of the pathogenic substance or parasite.*

Symptoms.—When it does not occur as a result of acute enteritis, the chronic form comes on insidiously, the first indication being looseness of the bowels, occurring coincidently in most cases with gastric malaise. The movements gradually increase, however, both as to number daily, though they seldom exceed five, and as to quantity, and are apt to occur after rising in the morning or immediately after a meal. The first daily stool is usually fæcal, but the succeeding ones gradually become more liquid until they are watery, though yellowish-brown in most instances. The typical stools are clay-colored and usually contain considerable mucus, the terminal stool of the daily series being often entirely mucoid, sometimes streaked, in advanced cases, with blood. They are often described as "sago-like," the mucus being broken up into granules. At times they are bile-stained and brownish-yellow.

Microscopically, the stools are usually found to contain fragments of food, carbohydrates as well as proteids, in various stages of digestion, starch granules, fat globules, cholesterin plates, triple phosphate crystals, etc. Occasionally, especially in women, the mucus is discharged in the form of casts of various segments of the colon. Examination of the rectum in advanced cases reveals marked local congestion and areas of ulceration, the whole being coated with mucus. In the proximity of the anus the mucous membrane is usually found thickened and excoriated, owing to constant contact with abnormal excrementitious products. The sphincter being extremely irritable, tenesmus is often complained of—a cause in some cases of constipation, followed sooner or later by a copious discharge. Pain is sometimes complained of, but it amounts seldom to

* *Author's definition.*

more than slight colic. Tenesmus and flatulence are prominent features. Another salient symptom in some cases is a voracious appetite, though the patient is usually asthenic, even his temperature being sometimes below normal.

In tropical countries especially, including the Philippines, various protozoa, the balantidium coli in particular, may cause obstinate diarrhœa. The stools are generally bloody and contain the organism, while the blood of the general circulation is found to contain an unusual number of eosinophile leucocytes.

Pathogenesis and Pathology.—Chronic catarrhal enteritis may be due to the presence in the intestinal canal of foodstuffs (both proteids and carbohydrates) that have been imperfectly hydrolized to peptones and proteoses in the stomach, and which therefore act as irritants. Any disease of the stomach in which the digestive process is sufficiently impaired may thus give rise to this form of enteritis, also termed "lienteric diarrhœa." The imperfectly digested foods, owing to their irritating nature, stimulate reflexly the intestine to increased activity,* secretory and peristaltic, to such a degree that in the majority of cases the bowels are evacuated immediately after a meal, the stools containing considerable undigested material.

In another class of cases, the digestive process is inadequate in the intestine as well as in the stomach, the secretion of pepsin and trypsin being markedly reduced, and the gastric motricity and intestinal peristalsis likewise. Dilation of the stomach and enteroptosis are sometimes observed in these cases, owing to muscular relaxation, and the diarrhœa often tends to alternate with periods of constipation. This form is primarily due to conditions which markedly debilitate the adrenal system.* These include exhausting diseases such as tuberculosis, malaria, anæmia, syphilis, and influenza; conditions which overtax the muscular system, such as long marches with heavy accoutrements and other causes of fatigue; insufficient or indigestible food; dirt-eating, etc. The excessive heat of tropical countries also predisposes to chronic catarrhal enteritis, *i.e.*, tropical diarrhœa, the debilitating influence being the loss of reflex excitation of the central nervous system which cold insures by exciting the cutaneous sensory organs.*

* *Author's conclusion.*

Various protozoa may provoke persistent chronic diarrhœa by causing ulcerative enteritis. Prominent among these is the balantidium coli of Malmsten (1846) which penetrates the mucosa and submucosa, and by multiplying rapidly, brings about organic changes that may cause death in a few months. It is ingested by drinking water infected with the balantidium of pigs, in which it is common. The amœba coli, one of the causes of tropical dysentery, and the strongyloides intestinalis of Havay (1876) may also cause obstinate diarrhœa by giving rise to ulcerative enteritis.

That chronic diarrhœa may be of dyspeptic origin is now generally recognized, thanks to the labors of Ewald, Nothnagel, Rosenbach, Penzoldt, Einhorn and others. The same may be said of the asthenic form. As stated by Allen A. Jones,[104] "in the gastric affection named by Einhorn 'Achylia Gastrica,' there exists a suspension of the secretions of the stomach, in some cases as the result of atrophy of the gastric glandules, in others as the result of a nervous disturbance of secretion. It is probable that all cases of this affection do not arise from glandular atrophy. For some years Stockton has maintained that the disorder often begins, and may continue, as a neurosis, and he has found a special form of ocular refractive error associated with it. In writing upon 'Gastric Anacidity' some years ago," adds the author, "I also emphasized the suggestion that some cases perhaps commence as a neurosis and may go on to subsequent organic disease and atrophic changes." He considers as results of such a condition, a precipitate expulsion of food with irritation or overwork of the intestine, caused by the toxic substances developed and more or less severe inflammation of the intestine. That the adrenal center is primarily affected is shown by the nature of the diseases which give rise to it, *i.e.*, "chronic exhausting diseases," as Tyson[105] characterizes them.

That the balantidium coli may also produce lesions other than those found in the colon, may be illustrated by a case reported by Strong and Musgrave,[106] in which the jejunum and ileum were both hyperæmic and contained considerable mucus.

Treatment.—The chronic catarrhal enteritis due solely to gastric disorders, requires, of course, appropriate measures calculated to remove the latter. Attention to the *diet* is also of paramount importance: cereals, fruit and vegetables leaving much waste, iced foods or beverages, fried or highly seasoned foods, or substances cooked in much fat, etc., should be avoided and replaced by easily digested articles. Over-eating and drinking is a prolific source of the disease in tropical countries. Alcohol is always contraindicated, since it deoxidizes the adrenoxidase of the gastric juice and lowers its digestive activity in proportion.*

* *Author's conclusion.*

[104] Allen A. Jones: Jour. Amer. Med. Assoc., July 30, 1898.

[105] Tyson: *Loc. cit.*, p. 382.

[106] Strong and Musgrave: Bull. of Johns Hopkins Hosp., Feb., 1901.

Fresh water, without ice, should be used as a sole beverage. *Bismuth subnitrate,* in 15-grain doses (1 gm.), taken one hour before each meal, and washed down slowly with a half-tumblerful of water, is carried by the latter directly to the intestine, and markedly reduces the local congestion before the next meal enters the canal. Towards the end of each meal, 5 grains (0.3 gm.) of *pepsin* aid considerably the digestive process and avoid the formation of the intestinal irritants. If there is gastric atony, and the digestion be abnormally slow, a small pill composed of extract of *gentian,* $^1/_2$ grain (0.033 gm.), and extract of *nux vomica,* $^1/_4$ grain (0.016 gm.), taken twenty minutes before each meal in addition to the foregoing measures, is indicated. In mild cases, these remedies, a light diet, and rest —since a considerable portion of muscle-wastes are eliminated by way of the intestine and tend to aggravate the local lesions— soon prove beneficial and, if persisted in, curative. In severe cases, the reduced diet should be replaced by an all-milk diet, taking care that the patient be supplied daily, distributed throughout the three meals, the quantity of *sodium chloride* eliminated daily with the urine, *i.e.,* $^1/_2$ ounce (15.5 gms.).*

The milk treatment fails in many cases because the fact is overlooked that milk is very poor in sodium chloride. This salt is all the more essential in that it takes part in the formation of the gastric hydrochloric acid, which plays in the present disorder a cardinal rôle as will be shown presently.

The treatment of the neurasthenic form differs from the preceding in that the main indication is to raise the functional activity of the adrenal system to its normal level and thus increase the functional activity of the stomach and pancreas.* The treatment—dietetic and medicinal—indicated in the first form, is likewise of advantage here. After a week or so, however, when the acute irritability of the intestinal canal begins to disappear, as shown by a marked diminution of the number of stools and of the tenesmus and general discomfort, the pepsin should be omitted, and a capsule containing *strychnine sulphate,* $^1/_{40}$ grain (0.0016 gm.), and *thyroid gland,* 1 grain (0.06 gm.), given during each meal to increase the proportion of auto-antitoxin in the intestinal secretions.* The diet can then be increased gradually to the normal quantity, the patient

* *Author's conclusion.*

being warned to avoid foods that produce bulky wastes, irritating condiments, and alcohol, and any kind of food which he has found by experience is digested with difficulty. Cases in which there is a history of syphilis yield promptly to treatment addressed to this condition. High enemata of normal *saline solution* at 104° F. (40° C.) hasten materially the curative process in all forms of chronic diarrhœa.

When the general asthenia is not marked, regulation of the diet, the bismuth before meals and strychnine during the meal usually prove efficacious. The functional torpor of the pancreas may be counteracted and recovery greatly hastened, however, by administering *dilute hydrochloric acid,* 20 to 30 drops in water after meals. On reaching the duodenum the acid stimulates the pancreas and causes it to increase its production of trypsin. This enhances not only the efficiency of the intestinal digestion, but also the intracellular functions of the digestive leucocytes and, therefore, general nutrition.*

The treatment of chronic diarrhœa depends upon the identity of the parasite, as far as local treatment is concerned; thus, rectal injections of *quinine,* 1 in 1000 solution, kill the balantidium, but do not affect the amœba coli. A solution of 1 in 10,000 of *silver nitrate* used in the same manner is sometimes effectual in destroying the latter. *Calomel,* in small doses, has been recommended by several observers; it acts, as we have seen, by increasing the proportion of auto-antitoxin in the intestinal juice, owing to its powerful stimulating action on the adrenal system.*

We have seen that potassium iodide and mercury are most potent adrenal stimulants. In a case in a syphilitic subject reported by Lereboullet,[107] the diarrhœa, which had lasted eighteen months and had resisted all treatments, promptly yielded to anti-syphilitic measures. The same treatment is in reality effective irrespective of any syphilitic disease. Its action through the adrenal system is supplemented by a direct effect on the organisms. Quincke[108] states that calomel is toxic to all protozoa. Hydrochloric acid has been found very useful by Allen A. Jones,[109] Soupault,[110] Aaron[111] and others.

* *Author's conclusion.*

[107] Lereboullet: La semaine méd., July 4, 1900.
[108] Quincke: Berl. klin. Woch., Bd. xxxvi, S. 1001, 1032, 1899.
[109] A. A. Jones: *Loc. cit.*
[110] Soupault: Le bull. méd., vol. xvi, p. 255, 1902.
[111] Aaron: Medical Age, Feb. 25, 1903.