of all the capillary openings in the wound, than from the special destructive influence of carbolic acid on the virulent principles. Laborde has completed these researches in showing us that this capillary obliteration is due to an action of carbolic acid on the vaso-constrictors.

It is probable that like effects are produced in fever, and that phenic acid once introduced into the blood acts on the vaso-motor centres either directly or indirectly, and thus modifies the conditions of febrile thermogenesis. As you see, gentlemen, therapeutics confirms in a certain measure, the data furnished us by physiological pathology, and shows us the unbounded and preponderant influence of the nervous system on the febrile processes.

In the next lectures we shall make numerous and practical applications of the deductions which flow from this general survey, and you will see the importance of all these developments into which I have entered.

ON THE TREATMENT OF TYPHOID FEVER.

SUMMARY.—Typhoid Fever—Etiology—Spontaneity—Contagiousness—Theory of Typhoid Contagion—The Microbe of Typhoid Fever—The Virus of Typhoid Fever—Theories of the Contagion—Fecal Matters—Fecal Theories—Sewerage—Aliments—Overcrowding—Experimental Physiology of Typhoid Fever—Public Hygiene—Private Hygiene—Hygienic Treatment of Typhoid Fever—Alimentation—Æration—Cleanliness—Treatments of Typhoid Fever—Divisions—Antithermic Medication—Method of Refrigeration—Cold Baths—Brand's Method—Its Application—Its Results—Its Advantages—Its Disadvantages—Warm Baths—Refrigerant Apparatus—Cold Lotions—Cold Lavements—Antiphlogistic Method—Local Bloodletting—General Bloodletting—Antipyretic Medication—Digitalis—Quinine—Antiparasitic Method—The Aromatic Series—Phenic Acid — Salicylic Acid — Resorcin — Kairine — Evacuant Medication — Purgatives —Calomel — Mercurials — Tonic Medication — Alcohols — Cinchona — Exclusive Medications — Their Dangers — Expectancy — Treatment of Indications — Armed Expectancy—Bases of this Medication—State of the Forces—Intensity of the Fever—Treatment of the Complications—Nervous Complications—Pulmonary Complications—Abdominal Complications—Conclusions.

GENTLEMEN—There is, perhaps, no question in therapeutics which has caused so much discussion as the treatment of typhoid fever, and, if I were to follow out all the lines of inquiry which this subject has opened, I should require, not one lecture, but the entire course. I shall, then, be as brief as possible on points of theory, and dwell rather on practical conclusions. Whether you practise in the country or in the city, you will continually meet with cases of abdominal typhus. Last year (1882) you saw our wards filled with the victims of one of the most severe epidemics that have ever afflicted the population of Paris, and the hall of the Academy of Medicine stills rings with the passionate discussions which were raised by the various questions pertaining to this great problem of hygiene and therapeutics.[1]

Etiology, as I have often told you, has an important bearing on the treatment of disease; you recognize, then, the propriety of considering first the causes of typhoid fever; for, if they were absolutely known to us, we should be able henceforth to establish on a scientific basis the prophylactic treatment of this disease. This particular point in the study of dothinenteritis has been especially investigated during the last few years, and we shall have here to dis-

[1] Read the discussion which was held in 1882 and 1883 at the Academy of Medicine on typhoid fever ; a discussion in which the following gentlemen took part : Marjolin, Proust, Fauvel, Rochard, Lagneau, Léon Colin, Bouchardat, Gueneau de Mussy, on the part of hygiene ; Herard, Germain Sée, Dujardin Beaumetz, Peter, Jaccoud, Vulpian, Bouley, Glenard, on the part of therapeutics. (Bull. de l'Acad. de Méd., 1883.) Read also the discussion which took place at the same Academy in 1876 and 1877, and in which H. Gueneau de Mussy, Bouillaud, Brouley, Bouchardat, Jaccoud, Jules Guérin, Chauffard took part. (Bull. de l'Acad. de Med., 1876, 1877.) Read finally the discussion which was held at the Academy of Medicine *apropos* of the epidemic which broke out in Brussels in 1869, and where Martin, Coussot, Crocq, and Boens had the floor. (Bull. de l'Acad. de Méd. de Belgique, 1875, 1876.)

cuss the contagiousness and spontaneity of this affection. According to some authorities, typhoid fever is always the result of a particular contagion ; according to others, it comes from a miasmatic poison. You cannot be ignorant, gentlemen, of the difference which separates *contagium* from *miasm*, a distinction well established by Liebermeister ; *contagium*, coming from specific, morbific agents, which always take their origin and undergo development in a diseased organism ; *miasm*, on the contrary, being generated outside of, and independent of, an infected organism. To make more orderly and clear the exposition of this difficult subject, I shall commence with points which are best established and least open to dispute ; then I shall take up those which are most amenable to discussion.

To-day, everybody is agreed in admitting the contagiousness of typhoid fever. It is especially in our rural districts that this contagion is observed in its worst form, and every year the reports made to the Academy of Medicine on the prevalent epidemics contain facts establishing the contagiousness of this disease. We can go even further, and declare that to-day the active principle of this contagium has been determined. The principle is found exclusively in the stools of typhoid patients, and it needs but a very minute quantity of this pernicious element in potable water to communicate ileo-typhus to all who drink it. We possess, to-day, a considerable number of observations which establish this fact on an undisputable basis. The latest and most accurate is, assuredly, the observation published by Dionis des Carrieres, concerning the epidemic which lately devastated the city of Auxerre, where one of the springs which supply the city was proved to have been polluted by the dejections of a woman sick with typhoid fever.[1] The entire population which derived its drinking water from this source was infected, and there were few that did not suffer more or less; those parts of the city, however, which did not make use of this water, had entire immunity from the epidemic.

The attempt has been made by experiments on animals to elucidate this subject, but these have given uncertain results, and to the positive experiments of Birch-Hirschfeld, of Letzerich, and of Tizzoni, we must oppose the negative results of Robert Bahrd and Motschutkoffsky; moreover, the basic premise of these researches is under dispute, for it is not proved that the lower animals can contract typhoid fever.[2]

[1] Dionis des Carrieres, on an epidemic of typhoid fever which ravaged the city of Auxerre in 1882. (Bul. et Mem. de la Soc. des hôp., 1883, et Un. méd., 1883). [A similar epidemic prevailed this year (1885) in Plymouth, Pennsylvania, among those portions of the population that used water from a reservoir that was polluted by the dejections of a typhoid patient ; these fecal excreta having been consigned to the stream that fed the reservoir.—Tr.].

[2] In experiments made on animals, the hare is generally selected in preference to other animals, this animal being subject, according to Kuchenmeister, to an affection very similar to ileo-typhus; an affection characterized by augmentation (yet without ulceration) of Peyer's patches.

Birch-Hirschfeld, of Dresden, has experimented on animals with typhoid dejections, giving these to hares to eat. They succumbed at the end of from three to thirty days, and

But it is not enough to know that it is by the dejections that typhoid fever is communicated. Pathologists, guided by the theories of Pasteur, have sought in the dejections, and even in the tissues of victims of the disease, the microbe which contains the contagious principle. Unfortunately, we have not here any positive information; not because micro-organisms are not exceedingly abundant in the stools of typhoid patients, but because amid this abundance it is difficult to tell exactly which one of these microbes is the essential element of dothinenteritis.[3] It is generally known that Recklinghausen has found micrococci, Eberth, rod-like forms, and Klebs has described, under the name of *bacillus typhosus*, certain elongated filaments; but despite these researches, and those of Koch, of Meyer, of Friedlander, of Maragliano, of Almquist, we are

presented, at the autopsy, the characteristic lesions of Peyer's patches. Ordinary diarrhœal matters, administered to hares, did not produce any of these symptoms.

Jules Guérin in also experimenting on the same animals, and in injecting, under their skin, from one to two drachms of fecal matters, of urine, or of the blood of typhoid patients, has caused the death of the hares with symptoms similar to those of abdominal typhus.

Letzerich injected, in the subcutaneous cellular tissue of hares, distilled water, holding in suspension certain inferior organisms obtained by subjecting to repeated washings the stools of individuals dead from typhoid fever, and always determined a disease identical with typhoid fever. This affection commences always by the intestine, and induces ulceration of Peyer's patches. The same organisms develop also in the spleen, kidneys, and mesenteric glands.

Tizzoni, in an epidemic at Catana, injected in animals the organic insoluble matters extracted from drinking-water by filtration, and determined in them symptoms analogous to typhoid fever. The anatomical lesions of this experimental typhus are the result of the presence of numerous micrococci in the parenchyma of the spleen, and mesenteric glands.

But by the side of these favorable results we must note the contradictory experiments of Robert Bahrd, and of Motschutkoffsky.

Robert Bahrd, after injecting into the abdomen of hares from ½ gramme to 50 grammes of the fecal matters of typhoid patients, and causing them to live on a soil impregnated with these matters, obtained no results.

Motschutkoffsky, of Odessa, has made experiments with the blood and excrementitious matters of patients affected with typhoid fever, of syphilis, of rheumatism, and of recurrent fever, employing as his subjects, monkeys, goats, and even men. The results were negative as far as the first two diseases were concerned, positive only in the case of recurrent fever. (*a*)

[3] Recklinghausen was the first to find micrococci in the intestinal ulcers of typhoid patients.

Klein discovered the same micro-organisms in the intestinal mucosa, Sokoloff in the spleen, and Fischel in the lymphatic glands. In 1877 Feltz found figured ferments susceptible of culture in the blood of typhoid patients.

Eberth, in 1880, endeavored to isolate the micro-organisms of typhoid fever, but he found that this separation is very difficult. The same year, Klebs and his pupil, Epinger,

(*a*) Birch-Hirschfeld, Untersuchungen zur pathologie des Abdominaltyphus (Klin. Wochens., No. 52, 29 décembre).—Jules Guérin, Expériences sur l'origine et la nature de la fiévre typhoïde (Compt. rend. acad. des sc., 26 février 1877).—Letzerich, Experimentelle Untersuchungen über typhus abdominalis (Arch. f. experiment. Path. und Pharm., Bd. XX, heft 3 et 4, p. 312, 1878).—Tizzoni, Studii di Pathologia Sperimentale sulla genesi e sulla natura del tifo abdominale (Ann. univ. di Med. e Chir., février 1880).—Robert Bahrd, Experimentelle Untersuchungen über die Uebertragbarkeit der Typhus abdominalis auf thiere (Arch. der Heilk., XVII, p. 156).—Motschutkoffsky, Experimentale studien über die im barkeit typhœses fieber (Centr. f. d. Med. Woss., 1876, No. 11).—Homolle, Revue générale sur la fièvre typoïde (Rev. des sc. méd., t. X, p. 681).

still ignorant of the real microbe of typhus abdominalis. In a word, the parasitic theory of typhoid fever is almost certain, but it has not yet been scientifically demonstrated in a rigorous manner.

As opposed to this doctrine of contagiousness, we must allude to that of spontaneity. Struck by the fact that typhoid fever exists endemically in all places where are accumulated a great number of individuals—as in our great city; moved also by the appearance of certain epidemics apart from all known contagion; comparing, moreover, the typhus of armies with the abdominal typhus of great cities, certain authorities have maintained that typhoid fever may be produced spontaneously under the influence of bad hygienic conditions; and the cause has been by turns assigned to fecal matters, overcrowding, spoiled alimentary substances, and even to certain bad geological conditions of the soil. Let us rapidly examine each of these points.

Murchison has been the chief defender of the first of these causes, and he has labored to show that fecal matters may spontaneously develop a miasmatic principle which, entering the human system, may engender there ileo-typhus. Between him and Budd quite a lively discussion arose; Budd maintaining that fecal matters were dangerous only when they were fouled by the dejections of a typhoid patient.[4]

These are the two so-called fecal theories of typhoid fever. It was, however, a mistake to confound these theories under one name, for if Budd's view

claimed that they had discovered the parasite of typhoid fever. The bacillus typhosus, according to them, when it is completely developed, is constituted by certain entire filaments $O\mu$ 50 in length, by $O\mu$ 2 in breadth. Experiments made on hares have demonstrated that the inoculation of these microbes determines symptoms similar to those of typhoid fever. Nevertheless, the attentive study of these observations does not prove that the animals really had typhoid fever.

Brautlecht has also found a microbe in typhoid fever, but which is quite different from the one described by Klebs.

According to Koch, micro-organisms of three different species have been found: micrococci, large and short rods (Eberth), and elongated filaments (Klebs). It is difficult, according to him, to determine the veritable infectious agents in typhoid fever. At the same time, the presence of these groups of rods in the internal organs has a real importance. W. Meyer, Friedlaender, Maraglano, Almquist, have also noticed the presence of the *bacillus typhosus*. (*a*)

[4] Budd has affirmed the following propositions:

1. Typhoid fever is a disease essentially contagious.

2. The irritant substance which produces the contagion comes almost exclusively from the intestine of the typhoid patient.

3. The cess-pools and the sewer-pipes, which are the direct continuation of the dis-

(*a*) Recklinghausen, Ueber den Abdominaltyphus (Wurtzburger Zeitung, 10 juin 1871).—Eberth, Die organismen in den Organen der Typhus abdominalis (Arch. f. Path. Anat. und Phys., LXXXI, p. 58). Neue Untersuchungen über den Bacillus des Abdominaltyphus (ibid., LXXXIII, p. 486)—Klein, On the enteric fever (Reports of the med. office of the Privy Coun. and local Government Board, 1875).—Sokoloff, Zur Pathologie der Acuten Miltztumors (Arch. für Path. Anat. und Phys., t. LXVI, 1876, p. 171).—Klebs, Der Typhus abdominales eine Schistomikose (Arch. f. sper. Path., 1880). Der Bacillus der Abdominaltyphus und der typhose Procets (ibid., XII, 1881, p. 381 et 399).—Koch, Mittheilungen aus dem k. Gesundheistamte, p. 45.—V. Meyer, Untersuchungen über den Bacillus des Abdominaltyphus (thèse de Berlin, 1881).—Friedlaender, Notiz ueber typhus bacillen (Dubois Reymond's Arch., 1881).—E. Maragliano, Pathogenese des Abdominaltyphus (Cent für Med. Wiss., 1882, No. 11).—Almquist, Typhoïds feberus. Bacterie, Stockholm, 1883.

be correct, Murchison's cannot be; for it is not yet rigorously demonstrated that fecal matters may spontaneously generate the typhoid poison. This fecal theory has served as an argument to the adversaries and to the partisans of the exclusive sewerage doctrine,[5] which condemns the fixed privy-vaults and the separate systems of removal, and insists that all night-soil shall be consigned to the public sewers, which shall be constantly flushed with running water—the latter, with its excrementitious products, being finally subjected to the filtering and purifying action of the soil. This whole matter of sewerage is not yet settled; yet despite the opposition in certain quarters, the majority of hygienists and civil engineers are of opinion that those cities which have the best system of sewerage are the best protected from typhoid epidemics.

I do not wish to enter into the details of this discussion, which would draw

eased intestine, are the constant source of the propagation of typhoid fever, by diffusing their noxious principles into the atmosphere, and the potable water sources.

4. But the contents of sewers, and the putrefactions there taking place, do not produce typhoid fever until there is mixed with them, at some period or other, real typhoid stools.

Murchison has, on the other hand, pretended that typhoid fever, an endemic disease, may arise independently of any previous case or contagion, from the fermentation of fecal matters, and perhaps from the fermentation of other forms of organic matters.

Biermer has studied the typhic poison. This poison, according to him, is of animal nature; it may be transported by the patient and by his clothing. The poison exists only in the dejections, and it is these latter which render the disease contagious whenever they are placed in favorable conditions. The air does not seem to waft the contagion, but it is surely and rapidly transported by the water of springs and streams.

Cousot has given especial attention to the typhogenous miasm. According to him, the contagia are living, and the theory of animated virus explains the anatomical and functional lesions of dothinenteritis. In his opinion, the virus does not develop in the blood, but in the lymphatic system, and especially in the ganglia, which are the principal, if not the only seat of the evolution of the contagion.

Bouchard rejects both the doctrine of contagion and infection; he considers the theory of fecal origin and that of spontaneous development as not proven. According to him, typhoid fever is a specific and miasmatic disease. (*a*)

[5] As for this question of sewers and cess-pools, it is worth the while to refer to the discussion which was held at the meetings of the Society of Public Hygiene, during the year 1883, and in particular to the discourses of Durand-Claye and Emile Trélat, advocates of the "*all for sewers*" system, and of Brouardel, Vidal, Duverdy, opponents of this system.

One may also appropriately consult the proceedings of the International Congress of Hygiene, which was held at Geneva in 1883, where this question was discussed in the sessions of the 5th, 6th, and 7th of September.

Warrant of Frankfort-on-the-Main, reporter, Smith of London, Hauser of Leipsig, Soyka of Munich, Bourrit of Geneva, have defended the advantages of the "*all for sewerage*" method. Van Overbeck de Meyer of Utrech, and Williem of Mons, have declared themselves partisans of the system of Liernur, which is characterized by the delivery of fecal matters in a system of closed pipes separate from the sewers.

The Technical Commission for promotion of the salubrity of Paris, adopted conclusions

(*a*) Biermer, Ueber entsehung und Verbrettung des abdominaltyphus (Samml. Klin. Vort., No. 53, 1873.—Cousot, Etude sur la nature, l'etiologie et le traitement de la fiévre typhoïde, Bruxelles, 1874.— W. Budd, Typhoïde Fever, London, 1873.—Bouchard, Etiologie de la fiévre typhoïde, Congrès médical international de Genève, 1877.—Van den Schrieck (de Hal), Du virus typhoïde et de son rôle dons les épidémies, Bruxelles, 1875.—Pages, Etude clinique sur l'étiologie de la fièvre typhoïde, Paris, 1878.

us away from our subject. I shall only call your attention to the action of oxygen on all putrescent materials floating in sewers—an action which Fauvel has clearly shown in making it plain that this oxidation is a veritable combustion, which rapidly destroys the infectious element in night-soil; and we see in this an explanation of the fact that the South and East, despite their deplorable hygienic conditions, manage (by free exposure of their filth to atmospheric air) to keep tolerably free from epidemics. Although Rochard has affirmed that it would be easy to develop typhoid fever by the simple fact of massing people together in close quarters and under bad hygienic conditions, I believe that this overcrowding is a more powerful factor of typhus exanthematicus than of abdominal typhus. I make the same reserves in reference to the subject of alimentation as the determining cause of ileo-typhus. Wernich,[6] comparing the bacillus of typhoid fever with that of putrefaction, has ably maintained that the

rejecting both fixed and movable fossæ, and the "separative" or "diluent" apparatuses, and sanctioned the following resolution:

"The flow *in toto* of excrementitious matters by sewers may be authorized in sewers largely and constantly fed by running water, which does not allow an accumulation of sand and dirt, and in which these effete matters shall be carried without obstruction or delay to the terminal distributing depot."

The sewer waters carrying excrementitious matters, ought to be submitted to the process of purification by the soil. This purification may take place without danger to the public health. (*a*)

[6] The bacillus of typhoid fever being, according to Wernich, very similar to the bacillus of putrefaction, may be only a variety of the latter under peculiar circumstances of culture. Starting from this principle, he proposes the following distinctions between the typhoid fevers:

1. The typhoid fevers by contagion which are due to the introduction of the bacillus and of spores from typhoid subjects.

2. The typhoid fevers occasioned by aliments in the processes of decomposition. These fevers are determined by the bacteria of putrefaction which are found in unhealthy or spoiled meat.

3. The endemic typhoid fevers due to putrid emanations of sewers, marshes, in a word, to the products of organic decompositions set free from the soil.

4. Idiopathic typhoid fevers: an alimentation exclusively animal in too great abundance and especially the bad digestion of such food, determine in the stomach the putrefaction of the latter, and from this cause the presence of the bacillus of typhoid fever.

With respect to treatment, there are two indications to fulfill, the causal indication and the symptomatic indication. With respect to the causal indication, it varies with the symptomatic indication. The typhoid fevers due to spoiled food, or to too abundant alimentation, demand the employ of purgatives, of calomel, and the internal use of antiseptic substances. The fevers due to contagion and endemic influence are tributary to treatment by quinine and salicylic acid. Idiopathic typhus claims purgatives and a strict dietary regimen.

The symptomatic indications ought to be fulfilled by an alimentation from which should be excluded albuminoid or azotized substances, such as meat, eggs, milk, substances in which the bacillus develops with greatest facility; for drinks, pure water, or spirits and water, are recommended. (*b*)

(*a*) Société d'hygiene publique et professionnelle, 1882.—Congrés international d'hygiène, Genève, 1882.—Travaux de Paris, commission technique de l'assainissement de Paris, 1883.

(*b*) Wernich, Studies and Observations of Typhoid Fever (Zeitsch. f. Klin. Med., IV and V).

use of spoiled meats is a cause of typhoid fever. It has also been asserted that the use of water polluted by organic detritus, and that even milk contaminated by water of bad quality, might also be a cause.[1] I consider all these circumstances as adjuvants; but no one of them alone seems to be sufficient as a determining cause of this disease. It is the same with geological conditions. The doctrine which is supported by Pettenkoffer and Buhl, attributes epidemics of typhoid fever to a lowering of the stratum of subterranean water. Observations have in fact demonstrated that if this theory is conformable to what has been observed at Munich, it is not applicable to epidemics in other parts of Europe.[2]

As you see, gentlemen, it is not yet proved that any of the causes just alleged may spontaneously give rise to typhoid fever; and I am ready, for my part, to give my adhesion to the parasitic theory of this affection. It is true that this doctrine of *contagium vivum* denies all spontaneity, but it enables us to explain—thanks to the theory of vaccination (or, if you prefer so to put it, of

[1] It is in England that attention has been especially called to milk as an agent of contagion in typhoid fever. Hart, Russel, Cameron, Button, Murchison, have observed epidemics developed by the use of milk brought from a farm or habitation where were dwelling patients affected with typhoid fever. (*a*)

[2] In 1865, Buhl remarked that at Munich a large mortality from typhoid fever coincided constantly with the lowering of subterranean water level. On examining, by the aid of statistics, the mortality of typhoid fever, Pettenkoffer found there complete confirmation of the opinion put forth by Buhl, and declared that "these mountains (meaning typhoid fevers) coincided with the valleys" (meaning lowering of the stratum of subterranean water)—a somewhat picturesque expression. Thus it is, for example, that in 1872 there were observed at Munich, in January, 60 deaths from typhoid fever, the level of the waters of the wells being $4\frac{1}{8}$ metres below the surface, while only 18 deaths were observed during the month of July, when the level of the well water was only $3\frac{7}{10}$ metres.

Different explanations of this fact have been given. According to some, when the level of the water-bed is lowered, the fermenting detritus which impregnates the upper strata of the soil soaks, as by a natural drainage, into the wells and reservoirs of drinking water, carrying with it germs from the stools of typhoid patients, issuing from sewers badly calked, and fouling the water destined for alimentation. When the level of the underground water, on the other hand, is higher, as, for instance, after rains, the organic detritus of the soil is diluted and bathed with water constantly renewed, which stops further fermentation. This theory is still defended by Liebermeister, Buchanan, de Renzy, Hoegler, and Geissler.

Buhl and Pettenkoffer do not take this view. According to them, when the waters are low, miasms are disengaged from the soil, and gain the atmosphere. The air of the miasms being generally warmer than the exterior air, acts in rising the part of a cupping apparatus, and aspirates, as it were, the germ-laden water from the soil, and this takes place the more readily since the barometric fall, which almost always coincides with the lowering of the subterranean water-bed, facilitates this gaseous liberation. Pettenkoffer adds that it is, in his estimation, probable that since the respiratory surface is larger than the digestive surface, the typhic poison behaves after the fashion of some other infectious poisons, and is absorbed by the respiratory rather than by the digestive passages. The dispute is far from being terminated between the partisans of the first of these theories (infection by water) and those of the second (infection by the air of the soil). Moreover, the basis of

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(*a*) Hart and Corfield, Medical Times and Gaz., april 1873.—Russell, Glasgow Med. Journ., april, 1872.—Cameron, Dubl. Journ. of Med. Sc., november 1873.—Bütton, Lancet, september 1873.

preservation by attenuated virus), it enables us, I say, to explain the immunity of typhoid patients from all future attacks of the disease. It enables us, also, to understand the comparative immunity of individuals who have long lived in Paris as contrasted with those who have lived there but a short time; the first having acquired, by long exposure to the virus, constitutional modifications which prove a relative protection.

It enables us, moreover, to hypothesize atmospheric or telluric conditions, favoring in some degree the culture of germs of the typhoid contagion, without being compelled quite to indorse the explanation which Ernest Besnier has given of the march in accordance with seasons of the dothinenteric epidemic.[3]

But, on the other hand, this theory of living contagium leaves in obscurity many points in this interesting part of etiology, and in particular the epidemic character of this affection, and the special features which distinguish each epidemic—circumstances which render so difficult the application of statistics to the study of the therapeutics of typhoid fever. Nevertheless, despite these reserves, I adopt the theory of contagium rather than that of miasm.

From the facts which I have just set forth, flow very important hygienic applications, some concerning public hygiene, into the consideration of which I shall not enter, others concerning private hygiene, and which in their totality constitute the hygienic and the prophylactic treatment of typhoid fever. As it seems to be absolutely proved that the typhoid virus is found in the fecal matters of persons suffering from the disease, and that water polluted by these dejections is the most powerful factor of the contagion, it follows that it is a duty thoroughly to disinfect these alvine dejections, and the objects which they have polluted. It follows, also, that one should have a careful surveillance of potable water, and, if not certain of its purity, such water should be boiled before

the discussion is far from being indisputable, and Dr. Albin has well said that the exceptions to the aphorism of Munich (Münchener aphorism) are so many that one may almost maintain the contrary aphorism, *i. e., to a rise in the subterranean water-level, corresponds an elevation in the number of typhoid cases.* Similar cases have also been noted by Liebermeister, Ruitmeyer, and Louis. (*a*)

[3] Ernest Besnier has formulated the following laws, basing himself upon the march of typhoid fever these last two years in the hospitals of Paris :

Typhoid fever prevails according to seasons. It finds a habitat in every soil where man dwells, but France is its favorite seat.

In Paris typhoid fever reigns permanently. It carries off every year 1200 of the Parisian population, a mortality which supposes from 7000 to 10,000 typhoid cases in Paris each year.

Of 100 deaths, there are 17 in the spring and 37 in the fall. In July and August the mortality rises suddenly to descend in November and December, and reach its minimum in June.

Such is the law ; there are few exceptions, and these do not materially change it (*b*).

(*a*) Buhl, Eine Beitrag zur Œtiologie des Typhus (Zeitsch. für Biol., 1865, B. I, p. 1).—Pettenkofer, Ueber die Schwankungen der Typhussterblichkeit in München von 1850, bis 1857 (Zeits. für Biol., 1868, et Ueber die Œtiologie des Typhus, München, 1875. — Liebermeister, Deutsch. Klin., 1866. — Buchanan, Lancet, janvier 1873.—De Renzy, Lancet, juin, 1873.—Hoegler, Deutsch. Arch., 1873, t. XI, 257.—Geissler, Bericht über den typhus.—Liebermeister, Handb. von Ziemss., 1854, p. 73.—Albin, Zeitsch. f. Epid., 1874, p. 270.

(*b*) E. Besnier, Comptes rendus de la Société des hôpitaux, from 1865 to 1883.

being used, or some of the table waters should be employed, such as Apollinaris. Moreover, I refer you in this connection to the instructions issued by the Council of Hygiene, of which I am a member, concerning the measures to be taken to stay the progress of the epidemic of typhoid which raged over this city in 1882.[1]

So much for the prophylactic treatment. The hygienic treatment is of capital importance, and the more you see of this disease the more you will appreciate its importance. Under this head I shall examine, successively, the dietary regimen, the measures to promote cleanliness, and the care of the sick-room.

For the severe and cruel regimen of Broussais, who opposed feeding fever patients, we now substitute the administration of nourishment as a necessary part of the treatment, and no disease so markedly shows the advantages of generous alimentation. You must, then, feed your typhoid patients ; but, remembering the disease of which the digestive tube is the seat, you should exercise great care in the choice of nourishment, which should be chiefly liquid ; and every substance should be prohibited which might become a source of

[1] These are the rules adopted October 19, 1882, by the Council of Hygiene and of Salubrity of the city of Paris, concerning the precautions to be taken in the event of the occurrence of typhoid fever :

When a patient is found to be affected with typhoid fever, it is well to adopt the following hygienic measures :

1. *Isolation.*—The patient must be isolated as much as possible from the other inmates of the house.

If the situation does not permit sufficient isolation, it is better to remove the patient to the hospital.

If the patient remains at home only those persons should be allowed to enter his room who are necessary to give him the requisite care ; and all children and youths should be rigorously excluded.

All nurses and attendants should be required to bathe themselves with carbolic water (2½ drachms to a quart of water).

2. *Aeration of the Sick Room.*—The sick room ought to be well ventilated. All tapestry, window curtains, and carpets should be removed. The bed should as far as possible be placed in the middle of the room. All the dejections of the patient before being carried out of the chamber to the privy should be completely disinfected by a solution of chloride of zinc (50 grammes—about 1½ oz.—to the quart of water). This solution should also be employed in thoroughly cleansing the cloaca every time that the dejections are thrown into it.

3. *Disinfection of the Clothing*—All the body clothing, all the bed clothes, that have been used about the patient, ought before being taken from the sick room to be soaked in a solution of phenic acid (5 drachms to the quart of water) ; they should then be immediately given to the washerwoman.

4. *Purification of the Room.*—After the recovery or death of the patient there should be placed in the sick room, on a bed of sand, an iron kettle containing red hot coals, upon which should be thrown a quantity of sulphur proportional to the capacity of the rooms—5 drachms to every cubic metre. The room should be thus thoroughly fumigated, and should remain closed for 24 hours.

This having been attended to, the bedding and clothing in this room should be cleansed with the greatest care.

The room should be thoroughly washed with carbolized water (5 drachms to the quart), and it should not be occupied till after having been aerated for at least one week.