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TREATISE

ON

EPIDEMIC CHOLERA;

BEING LECTURES DELIVERED UNDER THE AUTHORITY OF THE FACULTY OF MEDICINE OF PARIS.

BY

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TRANSLATED FROM THE FRENCH

BY

SAMUEL LEE BIGELOW, M. D.

WITH AN APPENDIX

BY A FELLOW OF THE MASSACHUSETTS MEDICAL SOCIETY.

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NOTE BY THE TRANSLATOR.

The Epidemic Cholera having reached the United States, the Translator feels it a duty to place this new Treatise upon the subject before the Medical Profession and the public. Even if much of what it contains is already known to professional scholars, yet its elaborate exposition of the wise sanitary measures adopted in France, England and Russia, can hardly fail to furnish some useful suggestions relating to the formation of public boards or committees of health, or to the carrying into effect the measures of those already existing. To the community at large it certainly affords information of the highest importance with regard to those hygienic measures most to be relied upon as the means of preservation from the disease.

The name of the Author is sufficient guaranty for the merit of the original. Any defects in the translation may find some excuse in the short period of time allowed for its completion, the work having appeared in Paris but little more than two weeks since.

Paris, February 1, 1849.

PREFACE.

Having been appointed by the Faculty of Medicine of Paris, to supply the place of Professor Duméril in the chair of Medical Pathology, for the years 1848 – 49, the author took the opportunity to give a full exposition of the history of the terrible epidemic, which, after a lapse of sixteen years, again menaces France. He commenced his course by a series of lectures upon the cholera.

These lectures have been thought worthy of publication. Nor can they appear entirely devoid of interest, when it is considered that they present a faithful analysis of the innumerable publications upon various points connected with the history of cholera, which have appeared in France and elsewhere, from 1830 to the present time. They comprehend at once, pathological descriptions, anatomical and chemical researches, historical facts, both geographical and statistical, considerations upon the particular and general causes, political information, sanitary measures, and hygienic and therapeutic prescriptions, methodically presented and carefully considered. The progress and character of the epidemics which have so often desolated Europe, and particularly that which for two

years past has been gradually extending its ravages, and has now reached our own country, have been the object of a special investigation; and the researches relative to the general course of the cholera in France during the epidemic of 1832, may be considered as new, for, by a singular fatality, and apart from the very complete documents which have been procured for Paris, no complete work has been undertaken upon this interesting point. In regard to the present epidemic, it has been followed even to the latest dates, and its route has been accurately marked out according to authentic information. No pains have been spared to unite all those elements, either with regard to public hygiene, the proper regimen to be adopted in private life, or the means of treatment, which may contribute to remove, or at least render less terrible, the attacks of this formidable disease.

The Appendix has been prepared by the advice of Dr. O. W. Holmes, to whom the translation was submitted for an opinion as to the expediency of its publication. The compiler of the Appendix takes this opportunity to express his acknowledgments to that gentleman for very many valuable suggestions in regard to its preparation, and for his kindness in allowing him access to his excellent library.

The design of the Notes is to bring forward certain views and statements not adduced by the author of the work itself, and to give a concise and comparative account of the course and intensity of the former and the present epidemic in this country. The necessity of hastening the publication of the work, has deprived the editor of the opportunity of executing his task in as thorough and extended a manner as he would have desired; — and this will, it is hoped, excuse any deficiencies.

The revision of the sheets of the translation, and their preparation for the press, has been confided entirely to Dr. F. E. Oliver, who has also added an Index, which will be found convenient for reference.

The thanks of the editor are likewise due to Dr. A. L. Peirson, of Salem, for several valuable books,— and to Dr. F. S. Ainsworth, of this city, for the use of a number of interesting and rare monographs upon epidemic cholera.

W. W. M.

Boston, May 10, 1849.

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ERRATA.

Page 30, ninth line from bottom, for *borborygma*, read *borborygmi*.
Page 72, eleventh line from bottom, for *the Hindostan*, read *Hindostan*.
Page 72, tenth line from bottom, for *at*, read *and*.

EPIDEMIC CHOLERA.

CHAPTER I.

DEFINITION. — HISTORICAL SKETCH.

CHOLERA is a pestilential disease, having its origin in the East Indies, whence it has extended epidemically to all parts of the world, characterized by a peculiar gastro-intestinal flux, a special alteration of the blood, and a disordered state of inervation, the circulation, and hæmatosis.

We do not include in this definition, nor shall we here describe, the accidental fluxes due to various causes, which have been confounded under the improper term, sporadic cholera.

The term cholera (*cholera morbus*) itself raises an important question, for its etymology alone may imply the origin of the disease. Now it is very difficult to admit the Greek derivation so universally assigned to the word cholera, χολὴ ῥέω, a flow of bile,[1] or χολὰς ῥέω, an intestinal flux. In fact, the words into which the radical ῥέω enters, take the termination ῥοία, and in French *rhée*, (διαῤῥοια, diarrhœa);

[1] Alexander de Tralles rejects the etymology χολὴ, bile, but adopts that of χολὰς, intestines. *De arte medica*, lib. vii. chap. xiii.

and if the word χολερη occurs in the works of Hippocrates,[1] we may still regard it as a compound whose origin is not necessarily to be referred to the Greek. We do not hesitate to confess our preference for the etymology proposed by M. Jobard, of Brussels,[2] who derives the term cholera from two Hebrew words, *choli-ra*, the signification of which, *morbus malus*, agrees entirely with the sense of many passages in Holy Writ,[3] and at the same time with the characters of the epidemic disease of which we speak. The double appellation, *cholera morbus*, further confirms this last etymology; for nothing is more common, in words which have passed from the oriental languages into our European idiom, than to find this redundancy, which consists in adding a substantive to the termination of the primitive adjective, which is a literal translation or repetition of its signification; as, *cholera morbus*, disease disease.

This first proof of the antiquity of cholera is still further confirmed by the mention which is made of it in the Sanscrit manuscripts, and in Chinese writings, as also by the names which it has received in the most ancient Eastern idioms.[4] Frequent mention is made here of the epidemic cholera; but it is not so with the ancient Greek and Latin.

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[1] *Des Epidémies*, liv. v. Ed. Littré, t. v. p. 210.

[2] *Gazette Médicale* de Paris, 1832, p. 359.

[3] *Deut.* chap. 28; *Eccles.* chap. vi. verse 2.

[4] *Theorie des Orientalischen Cholera*, Von Dr. L. Grünberg.

Dr. Taylor found in an ancient manuscript, under the term *Medsoneidan*, the description of a terrible epidemic, which was no other than cholera. In China, the epidemic cholera was described by the contemporaries of Hippocrates and Confucius, under the name *Ho-luan*. According to Schnurrer, there is another Sanscrit work of Gouinda-chary, entitled *Chirten Money*, in which the cholera is described by the terms *vidhuna* and *eunerum vaudi*, that is, diarrhœa and vomiting. In the East Indies, in Malabar, and in the country of Mahratte, the cholera, whether epidemic or sporadic, is designated by the different names, *ola-utah* (diarrhœa and vomiting) *mu-pet* and *nitripa*. The Hindoos call it *morchi* (death), the Arabs, *el houwah* (hurricane), the Persians, *oueleb*. All these terms, with that most generally in use, *mordechin* (*mort de chien*), are very ancient, and show the distant Indian origin of the disease, and the terror which it inspired.

The χολέρη, of which Hippocrates speaks, in many passages upon *Epidemics*, is nothing more than a bilious intestinal flux, entirely analogous to the disease described under the name of sporadic cholera, and which he states is especially prevalent in the warm season.

The following example, related both in the fifth and seventh volumes upon *Epidemics*, clearly shows what is to be understood by the cholera of Hippocrates. "Eutichides had a choleric affection which terminated in tetanic spasms of the legs; at the same time that he voided by stool, he vomited three days and nights *a great quantity of dark colored and deep red bile;* he was feeble, had an aversion for food, and could keep nothing on his stomach, not even tamarind water; he had complete suppression of the urine and also of the alvine evacuations; he discharged by vomiting a kind of soft lees or grounds, which he likewise passed by stool."[1]

There are also the excellent descriptions of Areteus[2] and Celsus,[3] who fully comprehended the gravity of the disease "neque tamen ulli morbo minori momento succurritur;" of Galen,[4] who, with Hippocrates,[5] admits the division into *cholera sicca* and *cholera humida seu biliosa;* of Cœlius Aurelianus,[6] Aetius,[7] Paulus Æginatus,[8] and Alexander de Tralles.[9] All these descriptions refer to affections resembling the cholera, viz., those of a bilious character exclusively sporadic.

It is not until the seventeenth or eighteenth century that we find observations relative to epidemic cholera, and the

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[1] *Œuvres Complétes d'Hippocrate. Des Epidémies*, liv. v. p. 79, et liv. vii. p. 67. Edit. Littré, t. v. p. 249 et 431.

[2] *De Causis et Signis Acut. Morb.* lib. ii. cap. v.

[3] *De Medicina*, lib. iv. cap. xi.

[4] *Comment*, 4 *et* 5, *ad Aph. Hippocr. et Lib. de Victus Ratione.*

[5] *Du Régime dans les Mal. Aig.* (Append.) éd. Littré, t. ii. p. 495.

[6] *De Acut. Morb.* liv. iii. cap. xix. xx. et xxi.

[7] *Tétrabibl.* liv. iii. serm. i. cap. xii.

[8] *De re Medicâ*, t. iii. cap. xxxiv.

De Arte Medicâ, t. vii. cap. xiv. xv. xvi.

greater part of these authors confine themselves more or less exclusively to the descriptions given by ancient authors. We may cite, with M. Grüdner, in this list, Amatus Lusitanus,[1] Horst,[2] Schenk,[3] Jodicus Lommius,[4] Riolanus,[5] Peter Forestus,[6] Nicolas Piso, Rosinius, Centilius,[7] Bonet,[8] Slevogt,[9] and Pechlin, who have described a serous cholera, in which the dejections were watery without any admixture of bile. We deem it unnecessary to multiply these citations, to which might be added the names of many distinguished writers of the eighteenth century.

Certain genuine epidemics, which may be analogous to cholera, have been described by Rivière,[10] who made observations at Nimes in 1564; and by Zacutus Lusitanus,[11] who in 1600 noticed them in many parts of Europe. But the most remarkable histories, without doubt, which have been bequeathed to us by the authors of this epoch, are those of Willis,[12] Thomas Sydenham,[13] and Torti[14]. The first describes an epidemic that reigned in London in 1670, which he named *dysenterica aquosa epidemica.* The picture which he draws is too characteristic to admit a doubt in regard to the nature of the disease. Sydenham gives a very similar description from his observations made in 1669–1676. Bontius,[15] Dellon,[16] and Thévenot,[17] observed

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[1] *Curat. Med.* cent. ii. obs. 32, iii. xii. 28.
[2] *Oper. Med.* tom. vi.
[3] *Obs. Med.* liv. iii.
[4] *Obs. Med.* liv. ii. (édit. Antwerp,) p. 59, 6.
[5] *Obs. Med.* liv. ii.
[6] *Obs. et Curat. Med.* liv. ii. obs. v. 43, 50.
[7] *Eteodrami Obs.* p. 50, 58, 65, 244, 248.
[8] *Med. Septentr.* liv. iii. sect. vi. *et Sepulchret.* liv. iii. sect. ix.
[9] *Dissertatio de Cholerâ.*
[10] *Praxis Medic.* cap. ix.
[11] *Oper.* liv. ii. obs. 16 et 17.
[12] *Oper. Gener.* 1680, t. ii. p. 74, seq. 9.
[13] *Oper. Medic.* Genera, 1723, p. 106 et 184.
[14] *Therap. Spec.* liv. iii. cap. ii. et tom. iv. cap. ii.
[15] *De Medic. Indorum*, Lugd. Batav. 1642, p. 136.
[16] *Voyage aux Indes Orientales.* Amsterdam, 1689.
[17] *Voyage aux Indes Orientales.* Paris, 1689, tom. iii.

and described the epidemic cholera in the Indies, where it has most frequently raged both endemically and sporadically. Bontius says that death may occur in six hours, and graphically describes the rapid loss of heat and of all the vital powers. Later, in 1761, Donald Monro[1] observed an epidemic of cholera in Westphalia; also Agton Douglass and Bisset in 1768, in the north of England and in Scotland. Harlem[2] again quotes many dissertations written towards the close of the last century; and a description of this epidemic may be found in the *Annals of the Board of Health of Madras* for the year 1787.

But even to the present time, according to the learned remarks of M. Littré,[3] " l'histoire ne nons offre aucun example où le cholera épidémique soit devenu voyageur, et où il ait quitté soit l'Inde, soit un pays European pour se porter ailleurs. Et c'est un phénomene singulier que de voir une maladie connue, fréquente, revêtir subitement un caractère nouveau qui en agrandit énormément la portée et qui frappe les hommes de terreur. Ainsi, le choléra a acquis, il y a quelques années, une faculté de propagation qui, des bords du Ganges, l'a porté sur l'Elbe, et jusqu'à la capitale de l'Angleterre." Lastly, we may add, to all parts of the world.

It results from this extension of the cholera and from its numerous migrations, that the opportunities for its study and description have become so multiplied as to render it impossible to mention, even briefly, the innumerable publications to which this epidemic has given rise. It is principally since the epidemic of 1830 – 1832, that the most important works have been furnished to complete the history of this disease. In citing the labors of Grünberg of Germany, J. Brown and J. Copland of England, and in France those of MM. Littré, Gérardin, Gaymard, Brièrre de Bois-

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[1] *An Account of the Diseases in the British Military Hospitals in Germany.* Lond. 1764, p. 97.

[2] *Die Indische Cholera*, 1831, tom. i. s. 144.

[3] *Traité du Cholera Oriental.* Paris, 1832, p. 123.

mont, Foy, Dalmas, Bouillaud, Gendrin, Rayer, Magendie, Dubrueil, and Rech de Montpellier; and also the numerous observations preserved among scientific documents, especially in the *Gazette Medicale de Paris*, also the reports of the commissioners of health of the principal cities of Europe; we do not pretend to give even an outline of the numerous researches which were undertaken on the appearance of the epidemic cholera, and which we shall endeavor to profit by in the course of this work. These researches, moreover, commenced, for the most part, during the prevalence of the epidemic, were almost universally given up on its cessation; and we should have to mention as new only such as have been recently recommenced with so much zeal by Russian and German physicians, had not three of our most distinguished fellow physicians, MM. Monneret,[1] A. Contour [2] and Lasegue,[3] published the results of their studies upon the epidemic cholera observed by them in Russia, and in Turkey in Europe, while holding the commission which they received last year from the French Government.

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[1] *Lettres sur le Choléra Morbus en Orient.*, Gaz. Méd. 1848, Mém. 43, 44, 45.

[2] We owe it to the confidence and friendship of Dr. Contour, that we were permitted a knowledge, previous to its publication, of his extraordinary work, which must be considered as one of the most interesting and finished productions that has yet appeared upon epidemic cholera.

[3] *Arch. Gen. de Med.* Sept. 1848.

CHAPTER II.

DESCRIPTION.

Epidemic cholera, notwithstanding its multiplicity of symptoms, and aside from the several varieties of form which we shall mention, presents such decided characteristics, and so constant an aspect, that few diseases have been described so uniformly, and at the same time in a manner so likely to engage the attention, and fix itself upon the mind. In order to avoid omitting any striking feature of this disease, we shall first give a general description of this epidemic, and, returning afterwards to each of its principal features, shall dwell separately upon the most prominent symptoms, complications, and secondary affections, the progress, duration, and various modes of termination of the disease, and finally its different forms. We hope in this manner to omit no important detail.

GENERAL DESCRIPTION.

Epidemic cholera, in its common or grave form, may suddenly develop itself under the influence of some accidental cause, its invasion being marked only by a sudden uneasiness, and repeated alvine discharges, followed by syncope. But it is often preceded by a state of vague suffering, a rapid prostration, deep colicky pains, anorexia, sometimes a diarrhœa, profuse sweats, disturbance of the senses, and a greater or less retardation of the pulse. Great mental depression often rapidly follows this state, which generally passes off in one or two days, but which is liable to last even for one or two weeks.

After the disease becomes developed, the symptoms succeed each other in a regular order, which allows the admission of two natural and distinct periods.

First Period. — The phenomena which precede the invasion continue to progress. The alvine evacuations and vomiting increase in frequency; a veritable flux is established, in the first place serous or slightly bilious, afterwards composed of a matter termed *choleric*, which is liquid, whitish, grumous, or very uniformly troubled, sometimes resembling unclarified whey, sometimes a decoction of rice or oatmeal, sometimes thickened milk nearly clear, emitting an insipid spermatic odor, and sometimes presenting traces of blood or bile, and even worms.

These evacuations are very rarely wanting, and often continue even to the termination of the disease. A burning thirst, deep pain at the epigastrium, and a prolonged hiccough are the ordinary accompaniments. Intensely painful cramps at the same time attack the limbs, especially the calves of the legs, and extend to nearly all the muscles of the body. The muscles of the abdomen and limbs are often in a state of considerable contraction. Spasmodic motions are also observed; the fingers and toes perform involuntary flexion and extension. The pulse becomes very feeble and almost imperceptible. The features are altered and hippocratic, tremblings and great agitations manifest themselves, coldness increases rapidly, the pulse becomes suppressed, bluish spots appear, first upon the extremities; the skin assumes a blue or blackish hue, which is almost general; the nails become livid and almost black, the fingers wrinkled, and the genital organs retracted. The volume of the body diminishes rapidly and perceptibly, the eye sunken in the orbit is dull and surrounded by a bluish circle, the conjunctiva becomes faded, and the respiration slow and feeble, or rare and anxious; the breath is cold, the pulse ceases or slackens its movements, which seem reduced to mere oscillations. The secretions are arrested, the voice is lost, a whisper alone remaining; the nose is cold and sometimes becomes gangrenous, the cornea is flattened and puckered, spots of blood appear upon the sclerotica, a viscid sweat covers the face and extremities,

the intellect which remained unclouded becomes obscure, respiration is embarrassed, hiccough commences, and death follows in the midst of an apparent calm.

The first period which is designated under the terms, cold, livid, or asphyxic period, may terminate fatally by the evacuations alone, before cyanosis or cramps make their appearance. Sometimes also the accidents of the disease gradually cease, and health is restored by a natural process, without the intervention of any new morbid phenomena to interrupt its course. Ordinarily, however, when the patient escapes the fatal termination, the symptoms change their character, and the disease enters the second period, called that of reaction (*period œstueuse.*)

Second period. — The coldness, having reached a certain degree, ceases to increase, warmth gradually returns, the pulse is restored, increases and becomes febrile, the face regains its color, the eye becomes animated, and a general reaction takes place. If an easy and rapid recovery is at hand, the vomiting becomes less frequent; the diarrhœa persists, the discharges no longer presenting the peculiar appearances of the disease; the secretion of urine is re-established; the nausea, thirst, and pains in the stomach, which have, perhaps, lasted for a considerable time, cease to be felt; the pulse becomes regular, and convalescence commences. When reaction is incomplete, the phenomena of the cold period return with renewed severity. In other cases, the reaction is too energetic, and gives rise to apoplectic symptoms, spasms, and convulsions, or produces local congestions and inflammations and, in some cases, latent pneumonia. The patient sometimes, moreover, falls into a state of stupor, and presents some of the characteristic signs of the last period of typhoid fever. Swelling of the parotid glands, various eruptions of the skin, as roseola, urticaria, erythema, erysipelas, miliary vesicles, etc., manifest themselves towards the close of the disease.

The average duration of cholera is from one to three days;

but it sometimes strikes like a thunderbolt, producing death in less than six hours. At other times, on the contrary, the struggle is more prolonged, having lasted, in one case, fifty days. Convalescence is rarely free and rapid. Great feebleness, anorexia, gastralgia, or gastro-intestinal derangement, sometimes so marked, as to demand a special treatment, want of sleep, and other nervous troubles appear, and may persist a long time. When the appetite returns, the vital powers are promptly re-established.

In other cases, health is not restored without extreme difficulty, and the influence of the disease is felt sometimes for months, or even years. In all cases, relapes and a recurrence are much to be feared.

SYMPTOMS.

Having sketched, in a rapid and connected manner, an outline of cholera, let us now endeavor to learn from the study of its principal symptoms the interesting features of each. We have seen that the digestive functions, inervation, and the phenomena of hæmatosis, are most seriously deranged. We shall now review them in the following order:

Precursory phenomena. — We have seen that cholera is often preceded by an initiatory uneasiness, which announces its appearance more or less time in advance. All the more importance should be attached to these prodromes, as they serve to attract the attention of the patient and the physician; thus allowing the immediate application of preventive and curative measures. We cannot, then, pay too much attention to their definite characteristics; their importance has been placed in its true light by Dr. Annesley.[1] According to Dr. Coolidge, quoted by M. Littré, "If one approaches an individual who is beginning to come under the influence of epidemic cholera, he is struck with the langour under which he appears to sink. His pale countenance

[1] *Researches into the Causes of the Diseases of India.* Lond. vol. ii.

wears an expression of anxiety, which is not, however, as it afterward becomes, that of pain; the features are sunken." This peculiar expression is remarked by every intelligent observer. The patient says: "I cannot work, I am not in a condition to do any thing; I don't know what ails me; I have a weight at the stomach, and movements in the intestines."[1] Another observer, M. Prchal,[2] adds the following phenomena: "Pain between the shoulder-blades, racking pain in the region of the epigastrium, borborygmi in the intestines, irritability, a sunken and earthy aspect, a singular expression of the countenance, and a bluish margin about the eyes; these various appearances should lead us to fear an irruption of the disease. Afterwards supervene sudden vertigo, headache, and pains, more or less acute, in the abdomen; in many cases there is dimness of vision, difficulty of hearing, etc. The eye also undergoes certain changes, either becoming more brilliant than ordinary, or resembling that of a person in a state of intoxication. In others, the progress of the preliminary symptoms is different; the appetite being diminished for several days, previous to the appearance of the disease, accompanied by general disagreeable sensations, and frequent alvine dejections, unattended with pain. The matters evacuated are yellowish, become more and more fluid, and at last escape like water. A similar diarrhœa also, sometimes, manifests itself without any previous indisposition, which, if neglected, infallibly results in cholera. Finally, the disease often makes its first appearance without precursory symptoms, and the patient finds himself, at once, in the same situation with one who has passed through all these different stages. The invasion often occurs at night."

Diarrhœa.—The diarrhœa, which most frequently marks the commencement of the disease, becomes at once more and more frequent. The patient has from fifteen to twenty

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[1] *Loc. cit.* p. 10.

[2] *Die cholera beobactet in Gallizien.* Prague, 1831.

dejections, or even more, in the twenty-four hours. They escape in some fatal cases by an involuntary and almost continuous jet. They are often accompanied by colic, borborygmi and gurgling, either spontaneous, or excited by pressure upon the abdomen. The choleric evacuations, in the first place, composed of bilious, fœcal, or sero-mucous matters, quickly assume a peculiar and distinctive character, which attracts the notice of all observers, and which has been perfectly described by M. Bouillaud.[1] They are composed of a whitish floculent fluid, granular, curdled, or very uniformly troubled, sometimes resembling unclarified whey, sometimes thickened milk slightly turbid; and emit a nauseous, spermatic odor analogous to that of the alkaline chlorides. A large floculent sediment is deposited from this fluid on the bottom of the vessel containing it, part of which bears a marked resemblance to well cooked rice. Sometimes, however, the matters voided by stool resemble, in color, the lees of wine, or have a more or less deep brownish color.

The frequency of the dejections is not always increased as the disease progresses. M. le Dr. Valleix,[2] who has furnished an excellent analysis of the symptoms of cholera, saw a sero-mucous diarrhœa, very abundant at the commencement, completely suppressed during the cold period, yet in spite of this cessation, the other symptoms continued their course, and death was the result. It sometimes happens that the stools, thus suppressed, reappear with their characteristic aspects. When, on the other hand, their frequency diminishes on account of the transformation or amendment of symptoms, the evacuations, in becoming more rare, reassume more nearly their proper fœcal consistence and odor, or cease entirely. The diarrhœa may be followed by obstinate constipation.

Vomiting.—Nausea, and repeated, and sometimes almost

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1 *Traité Pratique de Choleraû morbus de Paris*, 1832, p. 435.

2 *Guide du Médicin Practicien*, tom. v. p. 435.

constant vomiting occur in conjunction with the diarrhœa, from the very commencement. The matters are poured forth as if they filled the mouth, escaping by jets or spirts, and, not unfrequently, simultaneously with the alvine dejections. The fluids expelled from the stomach do not differ materially from those which escape from the intestines ; they are, however, sometimes more limpid, and sometimes slightly tinged with bile. The matters vomited are, frequently, almost entirely composed of the drinks which are taken into the stomach ; in some cases, however, the least quantity of fluid introduced into the stomach excites immediate vomiting and alvine evacuations. This symptom generally ceases before the termination of the disease, sometimes early in its course. It very rarely happens that vomiting persists to the second period of the disease. It often alternates or coincides with a very troublesome hiccough.

Abdominal pain. — The vomiting and choleric diarrhœa are frequently preceded by a sort of epigastric anxiety, or a sensation of anguish and embarrassment, not only in the region of the stomach, but throughout the whole extent of the abdomen, the parieties of which are sometimes slightly resistant, sometimes retracted, but very rarely distended by meteorism. This sensation of weight and constriction is sometimes replaced by griping pains, either in the epigastrium or abdomen. It gives a doughy sensation to the hand upon pressure ; and percussion yields almost every where a dull, flat sound, though in some points may be found a hydraeric resonance. It is easy to displace these fluids, which give rise to a sound of succussion or true fluctuation.

Anorexia, thirst, state of the tongue. — Disgust for food and complete loss of appetite coincide with a burning and often inextinguishable thirst. The throat and mouth are parched, the tongue is frequently clean, commonly large, pale, moist, cold, and sometimes covered with a yellowish coat, though very rarely dry. This state of the tongue is peculiar to the first period. It varies afterwards according to the degree of

reaction, or the nature of the complications and secondary symptoms.

Urinary secretion. — From the first appearance of the gastro-intestinal evacuations, the urinary secretion suffers a remarkable diminution, and may become afterwards entirely suppressed. There are a few exceptional cases, in which the urine has remained normal during the entire course of the disease ; the emission however becomes involuntary. In a few cases, the urine, after having become scanty or suppressed, has reappeared in greater or less abundance, towards the middle of the cold period, to become again suppressed, however, during the remainder of the disease. It has been observed also that, although the power of emission was lost, there yet remained a frequent desire to urinate.[1] The flow of the urine is generally re-established, during the period of reaction, especially when this is free and regular.

Cramps. — One of the most characteristic, and at the same time one of the most afflicting symptoms of cholera, consists in cramps, ordinarily violent, prolonged, and persistent, which commencing often with the first evacuations, and confined at first to the calves of the legs and feet, rapidly extend to the arms and abdominal muscles, and even to those of the face. Every physician has observed the abdominal muscles to be in a state of very considerable contraction ; the recti in particular, often assume the appearance of round, tight cords. These cramps, sometimes so terribly painful and acute, as to wring from the unhappy patient rending cries, commonly appear, as we have seen, at the very beginning, and often persist even after the cure. It has been even remarked that, during the course of the epidemic, persons were met with, who presenting no other symptom of the disease, suffered nevertheless extremely painful cramps.[2]

Nor is this all. In some rare cases, muscular contractions

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[1] Valleix, *loc. cit.* p. 442.

[2] Delaberge et Monneret, *Comp. de Méd.* tom. ii. p. 256.

have been observed to occur in subjects in whom life had, to all appearance, become extinct. It appears to us important to report some examples of these extraordinary phenomena, taken from the learned treatise of M. Littré.[1]

"The serf Iran Andrianow," says M. Sokotow, physician at Orenbourg, "died of the cholera, after two hours' sickness. After death he was washed, and while being dressed, there appeared in the body extraordinary movements which terrified the assistants. There were contractions in the feet and hands, bearing a striking resemblance to those produced by the application of galvanism to denuded nerves. In the first place, feeble convulsive movements commenced in one or two isolate muscular fasciculi, especially in the neck and thighs; these movements then extended in a vermiform manner, and spread suddenly to many muscles, in such a manner that the head inclined itself upon the body, the feet became agitated, flexed and raised. "These contractions persisted at intervals for ten minutes, and at last became more feeble and rare and finally ceased. This phenomenon appeared, although with less intensity, upon the body of a man who died of cholera in the Hospital of Orenbourg, six or seven hours after the cessation of all symptoms of the disease." Mr. Marshall, physician at Bengal, also observed two cases in which the convulsions appeared in bodies in which life was supposed to be totally extinct. One of the bodies had been already deposited in the dead-room. In both cases the head shook, the toes were slowly extended, becoming afterwards flexed; the inferior extremities performed a movement of rotation upon the pelvis, by placing themselves upon the heels. The arms executed the movements of pronation and supination, and the fingers performed the movements of extension and flexion. In one case, the contractions lasted ten minutes, and in the other three quarters of an hour. The French physicians

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[1] *Loc. cit.* p. 17.

who were sent to Poland during the epidemic of 1831 observed analogous facts.

Mr. Littré asks if, in these cases, life was really extinct, or if death was only apparent, there being nothing to support the latter supposition; if, on the other hand, the contractions were due "to the persistence, after death, of the cause which provoked them just before; and lastly, if they are not the result of a galvanic action which is produced upon the yet irritable muscles of the body." This last supposition, which is neither repugnant to reason or experience, is interesting in connection with the extraordinary phenomena relative to the atmospheric electricity observed in the epidemics of cholera, and upon which we shall enter more fully into detail hereafter.

Headache; derangement of the senses. — Among the precursory phenomena, and also at the beginning of the disease, we have noticed a sensation of weight in the head, accompanied by giddiness and vertigo, but which rarely amounts to violent pain, and does not generally continue beyond the period of invasion. Proper cephalalgia often appears, on the contrary, during reaction, particularly when this assumes a congestive or inflammatory form. It then becomes very severe. It is generally heavy and more marked in the frontal regions. There exists at the same time a ringing and buzzing in the ears. The sight is generally affected during the whole course of the disease, obscured, sometimes double, or perverted in such a manner that the patient sees objects colored blue, or alternately black and red; it is sometimes completely extinct. The touch and general sensibility are considerably blunted.

Intellectual faculties. — Notwithstanding the grave and multiple affections produced by cholera, the intellect almost always maintains its integrity, and though the power of expression be enfeebled, it is no less certain that the mental faculties remain unaltered; it is only in certain modes of reaction peculiar to the second period of the disease, and

in certain complications, that stupor, and more rarely, delirium occurs.

State of the strength. — To the nervous symptoms above mentioned, is generally joined an agitation which alternates with sleepiness or marked drowsiness. This state, only interrupted by the violence of the cramps returning by paroxysms, is often so profound as to render it difficult to arouse the patient. It continues, moreover, to increase in power to the termination of the cold stage, to give place afterwards either to an entire absence of sleep, or to coma, according to the different modes of reaction. In all cases, there is an almost entire loss of strength, and the limbs, paralyzed by cramps, fall motionless, when these painful contractions cease. The least displacement is insupportable, and most patients, either stretched upon the back, or drawn up in bed, remain in a state of complete immobility, neither uttering a word or complaint for fear of fatigue. Some patients experience from time to time a transient faintness.

Voice. — The voice presents a constant and characteristic alteration, which has been long noticed, not only in the cholera, termed sporadic by the ancient authors, and by Hippocrates himself, but also in the true cholera of the Indies, by Annesley. It changes very rapidly from its state of feebleness at the commencement, to a rough and whistling tone. Sometimes it becomes entirely extinct, and it is hardly possible to distinguish an articulate sound in the feeble souffle which escapes the mouth of the patient. In some cases, however, the voice regains such energy at times, that the patients utter loud cries. Its natural tone returns in proportion as the phenomena of the disease become transformed, and pass from the first into the second period.

Respiration. — Respiration is ordinarily very difficult, and accompanied by an oppression which is sometimes insupportable; its frequency differs singularly in different cases, the number of respirations varying from ten to fifty-two in the

minute.[1] This slowness or rapidity of the respiratory movements does not depend upon the altered condition of the lungs; for percussion gives a perfectly normal sound, and the vesicular murmur is heard pure, though very feeble, except in cases where complications exist, which may occasion various râles.

But it is not only in the mechanical phenomena of respiration that serious troubles are observed; the chemical phenomena seem to be equally changed. J. Davy made analyses of the air expired by individuals attacked by epidemic cholera, and found that it contains not more than a third part of the carbonic acid ordinarily existing in the air expired by a healthy person.[2] Dr. Clauny proved that there is not the least trace of carbonic acid to be found in the air expired by choleric patients.[3] M. Guéneau de Mussy communicated to the Academy of Medicine the result of an analysis of Barruel, who arrived at precisely the same results with Dr. Clauny, and in one case his experiments were upon a patient who had already passed from the cold stage.[4] Finally, M. Rayer has satisfactorily established, in a series of very important experiments, "that the air expired by those laboring under an attack of cholera, who do not present the external characters of asphyxia, contains nearly the same proportion of oxygen as the air expired by healthy individuals, and that the air expired by those cholerics in whom the external characters of asphyxia exist, contains considerably more oxygen than that expired by persons in health."[5] It will be useless to dwell upon the signification of these facts, which demonstrate so forcibly the existence of a highly disordered state of the processes of sanguification in epidemic cholera. It is

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[1] Valleix, *loc. cit.* p. 448.

[2] Annesley. *A Treatise on the Epidemic Cholera.* Lond. 1831, 2d ed. p. 127.

[3] Delpech. *Etudes sur le Choléra*, p. 50.

[4] Séance du Mai. 1832.

[5] *Gazette Médicale.* Paris, 1832, p. 277.

not till the period of reaction that the respiration is re-established, and the inspirations become more complete and energetic.

Circulation. — The circulation is not less gravely affected. The pulse, becoming more and more feeble, smaller and filiform, and almost insensible, disappears entirely at the acme of the algide period. It is nevertheless more frequent than in the normal state. M. Magendie observed that while the pulsations of the heart increase in rapidity, they are constantly losing in strength. The first sound, says he, finally ceases to be heard, and in the last moments of life neither sound is perceptible.[1] The blood, apart from the alteration which characterizes it, moves so slowly, that it will not flow from a vein, or from an artery of medium calibre, the radial or temporal, for example, when opened during life.

This species of stagnation of the blood aids in giving to the surface of the body the bluish tint peculiar to the cold or cyanic stage of cholera. This appears in the first place upon the extremities, upon the genital organs, and in the face, often affecting the entire surface of the body. The violet or livid color sometimes reaches such a degree as to give the skin a very deep hue; this phenomenon, which fails in certain cases, is particularly observable in plethoric individuals of florid complexion.[2] It diminishes and often disappears during the period of reaction. This stagnation of the blood, in its highest degree, may even produce gangrene of the parts farthest removed from the centre of circulation; this has been observed in the nose, tongue, and sexual organs.

Temperature.—The perversion of hæmatosis and of the course of the blood coincides with a reduction of the general temperature of the body. The skin, whose elasticity is diminished, becomes faded, wrinkled and cold, giving to the

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[1] *Leçons sur le Choléra*, p. 29. Paris, 1832.

[2] Boisseau, *Journal Hebdomadaire*, 1832, p. 277.

hand the sensation of that of a reptile. The coldness, first sensible at the extremities, extends rapidly to the central parts; the breath itself is cold, and also the internal surface of the mouth. The expired air has a temperature of only 25° or 27° centigrade (76° to 80° Fahr.) 10° or 12° less than its ordinary standard. Thermometrical researches have given the following results with regard to the exact degree of the reduction of temperature in the bodies of those suffering from an attack of cholera. Dr. Czermack[1] has always observed the maximum degree of coldness in the feet, next in the hands and tongue, face, neck and epigastrum, while MM. Gaymard and Gérardin[2] have always found the inferior extremity of the nose colder than the feet. M. Czermack says he has observed the temperature of the feet descend to 17°, (63° Fahr.) and that of the tongue to 19° (66° Fahr.) and he adds that, below the general temperature of 23°, (74° Fahr.) death was constant. But so low a degree as this must be very rare. M. Monneret, who is more versed than any other person in this kind of observation, has recently proved, by aid of the thermometer placed in the axilla, that in nearly all the subjects who died during the epidemic at Constantinople, in the midst of the choleric coldness or some time after it had ceased, the temperature did not deviate sensibly from the natural state (37°.)—These apparently contradictory results are reconciled when we consider the different parts of the body upon which the thermometrical trials were made, and also the less violent character of the epidemic observed by our learned colleague.

However this may be, the most positive observations establish the facts that the blood circulates but imperfectly and that it shuns the periphery; that the respiration is imperfectly performed, and that from these circumstances there re-

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1 Gaymard et Gérardin, *Histoire du Choléra en Russie*, p. 121.

2 *Lettres sur le Choléra Morbus en Orient.* (2d lettre), *Gaz. Méd.* 1848, p. 845.

sults a considerable reduction in the temperature of the body, of which, however, the patients are unconscious. To use the expression of Mr. Littré: "Every thing pertaining to those attacked with cholera is cold — the skin, the interior of the mouth, the breath, and even the sweat which bathes them. In proportion as the circulation becomes embarrasssed, the source of vital heat, deprived of its nourishment, becomes lower and more feeble; it diffuses itself through the body with less and less force, and warmth seems extinguished before life."[1]

The period of reaction is chiefly marked by the return of warmth, which becomes sometimes very considerable and causes abundant perspiration.

Features. — The aspect of the physiognomy in cholera is so peculiar, that all authors agree in their delineation of its characteristics.[2] The face is very early painfully contracted, and numerous wrinkles furrow the brow. The cheeks become hollow, the lips become thin and are pressed upon the teeth, the most sullen sadness is depicted upon the features, the natural complexion is changed to the livid, bluish tint of the cold stage, the eyes become more and more sunken in the orbit and are surrounded by a dark circle. The expression becomes by degrees lost, and it appears as though the veil of death was stretched over the face of the choleric before life has left his body. At last the shining membrane of the eye grows dim, its surface becomes wrinkled, sinks down, and sometimes becomes dry. The immovable lids leave the globe of the eye uncovered, the inflamed conjunctiva becomes injected and covered with spots of blood, which aids in giving to the countenance an aspect more terrible and sinister perhaps than that of death.

This picture, which characterizes the disease in the high-

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[1] *Loc. cit.* p. 20.

[2] *Loc. cit.* Voy. Bouillaud, Magendie, Gendrin, Dalmas, Delaberge et Monneret.

est degree of the cyanic state, becomes less sombre in proportion as reaction advances. The lividity of the face disappears, leaving it more or less full and flushed. But in all cases, even though recovery is certain, the physiognomy regains its natural appearance very slowly. The lustreless eye, the leaden complexion, the sunken features, the pallid skin, and the extreme emaciation, remain for a long time as visible traces upon the visage of choleric patients.

The details which we have now given suffice to acquaint us with the symptoms belonging to cholera. It remains for us, before analyzing the various forms under which it appears, to study the complications and secondary affections connected with it.

COMPLICATIONS. — SECONDARY AFFECTIONS.

In the course of the different periods of cholera, or even after recovery appears certain, morbid phenomena or various affections entirely distinct from the true constituent symptoms of the disease not unfrequently supervene.

Complications, among which we shall mention principally peritonitis, jaundice, gangrene, œdema of the lungs, erysipelas of the face, abscesses and ulcerations of the eyelids, and apthæ, are quite rare and are apparently accidental.

It is not so however with secondary affections, which, intimately connected with the cholera must not be confounded with complications, and which do not constitute symptomatic forms.[1] They have been constantly noticed wherever the cholera has made its appearance. It is about the middle or towards the close of the second period, or sometimes at the beginning of convalescence, that they are manifested under the most various types. The influence of a warm country gives them a peculiar character. We read in the reports of the

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[1] Dalmas, *Dict. de Méd.* tom. vii. p. 493. *Compend. de Méd. loc. cit.* p. 260.

physicians of Bengal,[1] that "the fever which almost always accompanied the second period of the disease, partook of the nature of the ordinary bilious diseases of these regions." The observations made in Europe, and especially at Paris, have shown that these secondary affections commonly group themselves in four principal classes already indicated by M. Littré, and well described by M. Rayer.[2]

Sometimes they consist in gastro-intestinal inflammations, which appear immediately after the period of reaction, or later, after some days of convalescence. The evacuations caused by this gastro-enteritis are colored with bile, and are totally distinct from the evacuations of cholera.

Sometimes, under the influence of the reaction, inflammatory congestions occur in the respiratory organs. Latent pnuemonia is particularly observed, commencing in the posterior part of the lungs, and characterized moreover by the ordinary physical signs.

In other cases, patients, having apparently escaped the accidents of cholera, are overtaken by a secondary fever, characterized, according to Drs. Keir and Romberg, by a typhoid aspect, dryness of the skin, tension and peculiar tenderness of the epigastric region, inquietude, agitation, dryness of the tongue, bilious stools, and sudden variations in the heat of the body. Swelling of the parotids, and sometimes a painful tumefaction[3] of the sub-maxillary glands, are affections far more frequent than authors have admitted.

The skin is sometimes the seat of eruptions which appear to have assumed very different forms. MM. Rayer and Duplay[4] have especially called attention to this point, which has been confirmed by M. Cullerier, Alibert and many German pathologists. The most common of these eruptions,

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[1] Littré, *loc. cit.* p. 21.

[2] *Des Maladies Consécutives, Gaz. Méd.* 1832, p. 216.

[3] Duplay, *Arch. Gén. de Méd.* t. xxix. p. 373.

[4] *Mémoire sur la Roséole Consécutive au Choléra, Gaz. Méd.* 1832. p. 583.

and which occur particularly in females, often extending over a large portion of the neck, chest and limbs, consist either in patches of erythema, urticaria, or roseola, or in miliary or herpetic vesicles. Rubeola and scarlatina[1] have also been noticed, which, if they are really present, must in all cases be considered as true complications.

But the most characteristic and formidable secondary affections are those which attack the nervous system. The cerebral congestions, so frequent during the period of reaction, are, in some cases, followed by a perfectly characterized meningitis, accompanied by trismus. M. Rayer has described, under the term, "*état cérébral cholérique*," a group of peculiar phenomena, very distinct from those of inflammation of the meninges and brain, which supervene upon the cold period. This is a sort of prolongation of that period, with a diminution or cessation of the vomiting, alvine evacuations, and cramps, and the development of cerebral symptoms; the skin continues cold or cool, the nose is cold, the tongue is yellowish, and sometimes cold; if there be injection of the eyes, it is only upon their inferior parts; the pulse is feeble, the head heavy, the countenance stupid, and in some cases, the tint peculiar to cholera remains. Our learned teacher also observed, in a patient who had passed the cold stage, a sort of non-febrile delirium which continued for two or three days; and in a convalescent, a contraction of the flexor muscles of the fore-arm, occurring suddenly, entirely analogous to the idiopathic spasmodic contraction of the extremities, which may be grouped with those spasms limited to certain muscular fibres, which have been described by M. Magendie, under the term "*réaction fibrillaire.*"

We ought to mention, as belonging to these secondary affections, true intermittent febrile attacks, with initial chills, occurring every day during the period of reaction. This fact,

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[1] Dalmas, *loc. cit.*

first noticed by MM. Dalmas,[1] and Valleix,[2] is not without importance if we compare it with the observations of M. Contour, upon the relation which has existed almost every where in Russia between intermittent fevers and cholera; and, which, besides the disappearance of the former on the manifestation of the latter, and their reappearance, when this has ceased, is particularly shown by the intermittent type which the secondary fever assumed upon the decline of the epidemic. It is useless to remark that these cases differ entirely from those of intermittent cholera, so wanting in accuracy, reported by Drs. Foy, Pigeaux and V. François de Mons.[3]

Whatever may be the nature of these various secondary affections, they present, for the most part, a more rapid course than when existing in individuals not affected with the cholera; this has been strikingly noticeable with regard to pneumonia, which shows a tendency to reappear without any appreciable external cause, has a variable seat, and is a disease of extreme gravity.

COURSE. — DURATION. — TERMINATIONS.

If we now endeavor to review the general course of cholera, we shall see that the disease announced by precursory phenomena more or less marked, characterized at first by the phenomena of the cold stage, if it does not terminate suddenly at this point, undergoes a peculiar transformation, which constitutes reaction; but which, as it differs in different cases, does not involve the necessity of multiplying the forms of disease, as has been done by mistaking certain secondary affections for particular modes of reaction, described under the names of typhoid and adynamic reaction, reaction with persistence of vomiting, etc.

Sometimes the reaction is almost insensible, constituting

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[1] *Loc. cit.* p. 493.

[2] *Loc. cit.* p. 459.

[3] *Gaz. Méd.* 1832, p. 284 et 784.

merely, so to speak, a natural return of the normal phenomena, a gradual passage from disease to health. Sometimes it is free, operating more or less powerfully in the re-establishment of the circulation, hæmatosis, heat, and sometimes even overstepping the proper limits, and disposing the patient to those secondary inflammatory affections which we have already described; lastly, it is sometimes incomplete or irregular, presenting in the same subject strange alternations, which have been very accurately pointed out in the official report published by the academy of medicine.[1] M. Monneret has comprehended and perfectly traced the principal features of this slow asphyxia[2] which characterizes incomplete reaction.[3]

"When a subject has been attacked by a simple or complicated algide cholera, which has but partially yielded to treatment, the cyanosis disappears but imperfectly. The calorification remains feeble, and, so to speak, vascillating. The pulse is weak, soft, slackened, and the respiration irregular, slow and sighing. It is then that the patient, after having presented the symptoms of a short and imperfect convalescence, falls into a state more dangerous than that from which he has just emerged. He preserves his intelligence entirely, sleeps without cessation; his countenance expresses stupor, his movements are slow, thirst and appetite are absent, tongue natural, the abdomen preserves its natural conformation, and the stools are rare or regular, and the patient dies in this state, to which the term typhoid has been improperly applied. The lividity of the skin, fulness of the veins of the face and neck, slowness of the respiration, uneasiness, pectoral anxiety which the patient suffers, feebleness of the respiratory murmur, and the existence of sonorous râles at the base of the two lungs, afford grounds for the belief that these organs with other viscera are the seat of sanguineous congestions.

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[1] *Gaz. Med.* 1832, p. 255.

[2] *Choléra Suffocativa* de Grüd. res loc. cit.

[3] *Léttres sur le Choléra en Orient. Gaz. Méd.* 1848, p. 845.

The course of the cholera undergoes no considerable modification by the anterior existence of any other disease, even when it itself occurs as a complication. In regard to the influence which it seems to exert upon antecedent affections M. Duplay, who has endeavored to estimate it in a treatise,[1] in which it is necessary to make allowances for physiological doctrines, believes that the cholera ordinarily changes the course of the first disease and hastens its final termination. M. Monneret has noticed the same thing in the cholera which he calls the cholera of complication.[2] It is much more doubtful whether cholera ever favors recovery from any disease.

In all cases, the cholera, in its common form, runs its course with great rapidity. Its duration has been investigated by means of extensive statistical researches, made by the central committee of the department of the Seine.[3] It appears from these documents that the duration of the disease, slightly influenced by the age of the patients, whose powers of resistance were in exact proportion to their natural strength and the peculiar character of the secondary affections, was in 4907 individuals, as follows :

In	204	from	1	to	6	hours.	In	125	from	5	to 6 days.
"	615	"	6	"	12	"	"	79	"	6	" 7 "
"	392	"	12	"	18	"	"	171	"	7	" 8 "
"	1173	"	18	"	24	"	"	35	"	8	" 9 "
"	823	"	1	"	2	days.	"	36	"	9	" 10 "
"	502	"	2	"	3	"	"	111	"	10	" 15 "
"	382	"	3	"	4	"	"	19	"	15	" 20 "
"	240	"	4	"	5	"					

It should be remarked that the duration of the disease is shorter at the period of the highest intensity of the epidemic, and also that the nature of certain secondary affections may prolong it beyond the term indicated in the foregoing table.

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[1] *Arch. Gén. de Méd.* t. xxx. p. 29.

[2] *Mémoire lu à l'Acad. de Méd. Union Médicale*, 1848, nos. 40 et 41.

[3] *Rapport sur la Marche, et les Effets du Choléra.* Paris, 1834, p. 70.

M. Dalmas witnessed a case in which the struggle lasted for fifty days, terminating in the formation of a double parotitis which was soon followed by death.[1]

The termination of epidemic cholera, too often fatal in the first period, or following a reaction either too violent, or incomplete and irregular, may, nevertheless, be favorable, the progress of the recovery seeming to vary in different cases. Sometimes, in fact, as we have said, the symptoms of the cyanic or livid period, disappear by true resolution, and in these cases, the convalescence is as prompt as had been the course of the disease. In a few hours, the physiognomy changes; in twelve, or twenty-four hours, at most in a few days, the features regain their ordinary expression. The strength returns with equal promptness; and in a short time the patient who had stood upon the threshold of the tomb, who was cold as marble, pulseless, and in a state of the utmost feebleness, returns to his habitual occupations.[2] It is impossible to receive without reserve the opinions which have been expressed upon the necessary appearance, in this mode of termination, of critical phenomena, as epistaxis, sweating, or evacuations of a peculiar nature, as well as of the metastases which, in other cases, account for the disappearance of the accidents of cholera. These opinions, which accurately observed facts are far from establishing, are without significance, except as doctrines which are at the present time imperfectly understood and commonly wanting in good sense.

Recovery from cholera is often much more gradual than we have above indicated. It is not established until after the long and perilous struggles which the patient is forced to make against complications and secondary affections. Convalescence is still influenced by the gravity of the symptoms, and the difficulty and slowness with which it pro-

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[1] Littré, *loc. cit.* p. 15.

[2] Gendrin, *Monographie du Choléra*, 1832, p. 54. Dalmas, *loc. cit.*

gresses, it would not be easy to describe. There remains, for a greater or less length of time, a general debility, such as is not encountered after any other disease ; the emaciated features, the languishing expression, the unequal, capricious appetite, an obstinate gastralgia, colics, wakefulness, a great tendency to coldness, either partial or general, and an intellectual and moral dejection sometimes persist with great obstinacy ; and it is not rare to see a relapse follow the slightest change of diet or some accidental circumstance. This is not all ; epidemic cholera has been frequently known to effect an entire change in the constitution, temperament and nature of the individuals attacked, if not for life, at least for a very long time.

Without asserting that a grave attack of cholera predisposes to a second, it should be borne in mind that one is not completely exempt from another attack. The most recent observations, however, show that this is a very rare occurrence.

FORMS.

If, during the progress of cholera, varieties are observed in the violence of the accidents, or in the connection of symptoms, we must guard against recognizing essential differences, and reserve the name of distinct forms of cholera, for that group of characters which, modifying the relation of the symptoms and affections, either sympathetic, or complicatory, change the general course of the disease, and give place to special prognostic or therapeutic indications.

Without involving ourselves in the enumeration and discussion of the divisions proposed by a great number of authors ; without stopping to describe a bilious, flatulent, spasmodic, asphyxic, ataxic, and adynamic cholera, which for the most part are only characterized by the exaggeration of one of the ordinary symptoms of the disease, and without here alluding to that species which was very anciently termed dry cholera, an affection probably analogous to the colics of

warm countries, and in all cases very distinct from cholera;[1] we shall admit four forms of epidemic cholera.

1st. The common form or *Grave cholera*, which has furnished the theme of the preceding description; 2d. The mild form or *Cholerine;* 3d. *Foudroyant cholera;* 4th. *Paralytic cholera.*[2]

Cholerine. — We shall reserve for the light[3] form of cholera the term *cholerine*, under which has not only been confounded the mild form, but also the precursory phenomena, and even the period of invasion of the grave cholera; it has thus been said that cholera was often the consequence of cholerine.[4]

Cholerine, which appears particularly at the commencement of the epidemics, or in individuals placed under the most favorable circumstances to become affected with it, is characterized by general indisposition, an unusual depression of the moral and physical powers, insomnia, epigastric uneasiness, a sensation of weight and, sometimes, of heat at the stomach, feebleness of the pulse, which is small, soft, and more or less slow; nausea, borborygma, a clammy dryness of the mouth, thickened, scanty and high colored urine, and alvine evacuations, often analogous in their nature and frequency to those of cholera, sometimes yellowish or colored with blood, but almost always mixed with white mucosities, accompanied in some cases by vomiting. Though cramps are sometimes observed, they are more frequently wanting, and the livid discoloration of the skin, with the phenomena of asphyxia, are never present. The disease may

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[1] Hippocrate, Edit. Littré, t. ii. p. 387, et P. Franck, *Traité de Méd. Prat.* Paris, 1842, t. i. p. 594.

[2] Dr. Pigéaux describes a species of slow or chronic cholera (*Gaz. Méd.* 1832, p. 594), the peculiar form of which it was difficult to detect. As the duration of the disease is not stated, we are unable, in default of this important characteristic, to view it as other than a variety of the mild and common form.

[3] Bouillaud, *loc. cit.* p. 242.

[4] *Rapport de l'Acad. de Méd*, *déjà cité*, et *Gaz. Méd.* 1832, p. 165.

last several days, rarely, however, more than a week, and generally terminates in recovery. Yet it is not uncommon to witness even after these slight cases a languishing convalescence, retarded by various troubles of the digestive functions, in fact almost as tedious as after the gravest cases.

Foudroyant cholera. — There are no epidemics of cholera in which are not witnessed some cases of this "fondroyant" form, in which individuals are suddenly attacked, with or without the precursory phenomena, with vomiting, diarrhœa, cramps and coldness, and die in one or two hours, even before the appearance of cyanosis. Among us, MM. Dalmas, Magendie and Bouillaud, have cited cases of this kind; but sometimes death occurs without the evacuations having taken place, solely from the violence of the epigastric distress and the cramps. M. Dalmas has seen soldiers attacked, when in full march, with vertigo and violent cramps, quit the ranks, lay down their arms, and die in two hours.[1] This might be, strictly speaking, a species of spasmodic cholera; but to recognize in these cases that variety which has been denominated *dry cholera*, would be to lose sight of the intestinal secretion which, if not ejected, is found upon the surface of the intestinal canal.

Paralytic cholera.—Russian and German physicians have admitted a paralytic or apoplectic form of cholera,[2] which predominated in Stettin in August, 1848, and which M. Contour observed at Moscow. It seemed to resemble very much an exceedingly rare form whose description is thus given by M. Magendie.[3] "The access is in general very slow; the patients feel nothing but an excessive weakness and loss of appetite. In the course of eight days they fall into a state of extreme moral and physical depression; the muscles of the face become paralyzed, those of the limbs are in a state of

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[1] *Loc. cit.* p. 491.

[2] Grüdner. *loc. cit.*

[3] *Loc. cit.* p. 7.

complete resolution, the intellect loses all activity, and death occurs in the midst of this general annihilation of the powers." We may add that, according to Dr. Contour, the vomiting and the dejections are often wanting in this form, and that the abdomen is enormously distended by the liquids secreted in the intestinal canal, the muscles of the abdomen, stomach and intestines being without sufficient power to eject them.

In order to comprehend the nature of these cases, which certainly require further investigation, it should be remarked that they are allied to epidemic cholera by the conditions under which they become developed and by the peculiarity of their precursory phenomena; they, however, still remain clouded in great obscurity.

CHAPTER III.

PATHOLOGICAL ANATOMY.

The alterations found in the organs and fluids after death from cholera are far from bearing always a just proportion to the severity and multiplicity of the symptoms which we have just passed in review. There are those, however, which should be mentioned as almost constant and as characteristic; such as exist in the composition of the blood, in the aspect of the gastro-intestinal mucous membrane and the serous surfaces and, lastly, in the state of the nervous centres.

External surface.—In referring to the description already given of the physiognomy of those dying from cholera during the last moments of life, and recalling to mind the circumstance that death had already impressed upon them its seal before life was yet extinct, we shall at once comprehend how the exterior aspect of the dead body differs so little from

that of the living patient. Indeed, when death occurs before the disappearance of the livid discoloration, the surface of the body retains a violet hue unequally distributed, and which gradually abandons the inferior extremities. The general emaciation, especially marked in the face, the lividity of the lips and nostrils, the black color and rapid desiccation of the membranes of the eye in those parts left uncovered by the lids, constitute the distinguishing characteristics by which we recognize the body of one dead from cholera. The reduction of the temperature, sometimes so considerable during life, explains the slowness with which the cooling of the body often takes place, notwithstanding the assertions to the contrary of MM. Gaymard and Gérardin.[1] It is certain that a body whose temperature is already in equilibrio with that of the surrounding objects, has but little heat to lose compared with those which have died of other diseases than cholera. It is still more difficult to comprehend, whatever may have been said, how the face and hands should become warmer eight or ten hours after death than they were at the moment of its occurrence. It is, moreover, not rare to find a considerable rigidity before warmth has disappeared, which is owing to the fact that death occurred while the muscles were in a state of violent contraction.

State of the digestive organs.—The alterations which the digestive organs present are of a different nature, but equally remarkable.

The exterior of the intestinal mass offers a very peculiar aspect. The peritoneal surface is, in all cases, sticky and shining as if varnished, and covered with such a viscidity, that, according to M. Contour, long whitish filaments are formed between the convolutions when they are separated. The engorged vessels of the mesentery impart to them an almost general violet color. The calibre of the intestinal canal is more often increased than diminished.

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[1] *Gaz. Med.* 1832, p. 40.

The digestive tube always contains a certain quantity of fluid which is composed of choleric matters. It is sometimes so completely filled, that the latter spirts out violently if the least puncture be made into the distended intestine. We have already indicated the characters of this fluid when discharged from the body either by vomiting or stool. It now remains for us to point out some peculiarities revealed by autopsy. It is observed, in fact, that the fluid differs slightly according to the portion of the intestine in which it is contained.[1] In the stomach it is sometimes as fluid as water, sometimes thick and mingled with a viscid substance. In the superior part of the intestines, the fluid, considered generally, is frequently gray, yellow, greenish yellow or white; sometimes it is rose colored, sometimes reddish, but almost never livid; it is at the same time thick or of a milky consistence. In the second portion it frequently becomes livid, partakes of a lilac hue, and is sometimes of a bluish color, and is much more fluid than in the first portion, sometimes even of a watery consistence. Finally, in the third portion, it is still more frequently of a livid or lilac hue; it has been seen even of a chocolate color; it presents also a remarkable fluidity. In short, in proportion as we descend lower in the intestinal canal, the fluid increases in color and diminishes in consistence.

All authors have noticed the presence of a denser substance which floats in the intestinal fluid and coagulates with great facility. M. Contour in his recent observations, by which he was enabled to make a great number of autopsies at Moscow during the last epidemic, has confirmed this fact. He saw adhering to the mucous surface of the intestinal canal, a soft, white or grayish substance, in some cases resembling a kind of paste of variable hue, and which was easily removed by scraping or washing, leaving exposed the free mucous membrane. It appeared to this excellent

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[1] Valleix, *loc. cit.* p. 466.

observer, as to the authors of the "*Compendium*," that this adherent layer might be the deposit of the coagulable portion of the choleric fluid, although it was sometimes too abundant not to be considered as the direct product of a new secretion, and although, in other cases, found with the same characters upon the mucous membranes which had not been in contact with the choleric fluid.

Dr. Parkes, in a work which he has just published upon the pathology of Asiatic cholera, sums up, in the following manner, the characters of the fluid found in the intestinal canal.[1] "This fluid," says he, "is of a bluish color, bordering on gray; the longer the disease continues, the deeper becomes the tint, a circumstance which should be attributed to the passage, in a greater or less quantity, of blood globules; the fluid consisted of a thinner and thicker portion, according to the quantity of the component parts. The thicker portion was flabby, stringy, curdy or clotted. It was not spread uniformly over the surface, but lay in masses here and there, as if it had been deposited from an agitated fluid; some of these masses adhered with considerable firmness to the mucous membrane. The serosity extracted from the intestines thickened by heat; this, however, is an exception, for in most of the experiments, this fluid, like that of the stools, was not coagulable. The reaction was found in many instances alkaline, and nitrate of silver gave a precipitate. These clots of which we have spoken, when treated by caustic potash or carbonate of soda manifested great solubility." These experiments are in accordance with most of the numerous analyses to which the intestinal matters of cholera have been submitted. Dr. Parkes, as also Christie,[2] Lecanu,[3] and Lassaigne,[4] has found the composition of this liquid to be analogous to that of the serum of the blood.

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1 Voy. *Union Médicale*, 1848, No. 110, p. 436.

2 Littré, *loc. cit.* p. 33.

3 *Dissert. Inaug.* p. 108.

4 *Leçons de Magendie*, p. 87.

Nevertheless, it must be remarked that its coagulability by heat is often wanting, and that the reaction given by authors as strongly alkaline, has been stated by R. Hermann to be ordinarily acid,[1] which, it should be remarked, is contrary to most other observations, and especially those of Rose and Wilstoch, made at Berlin for the purpose of verifying the results announced by Hermann. Finally, Dr. Burguières, in the researches sent from Smyrna to the Academy of Sciences,[2] found in the stomach an alkaline reaction, a circumstance entirely opposed to what has been observed in other diseases and also in the healthy state.

When the mucous membrane of the digestive tube is denuded, the following conditions may be discovered. The membrane is variously colored, according to the nature of the fluid by which it has become impregnated. It presents sometimes a blackish tint, owing to the large ecchymoses which are found especially in the large intestines. It presents, more frequently, a reddish coloration more or less bright, admirably described by M. Bouillaud,[3] disposed in bands or points, and owing to stagnation of the blood. M. Contour, in connection with Professor Siewruck, of Moscow, repeated the experiments instituted by M. Magendie, in 1832,[4] for the resolution of the question of the congestive or inflammatory nature of these discolorations of the intestine. Like the learned French physiologist, he saw, in injecting water into one of the gastro-epiploic arteries, the blood give place to the injected liquid, and the redness of the mucous membrane disappear ; a proof that it was caused simply by a sanguineous stagnation by congestion, and not by a vascular obliteration from inflammation.

The thickness and consistence of the gastro-intestinal mucous membrane is almost always normal. It is not found

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1 *Analyses Chimiques* de M. Hermann, in 4to, p. 16.

2 *Compt. rend. de l'Acad. des Sciences*, 2 Oct. 1848.

3 *Loc. cit.* p. 252.

4 *Loc. cit.* p. 82.

really inflamed, softened, ulcerated, or gangrenous, according to M. Bouillaud and M. Bonnet,[1] except in cases where the disease having been prolonged, a secondary inflammation has supervened.

The hypertrophied and prominent villosities give a velvety aspect to the intestinal membrane. The solitary and agglomerate glands are constantly found, at the same time, remarkably developed. According to M. Contour, it is especially in the first stage of the disease, and in the ileum exclusively, that the oval honeycomb, grayish white, and sometimes slightly injected patches are found. These lesions, although constant in cholera, are not characteristic, and exhibit themselves in a great number of other acute affections.

But there is one alteration to which is generally attached a much greater importance, and which placed in the first rank by M. Serres, has given to the cholera the term "*Psorentérie.*"[2] Upon the internal face of the œsophagus, stomach and duodenum, throughout the whole extent of the small intestines, especially near the ileo-cœcal valve, and also in the large intestines, though in a smaller number, are found little hard, opaque, oval, ordinarily dull white bodies, the size of which varies from that of the point of a pin to that of a very small pea, and sometimes so numerous and near together that the whole mucous membrane seems to be covered. They rest often upon a more or less injected base and, when incised, flatten down, leaving only a small elevation. Is this alteration due to a hypertrophy of the solitary glands improperly designated by the name of Brunner's follicles, but which exist throughout the whole course of the intestine; or are these bodies, on the contrary, formed by the intestinal villosities tumefied and united? M. M. Czermak and Hyrtz[3] have endeavored, in vain, to force into their interior, injections

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[1] *Arch. de Méd.* t. xxviii.

[2] *Gaz. Méd.* 1831, p. 206.

[3] Gaymard et Gérardin, *loc. cit.* p. 158.

which have readily penetrated the villosities, and hence their conclusion that these bodies were entirely distinct. The new results obtained by MM. Contour and Siewruck places the subject in a different light, since these two expert anatomists have satisfied themselves, by the aid of the microscope, that it is easy to inject these corpuscles simultaneously with the intestinal villosities. However this may be, this alteration loses much of its value, if we consider, on the one hand, that in a certain number of cases of epidemic cholera it is wanting, and on the other, that it appears in various degrees in some other affections.

The organs annexed to the digestive canal do not appear to be the seat of any particular lesion.

The liver is rarely increased in volume; it is ordinarily found gorged with black blood. The gall bladder is ordinarily distended with thick, stringy, viscid and deep colored bile. It was in exceptionable cases, that Jachnichen, Annesley, and Dr. Contour, found it transparent and discolored. Hermann, who submitted it to analysis,[1] found no difference between the bile of cholerics and that of a healthy person, except that the first has more consistence, is of greater density, and contains a larger proportion of resin. The biliary ducts are not obstructed.

The pancreas presents no marked alteration.

The spleen, in cases of rapid death, is small, hard, and wrinkled upon its surface, of a deep color, presenting, sometimes, ecchymoses, or even, in the substance of its tissue, true apoplectic clots. When the course of the disease is prolonged, it may be found slightly increased in size, less deeply colored, and sometimes of a beautiful vermilion red.

State of the blood and organs of circulation. — The alteration of the blood in epidemic cholera is so striking, that it has attracted the attention of all observers; it relates to its physical qualities as well as to its chemical composition.

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[1] *Loc. cit.* p. 22.

The blood of those attacked with cholera is so thick, that it will not flow from the vessels; its consistence is viscid, and very analogous to that of varnish. It is black in the arteries, as well as in the veins; and, as has been established by M. Rayer,[1] even prolonged contact of atmospheric air reddens it much more slowly, and much less deeply than normal blood. Left to itself, choleric blood coagulates; but the separation into clot and serum is very incomplete; the clot is brown, and mottled with spots, more or less deeply colored. Notwithstanding contradictory observations, it does not appear, from the researches of M. Donné,[2] that the globules are altered in form. We only know from an observation of Hermann,[3] that they are rapidly destroyed after death, and that only imperfect traces of the globules can be discovered by means of the microscope. Chemical analysis demonstrates, in the blood of those who have died of this disease, a remarkable diminution of the proportion of water and neutral salts, and also a decrease of fibrin and albumen. It is doubtful if a large amount of urea be found in it, even in cases in which there has existed suppression of the urine; this is the opinion of O'Shaughnessy. The serum which is much less abundant than in the ordinary condition, since, instead of 55 parts in 100, its proportion is but 33 per cent., is of considerable density. From 1028, its medium condition in the healthy individual, it rises to 1057, according to the analyses of Thompson and Hermann.[4] The reaction of the serum appeared to O'Shaughnessy[5] less strongly alkaline than in the state of health, often even neutral. It is very evident that Hermann was in error, when he stated, that in those who have died of cholera, the blood gives an acid coagulum and an alkaline serum; the error is obvious in the outset, as well as in the

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1 *Gax. Méd.* 1832, p. 329 et 427.

2 Bouillaud, *loc. cit.* p. 2, 16.

3 *Loc. cit.* p. 10.

4 *Loc. cit* p. 39.

5 *Gaz. Méd.* 1832, p. 109.

results; for, contrary to the best established facts, Hermann states that the serum is acid in the normal state, and on the other hand, we have seen that he assigns an acid reaction to the evacuations, explaining this fact by the loss of free acid, which he says is absent in the serum of the blood of cholerics. All the researches made at Berlin, in England and France, and in Smyrna, by M. Burguières, agree upon this point, that the serum is alkaline, as also are the evacuations. Besides, Hermann came very near discovering his error himself, when he endeavored to explain the difference in his results, by a peculiarity of organization of the Muscovites, whose blood, according to him, was acid, while that of all other nations is alkaline.[1] However this may be, it results from all these analyses, that the alteration of the blood is in relation to the nature of the intestinal evacuations.

The state of the circulatory organs corresponds to the modifications which the blood presents. The heart is sometimes diminished in volume, and flabby. Small ecchymosed spots are disseminated in great numbers upon the pericardium, the surface of which is sometimes viscid. The left cavities are almost always empty, and their parietes contracted. Sometimes they contain a small quantity of blood, either liquid or coagulated. The right cavities are distended by black blood, rarely fluid, and more commonly firmly coagulated, having the aspect of a thick confection of grapes; sometimes, well formed, colorless fibrinous clots are met with. The arteries are generally nearly empty; they sometimes, however, contain a small quantity of thick blackish blood. The venous system of those who have succumbed during the first period, is always gorged with black viscid blood, which M. Contour compares to semi-fluid tar. There exist sometimes very resistent fibrous cords, which ramify in the vessels.

Condition of the respiratory organs. — The pleuræ are, like the other serous membranes, the seat of an extremely

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[1] *Loc. cit.* p. 31.

frequent, if not constant, alteration, which consists in the deposit upon their surface of a glutinous and stringy substance. Small ecchymoses sometimes present themselves in the subpleural cellular tissue.

The lungs are often healthy; they often, also, exhibit at the posterior part, an engorgement, more or less considerable, formed by a sticky fluid of a deep red color, which, in some cases, goes so far as to form the nuclei of pulmonary apoplexy. The inflammation of the lungs, and the pleural effusions which sometimes occur, should be connected with the secondary affections, or considered as true complications.

The interior of the air passages generally presents a discoloration, which results from a powerful sanguineous congestion. They often contain a white, viscid, and stringy mucus, or, as M. Bouillaud, and, more recently, M. Contour have described it, a white creamy matter, entirely analogous to that which lines the internal surface of the intestines. The latter observer has made a remark, which will, without doubt, appear very important, in an etiological point of view; it is in regard to the rarity of pulmonary tubercles, which he found but in three or four cases in more than fifty autopsies of cholera, made in the hospitals of Moscow.

State of the nervous centres. — The alterations which the cerebro-spinal system presents deserve particular attention; for, although far from explaining the formidable nervous symptoms noticed in epidemic cholera, they are, nevertheless, of a nature to give a clearer comprehension of certain phenomena of the disease.

The sinuses of the cerebral and spinal dura-mater are almost constantly found gorged with black blood, sometimes coagulated and adherent to their parietes. The arachnoid is coated with a sort of sticky varnish. In the rachidian canal, it presented to many observers, placed in the most different conditions, to Jachnichen and Markus,[1] as well as to

[1] *Arch. Gen. de Med.* t. xxx. p. 355.

M. Contour, small, whitish, irregular, hard, cartilaginous granulations, from the diameter of a mustard seed to that of a lentil, which, examined under the microscope, appeared to have a fibro-cartilaginous structure. The pia mater is infiltrated with serosity and congested by black and viscid blood throughout its entire extent. This congestion is greater in proportion as death is more rapid. Deposits of plastic lymph are sometimes formed in the course of the vessels, sometimes in variable points and in the spaces between the convolutions. Occasionally, ecchymoses are found disseminated in the substance of this vascular membrane.

The nervous substance, whether it be of the brain, or the spinal marrow which is often healthy, appeared ordinarily to M. Contour to be sensibly increased in consistence and volume. It is also the seat of an almost general congestion and sanguineous turgescence. This state, already pointed out by M. Baron in three young children,[1] appears also peculiar to the first period. If death has been but a little delayed, it is not rare to find, on the contrary, a softening, more or less extensive, of the nervous centres. Finally, secondary phlegmasiæ of the membranes, of the brain and of the spinal marrow, are encountered very frequently at the end of the second period.

The nervous ganglionic system presents no alteration worthy of notice.

State of the locomotive organs.— The muscles, often gorged with blood, retain sometimes the sticky consistence common to organs injected with the blood of cholera.

M. Bégin has noticed[2] a very marked, reddish brown discoloration of the bones and teeth of those who die during the period of asphyxia. This fact, confirmed by a great number of observations, is not, however, constant.

State of the genito-urinary organs. — The kidneys present

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[1] *Arch. Gen. de Méd.* t. xxx. p. 355.
[2] *Gaz. Méd.* 1832, p. 219.

nothing abnormal but the sanguineous congestion common to all the viscera. The bladder, in individuals dying in the algide period, is always closed upon itself, and firmly contracted.

In summing up, it is easy to see the bond which unites these numerous and divers lesions, and connects them with certain phenomena observed during life. The great change which the blood undergoes in its composition ; the diminution of serum and of the quantity of salts, which render more difficult the oxygenation and the circulation of the blood, explain the tendency to asphyxia, and the sanguineous stagnation which is met with in all the tissues and organs and, especially, in the nervous system. To this state of the blood, should also be added, the alterations of the intestinal mucous membrane, which, besides this immoderate and entirely peculiar secretion, which is so closely connected with the change in the composition of the blood, presents also extensive congestion, and an abnormal development of the mucous follicles and villosities of the digestive tube. Finally, it should be remarked that, among the lesions existing in cholera patients, there are those which correspond to the secondary affections and to the complications already indicated in the description of the disease.

CHAPTER IV.

COMPARATIVE HISTORY OF THE VARIOUS EPIDEMICS OF CHOLERA.

We should receive but a very imperfect idea of the cholera, were we to limit ourselves to the exposition of its general characters, neglecting at the same time the general history of

the various epidemics of this disease. It is, in fact, only by the study of these epidemics, that it will be possible to seize upon its distinctive characteristics, singular physiognomy, and perhaps even the nature of the pestilence which we are now considering. We do not think it important, however, to enter into all the details which bear upon this subject; it will suffice to follow out a summary relation of the principal epidemics, dwelling particularly upon those which have raged in Europe, especially upon that which has ravaged France. We shall confine ourselves more particularly to the most recent facts, to those which, least known, may offer more interest and add to the instructions we have already received.

From the comparative study of the different epidemics of cholera, we shall endeavor to deduce some general considerations upon the route and nature of the places over which the epidemic passes, upon its mode of propagation, the phenomena which accompany it and, lastly, upon the mortality which has marked its passage.

In order to render this relation more intelligible, we shall divide the epidemics of cholera into four periods.

A. Epidemics anterior to 1830.

B. Epidemics observed from 1830 to 1832; first in the East and in the north of Europe, next in Paris, lastly, throughout France.

C. Epidemics observed from 1832 to 1836 in America, Europe and France.

D. Epidemics from 1845 to 1848.[1]

EPIDEMICS ANTERIOR TO 1830.

The cholera morbus remained limited for a long time to the places where it originated; but even in these situations it appears to have raged only in the form of an endemic dis-

[1] It is almost indispensable to trace upon the map the routes indicated in this study of the epidemics of cholera. The more minute geographical details we have been obliged to omit.

ease, more or less circumscribed, about the mouths of the Ganges. We find, however, that, since the end of the sixteenth century, and during the seventeenth, epidemic cholera has been observed in different isolated spots in Europe.[1] It is nevertheless hardly possible to follow in this direction the progress of a disease upon which we do not possess sufficiently precise data. We must look almost exclusively in the Indies for the first well marked traces of this pestilence. Now, from 1770 to 1790, the cholera was observed under an epidemic form in the southern extremity of Hindostan, along the coast of Coromandel, around the environs of Madras, and even farther south, at Pondichéry and Trinquimale in the Island of Ceylon. There it reappeared many times, especially in the English encampments. Yet, during this entire period, the invasions of cholera bore no other character than that of a partial epidemic, of very limited extent, confined to a very narrow circle, and otherwise much less severe than those which succeeded. The date of this new tendency to spread which the cholera has manifested, and the extraordinary impulse which it has received, is referable to an epoch very near to our own — the year 1817; and it was in Bengal near the mouth of the Ganges that the epidemic commenced, which was about to take such an astonishing range and give the signal for such numerous and terrible irruptions.[2]

Towards the month of May, 1817, after deluging rains, the cholera broke out in the eastern extremity of Hindostan, upon the banks of the Bramahpoutra, whence it extended along the branches of the Ganges, ravaging especially Jessore, Patna and Calcutta. After having appeared succes-

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[1] Voy. p. 4.

[2] In the analysis which we have made of the relations of the different epidemics of cholera, before the year 1830, we have especially profited by the learned work of M. Moreau de Jonnes, to which we shall refer for the most ample details. (*Rapport sur le Choléra Morbus.* Paris, 1831, 2e partie.)

sively along the whole frontier which separates Bengal from the Birman empire, it travelled west, and attacked the English army in November, on the banks of the little river Sind, in the district of Malva. The number of victims is estimated at about one tenth part of the troops. The Europeans resisted it better than the natives. The attack, however, was so sudden and violent, that the men who fell from their horses were unable to rise, and the roads were strewed with the dead and dying.

From this time, the epidemic cholera extended its ravages in every direction, to all parts of Hindostan, from the chain of the Himalaya, 1500 feet above the level of the sea, to the Carnatic, the extremity of the Indian peninsula, and from the eastern to the western coast, showing itself successively or simultaneously, from 1817 to 1818, in Calcutta, Madras, and Bombay. Thence extending towards the eastern parts of Asia, even to the Archipelagoes of the Chinese Sea and the ocean, it appeared in 1818 at Malacca and Manilla, in the Phillipines, in the Molucca islands, and also in 1819 and 1820 in the isles of France and Bourbon, carrying off at first one twelfth part of the population ; finally, later in China, at Macao and Canton, and, afterwards, in 1823, at Nankin and Pekin, penetrating those vast regions either by the maritime coast or by ascending the course of rivers. In another direction, about the same time, from the western side of Hindostan, the epidemic cholera traversed the gulf of Oman, reaching Muskat in 1831, upon the point of Arabia. It extended almost immediately along the borders of the Persian Gulf and, entering Persia by a constant progression, continued its course in a northwesterly direction towards Syria, Turkey in Asia, and finally even to the shores of the Caspian and Mediterranean Seas.

Up to this time the cholera had not made its appearance in Europe ; but it will be seen that, during the six years since it had quitted its point of departure, it had not ceased to advance, and that from the districts of India it had extended by

degrees to the limits of its empire, which embraced not less than 60 degrees of latitude, (from 20° south to 40° north,) and 95 degrees of longitude (from 35° to 130° east); that is to say, from north to south and from east to west, from 1000 to 1200 miles. During this time epidemics of cholera were multiplied in a truly frightful manner; having once appeared in the various points which we have indicated, it did not again abandon them, and according to the most authentic statements, which yet perhaps fall far short of the truth, M. Moreau de Jonnes[1] estimates no less than three hundred and eighty-five outbreaks of cholera to have occurred in Asia, from 1817 to 1823.

During these different epidemics, we see the pestilence traversing the most dissimilar places, from the marshy delta of the Ganges to the arid plains of Persia and Arabia, and from the shores of the ocean even to the slopes of the Himalaya mountains, attacking indiscriminately the most different races and classes of men. The mortality was also considerable; almost never less than one third of those attacked, commonly more than one half, and very frequently two thirds. It was noticed that the cholera in its march most generally followed the great roads of communication, and penetrated the continents by pursuing the courses of the rivers Ganges, Irawaddy, Mei-nam, Tigris and Euphrates. Although the progress of the cholera had been incessant during the space of time which we have indicated, the duration of the epidemic was not constant in each locality; the winter season almost always and nearly every where arrested its activity and checked its ravages.

We left the cholera in 1823 on the borders of the Caspian Sea and on the frontiers of Georgia; it was by this double channel, and at some weeks' interval, that it made for the first time its entrance into Europe. After appearing at the foot of the Caucasus, in the province of Chirvan, at Cha-

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[1] *Loc. cit.* p. 337.

makha and at Salian, which places lost, one, 40 persons in a population of 6000, the other, 30 in 2000, the cholera broke out in the month of September of this same year, 1823, in Astrachan, at the mouth of the Volga. It remained there for about six weeks, but, in this short space of time, out of 216 persons who were attacked, 144 died. It had been preceded by an epizootia, a thick fog, and an insupportable odor.

This first irruption of cholera in Europe was to have no immediate consequences, and was, so to speak, but a warning of the future. It, indeed, now retraced its steps, confining itself again to the places where it first took its rise, and appearing in Hindostan, periodically, from 1824 to 1829, especially at Bengal and upon the coasts of Coromandel and Malabar, only deserting these places for an occasional sally into the north of Asia, and, in 1828 and 1829, by two outbreaks, to appear in the province of Orenbourg, upon the eastern frontier of European Russia, where its invasion, entirely unexpected, coincided with the arrival of the caravans from Upper Asia.

EPIDEMICS FROM 1830 TO 1832.

In this second epoch of epidemic cholera, we may observe, that it appeared again upon the borders of Europe, after having followed the same route as before, without, however, stopping in its course, or retracing its steps; and, finally, after passing through Russia, Germany, and England, made its appearance in our own country to decimate Paris and France. We will follow it then, 1st, in the east and north of Europe; 2d, at Paris; 3d, in the different provinces of France.

1. *In the east and in the north of Europe.*—The route which had already once conducted the cholera to Europe, is the same which it again pursued when, travelling anew in 1829, and in the spring of 1830, over the north of Hindostan and Persia, it arrived at the confines of this kingdom, and attacked Tauris in the month of June of the latter

year. A few days after, it once more entered the Russian empire, at Sallian, and on the 13th of June, 1830, it was in Tiflis,[1] in the centre of Georgia, ready to pass the Caucasus; while on the other side, it spread along the shores of the Caspian Sea. From this time the cholera continued to advance towards the north. Following, simultaneously, three almost parallel lines, one towards the east, another in the centre, the last to the west, it advanced by the first upon Astrachan, where it arrived on the first of August, reaching Penza on the 29th of the same month, and Kazan, September 21st; by the second, it travelled from Tiflis to Moscow, where it broke out the 30th of September, 1830; lastly, by the 3d, it reached Kiev, where it arrived on the 26th of December, to extend itself from there to Mohilev, in the beginning of January, 1831. We should certainly form a very inaccurate idea of the progress of the cholera in these countries, if it was supposed to correspond with the regularity which the points of departure and arrival, as well as the dates of its appearance at the two ends of the lines that we have traced, seem to indicate. Many cities, situated in the intervals, were invaded in an irregular manner; but we should add that very few were spared.

At the same time that the cholera was travelling toward the north of the empire, it was extending upon the borders of the Black Sea, ravaging the south of Russia as low down as Odessa. From the mouth of the Dniester, it threatened Austria. It is to be remarked also, that the epidemic travelled in Europe and Arabia at the same time; devastated Mecca; reappeared at Damas, whence it visited Egypt.

In the centre of the Russian empire, in the old capital of the czars, on this first invasion of epidemic cholera, 8130 individ-

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[1] The dates which we have made use of were all taken from the French calendar, which, every one knows, is twelve days in advance of the Russian. This correction, necessary to the uniformity of the history, will account for the differences which are found in this respect between our statement and that of other authors.

uals were attacked in two months, of whom 4385 perished, and yet it is important to remark, that most rigid precautions had been taken against the generally admitted contagiousness of the disease. Rigorous quarantines were established, not only between each locality, but even in the interior of the cities. At Moscow, in particular, the population was divided into forty-seven quarters, separated by barriers and corps de garde, and completely isolated from one another.[1] Suspected houses were sequestrated. These extreme measures continued in full force till the end of April, 1831.

The period of the severest cold suspended the progress of cholera, but without forcing it from its position, for it renewed its ravages before the end of the winter. Setting out towards the latter part of January, 1831, the epidemic spread from Kiev across the western provinces of Russia, Podolia, and Volhinia, even to the frontiers of Poland, which it passed at the beginning of March, following a body of troops who were marching upon Warsaw. It appeared in this city on the 14th of April. From this point, the pest extended rapidly over the entire territory of Poland, especially over that part which was the theatre of war, where the masses composing the Russian and Polish armies furnished it a large number of victims.

In the mean time, the epidemic made the same progress in the direction of Moldavia, and Gallacia, invading Jassi on the 10th of May. In another direction, at the other extremity of Russia, it marched toward the shores of the Baltic, and attacked the provinces of Courland and Livonia; on the first of June, it was in Riga, and, on the 28th of the same month, in St. Petersburg,[2] in spite of the re-establishment of the sanatory cordons which had been suppressed from 1830 to 1831. On the tenth day of the epidemic, there were already more than 300 sick in the capital of the empire.

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[1] Moreau and Jonnes, *loc. cit.* p. 296.

[2] Grünberg, *loc. cit.* p. 43.

The total number of patients was 13,152, and, out of 430,000 inhabitants, 9,258 died. The same precautions were taken, moreover, against the contagion as in Moscow. From St. Petersburg, the cholera advanced a little later towards Kronstadt, reaching Revel on the 20th of August, and extending to Archangel, in the extreme north, where, in five weeks, it attacked 2000 persons, and out of a population of 19,000, 1200 fell its victims. The Vistula carried it on to Dantzic, just at its mouth, where it was introduced on the 26th of May. Finally it reached Prussia and Austria, appearing simultaneously in Silesia and in Gallicia, advancing into these countries and ravaging Lemberg, where 357 perished in five days; it traversed the Krapack mountains, travelled towards Hungary, touching at Prussia, by the Grand Duchy of Posen, and by Könisberg, which place it attacked on the 29th of July.

The cholera was now in the heart of Europe, and in a few days, the two great capitals, Berlin and Vienna, were simultaneously invested by the pestilence, which was to spare neither London nor Paris.

On the 31st of August, 1831, the cholera made its appearance at Berlin,[1] and it seems to have been less severe here than in other regions. From the day of its invasion to the 12th of the following December, 2230 were attacked, and 1407 died out of a population of 225,000 souls. In a large majority of cases, according to Professor Horn, to whom we are indebted for these details, the influence of occasional causes was established in a most positive manner, such as gross errors of regimen, exposure to cold, neglected colics, diarrhœas. The greater part of the cases of cholera developed themselves in obscure streets, almost inaccessible to the rays of the sun, and to fresh air, and in low damp houses, which often were crowded, and especially those situated near

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[1] Lettré du Professeur Horn. *Annales d'Hygiène, et de Médecine Légale* t. vi. p. 474.

the water; while the quarters composed of large houses, wide and airy streets, were, with some few exceptions, spared. The learned professor observed nothing which seemed to him to favor the idea of contagion. A few cases only occurred among the medical gentlemen, overseers, or attendants of the sick.

At Vienna,[1] after some doubtful cases occurring about the 1st of August, 1831, the flame suddenly blazed forth, on the 14th of September, following a stormy night, after having passed over, unchecked by numerous sanatory cordons, large tracts which remained unaffected. Contrary to what occurred in Berlin, it made its first appearance in one of the most polished and wealthy quarters of the city, and the disease inflicted itself principally upon the richest individuals. The malady preserved its character of rapid malignity a shorter time in Vienna than in almost any other place. There were fewer of those almost immediate deaths, which have been observed in other localities ; in a population of about 300,000 souls, there died of cholera, in six months, but about 2000.

From these two centres the epidemic spread, on the one hand, to Hungary and Transylvania, where its terrible ravages drove the decimated inhabitants to distraction. It is said that of the population of Hungary, which contains nine and a half millions, two hundred and fifty thousand were destroyed. It spread on the other hand to Prussia, and appeared in Breslau on the 23d of September, 1831 ; traversing the borders of the Baltic, from Dantzic to Hamburg, it soon shot across the North Sea, and invaded England by the port of Sunderland, a short distance from the frontiers of Scotland, where it developed itself on the 4th of November, 1831, and where, out of a population of thirty thousand souls, five hundred and thirty-six sickened, and two hundred and two died.

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[1] *Lettré sur le Choléra de Vienne,* par le Baron de Montbel, *Revue des deux Mondes, Avril* 1832, p. 240.

Winter again arrested its progress, and it was not until the month of February of the following year that the disease, again awaking, extended itself in the first place to Scotland and England, appearing in Glasgow on the 12th and in London on the 8th of February, 1832. In this immense city, during the first three weeks of the epidemic, it developed itself slowly, and three months after the invasion, there had been but 2564 persons attacked, of which number 1445 had died. Thus we see that, though in the bosom of a population like that of London, the disease attacked so small a number of individuals, the results were none the less fatal.

The cholera was now in sight of France, which it was soon about to visit. But before following it in our own country, we will anticipate the progress of time, and show the work of this long and fatal epidemic in the north of Europe.

Renewing its ravages in the Spring in almost all the countries which it had overrun, in April, 1832, without speaking of France, the cholera again visited Austria, Prussia, England, Ireland, and Belgium. In the beginning of the month of May, it was upon the frontiers of Switzerland, which, by some happy fortune, has always been spared in all the irruptions of cholera. Toward the end of the same month the disease was again found in Moravia. In June, 1832, it was observed to revive at Odessa and Vienna, and to appear for the first time in Holland, at Rotterdam, and in Saxony. On the 1st of July, at the same time that the cessation of the cholera throughout the entire extent of the Russian empire was announced at St. Petersburg, the epidemic broke out in the Duchies of Schleswick and Holstein, and reappeared with more violence than ever at Hamburg and Altona. The same occurred at London. On the 13th of July, it showed itself at the Hague; Amsterdam was not attacked till one month later, the 14th of August. At about the same epoch, the epidemic broke out in Mayence, and soon after in Aix-la-Chapelle.

The end of the month of August was the signal for its reap-

pearance in Russia, not only in the environs of St. Petersburg at Kronstadt, but again at the south, on the borders of the Sea of Marmora. The plague reigned then at Constantinople, where appeared, simultaneously, a few cases of cholera at the commencement of the month of September, 1832. These two pests united, however, presented each but a medium intensity, nor did they entail the horrible disasters that might well have been feared.

Finally, until the month of October, Norway and Sweden had escaped, notwithstanding the uninterrupted communication with all the parts of the North Sea and the Gulf of Finland, and with Hamburg, Sunderland, and Newcastle; rigid quarantine regulations were, however, established. But on the 16th of October, the disease showed itself in two or three places upon the coast of Norway, to which it remained limited.

This long epidemic was now near an end, almost every where; it did, however, revive in Berlin, in November, 1832. We shall pass to a general examination of the disease, after having followed it in Paris, and throughout the rest of France.

2. *At Paris.*[1] — From the coast of England, the cholera threatened France, and a few isolated, and perhaps unsatisfactorily settled cases had enabled its near invasion to be foreseen. Two had been observed in Lisieux, about the middle of January, 1832, and two in Paris, the 6th of January and 13th of February. The true epidemic did not actually appear, however, until the 15th of March, 1832,[2] at Calais, whence it

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[1] The details into which we are about entering may be relied upon as authentic; they are taken from the *Rapport sur la Marche, et les Effets du Choléra Morbus dans Paris*, (in. 4°, Paris, 1834,) the excellent work of an administrative and medical commission established by the authorities of the department of the Seine.

[2] We will here rectify an error of the press, which occurred in the *Rapport Officiel* of the commission of the department of the Seine, and has been republished in many works of high merit, especially in the *Compendium de Médecine*, and in the recent article of M. Monneret. It reads in note, p. 12 of the report, in a passage relative to the appearance of the

directed its course at once to Paris. It broke out here on the 26th of March, about seven weeks after its invasion of London.

Four persons were suddenly and almost simultaneously attacked in the rue Mazarine, in the quarters de la Cité, de l'Hotel de Ville and de l'Arsenal, and died in a few hours. On the 31st of March, the fifth day of its invasion, there were, already in Paris, 300 sick, and out of the forty-eight wards of the city, thirty-five were invaded by the disease. The third arrondissement alone was spared. From the 31st of March till the 1st of April, the epidemic diffused itself throughout the capital. It reached its height April 9th, to which day there had been 814 deaths. On the 14th of the same month, eighteen days after its commencement, the pestilence had increased to such a height, that the sick were reckoned from 12,000 to 13,000, and those already dead at 7000. The epidemic remained stationary about six days.

From this moment the disease began to decline; the deaths fell from 756 to 651; on the 30th of April they were 114; and, from the 17th of May to the 17th of June, there were not more than fifteen or twenty a day.

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cholera in Calais, "the 5th of March, 1831;" and our learned colleague has thought, that upon this false date might be founded a conjecture, relative to the probable ulterior march of the epidemic of 1848. M. Monneret expresses himself thus: "It would be difficult to say at what epoch the cholera will manifest itself in Paris. On the 5th of March, 1831, it broke out in Calais, and *only one year afterwards*, the 26th of March, 1832, it arrived in Paris," etc. But to demonstrate satisfactorily that the first date has been altered, it will suffice to cite, textually, the entire phrase of the official report, to which the note in question relates. After the enumeration of the places visited by the epidemic in 1831, these words are found, "and continuing constantly to advance, it crosses the sea, shows itself in England, whence, crossing the channel, it enters France, breaks out in Calais, and soon after in Paris." It was therefore, as has been seen, the 15th of March, of the year 1832, and not 1831, that the cholera appeared in Calais, eleven days only before its appearance in Paris. We have insisted upon this rectification only on account of the importance which an error of this nature receives, being authorized by the report of the Central Committee, and repeated by an author so justly worthy of credit, as M. Monneret.

Towards the end of the latter month, however, the third month of the epidemic, and at the very commencement of July, a very serious return of its intensity took place. On 9th July, 71 persons died, and, on the 18th, the mortality had reached 225. This increased gravity lasted but a short time, and, on the 28th of July, there were not more than twenty-five or thirty deaths per day. The disease confined itself within this limit during the entire month of August and the beginning of September; at this epoch it diminished sensibly, and on the 1st of October, it was considered extinct. This second epidemic presented, at the same time, a longer duration and less gravity than the first. Both ravaged alike the same parts of the city.

The entire duration of the epidemic in Paris was more than six months, from March 26th to September 30th, or "from one equinox to the other." The period of increase in severity was fifteen days, and the period of its decrease was sixty-two, a relation confirmed by the history of all epidemics, which are always longer in their decline, than in arriving at their acme. During its first period, more than two fifths of those attacked died; but after the 20th of April, the proportion diminished to one half. At the beginning of the month it was one third, and a little later even a fraction less. Besides this, numerous variations in the degree of mortality occurred, especially during the period of decrease, and at the end of the epidemic.

On the 28th of March, the cholera spread from Paris to the precincts, and, on the 31st, there were already patients and deaths in nine villages, Charonne, St. Denis, la Chapelle, Puteaux, Arcueil, Vannes, Vaugirard, Grenelle and Passy. Three only of the eighty communes belonging to the department of the Seine were wholly spared through the entire course of the epidemic; Drancy, in the arrondissement of St. Denis, Chatenay and Plessis-Piquet, in that of Sceaux.

In 1832, the population of Paris was 785,862, and that of

the department, 945,698; out of this number, 18,402 persons fell victims to this disease, 12,733 having died in the month of April alone; this furnished the report of 23·42 deaths to 1000 inhabitants. The mortality was essentially the same in both sexes. The greatest number of victims occurred, 1st, among the adults from thirty to sixty years of age, (457 in 1000 deaths;) 2d, among those aged from sixty to one hundred, (301 in 1000;) 3d, among youth, from fifteen years to thirty, (138 in 1000); 4th, among infants from one year to five, (71 in 1000); 5th, and lastly, among those from five to fifteen, (32 in 1000.) But if the number of victims of each age is compared with the number living of the same age, it will be found that infancy suffered more than childhood and youth; mature age more than the preceding ages; and, lastly, old age more than all the others. There is a remark, not without importance, relative to the effects of the cholera upon the military population of Paris. There were at the time the epidemic appeared, 31,598 men in garrison, of whom 811 perished, that is to say, 25.8, in 1000, in spite of the hygienic measures which were so wisely adopted. The central commission, which relates this fact in its very complete and satisfactory report, did not hesitate to attribute this mortality, which was larger than that of the civil population, to the extreme insalubrity of many of the barracks. The ordinary mortality of the city was not diminished during the epidemic. In fact, the total number of deaths amounted in 1832, to 44,119, 18,402 of which were caused by the cholera; 25,717 therefore remained for the ordinary mortality, being about 25,300, which represents the average mortality of the ten previous years.

Finally, to conclude this account of the epidemic in Paris, it has seemed to us interesting, to know the relative mortality, not only in the twelve arrondissements, but also, in the forty-eight quarters of the city, and we have, therefore, compiled the following tables.

RELATIVE MORTALITY IN THE TWELVE ARRONDISSEMENTS OF PARIS, DURING THE EPIDEMIC OF 1832.

1.	IX.	arrondissement,	45·87	deaths in	1000	inhabitants.
2.	X.	"	29·28	"	"	"
3.	VII.	"	29·20	"	"	"
4.	XII.	"	28·32	"	"	"
5.	VIII.	"	27·44	"	"	"
6.	XI.	"	26·67	"	"	"
7.	IV.	"	18·45	"	"	"
8.	VI.	"	16·12	"	"	"
9.	V.	"	14·90	"	"	"
10.	I.	"	12·21	"	"	"
11.	III.	"	11·14	"	"	"
12.	II.	"	9·39	"	"	"

RELATIVE MORTALITY IN THE DIFFERENT QUARTERS OF PARIS, DURING THE EPIDEMIC OF 1832.

1.	Hôtel de Ville,	53	in 1000	25.	Palais de Justice,	20	in 1000
2.	Cité,	52	" "	26.	Faub. St. Denis,	19	" "
3.	Des Arcis,	42	" "	27.	Saint Marcel,	19	" "
4.	De l'Arsenal,	41	" "	28.	Du Temple,	18	" "
5.	Du Jard. des Plantes,	38	" "	29.	Champs Elys.	17	" "
6.	St. Thom. d'Aq.,	38	" "	30.	L'Observatoire,	16	" "
7.	St. Jacques,	36	" "	31.	Faub. la Roule,	14	" "
8.	Des Invalids,	34	" "	32.	Saint Honoré,	14	" "
9.	Ile St. Louis,	31	" "	33.	Porte St. Martin,	14	" "
10.	Marais,	31	" "	34.	Montorguiel,	13	" "
11.	Quinze Vingts,	31	" "	35.	Bonne Nouvel,	13	" "
12.	Marché St. Jean,	29	" "	36.	Faub. Poissonn.	13	" "
13.	Sorbonne,	29	" "	37.	Port St. Denis,	13	" "
14.	Luxembourg,	28	" "	38.	St. Mart. de Ch.	12	" "
15.	Mont de Piété,	23	" "	39.	St. Eustache,	12	" "
16.	Faub. St. Ant.	27	" "	40.	De la Banque,	12	" "
17.	Louvre,	27	" "	41.	Du Mail,	10	" "
18.	École de Méd.	25	" "	42.	Faub. Montm.	10	" "
19.	Lombards,	23	" "	43.	Palais Royal,	10	" "
20.	Sainte Avoye,	23	" "	44.	Feydeau,	9	" "
21.	Faub. St. Germ.	22	" "	45.	Des Tuilleries,	9	" "
22.	De la Monnaie,	21	" "	46.	Mortmartre,	8	" "
23.	Popincourt,	21	" "	47.	Chausée d'Antin,	8	" "
24.	Des Marchés,	21	" "	48.	Place Vendôme,	8	" "

A single glance at these two tables suffices to show what considerable differences the epidemic presented in the various

parts of the capital. Although none escaped entirely, it will be observed that there is really no comparison to be instituted with regard to the intensity of the pestilence, between the most favored quarters in which the mortality was only eight deaths to one thousand inhabitants, and those which experienced its severest ravages, where the mortality was in the enormous proportion of fifty-two to one thousand. It is not less important to observe, that the effects of the epidemic were least felt in the three richest arrondissements, in the best constructed and least crowded quarters, and where ease and luxury most universally reigned. Bearing in mind that the average mortality of the whole city was twenty-three to one thousand, we shall be struck with this consideration, that six arrondissements presented an average above this, and six an average below; that of eighteen quarters were above, while twenty-eight remained below. This is not the place to estimate the conditions, which may account for these differences; we may examine them with more profit by reviewing the various influences favorable to the development of the epidemic cholera.

3. *In the departments of France.*[1] — We have seen that before breaking out in Paris, the epidemic of 1832, showed itself in Calais, in le Pas de Calais, but that none of the intermediate departments had been attacked up to the time when the capital itself was invaded. It was in fact from Paris, as

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1 By a singular circumstance, much to be regretted, which may be attributed to inexcusable carelessness on the part of the higher authorities, serious defects are found to exist in the authentic documents relative to the progress of cholera in France. As no similar work has been undertaken upon this interesting subject, we have had much trouble in making this compilation, having depended chiefly upon what appeared in the journals of that time, and principally in the *Gazette Médicale de Paris*, and upon the official information which we have been able to collect directly in certain localities, or through the administrators of some of the departments. We regret, exceedingly, these omisions, and, perhaps, even errors, in the details, which, in spite of all our efforts, the absence of accurate data has rendered almost inevitable.

the central point, that the disease, radiating in every direction, extended over one half of France.

The epidemic first took a circuit among the departments surrounding that of the Seine ; then, all at once, spreading itself, it reached towards the east as far as Alsace ; southerly, to Corrèze ; more slowly advancing towards the west, to Sarthe, Mayenne, Cotes du Nord, and Ille et Viliane ; and, lastly, passing the northern frontier, it appeared in Belgium.

During the existence of the epidemic among us, forty-eight departments suffered, more or less, from its ravages, and the epochs at which the invasions took place in these various departments are as follows: three were attacked in the month of March, twenty-four in April, eight in May, five in June, one in July, three in August, two in September and two in October. It was only at the epoch of exacerbation which took place towards the month of July, that the cholera invaded the western departments, and appeared in the south ; and it was, particularly, when at its lowest point of intensity, that it was observed to appear in certain isolated places, remote from the central point, and especially in the Gironde and in Bouches du Rhône, while the departments immediately bordering upon this point remained unaffected. It appears, also, that in some of these places, the cholera regained, without appreciable cause, all its former energy ; this was the case at Vannes and at Arles.

Upon the first appearance of the epidemic, and in certain departments into which it had not extended, in that of the Rhone, for example, the first and only victims were individuals who had just arrived from Paris. Those departments, first attacked, suffered generally more than the others, with a few exceptions, especially l'Orne, le Marche, Indre et Loire, Indre, Eure, Eure et Loire, which, attacked very early, suffered proportionably less. The prompt termination of the cholera in the localities last attacked is to be mainly attributed to the nature of the epidemic and to its being on the decline. In the first four months and up to July 9th, the

estimate of the total number of those attacked in the 93 departments, at this epoch, was 120,000, of which 60,000 died.

After these general results, which we shall soon complete by a statistical sketch, we think it useful to give here some special details which we have been able to collect upon a certain number of departments. We shall follow in this very summary recital the alphabetical order.

Aisne. — The appearance of the cholera took place here towards the end of the first fortnight in April. This department was one which suffered most severely.

Allier. — The epidemic was here very mild. The important thermal establishments at Vichey and Bourbon l'Archambault were free from its ravages.

Ardèche. — The invasion of the disease took place about the middle of August; it confined itself in its course almost exclusively to the banks of the Rhone.

Aube. — On the 11th of April the cholera appeared at Troyes, and not until toward the middle of August, probably the 8th, did it return upon Bar sur Aube. It committed extensive ravages over a large portion of the department, a few of the more unimportant localities alone being spared.

Bouches du Rhône. — The cholera broke out in Arles suddenly on the 29th of September. It attacked Marseilles towards the beginning of October. But few died.

Calvados. — It was only from June to August that the epidemic raged in this department, confining itself principally to the communes on the coast near Caen.

Cher. — The cholera did not appear here until the end of May; it was at Sancerre on the 17th of June and continued at Bourges until the 19th of October.

Côtes du Nord. — The epidemic commenced its ravages in this department in the beginning of September and was quite violent.

Eure. — Eure was invaded towards the middle of April, but did not suffer severely.

Gironde. — The cholera broke out here about the 5th of August; on the 6th, three cases were authentically verified. Its ravages however were slight.

Ille et Vilaine. — The invasion took place at Rennes on the 19th of October.

Indre. — On the 15th of April, a patient coming from Paris was found affected with the disease, at Tours. This department suffered but slightly.

Indre et Loire. — The epidemic appeared here on the 19th of April, and was not very fatal. It was extinct by the 16th of August.

Loire et Cher. — The first invasion took place April 19th, by means of a patient who arrived from Paris at Vendôme. The progress of the epidemic here was slow, and its character light.

Loire Inférieure. — Nantes was attacked between the 16th and the 18th of April, and the cholera remained here until October. July 15th it broke out in Batz and in Croisie, where the determinate causes were supposed to result from the rotting of hemp, the putrefaction of a mass of the spawn of cod fish, the salting of fish, &c.

Loiret. — The cholera appeared about the middle of April and raged with violence at Pithiviers; it disappeared towards the 30th of September.

Manche. — The department of Manche, attacked in April, was the seat of a very marked increase in the severity of the disease, at Saint Lô in October.

Marne. — The invasion took place towards the middle of April. The ravages were considerable, especially in the commune of Bazancourt, where, out of a population of 650 inhabitants, there were not ten who escaped the cholerine, 72 had the cholera, and 14 died.

Haute-Marne. — The cholera made its appearance in this department about the middle of April. It broke out in the Hospital of Bourbonne les Baîns in the middle of June, where 5 or 600 soldiers had just arrived from various parts of France, and in three weeks there had occurred 44 deaths.

Mayenne. — Was attacked on the 10th of August.

Meurthe. — The first irruption occurred in May, upon the confines of Meurthe and Vosges, and was without much severity. Nancy was attacked about the first of July; from this day to the 8th of September 136 deaths occurred among 28,000 inhabitants. The epidemic continued with force until the 20th of October.

Meuse. — Was attacked the middle of April.

Morbihan. — The disease commenced between the 16th and the 18th of April. It was at Guers May 20th. The ravages at Vannes were considerable. Towards the month of October a considerable increase of intensity occurred at Belle île en Mer, and at Lorient.

Moselle. — The cholera, which appeared in the beginning of May, ceased at Metz on the 31st of August.

Nièvre. — After the middle of May, Cosne and La Charité were attacked, before the cholera had entered Sancerre which is situated between the two cities.

Nord.[1] — The cholera appeared in the department of Nord, first, at Donai, April 14th, 1832; on the 17th at Valenciennes and at Dunkerque; on the 25th, at Cambrai; May 31st, at Lille; June 1st, at Hazebrouck, and at Avesnes October 6th. The duration of the epidemic for the entire department was more than 8 months; it lasted at Lille 5½ months, from May 31st to the 17th of November. The prefecture of the department was surrounded during a considerable time by places infected with the cholera, and with which constant communication had continued uninterrupted, and yet was not attacked. The population of Lille was 69,073, and there were at least 25 patients in 1000. In the quarters bordering upon the canals and faubourg Saint Sauveur, where the greater portion of the working classes lived in unwholesome cellars, the average varied, being

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[1] *Rapport Generale sur l'Epidemie de Choléra qui a Régné à Lille*, 1832, par T. Lestiboudois, Lille, 1832.

in the first 76 in 1000, and in the second 40 in 1000. It is a remarkable fact, that out of 1731 who were attacked with the cholera, 355 were lace makers, whose life is so wretched, of which number 140 died. Not a physician was taken sick. Throughout this department the epidemic was more severe among the females than the males, as the following table will show.

Patients, 6672 females, 5721 males.
Died, 3123 " 2815 "

In the different arrondissements and in the various capitals of the arrondissements of the north, the number of patients in proportion to the population, and the number of deaths in proportion to those attacked, is expressed in the following table.

	PROPORTION			
	of sick to the population ;		of deaths to the sick.	
	Arondiss.	Prin. place.	Arondiss.	Prin. place.
Donai	1 in 36	1 in 20	10 in 23	10 in 21
Cambria	1 in 38	1 in 43	10 in 23	10 in 25
Lille	1 in 33	1 in 43	10 in 21	10 in 21
Valenciennes	1 in 46	1 in 48	10 in 19	10 in 13
Dunkerque	1 in 173	1 in 52	10 in 16	10 in 16
Avesne	1 in 475	1 in 150	10 in 18 1-2	10 in 17
Hazbrouck	1 in 1156	1 in 7522	10 in 17	0

The mortality, therefore, in the departments of the Nord, was in the proportion of 10 to 20 in 87 patients, and 37 in 1000 inhabitants.

Oise. — The invasion took place on the 1st of April. It appeared, simultaneously, in all the parts of the department.

Orne. — The epidemic appeared a little before the 16th of August.

Pas de Calais. — The cholera, which was in Calais on the 15th of March, did not extend to the rest of the department until the 1st of April; from the 15th to the 17th it was in Boulogne; on the 17th at Arras.

Rhone. — The department of the Rhone was attacked as it

were by accident. At Lyons, situated apparently under so favorable circumstances for the development of the epidemic, a single case only had appeared up to April, 20th, which was that of a female who had arrived sick from Paris. There were in the course of a month some cases of cholerine; but the sanatory state was generally excellent. The rivers were very low, and there were no rains. During the month of May a few cases of cholorine were observed; on the 30th one case of cholera occurred. In June and July there were still noticed affections resembling cholera. On the 25th of July appeared a new case of Asiatic cholera; and on the 16th of August two other well characterized cases. These were the only three cases which occurred at Lyons during the epidemic of 1832.

Seine Inférieure. — The cholera appeared at Rouen on the 7th of April; from the 7th to the 15th there were twenty-five cases. No other portion of the department had been attacked. The disease was particularly severe in the Faubourg Saint Sever, which is very low and moist. From the 16th to the 18th, the epidemic extended to Sotteville and Elbeuf; and afterwards to Dieppe, where the disease, otherwise very light, was extinct by the end of July.

Seine et Marne. — The invasion took place about the 1st of April. All the arrondissements were simultaneously affected, but that of Meaux suffered most severely. In a village of the Canton of Rozoy, the cleansing of a filthy drain was immediately followed by an irruption of cholera. Out of 500 inhabitants, 100 were taken and 50 died.

Seine et Oise. — After the close of March, this department was invaded, and all the arrondissements were successively attacked. At Corbeil, the disease commenced with an individual coming from Paris; up to the ninth day, two cases only had occurred, both of which came from the capital. St. Germain en Laye escaped entirely, and Versailles was mildly attacked.

Deux Sèvres. — The invasion took place at Villedieu, on the 23d of April.

Somme. — Amiens was attacked on the 11th of April. An exacerbation was observed towards the end of August, at which time it extended to Saint Valery, until that period, unaffected.

Haute Vienne. — One doubtful case only was observed at Limoges, on the 12th of April.

Yonne. — The attack commenced about the 16th of April in this department, every arrondissement of which was invaded. The disease began at Sens by a patient coming from Paris.

We shall complete this history of the epidemic cholera in France, during the year 1832, by two tables which we have drawn up for the purpose of showing, 1st, the order of the invasions in the different departments; 2d, the proportionate mortality during the first three months of the epidemic. This last statistic must be considered as but an approximation; for not only does it fail to comprehend the entire course of the epidemic, and all the places which were invaded, but, moreover, I am not sure of having always possessed sufficiently complete documents.

ORDER OF INVASION OF THE CHOLERA IN THE DIFFERENT DEPARTMENTS OF FRANCE.

MARCH.

1. Pas de Calais.
2. Seine.
3. Seine et Oise.

APRIL.

4. Seine et Marne.
5. Oise.
6. Seine Inférieure.
7. Aube.
8. Somme.
9. Aisne.
10. Haute Vienne.
11. Indre.
12. Orne.
13. Loir et Cher.
14. Yonne.
15. Eure.
16. Eure et Loir.
17. Nord.
18. Loiret.
19. Marne.
20. Loire Inférieure.
21. Morbihan.
22. Haute Marne.
23. Meuse.

APRIL.

24. Indre et Loire.
25. Deux Sèvres.
26. Rhône.
27. Manche.

MAY.

28. Moselle.
29. Meurthe.
30. Vosgès.
31. Maine et Loire.
32. Nievre.
33. Corrèze.
34. Cher.
35. Finistère.

JUNE.

36. Ardennes.
37. Allier.
38. Haute Saône.
39. Calvados.
40. Charente Inférieure.

JULY.

41. Mayenne.

AUGUST.

42. Gironde.
43. Ardèche.
44. Isère.

SEPTEMBER.

45. Côtes du Nord.
46. Bouches du Rhône.

OCTOBER.

47. Sarthe.
48. Ille et Vilaine.

COMPARATIVE MORTALITY IN THE DEPARTMENTS INVADED DURING THE FIRST THREE MONTHS OF THE EPIDEMIC.

1. Marne,	in 1000	inhab.	42.78	died.	18. Loire et Cher,	in 1000		2.89	died.
2. S. et Marne,	"	"	" 39.12	"	19. Eure	"	"	1 79	"
3. Nord,	"	"	" 37.	"	20. Meurthe,	"	"	1.70	"
4. Meuse,	"	"	" 27.3	"	21. Eure et Loire,	"	"	1.33	"
5. Seine,	"	"	" 23.57	"	22. Indre,	"	"	1.19	"
6. Aisne,	"	"	" 16.9	"	23. Cotes du Nord,	"	"	0.836	"
7. Yonne,	"	"	" 15.81	"	24. Maine et Loire,	"	"	0.830	"
8. Oise,	"	"	" 15.2	"	25. Finistere,	"	"	0.72	"
9. Aube,	"	"	" 13.98	"	26. Indre et Loire,	"	"	0.68	"
10. Seine et Oise,	"	"	" 10.1	"	27. Ardennes,	"	"	0.62	"
11. Haute-Marne,	"	"	" 9.97	"	28. Calvados,	"	"	0.50	"
12. Somme,	"	"	" 9.55	"	29. Vosges,	"	"	0.49	"
13. Pas de Calais,	"	"	" 5.08	"	30. Haute-Saone,	"	"	0.44	"
14. Loiret,	"	"	" 4.15	"	31. Allier,	"	"	0.28	"
15. Nievre,	"	"	" 4.10	"	32. Manche,	"	"	0.18	"
16. Seine Infér.	"	"	" 3.8	"	33. Deux Sevres,	"	"	0.17	"
17. Moselle,	"	"	" 3.01	"	34. Orne,	"	"	0.092	"

A superficial examination even of these two tables confirms some of the general considerations into which we have

entered upon the epidemic of 1832, in the departments of France. They show, in fact, the order of the appearance of the disease in the different points of territory and, in a manner sufficiently exact, the relation which existed between the gravity of the epidemic and the suddenness of the invasion.

We shall limit ourselves, before concluding this subject, to the remark that, out of the 86 departments of France, 38 were absolutely spared; and that the latter were principally those of the east and south. Aside from the isolated irruptions which have been indicated in some points of these regions, Ardèche and Bouches du Rhône, for example, it is very remarkable that the lines followed by this pestilence, and diverging from Paris, were not interrupted, and that the departments crossed in their passage were all invaded. There is a double restriction to be made, however, upon this remark. On the one hand, the order of invasion was not always in regular succession from the centre to the extremity of the line passed over; on the other hand, in those departments, even where all the arrondissements were attacked, there were always a certain number of cantons or villages spared, there being, generally, no evident local cause to account for this immunity.

EPIDEMICS FROM 1832 TO 1845.

While the cholera continued to ravage Europe, and at the precise epoch when it raged with renewed violence in France, it crossed the ocean for the first time and invaded the new world. It appeared in Canada June 14, 1832, and in New York at the commencement of July. The ravages of the epidemic were here most frightful; from the 3d to the 31st of July there were 3850 attacked, of whom 1156 died. On the 18th of August the number of deaths was already 2680. It reigned in Philadelphia during August and September, 1832. We are not able to follow, in detail, the course of the cholera in America. We shall

only here remark, that it remained there for a long time; as cases of it occurred in Havana as late as the month of April, 1833.

In the mean time and at a still later period, the disease penetrated Spain and the coasts of Africa, where it raged from 1833 to 1834. Thence it extended a second time to France, limiting its ravages to those parts which had before been spared, that is to say, to the southern departments.[1]

It was in the month of December that the cholera reappeared in France. It broke out almost the same day in the two most frequented ports of the Mediterranean Sea; in Marseilles on the 11th, and in Cette on the 13th. The epidemic confined itself to Marseilles during the whole winter; it disappeared from there April 18, 1835, before any other commune of Bouches du Rhône had been attacked, and it was only fifty days after that it made its appearance in St. Chamans and Grasse, in the former about June 1st, and in the latter one week later. The epidemic did not cease entirely at Cette until September, 1835; to this time, deaths had continued to occur at short intervals.

From these last points the cholera rapidly spread in Hérault; in the beginning of January, 1835, Bourigues, a little village separated from Cette by a large pond, and Sérignan, which is about twenty miles distant from it, were already suffering severely. Agde, a maritime city, situated at the mouth of the Hérault, was invaded in May.

The cholera did not penetrate into Var until the 20th of June, more than six months after its appearance at Marseilles and Cette. The first case was verified at Toulon, where the disease acquired in a few days much severity, and from whence it rapidly spread throughout the department, and also into Bouches du Rhône, returning thus to

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[1] *Rapport sur le Choléra Morbus Asiatique, qui a Régné dans le midi de la France en* 1835, par les Professeurs Dubrueil at Rich. Montpellier, 1836, in 8mo.

Marseilles, July 5th. At the same time it extended itself from Agde to a great number of towns in the arrondissement of Béziers, some of which suffered severely; it spread also from Cette into the arrondissement of Montpelier, where its ravages were slight. Aix and Arles furnished successively numerous victims.

The departments of Gard, Vauclause and Drôme were successively invaded. Its presence was again felt at Beaucaire on the 14th of July, and on the 19th at Avignon. Towards the end of the same month, Aude, bordering upon the arrondissement of Béziers, was also attacked in course; the epidemic broke out on the 27th in Gruissans, a little peninsula washed by the Mediterranean.

Of these seven departments, invaded in the south of France, five were situated upon the shores of the Mediterranean. The epidemic made but little advance in the country, into which it had hardly penetrated, except by Valence, in the department of the Drôme, a little more than two and a half or three and a half miles; it constantly confined itself to the seashore, leaving, first Marseilles and Cette, and afterwards Agde and Toulon.

The cholera ravaged the south of France, from the 11th of December, 1834, to the last of October, 1845. During all this time, except during the last month, it continued to rage in Hérault; its ravages in Bouches du Rhône were suspended only fifty days, and it raged in Var to the very end. It lasted in the department of Vauclause, only from July until October; and in those of Gard and Aude, from July to September. Finally, it reigned without cessation, for ten months.

The Bouches du Rhône suffered the greatest mortality; the epidemic raging among 319,614 inhabitants, especially at Marseilles, Aix, Arles, and in some small towns. Var also suffered much. This department, containing 305,096 inhabitants, lost by the cholera, 3941. This mortality resulted in a great measure, not only from the intensity which

the epidemic presented in Toulon, but also from the great number of places which were attacked.

Hérault escaped with much less loss; out of a population of 324,200 inhabitants, only 1252 were attacked, although the cholera prevailed there a much longer time. Agde was the only city which really suffered; the other places attacked in this department were small, and of little importance. Gard[1] lost but 944 out of 334,164 inhabitants. It was, moreover, one of the last departments attacked, and none of the large cities which it contains seriously suffered. The mortality in the department of Vauclause was 443 in a population of 224,431. Nearly one half the deaths occurred in Avignon alone; in most of the townships, the number was not above thirty. Aude lost but 229 inhabitants out of a population of 263,000; this department, the last invaded by the epidemic, was first delivered from it. It penetrated but fourteen townships, and raging with severity only at Castelnaudary and Gruissan alone. Finally, the mortality for the six departments amounted to 11,416, in a population of 1,770,505 souls, giving us the average of one death in 155.

In other respects, the epidemic of the south of France, did not differ materially from that of Paris, except that the two sexes were about equally affected, 1087 deaths occurring among the males, 1084 among the females.

The cholera remained limited, in France, to Provence and Dauphiné; Grenoble and Lyons, although seriously menaced, were not attacked. But the scourge extended with great violence into the north, and even to the centre of Italy. Turin, Leghorn, Genoa, Florence, Venice, Rome, Naples and Palermo were invaded by the epidemic, in 1836-7; the three first cities suffered severely; as in Naples, during the months of October, November and December, 1836, April, June and July, 1837, there had not then been less than

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[1] *Tableau Statisque du Choléra dans le Department du Gard*, par M. Rivoire, Septembre, 1835.

21,066 deaths, giving an average mortality of from fifty-five to sixty in a hundred patients. Finally, at Palermo, in 1837, no less than 25,000 persons fell its victims, one fifth part of the entire population. At the same time, the northern countries of Africa, and especially Algiers, were, in a like manner, decimated by this scourge. Greece was spared, as had been Switzerland in the centre of Europe.

After having traversed this immense circle, the epidemic cholera again sought the places whence it came. It had spent seven years in overrunning the world, and after having ravaged these divers countries, returned to its original point of departure.

The general consideration of these different epidemics we shall treat hereafter, first tracing the history of the last irruption, the most recent of all.

EPIDEMIC FROM 1845 TO 1848.

It has been the fate of our age to witness the cholera again in its course through the world, and pursuing, with astonishing fidelity, the same tracks which had already marked its passage.

Starting from the borders of the Ganges, traversing the Hindostan, at the kingdom of Lahore, the epidemic appeared in Tartary in the month of September, 1845. Two months later it was in Persia, at Taharan. Thence the scourge appears to have taken two different directions. One of the two branches advancing from east to west, through Bagdad and Mecca, where the cholera raged in December, 1846, and destroyed 15,000 out of 100,000 persons, is probably that which has since ravaged Egypt. The second branch spreading toward the north, reached Tauris, and on the 18th of October, 1846,[1] attacked the Caucassian provinces,

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[1] It should be recollected, that the dates which refer to the progress of the cholera in Russia, are twelve days in advance of the Russian calendar, which is followed in the most recent accounts of this disease. It is, more-

which it entered, for the third time, by way of Sallian. From this moment the cholera invaded the Russian empire, and extended towards the north-west by two nearly parallel routes. The first coasted along the western shore of the Caspian Sea, whence the epidemic, very mild during the winter, attacked Derbend and the fortress of Temir Khan Choura, at the mouth of the Tereck, on the 16th of May, 1847, and Astrachan, on the 16th of July, whence it ascended the Volga, finally reaching Kazan, where it burst forth on the 17th of September. It is related that some individuals going to a fair, carried the disease from Samara, situated on this line, upon the borders of the Volga, to Orenbourg, in the eastern frontiers of the empire, where it will be remembered the scourge had already appeared in an isolated manner. The second route toward the north was from Tiflis, where the cholera appeared on the 9th of June, 1847, following the great military road from Tiflis to Moscow. The cholera advanced thus upon Georgievsk on the 12th of June; upon Novo-tcherkask, the 30th of July; traversed successively the governments of Kharkov, Voronej, Orel, and Toula; arrived at Moscow on the 30th of September, extended into the environs from the 18th to the 30th of December, and reached Tver, where the winter arrested its progress.

At the same time retracing its steps, the cholera travelled from Tiflis toward Erzeroum and Trabizond. Following then the borders of the Black Sea, it reached Constantinople, where it made its appearance on the 24th of October, 1847; it attacked Redout-kale by the eastern coast, and extended

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over, to that of M. Contour that we are referred, not only for its completeness, but because all the figures were furnished him directly by the chief officer of the "*Direction Médicale Civile*," in the department of the interior at St. Petersburg, the learned Dr. Richter, who transmitted them to him in his own hand-writing. We have not, therefore, hesitated to accept the documents of M. Contour as official. With regard to the progress of the epidemic out of Russia, we have gathered our information from a few particular works, and the prominent journals, chiefly the "*Union Médicale*," which principally contains the news relative to the cholera.

even to Anapa, on the confines of Circassia, where it arrived the 1st of September; then to Taman, whence, traversing the Desert of Kertch, it passed into Crimea.

Besides the route from the east and that from the centre, which, passing by way of Novo-tcherkask, extended towards the north, a third detached itself from the second at this point, proceeding westward. Rostov and Taganrog, on the Sea of Azof, near the mouth of the Don, were first attacked on the 24th of July and the 2d of August, 1847. Thence it arrived at Ekaterinoslav, upon the Dnieper, on the 17th of September. It ascended the course of the river, appearing, October 5th, at Kiev, whence it extended a little to the west, to Podolia and Volhinia, without committing any great ravages; it reached Scherwigov on the 9th of November, and Mohilev on the 12th of the same month, and above this last city to Vitebsk, where it arrived December 26th, 1847. It was at this point, situated upon an elevation not far from that of Moscow, but much more westerly, and on the route to St. Petersburg, that the cholera, benumbed by the cold, was again arrested.

Its activity soon returned with the spring; and not only did it renew its ravages at Moscow, at Tver, and in those places where it had been arrested, but it continued its ascending course, and appeared at Saint Petersburg on the 8th of July, 1848.

We have seen that the cholera invaded Constantinople, October 24th, 1847; its progress was not checked until the 17th of December; towards the end of February, 1848, it appeared to have ceased, but on the last of May, a slight exacerbation was felt. In the month of December, 1847, the disease spread itself upon the banks of the Euphrates. In April, 1848, it attacked Aleppo, and in July, Smyrna, where it made, at four or five different times, considerable ravages.—At the same epoch, the epidemic extended from Syria to Egypt. It appeared at Cairo on the 16th of July, 1848; at Alexandria on the 25th; and in one month and a half in Egypt alone, more than 25,000 had fallen victims. Station-

ary in the mean time, during the month of August, at Smyrna and upon the Dardanelles, crossing to Trabizond, it invaded Salonica, on the eastern coast of Turkey in Europe, on the 7th of August, where it made terrible havoc. Thence, in a few days only, it extended itself over a very small space in the north of Greece.

We have seen that, at the end of the year 1847, the cholera, upon the southern and western frontiers of the Russian empire, approached Moldavia and Wallachia. It appeared in Jassi,[1] on the 4th of June, 1848, and soon after at Boukharest.

If we now return towards the north of Europe, we see that at the end of June, 1848, and nearly at the same time that it appeared at St. Petersburg, it broke out anew, with increased intensity, in Kazan, Nidji-Novgorod, Moscow, Tver, and Smolensk, that is to say, at the same time, in nearly all directions. This was the precursor of a renewed advance; it now, indeed, reached Finland and the shores of the Baltic, about the 1st of July, while on the one hand, the decline of the disease was announced at St. Petersburg and at Moscow; and on the other, its appearance in Siberia, and the continuation of its ravages in the Caucasus, it was at Abo, and one month later, at Helsingfors. After having appeared, almost at the same time, at Riga and at Mitau, it attacked Prussia, where some doubtful cases had been observed at Tilsit since the 20th of December of the preceding year, showed itself at Stettin, in Pomerania, on the 8th of August, and at Berlin, on the 20th of the same month, eleven days sooner than in 1831. In the direction of Austria, it stopped on the frontiers of Gallicia, pursuing a northerly course. In the month of September, 1848, it arrived at Warsaw, where were collected a great number of troops encamped in very damp situations. At the same time, on the 1st of the month, it appeared at Dantzic and Hamburg, and a little later, on the 23d, at Lubeck.

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[1] *Mémoire sur l'Epidemie qui à Régné à Jassi en* 1848, par le Docteur Bassereau, *Gaz. Médic. Octobre*, 1848, No. 42 and 43.

From the different points on the coast of the Baltic and North Seas, the cholera, following the same direction it had already pursued seventeen years before, crossed the sea and appeared in the British Isles and in Holland. It was observed on the 1st of October, at Amsterdam, and extended on the 18th with increased intensity to Rotterdam, where, notwithstanding the best conditions of salubrity, it raged with much more severity than at Amsterdam, or than in Zelande, the most unhealthy part of Holland. A few cases appeared at Antwerp, in Belgium, but they were observed only in those individuals who arrived there from Rotterdam.

On the 5th of October, 1848, the cholera broke out in Sunderland, England, where, as we have already seen, it made its first invasion in 1831. The first patients were sailors arriving in vessels from Hamburg. Two cases were announced, October 6th, at Edinburgh, and Woolwich on the Thames, and at the gates of London, in the prison-ships. From the 24th of October, the epidemic extended in England, and although its progress was slow and irregular, it soon invaded Hull, Woolwich, London, Uxbridge, Swansy in Wales, and Rickmansworth, in the county of Middlesex; but it was in Scotland that its ravages were most severely felt. On the 22d of October, the bulletin of Edinburgh announced 160 cases and 95 deaths, dating from its commencement.

The epidemic cholera was now, for the second time, in sight of France, and soon after, as before, it crossed the channel. Some weeks after it appeared in London, its presence was noted on the borders of France, in the departments of Nord, and of Pas de Calais.

Dr. Lequoy announced the appearance of the cholera at Dunkirk, in the following terms, in a letter dated Nov. 3d, 1848[1]: "The cholera has just reached us; since the 15th of October, there have been thirty cases at Dunkirk, and nine

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[1] *Union Médicale*, 2d Année, No. 131, p. 522.

deaths." On the 5th of October, new cases had appeared in Dunkirk, and in the townships of Watton and Holgue, in the same arrondissement, there had been four deaths. Finally, on the 10th, 11th and 19th, M. Durand Saint Amand, prefect of the Nord, transmitted to the minister of health, many reports containing accounts of deaths from cholera, observed up to this date, either at Dunkirk, or at Bourbourg, by M. le Dr. Demeunynck. The results of these official documents show that there were still fatal cases of cholera in the last named locality on the 18th of November.

The epidemic, without leaving the department of Nord, soon extended to that of Pas de Calais, and committed ravages at Béthune, Saint Omer, and particularly in the arrondissement of Calais, during the first fifteen days of November.

It was very important to verify, in a satisfactory manner, the nature of all these facts; and although it was difficult, on account of the approach of epidemic cholera, and its presence in England, to doubt that the cases observed on the coast of France were really examples of this disease, it was necessary to clear up all uncertainty in this respect.

M. Magendie, president of the board of health, having himself repaired to these places, considered the disease but in the light of a grave cholerine, in which the phenomena of cyanosis, asphyxia, and suppression of urine, were wanting. But notwithstanding that this particular form in no wise excludes the idea of a commencing epidemic, it appears from later information, furnished by the physicians who practise in the specified localities, that the symptoms reputed characteristic, showed themselves in the last cases observed, and that the mortality nearly every where exceeded one half the number of individuals attacked, which facts do not permit us to doubt that the disease was in reality an epidemic cholera. It must be recollected, however, that, up to this time, and in these various parts of the departments of Nord, and of Pas de Calais, the ravages of the disease were almost exclusively confined to the lowest class, consisting of poorly

fed fishermen, who were greatly addicted to the use of potato brandy; but the season in which it appeared, furnished sufficient explanation for the slight inactivity of the epidemic. If we refer to the epidemic of 1832, we find, as at present, that the cholera, arriving in England after having traversed the entire north of Europe, entered France some weeks after its appearance in London. It will be observed, however, that, in 1832, this occurred in the months of February and March, at the close of winter; this year (1848) it was in October and November, at the commencement of the cold season, and we may suppose that, instead of taking up its winter quarters on the other side of the channel, it is upon our side that the scourge will wait to commence its ravages in the approaching spring.

In summing up, and without anticipating the future, we would remark that the day on which we are writing, Dec. 2, 1848, the epidemic cholera, having left, three years since, the lower part of Asia, has, in the mean time, traversed Persia, Syria, Egypt, Turkey in Asia, Turkey in Europe, Russia, Prussia, Germany, Holland, and England, and is even now for the second time, on the threshold of France, which it has already invaded, and still threatens to ravage.

But to return to certain details relative to the principal characters of this last epidemic, whose long path we have followed.

The first point, and one of the highest interest with regard to the progress which the present epidemic, arrested on the shores of France, may hereafter make, consists in comparing the latter to that which raged from 1830 to 1832, both in respect to the dates of its invasion in the same places, and relatively to the mortality. We must endeavor, therefore, to unite the proper elements for the resolution of this twofold question.

The comparison of the dates of invasion for the principal cities of Europe, during the two epidemics, give the following results.

Places.	Epidemic from 1830 to 1832.	Epidemic from 1846 to 1848.
Sallian, - -	June, 1830.	October 28th, 1846.
Tiflis, - -	June, 13th, 1830.	June 9th, 1847.
Astrachan, - -	August 1st, 1830.	July 16th, 1847.
Novotcherkask, -	August 30th, 1830.	July 30th, 1847.
Kasan, - -	September 21st, 1830.	September 17th, 1847.
Moscow, - -	September 30th, 1830.	September 30th, 1847.
Kiev, - -	December 26th, 1830.	October 5th, 1847.
Mohilev, - -	January, 1831.	November 12th, 1847.
St. Petersburg, -	June 28th, 1831.	July 8th, 1848.
Berlin, - -	August 31st, 1831.	August 20th, 1848.
Vienna, - -	September 14th, 1831.	Not appeared.
Hamburg, - -	September, 1831.	September 1st, 1848.
Sunderland, -	November 4th, 1831.	October 5th, 1848.
London, - -	February 8th, 1832.	October 24th, 1848.
Borders of France,	March 15th, 1832.	November, 1848.

We have mentioned in this table only the principal places, and if some variations exist at secondary points, especially in Russia, the striking analogy between the two epidemics cannot fail to be recognized. There were in fact no differences worthy of notice, except at the beginning and end of the epidemics; thus, in order to be in perfect conformity, these two periods from 1830 to 1832 and from 1846 to 1848 ought exactly to correspond; 1830 to 1846, 1831 to 1847, 1832 to 1848. This is not so, the relation existing between 1830 and 1847, 1831 and 1848. The reason of this is, that, in 1846, the commencement of the epidemic which had taken place at Sallian, at the end of autumn, was retarded until the spring of 1847, (9th of June at Tiflis;) while in 1830, the scourge not having appeared until spring, steadily progressed, as in 1847, after the month of June. An analogous difference, but in an inverse sense, exists with regard to the term of these two epidemics; that of 1830 arriving too late at Sunderland (November, 1831,) and checked probably by a severe season, did not reach London until the following year; while that of 1846, arriving at the same point about the first of October, 1848, during a season still quite mild, advanced a little way and attacked London, Calais and Dun-

kerque, three months sooner than in the preceding epidemic.

Aside from these differences, which a simple explanation reduces to a trifling matter, a most constant relation exists between the dates of invasion, and consequently in the progress of the two epidemics, which have attacked the principal cities of Europe in the same order, in the same season, often in the same month, and sometimes on the same day. The most striking difference consists in the immunity which Vienna presented this year, although the scourge approached the centre of the Austrian empire at the same time, by Moldavia and Wallachia, by Gallicia and Poland. Warsaw was also attacked much sooner in 1831, without doubt on account of the movements of troops which took place at this time towards Poland. Constantinople, on the contrary, was invaded later the first time than the second.

The direction of this epidemic, from 1846 to 1848, does not differ from that which has been observed in the one preceding.

It is not easy to arrive at an exact appreciation with regard to its relative intensity, for during most of the time we lack the comparative elements upon this point. It is well, nevertheless, to take advantage of those which we already possess. The most valuable are those which have been officially communicated to M. le Dr. Contour, relative to the Russian empire. We will also add those which we have been able to collect from the other parts of Europe. The following table is an extract from these statistics.

COMPARATIVE TABLE

OF THE INTENSITY OF THE TWO EPIDEMICS OF CHOLERA IN EUROPE.

	1831 – 1832.				1847 – 1848.			
Governments & Cities.	Duration of the Epidemic.	Population.	Patients.	Deaths.	Duration of the Epidemic.	Population.	Patients.	Deaths.
Astrachan.	from Aug. 1, to Sept. 6,	30770	3633	2550	from July 16, to Oct. 1,	45928	2455	1413
Saratov.	" " 19, " 30,	33661	3016	2166	" Aug. 23, to Oct. 5,	50486	5071	3084
Penza.	" " 29, to Oct. 30,	14944	549	319	" Sept. 4, to Nov. 10,	23298	189	97
Samara.	" " "	5648	571	276	" " 20, to Nov. 16,	14825	987	674
Kasan.	" Sept. 21, to Nov. 13,	50245	964	435	" " 17, to Nov. 25,	61104	2481	1274
Moscow.	two months,	——	8130	4385	" June 12, to June 19,	——	1724	728
St. Petersburg.	" "	430000	13152	9258	" July 8, to Aug. 13,	——	5063	2576
Warsaw.	" Apr. 23, to June 25,	90000	3912	1462	" Sept. to Nov. 6,	——	3875	1526
Berlin.	Aug. 31, to Dec. 12,	225000	2230	1407	" Aug. 15, to Sept. 1,	——	377	235
London.	three months,	——	2554	1445	" Sept. 28, to Nov. 25,	——	412	215

Some especial details may be added to the results shown in the foregoing table. Thus we find that, in Russia, from the month of April to August, 1848, there were not less than 505,328 persons attacked; out of which number 210,836 died, more than forty in a hundred, and that the mortality, which was in the first epidemic 1 in 1.7 of those attacked, was in the second 1 in 1.8; also the relation of the number of patients to the inhabitants does not differ materially, giving 1 in 19.6 inhabitants in 1831, and 1 in 19.7 in 1847. In Prussia, at Stettin, from the 8th to the 31st of August, 1848, there were 425 cases and 275 deaths; the cholera raged principally among the working and lower classes, lodged in unhealthy quarters and houses. In England and Scotland, from the end of September to the end of November, 1848, the total number of patients was 1466, that of deaths 694.

It appears from these statistical documents that, with regard to its intensity and gravity, the epidemic from 1846 to 1848 did not differ remarkably in Russia, from the epidemic of 1830 to 1832; that in proportion as it advanced westward its activity diminished, while its severity increased. Indeed, although at Stettin, Berlin and London, the epidemic attacked but a part of the population, situated in the worst conditions; and although in the latter city, particularly, notwithstanding the immense number of its inhabitants, only 412 were attacked during a period of two months, it is nevertheless true, that every where and under all circumstances the gravity of the disease remained the same, the mortality exceeding almost constantly one half the number of patients.

We would still further remark, that the slight activity of the present epidemic, in those countries which it has last invaded, may be principally owing to the lateness of the season in which it has appeared, and that it is not impossible that, on the opening of the warm season, it will assume every where a much greater intensity, at the same time commencing its ravages anew.

COMPARATIVE STUDY AND GENERAL CHARACTERS OF THE EPIDEMICS OF CHOLERA.

The relation which we have just traced between the different epidemics of cholera which have raged in the world would be of little use, did we not seek to discover some of the features common to them, which might lead to a clearer comprehension of the general characters of this terrible disease. We ought, therefore, to institute a comparison between them, and seize that which they present in common, both in regard to their course, direction, and manner of extension, precursory or concomitant phenomena, and, lastly, the effects of the epidemic cholera upon populations.

Course of the epidemics. — If we cast a look behind, and embrace at a glance all its peregrinations, we are amazed at the spectacle of this mysterious scourge, which, in the space of a few years, has almost completed the circuit of the world, attacking in its passage, without mercy and without exception, the most various people, and visiting regions the most unlike. We have seen it, indeed, leave at different times the place of its birth, and advance first towards the east, even to the confines of Asia, and to the islands of the ocean ; then toward the north and west, invading at the same time Africa and Europe, traverse throughout its entire extent northern and central Europe, cross the seas, touch the new world, return from North America, by the southern regions of Europe, to the eastern extremity of the Mediterranean ; approach again its point of departure, and suspend for a time the disastrous course which it was again to commence, at nearly ten years' interval, and which even now it has not yet completed.

It would be useless to return to the detailed enumeration of the places traversed by this fearful disease ; it will suffice to remark how much they vary in their geographical situation, as well as in the nature of their soil, so that, with the exception of the polar regions, the cholera has appeared in almost

all latitudes, and almost at the two extremes of eastern and western longitude. It appears not to have reached a great height above the level of the sea; but it has raged alike in the most arid plains and in the most humid lowlands, in places the most diametrically opposite, in those most exposed to the wind, as well as in the most sheltered valleys. It remains, therefore, to notice in this respect only, the prodigious extension of the cholera whose epidemic irruptions have spared but a very small portion of the globe.

Direction and mode of extension. — But what is particularly noticeable, is the constancy in the direction followed by the principal epidemics; a constancy so remarkable, that the track of this scourge for the future is, as it were, marked out upon the map of the world. Attention has been for a long time attracted to the sort of predilection which the cholera affects, in following almost every where in its progress, the course of rivers or the shores of seas. It is not true that this observation has the signification which has been awarded to it, and that the influence of humidity is here its cause. It is sufficient to remark, that the course of the epidemics is not less frequently over the great land routes. Truly, no sensible conclusion can be drawn from these facts, unless it be that the cholera extends itself by the most frequented routes of communication which connect the great centres of the population. It appears, nevertheless, that it advances more rapidly along rivers and coasts; for, according to the remark of M. Contour, between the 16th of July and the 17th of September, 1847, the cholera followed the banks of the Volga, passed over the 560 miles which separate Astrachan from Kasan, showing a rapidity of 280 miles a month; while by its land passage from Tiflis to Moscow, the epidemic travelled only 800 miles from the 28th of May to the 18th of September; in other words, 222 miles a month. This particular fact, giving it all due importance, does not nevertheless appear capable of generalization; it finds, moreover, an explanation sufficiently plausible, in the vast extent of territory in the

Russian empire, which, especially remote from large rivers, leaves often between cities a considerable distance. With regard to the rapidity with which the cholera advances, considered generally, it is impossible, notwithstanding the calculations of some authors,[1] to say any thing precise in this respect. All that is known is, that its progress is sometimes fearfully rapid.

In the direction followed by these epidemics, the mode of extension sometimes appears very regular, often, on the contrary, irregular. In the former case it is seen to advance, so to speak, with greater or less rapidity, over a regularly ascending route. It has been observed to accompany a body of troops through the Caucausus, and from Kiev to Warsaw; also, merchants from Samara to Orenbourg; and lastly, pilgrims from Damascus to Mecca. But commonly, the cholera, notwithstanding the constancy of its principal direction, does not extend regularly step by step, often clearing, at a single bound, distances of vast extent, and appearing at once in the centre of a province, afterwards to retrace its steps. This capricious course has been noticed by MM. Littré, Contour and Monneret,[2] whose observations perfectly agree. Numerous examples of this fact appeared in Russia during the last epidemic. Thus, in the government of Karkov, the cholera commenced in the northern part, afterwards appeared at the south, extended to the east, and reascended toward the north, above the principal city, which it did not attack until after having a second time descended to the south. Finally, a very important circumstance to be noticed, is the simultaneous appearance of this scourge, in many places separated from one another by very considerable distances, which have in some instances exceeded 120 miles.

There exists, commonly, no relation between the direction of the cholera and that of the winds which come from the in-

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[1] Vérollot, *du Choléra Morbus en* 1845, etc. Constantinople, 1848.
[2] *Gaz. Méd.* Mém. cit. p. 868.

vaded countries. It is only in exceptional cases that this coincidence has been remarked. It was observed especially by Dr. Willemin, in Egypt, where the increase of the cholera appeared more rapid, and its severity greater, in the most healthy and opulent quarters of Cairo and Boulac, which, by their situation, were first exposed to the north winds. But in opposition to this, it should be remarked that upon the line of the Volga, in the last epidemic, the wind blew without cessation from the north, whilst the pestilence proceeded in an opposite direction, from south to north. The progress of the epidemic is much more constantly influenced, and in a more marked manner, by the winter season. Its course has been noticed to be every where suspended, upon the occurrence of severe cold. It has, however, rarely received a final check. Ordinarily, it is a sort of benumbing of the scourge which soon awakens, and again assumes, with the warm season, its fatal activity. From 1830 to 1831 in Russia, from 1831 to 1832 in the north of England, from 1847 to 1848 at Tver and at Vitebsk in the Russian empire ; and even at the end of this last year, at the present moment upon the coast of France, the two principal epidemics of cholera, afford striking illustrations of this effect produced by the approach of winter.

Precursory or concomitant phenomena. — There is hardly an epidemic of cholera, which has not been announced more or less time in advance, by a peculiar medical constitution, characterized ordinarily by a greater frequency of intestinal affections, diarrhœa, dysentery, colics, or gastralgia. This observation has been very recently made at London, where, since the end of July of last year, diarrhœa has been observed to be very common. The same occurred in Russia, at Saratov, at Astrachan, and at Moscow. This influence is not manifested sometimes until the very commencement of the epidemic ; this was noticed by M. Monneret, at Constantinople.

But there are other phenomena less intimately connected

in appearance with epidemic cholera, which, however, frequently precede it. In certain cases, these are endemic or epidemic diseases, which rage with more or less violence before the appearance of the cholera. Thus, in many instances, the influenza has been observed, and it is very remarkable that this pestilential affection showed itself in 1847, in many countries of Europe, in Madrid, London, and also in Paris. At other times, intermittent fevers have acquired an entirely new intensity upon the approach of cholera; this took place in Russia, and has been verified by M. Contour.

Finally, in a great number of cases, the approach of cholera has been announced by epizootiæ; there has been very frequently a coincidence between an attack of cholera and the appearance of some very fatal disease among domestic animals. In India, Russia and Poland, deadly epizootia were noticed among camels, goats, horned beasts, dogs and poultry.[1] Many epizootiæ were also noted in France during the epidemic of 1832, especially among poultry.[2] Upon the appearance of cholera at Paris, Dr. Carrère observed one at Choisy le Roi, and at Bercy, where 500 hens perished in a few days. Others manifested themselves in May, at Calleville, in the department of Eure, at Montluel, in the department of Ain; at Belleville, in that of Rhône; later in July, at Compiègne, in the department of Oise, and near Brest in Finistère. M. Clément Désormes communicated to M. Rayer the description of an epizootia which existed among the carp of the ponds of many of the cantons in the department of Seine et Oise,[3] from the end of 1831 to the beginning of April, 1832. A fact not less striking, and not less significant with regard to the subject under consideration is that of the emigration of certain birds upon the approach of this epidemic. The rooks which lived in a steeple in one of the townships of Calvados, fled before the

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[1] Littré, *loc. cit.* p 128.
[2] *Gaz. Méd.*, *loc. cit. passim.*
[3] *Gaz. Méd.*, p. 287.

scourge. At Glatz, near Könisburg, in Prussia, the same observation was made upon thousands of rooks and daws, who suddenly abandoned their nests upon its approach.

The present epidemic has already furnished similar examples, especially in Russia. At the time when the cholera commenced its ravages, there appeared in the environs of Moscow, an epizootia among the horned animals; M. Siewruck mentions also a great mortality among the hens and rabbits. It does not appear that equally conclusive observations have yet been made in France. I learn from M. Professor O. Delafond, that lately there have been no well characterized epizootiae. There was, however, to my knowledge, an extraordinary mortality among hens, upon the occasion of an extensive clearing of land in the department of Marne, towards the commencement of last year; the same occurrence took place in Burgundy, and especially at Dijon; finally, at Oise, in the department of Calvados, and in those of Maine et Loire, Ille et Vilaine, and of Mayenne, during the months of July, August, September and October, a very severe epizootia attacked the horned animals, swine and cattle generally.

By a singular circumstance, and one which merits notice, the cholera, even when at its highest point, does not exclude other epidemics. We have seen that at Constantinople, in 1832, it was concomitant with the plague. In the months of May and June of the same year, while the cholera was at its height in France, the *suette*, an epidemic vulgarly termed the sweating sickness, appeared in the departments of Oise and Seine et Oise; severe sore throats in Haute Saône, and in Lot, and an epidemic of typhoid fever at Meures, in the department of Haute Marne. These different affections, the *suette* in particular, did not protect those whom they attacked from the cholera. MM. Hourmann, Ménière and Pinel Grandchamp, who were sent to the localities ravaged by the suette, affirm that it developed itself in the cholerics, sometimes at the commencement of the disease, and sometimes during convalescence. We recollect an instance where directly the

opposite occurred, in which the intermittent fevers which raged in Russia before the arrival of the cholera, disappeared during the epidemic, to return upon its decline. M. Contour has observed this same circumstance with regard to another disease. An epidemic of scarlatina prevailing at Sarátov, at the time of the invasion of the cholera, ceased, but returned when the scourge drew towards its close. Nor is it rare to see the medical constitution invest itself, upon the decline of an epidemic cholera, with the same character which it possessed at its commencement. M. Professor Cruveilhier noticed, in 1832, a transformation of epidemic cholera into epidemic dysentery. With regard to the common diseases, they do not appear to have been influenced generally by the epidemic. Thus typhoid fever, very common at Moscow, was not modified during the time that the cholera reigned there; although in that city, contrary to what occurred in Paris in 1832, the mortality from other diseases than cholera, was less than in ordinary times.

Intensity and mortality. — The effects of epidemic cholera have been felt every where with nearly equal intensity. The most diverse races of men have been attacked without distinction; and even all classes and all ranks of society have furnished victims. In the numerous epidemics which we have mentioned, the disease has almost always presented a movement of increase, a stationary state, and a period of decline. Paris offered of this a striking example. In some other cities, especially in Vienna, in 1831, the disease attained after the first week the greatest intensity. We have shown that the ravages of cholera, without being every where equally great, have offered this remarkable character, that the mortality did not vary notably in proportion to the number of patients; also, that it has almost never been below one third, and has generally surpassed one half the number of those attacked. The number of victims to the epidemic cholera throughout the world, during the last thirty years, is truly incalculable.

This constancy of the mortality is the more remarkable, as it does not appear to have been modified by those circumstances, which most commonly diminish the intensity of pestilential diseases. In fact if, in the majority of cases, the mortality in proportion to the number of patients diminished, as the epidemic approaches its termination, it is no less true, that in certain places, at Smyrna and Alexandria, for example, the gravity of the disease did not decrease with the violence of the epidemic; for, even on its decline, a great number of new cases proved very promptly fatal. Lastly, in many places, the epidemic was short in proportion as it was severe. It was prolonged, on the other hand, in those places where its ravages had been less active and severe. We do not think, however, notwithstanding the authority of M. Monneret, that it is admissible to calculate the intensity of epidemic cholera, from the duration of its sojourn, and to seek a proof of the greater benignity of the epidemic of 1848 in the long period of time which it remained in Moscow. In fact, the example of Paris, ravaged six long months in 1832, sufficiently shows that, in the appreciation of the intensity of cholera, we must regard less the total duration than the activity of its period of exacerbation, and the general character of the epidemic. But, with regard to this point, we have seen that there have been no great differences among the various epidemics of cholera, and especially between the last and those which have preceded.

CHAPTER V.

CAUSES.

In commencing the study of the causes of epidemic cholera, it should be remembered that pestilential diseases are among those whose origin and principle it is not given to man to comprehend. There, in the expression of M. Littré,[1] all is invisible and mysterious—all is produced by powers whose effects alone are revealed to us. And yet there is no subject which has given rise to such a multitude of theories and untenable hypotheses. It will not be our aim, convinced as we are of the futility of such attempts, to seek the cause of cholera; we shall be content to accept as a fact, the pestilential principle itself, referring to this principle the epidemic character, the mode of propagation, and the terrible action of the scourge. We ought, nevertheless, to endeavor to appreciate the peculiar circumstances, and the influences more or less well determined, which may affect the development and the extension of the disease. It is to this examination that we shall limit the study of the causes of epidemic cholera.

These then are reducible to influences sometimes general, sometimes individual, whose importance, though secondary, cannot be mistaken. They may be divided into telluric, atmospheric, hygienic, constitutional, moral, and specific. With the latter is connected the question of contagion. We shall study them in this order.

TELLURIC INFLUENCES.

Among the general circumstances by which it has been attempted to explain the invasion and progress of epidemic cholera, one of the first consists in the intimate constitution and revolutions of the terrestrial globe.

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1 *Des Grandes Epidémies. Revue des deux Mondes*, 1836, 4e serie, t. v. p. 221.

This hypothesis which M. Fourcault has quite recently presented with new details,[1] was published in 1832, by a distinguished geologist. In fact, on the 30th of July, while the epidemic raged in France, M. Boubée communicated to the Academy of Sciences his extensive researches upon the progress of cholera, compared with the geological composition of the places marked by its passage. It resulted from this study that the ancient formations were spared, while the tertian and alluvial strata suffered most. M. Boubée concluded that in France the points at which one would most certainly escape the scourge, ought to be the greater portion of Bretagne, Limousin, Auvergne, Cevennes, and the Pyrenees. But to show how little credit should be attached to such assertions, it is sufficient to add, that among the places designated by geology as the most fatal, we find Lyons, Guyenne, and Gascogny, which, in fact, were wholly spared. The theory renewed by M. Fourcault is still less in accordance with accurately observed facts. Developed in an exceedingly obscure manner, it encounters numerous exceptions which it is impossible to regard, whatever the author may say, as confirming the rule. Indeed, according to this hypothesis, Paris should be ranked among the places exceptionally attacked! Finally, serious errors in the facts adduced still farther invalidate the proofs by which M. Fourcault professes to support his system. After comparing Moscow to Marseilles, and affirming very gratuitously, that epidemic affections are almost never seen at the source of rivers and upon their course, he adds, "In France, the cholera has been governed by the same laws, confining itself, *when the initial physical cause has been slight, to the sea-shore, and to the mouths of rivers.*" Notwithstanding the obscurity of this proposition, we must not forget how many facts in the history of the epidemics in Russia, in central Europe, and even in Paris, are certainly incompatible with it.

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[1] *Union Médicale*, 1848, 10 Octobre.

The revolutions of the globe, and earthquakes, both of which are as striking to the imagination as the pestilential scourge, have been brought forward to explain the diffusion of the cholera over the largest part of the earth. M. Schnurrer has particularly insisted upon this idea, and has discovered a relation of cause and effect between the extension of the cholera and the numerous earthquakes which have happened successively in Europe and Asia.[1] But the fact is as doubtful as the consequences which it involves. We have clearly shown that the presence of rivers and large masses of water has less influence upon the progress of epidemic cholera than has been generally supposed.

Finally, our own opinion of these various hypotheses coincides with those of M. Littré and M. Monneret, whose conclusions we adopt: "All that has been written to prove that the cholera is more prone to attack those soils which are identical in geological constitution is in manifest opposition to numerous contradictory facts."

ATMOSPHERIC INFLUENCES.

It would appear that atmospheric and meteorological conditions and phenomena, whose action upon the living economy cannot be contested, should have contributed, more than any other cause, to the development and propagation of cholera. It seems even difficult to believe, that there is not in these conditions some influence which escapes us, and it must be acknowledged that this side of the question has not been sufficiently investigated, by means of consecutive and really scientific researches. Theoretical assertions upon this point are far more numerous than observations and experiments. It should be added also, that besides this hiatus, there are certain facts, apparently very significant and well established, which need to be examined and rigorously interpreted, before being admitted as even secondary causes of epidemic cholera.

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[1] Littré, *loc. cit.* p. 125.

We shall therefore consider, successively, the composition of the air and its barometrical variations, the conditions of its temperature and of atmospheric electricity, its hygrometric condition, and the movements of the atmospheric currents, which have been particularly observed during the existence of this disease.

Composition of the air. — Analyses have been attempted at many different times, with a view to discover if the air underwent any change in its physical or chemical qualities, during the existence of the epidemic at any particular place. It does not appear, although Dr. Prout has noted an increase of its density, that very sensible barometrical variations have been verified in the different countries where the disease has appeared. In regard to the composition of the air, it has never varied. A very recent analysis, made during the last year, by Dr. Luskowski, professor of pharmacy at Moscow, gives an entirely negative result.

Temperature. — When it is considered that the temperature constitutes the principal element of difference in climates, and that the cholera is not arrested by those most opposite in their character, it is impossible to attach an absolute importance to its influence. It however exerts a manifest influence upon the progress of the epidemic. The disease not only originated in one of the hottest countries of the globe, but heat has also constantly favored its progress, whilst cold has every where suspended it, and has sometimes even arrested it definitely. Hence results the very marked influence of the seasons. This is the only fact which should be considered as positive, for we cannot assign a limit to the variations of temperature observed during the different epidemics. We will only add, that in France the average temperature of the year 1831 exceeded a little more than one degree the ordinary average, and that during the epidemic of 1832, the thermometrical indications, although very variable, presented no fixed relation with the oscillations which have signalized the progress of the pestilence. It cannot be de-

nied, however, that, in warm countries especially, considerable variations do not operate as very powerful occasional causes of the disease.

Electricity. — The idea, attributing to electricity a very active part in the production of cholera, and which appears now to prepossess the general mind to so great an extent is not entirely new. But before passing to the consideration of the facts upon which this opinion is based, we feel the necessity of recurring to certain principles which it is important to keep in view in pursuing such an investigation. We quote a remark of our learned colleague, M. le Dr. Ch. Martins,[1] who is perhaps better qualified than any one else, to throw light upon these questions: "Among the various meteorological phenomena, there are none whose observation requires such delicacy as that of electrical manifestations. Great skill and infinite precaution are alike necessary. A vapor, a cloud, or a slight mist, is enough to change all the indications." We shall see if this judicious observation has always had due weight in the formation of theories relative to the causes of cholera.

Since 1830, in Russia, Professor Brosse sought in the action of atmospheric electricity the explanation of epidemic cholera. The same opinion was professed at Vienna and in Germany by Buzzorini. Under the influence of purely theoretical ideas, Dr. Harveng, of Manheim, in 1832, compared the symptoms of cholera, spasmodic contractions, cramps, etc., with the phenomena which electricity produces upon the organism; and the learned M. Grüdner has, in his important treatise published at Berlin in 1836, constructed upon this hypothesis an entire theory of cholera,[2] a confused assemblage of physico-chemical explanations and of purely gratuitous assertions, incapable of bearing the test either of analysis or criticism.

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[1] *Météorologie de la France*, extrait de *Patria*, p. 212.

[2] *Loc. cit.* p. 146.

It appears that to that time authors had confined themselves to speculation; the last epidemic, in recalling these ideas, so vaguely expressed, has furnished an opportunity to prove certain facts, which have appeared of a nature to give them a more solid foundation.

We have already seen that in some localities, both in the east and in the centre of Europe, the appearance or disappearance of the cholera coincided with very violent storms. At Vienna, in 1831, the epidemic was preceded by an electric meteor. At Jassi and at Constantinople, in July, 1848, it was observed, on the contrary, to diminish after repeated and violent storms. But there are other observations more worthy of attention. At Moscow, in 1847, Professor Blumenthal remarked that the condensing apparatus retained electricity with less force; that the power of the loadstone was considerably diminished, and that the needle did not present its habitual inclination. At St. Petersburg, while the cholera was at its maximum intensity, the action of magnetism was almost neutralized, and during the period of the decline of the epidemic, this action reassumed by degrees its former power. A loadstone which generally sustained eighty pounds supported only fourteen, and at the same epoch the magnetic telegraph was incompetent to the performance of its functions. I have been assured that the same facts were observed at Rotterdam, in the month of October last; the magnetic telegraph, which extends from that city to Amsterdam, remained inactive, and a loadstone of twenty pounds power was reduced to eight. M. Contour reports that upon his arrival at Moscow, he was struck with the facility with which his hair became electrical; merely passing his hand through it sufficed to produce electric movements, and to produce a spark from each tooth of his comb; he assured himself that many persons experienced the same thing. The same observer also stated that, from the 27th of September to the 27th of December, 1847, four auroræ were noticed at one time, where, it was said, these phenomena were ordinarily much less frequent.

Such are the facts which tend to show the relation which exists between the disturbance of the atmospheric electricity and the appearance of epidemic cholera. We may mention, in this connection, those spontaneous contractions, perhaps of a voltaic nature, observed in the dead bodies of choleraic patients.[1] M. Fourcault does not hesitate to seize upon these facts to found a theory, according to which the cause of cholera resides in a disturbance of the equilibrium between terrestrial magnetism and the magnetic fluid of the atmosphere.[2] This enunciation suffices to show how little in accordance is this obscure hypothesis with the most simple notions of general physics, and it is not necessary to discuss in detail the propositions of the physician whom we have just cited; the examination and appreciation of the facts quoted is a point of far more importance.

But however authentic and multiplied even may be the observations in question, we are far from attributing to them the value which one is tempted, at first sight, to accord to them. Let us not forget, in fact, that, before relying upon these facts as the cause of cholera, it is necessary that they should be established by an adequate comparative experimentation; now, without entering again into an examination of the phenomena, we do not see that the attempt has been made to discover whether the same phenomena may not manifest themselves aside from this epidemic, at other times and under different conditions. The number and accordance of the observations recently announced, prove but one thing, viz: that the public attention, not only among the learned, but especially among those least versed in science, is particularly aroused upon this point.

What is now the just signification of all these facts? They are of several kinds: 1st, the increased intensity of the electricity at the surface of the condensing or conducting

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[1] *Voyez*, p. 15.

[2] *Union Médicale*, 1848, Sept. 12th.

apparatus, with which may be ranked the telegraphic wires; 2d, the electric state of living bodies; 3d, the diminution of the power of loadstones, and the deviation of the magnetic needle; 4th, storms and auroræ. Let us endeavor to appreciate these various categories of phenomena, according to the data of science to which we have referred in the commencement, and especially not to swerve from the sure principles which physics teach us.

The loss of power, which the electric condensing and conducting apparatus suffer, depends entirely upon local circumstances, especially upon the humidity of the medium in which the apparatus is placed. To show how incapable of generalization and absolutely insignificant is this fact, especially as it is not verified by extended observation, it suffices to recal to mind that more than once Professor Gavarret, in his lectures to the Faculty of Paris, has shown his numerous auditors that the machines which operated best in the laboratory, lost all power of action when brought into the amphitheatre. The exaggerated intensity and dissipation of electricity which takes place in the conductors and condensers could not be explained, except by some condition entirely local, and probably by the humidity of the air.

That which has been called the electric state of living bodies, which gives rise to the movements of the hair and the sparks which escape from it, does not in the least represent a general phenomenon, whereby to demonstrate a perturbation of atmospheric electricity. The human body, in communication with the ground, can never possess an appreciable electric intensity, or what has been very improperly termed a "peculiar electricity." It may indeed be electrized by influence; but in this case the influence would be exerted at the same time upon substances generally, and upon all parts of the surrounding medium, that is to say, it would be inappreciable. There is not, therefore, strictly speaking, an electric state peculiar to the body. The movement of the hair, and the emission of sparks upon contact of the hand or the

teeth of a comb, constitute a very simple electrical phenomenon, but isolate, produced directly by friction, and which should be more marked in proportion as the part where it is manifested is more dry, which would be, as has been seen, in contradiction with the first fact, this, as we have said, appearing to depend upon the humidity in which the electrical apparatus is placed. Another phenomenon observed upon living bodies, and which would certainly possess much more value if it were not capable of a better explanation, consists in the muscular contractions which take place spontaneously upon the dead bodies of certain cholerics. We do not hesitate to consider them as galvanic movements; but they are in no wise peculiar to cholera. We encounter them generally in all cases in which death has been very rapid, and they are owing to the persistent activity of the nervous system, in which resides, as is known, a true current of dynamic electricity, which may enter into action under the influence of divers external conditions.

The two orders of phenomena which it remains for us to consider have incontestably more importance. The diminution in the force of loadstones, the variations of the needle and the auroræ attest, in fact, a singular perturbation of magnetic phenomena. But, without disputing the authenticity of the facts adduced, it may be questioned if they have been accurately observed, and upon a sufficiently extensive scale. It does not, indeed, appear that this diminished power of the loadstone, although it is of a nature to strike the minds of all, even those least capable of appreciating scientific truths, and a fact easy of verification, has been observed in all places, or even in the principal cities in which during many months the cholera has raged. It is therefore impossible at present to deduce from this particular phenomenon any legitimate conclusion. As to the deviations of the magnetic needle, which are ordinarily due to the influence of certain electric phenomena, inquiry should also be made if, in those places where they have been noticed,

they were not connected with a precisely similar cause, especially to storms, or to auroral manifestations. This last phenomenon would be to my eyes the predominant fact, if it were proved that the aurora borealis was really more common during the existence of the epidemic; for this incontestably is one of the most considerable and singular manifestations of the magnetic state of the terrestrial globe; and, however obscure it may be as yet, the influence of this wonderful phenomenon cannot be absolutely contested. But we still lack sufficient proof upon this point. Four auroræ were distinctly noted in Russia, between September 27th and December 27th of last year, and we may add that in 1831, on the 7th of January, an aurora appeared over an immense extent, visible at the same time throughout northern and central Europe, and even in North America. But it is not sufficient that similar meteors have appeared during epidemics of cholera; it is necessary that they should have been far more than ordinarily frequent. This is by no means demonstrated. Kaemtz[1] mentions the months of May, September and October, as those in which auroræ most frequently appear. And it is precisely from September to December that the four auroræ of last year were observed in Russia, which allow us to recognize here no unusual frequency. The learned Professor of Halle also remarks that, since the year 1820, auroræ have become much more common than they had been during the twenty years preceding. Ought we to recognize in this any relation with the invasion of cholera, which commenced about this epoch to progress and extend itself towards the north and west?

However this may be, and whatever opinion may be formed upon this difficult question, we wish it to be well understood, that a simple coincidence is all that can be admitted between these facts and the development of epidemic cholera, whose

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[1] *Cours Complet de Météorologie*, traduit par Ch. Martins. Paris, 1843, p. 457.

limits it remains for us clearly to define, and that in no case can we be authorized in saying, as is too apt to be said at present, that the cause of cholera resides in a disturbance of the atmospheric electricity and the magnetic phenomena of the globe. We have extended this examination to such length solely on account of this tendency of certain minds, which it has seemed necessary to counteract.

Hygrometric state. — Among the atmospheric influences most favorable to the development and progress of cholera, there is none more active, according to most authors, than humidity of the air, especially if connected with an elevated temperature. Aquæous meteors have been observed in a great number of places which have been visited by the cholera. In Russia, Austria, Hungary, Prussia and France, mists of an extraordinary intensity, and sometimes of an insupportable odor, and also abundant rains have been remarked. The hygrometic state of the atmosphere has generally maintained a high degree, either before or during the existence of this disease. Professor August, of Berlin, who has devoted himself to very accurate and extensive researches upon this subject,[1] states that the disease has always increased and diminished with the humidity of the air. It is equally certain that, at Paris, the year which preceded the invasion of cholera was more moist than dry, and warm rather than cold, and that in the first months of 1832, the sky, almost constantly obscured by clouds, mist and rain, remained overcast.[2]

To award to these meteorological observations all their value, it is very important to avoid the too common error, which consists in confounding the hygrometrical state of the atmosphere with the constitution of the soil and the presence of large masses of water, which exert no general influence,

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[1] *Luft's Feuchtigkeit und Choléra.* Berlin, 1832.

[2] *Rapport de la Commission, loc. cit.* p. 71.

as has been already stated, or at least only indirectly and in favoring the salubrity of situations, as we shall soon see.

Action of winds.—The study of the direction of cholera in its course across countries so numerous and diverse, does not allow us to attach any great importance to the action of winds. The facts which exist are too contradictory for the deduction from them of a general doctrine. We ought, therefore, to limit ourselves to the registry of the observations which have been made in this respect in different countries. It will be recollected that a north wind continued to blow whilst the cholera extended in an opposite direction along the Volga. But the reverse has been in several instances noticed. August observed that the violence of the epidemic of Berlin, in 1831, was increased by the winds from the east and north-east, while it diminished under the influence of westerly and southerly winds. It appears also that, at Paris, in 1832, the direction of the wind was not always without an apparent influence. From the 1st to the 12th of April, that is to say, during the time when the epidemic raged with the greatest intensity, the wind was constantly north and north-east; and it is remarkable that it was also the north and north-east winds which blew in the first days of July, the period at which the epidemic reappeared. The exposure of places, the peculiarity of which is mainly owing to the nature of the winds which blow over them, does not appear to bear any relation to the greater or less activity of epidemics. Although it was first supposed that in Paris, those places exposed to the south suffered more than others,[1] this was mainly owing to the interior arrangement of the habitations of the city, in which the sleeping apartments, where the deaths took place, have for the most part this exposure.

Finally, the most conclusive statistical calculations[2] appear

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[1] Rochoux, *Notice sur le Choléra, Arch. Gen. de Méd.* 1832.

[2] *Rapport de la Commission loc. cit.* p. 74, et Dr. Brandin *Del Cholera Asiatico.* Paris, 1832.

to show, that in general, neither variations of temperature, the nature of the winds, or their direction, nor the different exposures of places, influence the development, progress, or intensity of epidemic cholera.

HYGIENIC INFLUENCES.

It is not difficult to foresee the operation of hygienic conditions, at least as secondary causes in the production of cholera. The salubrity of cities and of habitations, a crowded population, the practice of certain professions, and the mode of life, have an influence in all epidemic diseases, which cannot be denied, and which has been no less evident in the irruptions of cholera.

Salubrity. — There exists between different countries, and even between the localities which cholera has visited, sufficiently wide differences, in regard to salubrity, to render the weight of this influence appreciable. But in regard to this, as to most others, all will allow that the most contrary effects have been observed. If salubrious places, that is to say, those having a sufficient elevation, combining the conditions of space, airiness, and cleanliness, have most frequently suffered much less than those places in opposite circumstances; if at Constantinople, Moscow, Berlin, London, Paris,[1] and Lille, in the quarters composed of narrow, filthy, and damp streets, the mortality was more than one half greater than where the streets are broad and airy; if, in short, it be certain that low, sunken, and damp situations are more exposed to the ravages of epidemic cholera than high, open, and dry places, the numerous anomalies observed in the relative mortality of certain localities, in the salubrity of which there is an essential difference, do not allow us to consider these conditions as absolute. Is it not, indeed, singular, that at Paris, to limit ourselves to examples which

[1] The deaths in the unhealthy streets, according to the report, were 33.87 in 1000, while in the more salubrious, there were only 19.25 in 1000.

have occurred in our own experience in the rue Cassotte, where exists numerous hotels, and large gardens, the mortality should be the same as in the rue de la Verrerie, composed entirely of obscure alleys, and narrow courts (39 deaths in 1000 inhabitants); that the rue Saint Dominique-Saint-Germain, rich, spacious, and almost always clean, should suffer (38 in 1000) more than the rue de la Harpe, a crooked, narrow, and constantly muddy street, (20 in 1000;) and finally, that the rue des Marmousets, a dark, infected alley, should have been less affected than the rue du Bac, where the air and light have full access to the houses, which are, for the most part, salubrious and well constructed.

Nevertheless, in spite of these exceptions, in all countries it is acknowledged that, in general, it is in obscure and dirty, and moist dwellings, in streets hardly accessible to sun and wind, where a miserable population is crowded together in dirty contracted lodgings, that the cholera produces the most fatal results. A crowded condition, together with poverty, have every where, in fact, aided powerfully to extend and aggravate the ravages of this disease. The infected haunts of the Russian peasants, the cellars of the beggars of Hamburg, or the unhappy laborers of Belgium and French Flanders, the dirty rooms of London, the foul sewers of the Cité, and of the quarter of the Hotel de Ville at Paris, were decimated by the cholera of 1831 and 1832; and at the present time, it is to the places where the poorest portion of the population is found crowded together in Constantinople, viz. the small traders, sailors, and wharfmen;[1] to the poorest habitations of Holland and England, and to the miserable cabins of the fishermen of the coast of the North Sea, and of Pas de Calais, that the present epidemic remains limited. The peculiar influence of a crowded condition and insufficient aeration in aggravating the intensity of the disease, appears from observations made at the Hospice de la

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[1] Monneret, *loc. cit.*

Saltpêtrière,[1] constant ventillation having sufficed to arrest the progress of the epidemic ; and at Breslau, where the removal of numerous families into more spacious habitations produced the same result.[2]

Another cause of insalubrity, which it is important to examine, consists in emanations of different kinds, which, in certain localities, may contribute to a vitiation of the atmosphere. Here, again, we shall encounter contradictory facts. We have seen, that in the environs of Nantes putrid emanations apparently excited the outbreak of this disease ; M. Littré cites analogous examples.[3] And yet in the environs of Paris, the most fœtid emanations of animal and other matters, coming from the pools of Montfaucon,[4] the starch manufactories, and places for cleaning and working intestines, and the most subtle ammoniacal vapors exercised no unfavorable influence upon the neighboring localities. It is also very remarkable to observe the mildness of the epidemic in the townships of Gentilly, Clichy, Colombes, Grenelle, La Villette, Pantin, Noisy le Sec, etc., where similar centres of infection exist.

Notwithstanding the uncertainty of these data relative to the influence of the insalubrity of cities and habitations, we may suppose, it is even impossible not to believe, that the considerable changes which have been wrought in the principal cities of Europe, and the means taken for rendering most of them healthful, may not be without influence in moderating the intensity of the scourge. Already, during the present year, the progress of cholera at Berlin, Amsterdam, and London, appears to confirm this hope. If this be so, Paris ought, more than any other city, to feel the happy effect of the prodigious

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1 Piorry *de l'Hygiène des Habitations, Thèse de Concours.* Paris, 1838, p. 73.

2 Gaymard et Gérardin, *loc. cit.* p. 83.

3 *Loc. cit.* p. 130.

4 This is a place just outside the Barrier du Combat, where the contents of all the Paris night carts are deposited for the formation of *Poudrette.*

sanatory labors which, for the last fifteen years, have been going on in its midst. The quarters most severely affected in 1832, those of the Cité and of the Hôtel de Ville, are really no longer to be recognized, since daylight has there penetrated; spacious streets and salubrious houses have replaced the dark, narrow alleys, and the frightful and contracted abodes which formerly furnished so many victims to the epidemic. The great increase of population, which, from 1832 to 1846, has risen from 785,862 to 1,053,897 souls, the removal of a part of the inhabitants, the building up of quarters formerly waste places, the prolongation of quays along the whole extent of the banks of the Seine, the erection of numerous fountains, which furnish a quantity of water truly enormous for household purposes, and which have so marvellously increased the healthfulness of the public ways, and lastly, the removal of insalubrious establishments,[1] cannot fail to modify the progress, and we hope to assuage the violence of the scourge, if it is reserved for us again to suffer its fatal ravages.

Professions. — In spite of the very laudable efforts, and the intelligent zeal of statiticians, and especially those of the central commission of Paris, it is impossible to deduce, from the considerable researches undertaken upon this subject, any precise data upon the particular influence of the professions. All reduces itself to general differences, resulting from the social position, and from the conditions of physical and moral well being, opposed to the miseries of vice and to the sufferings of poverty. We shall reserve, for the question of contagion, the examination of the influence of certain special professions which expose those who follow them to habitual contact with the diseased.

Regimen. — The manner of living, and particularly im-

[1] A work which may be consulted with the greatest benefit, and for which we are indebted to one of our most distinguished administrators, M. Husson, Chef. de Division in the Prefecture of the Seine, is *La Statistique de la Population de Paris*, (1847.)

properly directed alimentary regimen, ought to be enumerated among the most efficacious and predisposing occasional causes of epidemic cholera. On the one hand, the privations which result from misery and the bad choice of aliments, and on the other, errors of diet, excesses of the table, particularly the abuse of alcoholic liquors, favor, more than any other cause, the production of the disease.[1] It is thus that an insufficient nourishment, the exclusive or immoderate use of unripe fruit, substances difficult of digestion, the ingestion of cold drinks, or even of ice, the abuse of purgatives during the epidemic, may immediately induce an attack of cholera. A singular observation, and one which is of a nature to render the influence of insufficient nourishment quite evident, was made in several instances, among the Mussulmans. This year again, at Constantinople, an exacerbation of the epidemic was manifested at the period of "Rhamazan," when the religion enforces an absolute and prolonged fast. But nothing predisposes more to a sudden attack of cholera, than the habit of drunkeness, especially when it is pushed to the point where the strongest liquors become a substitute, in stomachs ruined by excess, for all kinds of substantial nourishment. This influence was felt, not only in Russia and Prussia, but in France, by the entrance of a greater number of patients into the hospitals, after those days, which in all the countries are devoted to that excess of drink which laziness engenders. The *Union Médicale* of October 7th, 1848, reports a fact, which particularly illustrates the powerful action of regimen. In a great spinning factory at St. Petersburg, out of 700 operatives who are employed there, about one half, men and women, are lodged and fed in the establishment, which is submitted to general rules and a rigid surveillance; the other half of the workmen live in the city, as they please. Out of the first half, which was the largest, eighty-three were

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[1] Littré, *loc. cit.* p. 129, Bouillaud, *loc. cit.* p. 183.

attacked by the cholera, and only five died. Of the second half, that is to say, out of little more than 300 individuals, there were 120 patients and 44 deaths.

It is apparent then, how important a place these divers hygienic influences hold in the history of the causes of cholera. One fact, which seems well calculated to give a striking proof of this, and which we must cite, is the immunity which, in 1847, as in 1830, was enjoyed by the town of Sarepta, founded upon the banks of the Volga by the Moravian brothers, and by the German colonies established in Gallicia, where the habits of a life regulated in common, submitted to all the best ordered conditions of regimen, the most scrupulous cleanliness, and especially exempt from the anxieties and vices which slavery and misery bring in their train, have twice preserved the inhabitants, although these different localities were placed directly in the course, and in the midst even of the hotbed of the epidemic.

CONSTITUTIONAL INFLUENCES.

The individual conditions which result from age, sex, and the general state of the constitution, have been partially seen in the tables of mortality. It appears that, although no age was exempt from an attack, infancy suffered least of all. The cases of cholera cited to have occurred in children from two to nine months[1] of age were exceptional, and in all countries the small number of children attacked under the age of seven years has been remarked. In regard to other ages, nothing similar is worthy of notice, except that the middle period of life is that most exposed to the disease.

It does not appear, if we consider the aggregate of statistic results, which vary in this respect in different localities, that there was between the two sexes any considerable difference in regard to the predisposition to cholera.

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[1] Rufz, *Du Choléra chez les Enfants. Arch. Gen. de Méd.* t. xxix. p. 346.

With regard to the state of the constitution, if there be no reason in the examination of the etiology of cholera to take into consideration the influence of temperament, it is very generally admitted that individuals exhausted by antecedent diseases are most generally attacked. This observation was made with rigorous accuracy, under the most favorable circumstances, among the men composing the garrison of Paris, in 1832. It is however incontestable that there are, in this respect, numerous exceptions, and that the most vigorous and healthy individuals are often attacked with more violence, and more rapidly carried off than those of a weak and debilitated constitution. Let us not forget here the important observation of M. Contour, on the remarkably small number of deaths among consumptive patients, during the epidemic of cholera, in the hospitals of Moscow.

MORAL INFLUENCES.

Mental affections, and especially moral emotions of a depressing nature, are cited as at once predisposing and occasional causes of cholera. It is impossible to admit the general exercise of this influence; it is besides very difficult to appreciate its peculiar action. What appears least doubtful is that an inordinate dread of the disease has, in certain cases, favored its development, although many contradictory facts diminish the value of this observation. It is much more doubtful whether moral impressions of any other character exert a like influence. The effect of the epidemic upon the insane, so ably observed by M. Ferrus, shows that they are attacked in nearly the same proportion with those of sound mind. This is an observation well worthy to be mentioned, and which forbids the attachment of too much importance to the action of moral causes.

CONTAGION.

It remains for us now to consider a question which, although apparently settled among modern observers, and especially among French physicians, is still agitated and differently regarded by learned foreigners. We refer to contagion. Certainly, if the least doubt could exist upon the subject of the contagiousness or non-contagiousness of epidemic cholera, the agitating nature of such a question must be evident. It is indeed impossible to pass it over in silence, and not to enter into an examination of the facts and reasons which have definitely established the non-contagiousness of this disease.

This question we shall now briefly consider. By the term contagion is to be understood merely a transmission of the disease from the diseased to the healthy individual, in consequence of mediate or immediate contact. The multiplication of epidemic *foci* is certainly very distinct from contagion. And this single distinction enables us to judge more accurately of the facts which have been adduced as favorable to this latter cause, a point which requires a few words of explanation. Pestilential diseases, in developing themselves, constitute foci more or less circumscribed, which may extend either step by step or by successive irradiations. There results from this character the possibility of a displacement of the epidemic foci, and the migration of the pestilential disease, which may be very easily confounded with a result of contagion. These ideas receive an evident confirmation from the observations made during the divers epidemics of cholera.

The mysterious origin of this scourge, its terrible activity, and its rapid mode of propagation, would inevitably suggest an idea of its contagious nature. Thus we observe the existence of this opinion previous to the first epidemic irruptions in almost all countries which they are about to invade, and the most creditable and respectable authors adopt it as an

incontestable truth. MM. Moreau de Jonnès and Littré, who wrote before the appearance of the cholera in France, following, in this, the example furnished them by nearly all the French and German physicians, do not call in question the contagious nature of cholera. And we see a medical commission, instituted by the council of the hospitals of Paris, propose, several months before the appearance of the epidemic, the establishment of special hospitals for the treatment and sequestration of cholerics, and even advise the placing upon all houses in which cholera may exist a peculiar sign, easy of recognition, which shall remain eight days after the disappearance of the disease. These sanitary measures were, moreover, but a repetition of those which were adopted and followed with so much rigor by the governments of the north.

We recall these circumstances and these excessive precautions, because their inutility even is a first proof to advance against the contagious nature of cholera. It must also be admitted that the opinions upon this point have, generally, undergone an entire change after the cholera has appeared, and that the contagion, admitted while the disease was still remote, has found but a small number of defenders among those who were able to observe the scourge close at hand. Quarantines also have been almost every where abolished after the first irruption of the cholera. There is here material for a very interesting comparison, and which may serve to settle the question. When it is considered, in fact, that in 1830 and 1831 sanitary cordons existed in every part of Russia, while, in 1848, they were nowhere established, and that, notwithstanding this, the progress of the epidemic was not in the least accelerated, it is very evident that measures taken in view of the contagion are entirely without avail, and that consequently the contagion itself is very improbable.

If we now pass in review the particular facts, which apparently favor the opinion which we are combating, it will be seen that, notwithstanding their number, and the details,

often very minute, in which they are enveloped, some lack authenticity, while others find a satisfactory explanation in the epidemic character of the disease. There are few occurring under circumstances sufficiently striking to raise a doubt, or at least to demand particular attention.

We cannot here enter even summarily upon a discussion, in which the various opinions advanced would suffice to fill volumes; and which besides, it must be confessed, has at present lost much of its interest. There may be found in the *Treatise* of M. Littré, so often quoted, and in the work of Dr. Markus,[1] a complete summary of the most important facts adduced on both sides. We shall confine ourselves to the principal points, availing ourselves of some new observations from the conscientious and intelligent researches of M. Contour.

One of the facts most often brought forward as an example of the contagiousness of cholera, is its appearance in certain countries and cities immediately after the arrival of a large body of men, who appear to communicate it directly to those whom they approach. It will be recollected, without here repeating it, that the cholera, in its course, accompanied armies, caravans and pilgrims. But to this first fact it is easy to raise a double objection.

It is that, in the first place, the examples are far from having been always correctly reported, and that they are neither certain nor constant. Thus, M. Monneret informs us that the Mussulmans gathered together at Mecca, where the cholera was so fatal in its effects, having departed after performing their devotions, the disease did not manifest itself among any of the people residing in the first course of the caravan, nor in the cities to which the pilgrims returned.[2] Again, we shall see that M. Contour proves the falsity, by a strict analysis, of one of the facts to which in Russia the most importance

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[1] *Notice sur Choléra, en Russie.* St. Pétersbourg, 1847, p. 116, et suiv.
[2] *Loc. cit.* p. 868.

had been attached, and which had chiefly contributed in causing the last epidemic to be considered as the result of contagion. The cholera broke out May 16th, 1847, in Temir Khan Choura, upon the borders of the Caspian Sea. From this fortress one hundred and fifty soldiers were sent towards the interior to take the sulphur baths at Petigorsk, a place a little below Georgiewsk. The opinion was circulated that this troop communicated the cholera every where on its passage. Now, according to M. Contour, the scourge declared itself on the 13th of June at Georgiewsk, three weeks before the soldiers had passed over even one half the distance which separates this city from their point of departure. We may judge, by this example, how much confidence is to be placed upon certain facts which apparently are beyond doubt.

But, besides this first objection, founded chiefly upon the doubtful certainty of a great number of documents, there is another of more importance, which applies itself to the fact, even of the propagation of cholera following large bodies of men in movement. Do we not know, indeed, and does not the history of all pestilential diseases show, that the epidemic foci may migrate, and that thus the corps of an army, a caravan, or a vessel actually ravaged by an epidemic, may carry, as it were, in its bosom, the epidemic element, and thus favor its extension? There is this great difference only between the transportation of an epidemic focus and its propagation by contagion, that, in the first case, the disease which disembarks in a city with the passengers of an infected ship, although there be none sick on board at the moment of its arrival, will break out suddenly in this city, and strike at random its first victims; while the contagious disease imported by one or more individuals into any place whatever, will first attack only those with whom they have been in contact, and one may thus follow its progress step by step, as by the aid of an uninterrupted chain. The study of the epidemics of cholera has furnished us with numerous examples of the extension of the pest by the migration of the

primitive focus. At Orenbourg, following the caravans of Upper Asia; at Hamburg, and Sunderland, carried by the merchant ships which plough the North and Baltic Seas, we have observed these facts, which it does not appear to us should be considered to favor the idea of contagion, since they find, aside from this cause, so natural and plausible an explanation.

But there are others which, as we have already said, present a different character, and most clearly show that the disease is transmitted directly from one individual to another; thus extending itself by successive contact. Many cases [1] of this nature have been reported by MM. Littré, Velpeau,[2] and Gendron.[3] We shall only mention the following, which we extract from the memoir of M. Contour. In a village of the government of Tchernigov, on the 30th or the 31st of August, a young girl fell sick and died in the night. On the day of the interment, her brother, after some excess, was attacked with cholera, and died in twenty-four hours. The father of these two young persons soon followed them, being carried off three days after his son. A woman who had taken care of this family died on the next day; and two days later, the husband of this woman shared the same fate. From this time, the epidemic spread into the province. Surely, in the presence of a fact so well attested, so clear and free from all complication, it is impossible not to admit that the intimate relations which existed between these different individuals, were the principal, if not the only cause which engendered the disease of which they died. This is, without doubt, an example of contagion. But no one is ignorant at the present time, and I am happy to see this opinion professed by Delaberge and M. Monneret,[4] that contagious properties may de-

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[1] *Des Maladies Epidémiques.* Journ. des Conn. Méd. Chir., t. iv. p. 130.

[2] *Loc. cit.* p. 50.

[3] *Du Choléra épidémique à Paris*, p. 21.

[4] *Compend. de Médecin. loc. cit.*

velop themselves accidentally, and that among the influences most proper to produce them, should be placed in the first rank the epidemic character of diseases. We shall not therefore dispute the facts; we shall, on the contrary, call the particular attention of physicians to them, as examples of the accidental contagion of epidemic cholera. It is to be remarked, besides, as M. le Dr. Gendron has so well demonstrated, that it is principally in limited localities that these examples of the accidental contagion of cholera have appeared both in France, Russia, and in the East.

It, moreover, remains for us to notice another order of proofs which do not allow the admission of the absolute contagious nature of this scourge. We mean the slight action which it has exercised upon the different persons who, from the nature of their occupations, have been called to pass much time near the patients, particularly physicians.

During the epidemic at Paris, were counted not less than 2035 individuals employed in the hospices and civil hospitals, either constantly or temporarily; and out of the total number of persons called upon to nurse the sick, either in the cities or in the hospitals, there were only 164 victims, of whom 30 were physicians, 12, students of medicine, 10, midwives, and 112, overseers of the wards, or attendants and nurses. This rate of mortality is also quite high in comparison with the more favorable proportion observed in different countries. MM. Gaymard and Gérardin report that at Revel, out of 113 persons attached to the service of the hospital, two only were attacked, one male and one female attendant, both of whom had been irregular in their habits. At St. Petersburg, out of 58 employed in the temporary hospital of the quarter of the admiralty, one only fell sick after having taken, while heated, a cold draught, and who recovered. We find again, out of 123 attached to the hospital of Moscow, two patients, and among 253 persons employed in the service of those sick with this disease at the marine hospital,

at Kronstadt, four patients only. Finally, Dr. MacLeon[1] says that at Bengal, out of from 250 to 300 officers of health, most of whom saw many of the sick, there were but three attacked, one of whom only died.

In the present epidemic, the same observation may be made. At Moscow, not a physician, nor one of the officers of health charged with the dressing of wounds and minor surgery was attacked with cholera; out of 310 attendants, distributed in eight hospitals, 20 were taken sick; they, again, were all addicted to drink. It is not less curious to witness the slight extent to which the epidemic has prevailed in the interior of the hospitals, among patients affected with other diseases. In the clinique of the learned and celebrated professor Auvert, during the whole time that the cholera prevailed in Moscow, there were but two individuals, among those whom other diseases confined in the hospital, who were attacked.

It is doubtless of little use, to multiply these incontrovertible proofs, and we may, without hesitation, decide, with the reservation of exceptional cases, upon the non-contagiousness of epidemic cholera.

We have now concluded our account and examination of the influences which have been mentioned as playing a prominent part in the production and development of cholera. Is there one of them which alone can sufficiently account, not for the nature of the scourge, but for its irruptions alone, so violent, and at once so uniform and capricious?[1] Is there any one, which alone can be shown to exercise a constant action upon the appearance and the extinction of the cholera? Lastly, is there one which will explain the peculiarities of its course, sometimes so regular, but often so unaccountable? To all these questions, we must content ourselves to reply by the conscientious and well considered confession of our ignorance. We have seen, in fact, each of these apparently

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[1] *Rapport sur les lois de Quarantaines.*

most powerful influences, followed by the most contradictory results, without being able to comprehend the causes of these singular differences; we have seen the most ingenious and most fascinating theories, fall before the examination of facts. It remains for us, therefore, to bow before the mystery of these pestilential diseases, whose first origin and essential principle are, probably, beyond our comprehension.

In a less elevated sphere, are happily found some conditions accessible to our means of observation, and which, considered as secondary causes, have also a very great importance in the history of the cholera. It is to these that we should apply ourselves, and it is the study of hygienic influences which constitute the most useful and most truly practical part of the question which we have treated in this chapter.

CHAPTER VI.

DIAGNOSIS. — PROGNOSIS.

The symptoms of epidemic cholera are so characteristic, that the diagnosis of this disease is generally regarded as easy. Thus, we do not think it necessary to insist upon the principal signs which may be derived from the description of the progress, and the study of the forms of cholera. We shall limit ourselves to the exposition of the differential characters, which may serve to distinguish it from certain affections with which it is not impossible it may be sometimes confounded.

DIFFERENTIAL DIAGNOSIS.

Those diseases, which, for the most part, bear a resemblance to a particular period alone of epidemic cholera,

are choleriform gastro-enterorrhœa or sporadic cholera, acute poisoning, gastro-enteritis, severe indigestion, asphyxia from the fumes of coal, and the plague.

It is well understood that confusion is only possible during the existence of the epidemic. This necessary condition is a first element of the diagnosis, which must be kept in mind, and which is generally sufficient to enable us to avoid all error. We shall review briefly the diseases which we have indicated, and notice the principal differential signs which distinguish them from epidemic cholera.

Sporadic cholera. — The choleriform affections, confounded under the name of sporadic or bilious cholera, are, as these terms themselves prove, entirely distinct from epidemic cholera, by the conditions under which they are developed. Thus, there can hardly be a doubt, except at the beginning of an epidemic, or while it is pending, at a time when the first cases observed would, very naturally, be attributed to some other cause than that of a pestilential scourge. But under these circumstances, even the diagnosis between the two affections is easily established; in the grave cholera, the phenomena of cyanosis, of asphyxia, suppression of the urine, etc., do not leave a doubt; in the other forms, the choleriform fluxes are distinguished by the nature of the evacuations, which are alway bilious, never presenting the characters of choleraic fluid; by the much greater violence of the cramps; by the less rapid progress, and almost constant happy termination. These signs, added to the accidental, and often appreciable cause of bilious fluxes, ought not to suffer these affections to be confounded with epidemic cholera.

Poisoning. — The diagnosis of this disease may become really very difficult, in certain cases of poisoning, occurring during the existence of the epidemic. It is even quite a general idea, that crime has profited more than once, by this fatal resemblance.

It is especially acute poisoning by arsenic which may

present a considerable analogy to the true form of epidemic cholera, particularly when the latter is accompanied by vomiting, and dejections of a reddish or bloody color. The vertigo, derangements of the senses, the great depression, epigastric distress, thirst, cramps, the general coldness, and suppression of the urine, all these symptoms are common to both morbid conditions. But arsenical poisoning presents some special characters. The first symptoms, as in all cases of poisoning, exhibit themselves generally soon after the ingestion of an alimentary substance or drink of some kind. The sensation which torments most patients, is that of a persistent constriction of the throat and œsophagus: spasms often supervene, symptoms not observed in cholera. It is evident that all doubt is at an end, when the cyanic period manifests itself in the latter disease, and when the character of the evacuated liquid becomes decided; but it must be again remarked, it is in the foudroyant form that the resemblance is the most marked; and the distinction is then sometimes far from easy.

Poisoning by concentrated acids, and by caustic poisons, presents but a very slight analogy to cholera. It would be useless to dwell upon the subject.

The action of certain stupifying poisons, and also of some narcotics, might be confounded sometimes with the asphyxic form of cholera. There would be, nevertheless, means of distinguishing them by the nature of the prodromes of the pestilential disease, the cyanosis, nervous and spasmodic phenomena, alteration of the blood, and especially by the course of the symptoms.

Gastro-enteritis. — Simple inflammation of the gastro-intestinal mucous membrane cannot, strictly speaking, simulate, even slightly, epidemic cholera; but it would be possible and dangerous to attribute to this inflammation the precursory phenomena of cholera, and especially the diarrhœa, which may announce the invasion of the epidemic. There is, however, in this prodromic period of cholera, a group of charac-

ters entirely peculiar, especially a series of nervous phenomena, which gives to it a peculiar physiognomy. It would be the same in regard to *cholerine*, if it could be for an instant confounded with a simple gastro-enteritis. There is in the latter, a series of purely inflammatory symptoms, local pains, redness and dryness of the tongue, fever, etc., which are absent in cholera; while nervous troubles, cramps, and characteristic evacuations are not observed as in the mild forms of the epidemic.

Indigestion. — Indigestion may, in some rare cases, acquire a sufficient gravity to resemble cholera. Nevertheless, it is impossible that the resemblance should be of a nature to produce more than a temporary error. It is, in fact, only the violence of the evacuations upward and downward, which can be falsely interpreted; but their nature, and the absence of all the other choleraic phenomena, should at once remove all doubt. This is, indeed, true of most of the gastro-intestinal affections, as the various colics, peritonitis and ileus.

Asphyxia. — Asphyxia, from the fumes of coal, presents hardly any thing in common with epidemic cholera, except the cyanic period, or even, to speak more properly, the cadaveric state; but, in all cases, the choleraic evacuations which precede the second stage, leave no doubt as to the nature of the disease.

The Plague. — We have seen that cholera and the plague may, though rarely, be encountered at the same time, in the same place. We can comprehend that the prodomes of these two pestilential diseases would be often difficult to distinguish, especially when they are confined to a general indisposition, vertigo, giddiness, intellectual torpor, and mental depression. All similarity disappears when the two diseases have reached their acme. But their nature may remain in great obscurity in the foudroyant form, in which the patient sinks, even before the really pathognomonic characters are pronounced. The cadaveric lesions even throw but little light upon them.

It appears, in summing up, that there are but very few diseases, and these under the rarest circumstances, which can be confounded with epidemic cholera. The signs of this terrible affection, added to its epidemic character, render the diagnosis ordinarily simple and easy. We consider it useless to enlarge farther upon this subject.

PROGNOSIS.

The prognosis of epidemic cholera is founded upon a certain number of signs, some of which are derived from the form and progress of the disease ; others, from the conditions which have favored its development ; and lastly, others from the general characters and progress of the epidemic.

But before entering into a particular examination of these different orders of signs, it may be said absolutely, that the prognosis of epidemic cholera should be considered very grave, and that there is not a pestilence which has weighed more heavily upon humanity. We shall not return to the statistical results, relative to the fearful mortality which has been observed in most of the epidemics of cholera ; if it be considered that almost every where more than one half of the patients have died, it will be at once evident how few are the chances of recovery from this terrible disease : it is precisely these chances which it remains for us to appreciate.

Prognostic signs derived from the form and progress of the disease. — There exists in the prodromes, in the different periods, in the cause and in the form of cholera, a series of signs which may be very usefully employed in establishing the prognosis of the disease. The existence or the absence of precursory phenomena is already a very important element. When they are wanting, in fact, it is a sign doubly serious ; for, on the one hand, it is to be feared that the disease which commences suddenly will be more violent and rapid, and on the other, the absence of prodromes removes the happy chance of applying means which may

arrest the disease at the very outset. As to the more or less favorable character of this or that species of precursory phenomena, it is not possible to establish in this respect absolute principles. The slightest prodromes may be followed by the gravest attack; and the contrary may alike be observed. Neither the form nor the character of these phenomena have any real importance in the prognosis.

Among the confirmed symptoms of the disease, there are some which have a signification entirely special. Thus the persistence and the extreme violence of the cramps, the vomiting and imminent danger of asphyxia, the complete suppression of the urine, the continual and involuntary stools, the great and rapid change in the features, the sinking down of the globe of the eye, the drying up and puckering of the cornea, the very considerable reduction of the temperature of the body, are signs extremely unfavorable; the last two especially may be regarded as announcing an inevitably fatal termination. We ought, on the contrary, to consider as very favorable the gradual diminution and cessation of the cramps and cyanosis, the return of the expression, voice, warmth, urine, and normal dejections.

The natural evolution of the disease, the succession of the periods, are significant of a more favorable termination, especially if the period of reaction goes on freely and perfectly; but nothing is more unfavorable than to see, after a commencement of insufficient reaction, the characteristic symptoms of the cyanic period reappear, or even to see this period prolong itself and give place to a sort of slow asphyxia, which almost inevitably hurries away the patient to the tomb. The secondary affections are far from possessing equal gravity. The most important are especially inflammations of the membranes of the brain or of the nervous centres, that choleric cerebral state described by M. Rayer, as well as the secondary fever which is accompanied with stupor. We have said that it was impossible to attribute a favorable signification to certain phenomena, such as cutaneous eruptions, parotitis, epistaxis, in

which some have endeavored to discern necessary crises. There are also, during convalescence, signs which must render our prognosis very reserved. When this, in fact, is slow, and difficult, we may fear, if not a relapse, a grave and durable alteration in the constitution and health.

In regard to the influence of the form of epidemic cholera upon the prognosis which it establishes, it is too evident to be insisted upon. Among the four forms which we have admitted, grave, benign, foudroyant, and paralytic, there are two, the benign and foudroyant, which are constituted and named precisely with reference to their prognosis ; while one has most often a favorable termination, that of the second is invariable fatal. The same is true with regard to the paralytic form, from which the chances of recovery are but little greater than in the *foudroyant* cholera. The grave form, which is the common one, is that in which the prognosis is variable and to which are particularly applicable the considerations into which we have entered.

Signs derived from etiological conditions. — It is not in the midst of atmospheric or meteorologic influences, otherwise so obscure, that we should look for any indication proper to throw light upon the prognosis. Hygienic conditions, on the contrary, may furnish very useful data upon this subject.

It is certain, indeed, that a much more unfavorable prognosis should be given in cases where the disease rages among individuals placed under the worst conditions in regard to habitation, regimen, and fortune, a prey to indigence or vice ; while the chances of recovery will be much greater under opposite circumstances.

It is not less important to consider individual conditions. The age, in fact, may, other things being equal, affect the prognosis. If we have seen that infancy is less exposed to attacks of cholera than other epochs of life, we must remember that the disease presents at this age a gravity relatively greater. The same is true of old age ; and those periods of

life which present themselves under the most favorable conditions, are those of adolescence and youth. We cannot admit, however, similar differences in regard to sex. The general characters of the disease do not appear to vary notably in the two sexes. In fine, it is easy to comprehend that the state of the constitution may exert an influence upon the termination of cholera, as upon that of all other grave diseases, and that feeble or already diseased individuals may be less able than others to resist their influence. It should be added, that mental depression and fear of death, if they are not causes entirely determinate, may greatly aggravate the attack of cholera, and give to it a most fatal character.

There is one peculiar condition which, on account of the influence which it seems to exert upon the termination of epidemic cholera, should here be mentioned. We refer to pregnancy and delivery. It has been said that pregnancy is an unfavorable complication in the case in question. Cholera produces almost inevitable abortion. But, what is much more singular, is, that labor seems to exercise a favorable influence upon the disease. This fact is so remarkable that we have thought proper to report some of the observations upon which it is founded.

At the height of the epidemic at Paris, April 12th, 1832, a woman 6½ months advanced in pregnancy was attacked, with great violence, with the first symptoms of cholera; reaction began to take place freely, when, after 48 hours, labor pains came on, and this woman was delivered of a child dead from cyanosis. Soon after delivery, the symptoms of cholera, which had come on in a manner so intense, ceased completely, and the patient, in whom all symptoms of the disease immediately disappeared, herself says that the delivery saved her from death.[1]

In the case of a woman in the eighth month of pregnancy, the cholera had reached the cold period; labor, having been

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[1] Monneins; *Gaz. Méd.* 1832, p. 193.

excited artificially, was accomplished in three hours, and produced the expulsion of an infant dead with cyanosis. Two hours after, all serious symptoms had ceased.[1]

A spontaneous accouchment also caused all the symptoms of cholera to disappear in a woman, who unfortunately afterwards died from a relapse.[2]

Signs derived from the character of the epidemic. — The prognosis of cholera may be further elucidated by the consideration of the course of the epidemic. This may, in fact, present a general character of gravity or mildness more or less apparent, although we have seen by the table of mortality that no great difference generally exists between epidemics of the disease in this respect. M. Monneret thinks he has noticed that the present epidemic has not followed, in most of the places which it has overrun, a regular increasing and decreasing progress, but that it has presented singular oscillations. These peculiarities appear to him to attest "a sort of degeneration in the cholera, and to portend that, like all diseases which have ravaged Europe at other epochs, it may end by becoming acclimated, losing its violence and its primitive characters." We cannot agree with these opinions of our learned colleague ; on one side it appears to us that the first part of his proposition is much too absolute, and that, in nearly the whole Russian empire, the present epidemic has preserved all its characters ; and we do not see, on the other side, any thing which indicates that the cholera may sooner or later become habituated to our climate. Much less can we accept the calculations by which M. Vérollot[3] endeavors to establish that the number of victims to the cholera, if it should again visit Paris, would be fewer by one half than in 1832. These are but suppositions which rest upon no certain basis.

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[1] Dr. Basedow de Mersbourg, *Medic. Zeit.* 1833, 2e Année, No. 32.

[2] Ferniot, *Thèse de Strasbourg*, 1836.

[3] *Loc. cit.* p. 128.

The prognosis must vary according to the period at which the epidemic has arrived. It is generally admitted that particular cases occur of much greater severity during the period of exacerbation, and much milder, on the contrary, upon the decline of the epidemic. This took place in Paris, where it was observed, in the first period, that more than three fifths of the patients died, while counting from April 20th, the proportion was not more than one half, at the beginning of May it formed one third, and, later, a still lower fraction. To this rule, however, there are numerous exceptions. In the example even which we have just chosen, numerous oscillations were shown in the tables of mortality, especially during the period of decline and at the end of the epidemic. And we know already that, in many places which the cholera has invaded in its last irruption, the disease has appeared to maintain the same gravity to the end of the epidemic, and to show itself, even on its decline, under the most terrible, the *foudroyant* form. It is necessary, therefore, to guard against attaching too great a value to this difference which the character of the epidemic may present at its various periods.

It appears, in view of what has been said, that the three orders of signs upon which we have just treated, may furnish extremely important practical considerations relative to the prognosis of epidemic cholera.

CHAPTER VII.

TREATMENT.

WITHOUT being carried away by a blind fatalism, we may nevertheless recognize in the nature even of pestilential diseases, a character of malignity which opposes a peculiar resistance to the efforts of man. They are truly the scourges

of humanity, and without going back to the mystery of their origin, we can understand how the means at the disposal of science should be more often unavailing in these than in other diseases. Hence it results that, in the absence of all specific remedies, it is necessary carefully to study the derangements of the diseased organism, and deduce from this attentive observation the rules of a rational treatment. This is especially true with regard to epidemic cholera. It would be utterly impossible to extract any thing from the innumerable remedies and modes of treatment which have been indicated in this affection, without first endeavoring to understand the peculiar indications which may present themselves, and upon which all therapeutics must depend. Having regard to these data, we may be assured that our efforts will not be entirely without avail in combating the gravest symptoms, and may thus save many victims, who, left to the efforts of nature alone, or to the incoherent practice of an ignorant empiricism, would have inevitably perished.

Different indications for the treatment of epidemic cholera result from a knowledge of the causes and analyses of the symptoms peculiar to each of the periods of the disease. The first order of indications will relate to the prophylactic treatment; the second will furnish us the most proper means to be employed against the prodromes, the cold period, the period of reaction, complications and secondary affections, and finally against the accidents of convalescence. It is in this order that we propose to study the treatment of cholera, always commencing by establishing the rational indications and practice applicable to each phase of the disease. We shall conclude by a summary of the medicines which have appeared to us the most useful in this disease.

PROPHYLACTIC TREATMENT.

The study which we have made of the causes of cholera, has shown us that among those which depend on atmospheric or hygienic conditions, or upon moral influences, there are

those which furnish very important indications with regard to the prophylaxis of epidemic cholera. Some of these influences can alone be counteracted by the resources at the disposal of the public authorities, and of which we shall speak under the head of *Sanitary measures.* We shall here allude only to what relates to private hygiene.

Thus the necessity of guarding against humidity; the danger of an insufficient alimentation, or of excess of any kind; the importance of a healthy and moderate regimen; the advantage of calmness and firmness of mind, should render apparent the value of the following prophylactic rules.

On the approach or at the commencement of an epidemic of cholera, we recommend the application of a flannel band, to be constantly worn upon the abdomen, next the skin, together with all the means proper to guard against the action of cold and dampness. Those who, from their position and habits, follow already a regimen and mode of life wisely regulated, should make no change. They should simply avoid, according to their individual dispositions, the use or at least the abuse of aliments of an injurious nature, particularly fruit, farinaceous vegetables, milk diet, pastry, ices, pork sausages ("*charuterie*"), and liquors, in a word, every thing capable of disordering the digestive functions, and especially which can excite diarrhœa. All excess at the table, even occasional, should be rigidly proscribed, as also venereal excesses.

We must not limit our suggestions to an avoidance of those errors which luxury or competence alone permit. It should be recollected that those most exposed are those most in need of the necessaries of life. To these we shall not confine ourselves to a recital of the frightful consequences which may follow drunkenness, which not only carries with it its own punishment, but also deprives often an entire family of the resources on which it was dependent for a healthy and sufficient nourishment. We may add, that the first law of public assistance, should be to insure to the

needy, a substantial and reparative nourishment, and sufficient clothing to shelter them from cold and damp. The influence of the wise and benevolent counsel of the physician, is perhaps the most often successful in animating dejected minds, and should in no case be neglected.

TREATMENT OF THE PRODROMES.

If we are well imbued with this capital truth, that the life of a great number of men will depend upon the care with which the precursory phenomena of cholera are observed and combated, we shall possess, without contradiction, the surest specific against the ravages of this terrible disease. But the knowledge of this important truth should not remain confined to the professional man; it should be circulated in all ranks of society, that every one may know, that during the prevalence of an epidemic, no indisposition, even the slightest, should pass unnoticed; that a derangement of health, in appearance insignificant, and which the most simple means would easily dissipate, may be quickly followed by the symptoms of cholera. The great error generally committed is, in attending only, in such circumstances, to the derangements of the digestive passages, particularly diarrhœa. But we know, and must insist upon this point, that the prodromes have often an entirely different character, and consist merely in a peculiar depression of spirits, heaviness of the head, vertigo, with other nervous symptoms, various in number. These two orders of precursory phenomena have an equal importance, but claim peculiar attention.

If digestion is difficult, the abdomen painful, the bowels costive, the tongue furred and covered with a saburral coat, with bad taste in the mouth, it will be very useful to forestall ulterior accidents, by administering a saline or other purgative, followed by a bath; and at the same time a rigid regimen should be subjoined.

If diarrhœa, borborygmi and colic exist, especially

after each meal, the patient should be confined to bed and restricted to the most rigid diet; in those of a bilious and hemorrhoidal tendency, the application of leeches to the anus may be had recourse to, with great advantage. Cataplasms should be kept upon the abdomen; baths should also be recommended. Opium administered at once, by the stomach and by injections, will be found very successful; feculent drinks, such as rice water, or the decoction of salep, may be allowed. It is very rare that the diarrhœa resists these means, for which may be substituted, if found insufficient, the use of sub-nitrate of bismuth, or some astringent substance, such as catechu or rhatany.

If the prominent prodromes consist in gastralgia, the sequel of atony of the digestive powers, or of an insufficient alimentation, the use of tonics, broth, meat, wine in small quantities, combined with certain bitter and slightly stimulant preparations, as rhubarb, the decoction of gentian and chamomile, will suffice, without doubt, to remove the symptoms.

The precursory phenomena of the second order, that is to say, vertigo, nervousness, general lassitude, and muscular weakness, require a different treatment, which, to succeed, ought also to be applied on their first manifestation. The patient should immediately abandon all occupation; if robust, and particularly if there be plethora, bleeding should be practised, and may be with benefit repeated after a short interval; under opposite conditions, a tepid bath, or affusions of warm water, may be presented, followed by frictions with warm flannel; repose in bed, the use of diaphoretic drinks, such as tea, infusion of pepperment or of balm, and all the means promotive of perspiration.

It is evident that the indications which flow from the prodromes are numerous and various; they have especially an extreme importance from the fact that, if they are treated in proper time, the disease may be cut short, even before its irruption. This is a consideration which must never be lost

sight of, and which again serves to show how fatal is the absence of all prodromes, since it does not allow this chance of safety.

TREATMENT OF THE FIRST PERIOD.

It is upon this first period of epidemic cholera, that are concentrated the efforts of therapeuties. Before enumerating the numberless means that have been employed, it is proper to recall the nature and connection of the principal symptoms by which it is constituted. Repeated evacuations, up and down, composed of a peculiar matter, a general coldness which rapidly increases till the supervention of the algide period, an extreme slowness of the circulation, and disordered respiration, from which results cyanosis. Such are the phenomena whose succession constitutes the first period of epidemic cholera; and, as the last symptoms are within a certain point, subordinate to those which precede, it is evident, that if we can succeed in arresting the first, the development of the others will be almost necessarily prevented. However this may be, a double indication presides over this part of the treatment; it is, on the one hand, to arrest the evacuations, on the other, to restore the heat, and with it the activity of the circulation and the respiratory powers. The means which may, simultaneously, be made subservient to this double end, are internal and external. We shall mention those which may be most usefully employed.

Internal means. — *Blood-letting* should rarely be practised after the prodromic stage is passed, and the disease has manifested itself. This remedy is only admissible at the very outset of the first period, and in individuals of a robust constitution and in the flower of their age.

At the head of the medicaments indicated in the most formidable symptoms of epidemic cholera should be placed opium and its preparations, which still form the basis of the treatment of this dreaded affection in the Indies. But they

should be employed in considerable doses, if it is wished to produce any decided effect. The following formula, suggested upon the origin of epidemic cholera, by an English missionary, will enable us to judge of the quantity of opium which may be administered:

Laudanum,	80 drops.
Brandy,	4 ounces.
Oil of Castor,[1]	2 teaspoonsful.

This mixture should be taken at once, or in divided doses at short intervals. It is still very much used in Bengal. I learn from one of our most distinguished brethren, Dr. Ollife, that in Calcutta a similar mixture is prepared and kept in every house, so that it may be administered on the first appearance of the disease. They often merely fill a wine-glass with one third laudanum and two thirds brandy. The quantity of opium taken by cholera patients has been in certain cases truly frightful. They have been known to take as much as five drachms of laudanum. Such an excess would never be advised in our country; but it is certain that laudanum, or the extract of opium, to be useful, should be administered in very large doses, either at once, or what is still better, in divided doses often repeated.

Ipecacuanha, by its properties at once emetic, contra-stimulant and diaphoretic, is singularly adapted to fulfil the principal indications of the first period of cholera. We do not hesitate to consider this medicine also as one of those most to be relied upon at the commencement of the disease. But it is not sufficient to administer it simply as an emetic; its action must be sustained and its effect prolonged by giving it first in the dose of ten grains, followed every half hour by

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[1] According to the French Dispensatory, "the oil of castor" is prepared as follows:

℞	Castor.	ʒij.	
	Ol. Olivæ,	℈ij.	
	Vini Albi,	℥iv.	M. Digere et Cola.

from one to five grain doses, until the entire disappearance of the symptoms. Under the influence of this agent, the choleraic evacuations seem to change their nature, the biliary secretion to re-establish itself, and a mild and moderate reaction soon to take place. Dr. Draut, of Vienna, and MM. Andral, the elder Guéneau de Mussy, Husson, Martin Solon, of Paris, have proved its power.

To this method belongs the employment of some substances equally of great utility, especially Dover's powder, which should also be given every half hour in doses of one or two grains. A secret remedy, which has been much employed for the last ten years in the Indies, and known by the name of Jeremy's drops, acts probably in an almost analogous manner. Calomel is an important element in the English treatment of epidemic cholera. Dr. Annesley insists especially upon its employment, and combines it with opium. It may certainly contribute to change the nature of the evacuations, and thus excite a good reaction. It is with the same view that M. Récamier and M. Trousseau have used the sulphate of soda, administered in the dose of two drachms and repeated every hour.

The *sub-nitrate of bismuth* was especially extolled in the epidemic of 1831 in Poland, by Dr. Leo, who gave it in the dose of three grains every two hours, either alone or combined with an equal quantity of rhubarb. But notwithstanding the very favorable report given by Biett in support of this medicine, to which has been attributed a sort of specific virtue, it is far from possessing the value which has been assigned to it.

A substance whose effects seem much more worthy of fixing our attention is the *Piper cubeba.* Dr. Carquet, an able practitioner at Sézanne, in the department of Maine, conceived the idea of employing this medicine, which he occasionally combined with canella and cayenne pepper. He gave it by the mouth, in the dose of twenty-five grains diffused in two ounces of cold water, renewing the dose when

the first had been rejected; or by injection, in the dose of half a drachm infused in three and a half ounces of emulsion of starch. It appears from observations detailed by M. Carquet, in a manuscript note which has been obligingly communicated to us by M. Bouteiller, a distinguished "interne" at Hotel Dieu at Paris, that this medication has in many instances removed as by enchantment all the grave symptoms, without causing either pain or too great reaction.

Whatever use may have been made of the various substances just enumerated, their action has been very often usefully combined with that of diffusible stimulants, tonics and anti-spasmodics, which have been administered under the most various forms. Those most commonly employed, and which are found to be most efficacious, are the infusions of *tea*, *peppermint* and *sweet balm; warm wine* with the addition of *canella* and lemon; *punch* to which remains attached the name of M. Magendie, and which differs from common punch only in this, that for the infusion of tea is substituted the infusion of lime-tree; *grog*, (a mixture of brandy, warm water, lemon and sugar;) *black coffee*, (a decoction of coffee without milk;) Madeira, Malaga and Alicant wines, and the variously composed ptisans, to which may be added *acetate* or *carbonate* of *ammonia*, or even *ammonia* alone, *camphor*, *ether* or *oil of cajeput*. The following potion might be prescribed, for example, composed by M. Récamier:

Infusion of Mint,	℥x.
Infusion of Elder,	
Decoction of Salep,	
Acetate of Ammonia,	℥vi.
Laudanum of Sydenham,	āā ℈ij.
Ether saturated with Camphor,	

Or as an habitual drink, the ptisan indicated by M. Magendie:

Infusion of Chamomile,	℈viij.
Acetate of Ammonia,	℥ij.
Tinct. of Lemon Peel,	℥ij.
Sugar,	℔j.

Camphor, which is far from having any specific virtue in cholera, is advantageously combined with ether and opium. *Ether*, on the contrary, possesses extremely useful properties, and should be employed with confidence, either alone, or combined with an aromatic infusion, coffee, or any other preparation. MM. Trousseau and Pideax, in their excellent treatise,[1] say they have been much pleased with the syrup of ether given in the dose of a large spoonful every hour, in concurrence with ice, and a slightly exciting drink, infusion of mint, for example. Finally, the *oil of cajeput*, which passes for a very energetic diaphoretic stimulant, although it has not been tried at Paris, appears to have been employed with success in the Indies, and at Berlin. From twenty to forty drops may be taken in a little tea.

A more simple means than the preceding, and capable of fulfilling the same indications, consists in the use of *water*, either very warm, or iced. M. le Dr. Sandras, has seen in Poland, cholera patients considerably improved after having drunk, in the space of two hours, twelve or sixteen tumblers of water at the highest temperature that could be supported without being burned. Ice has been of great service, and may supply the place of all other kinds of drink, when it is employed at the same time with warmth to the exterior.

Among the medicines which remain for us to examine, there are those which are based solely upon a preconceived theoretical idea, which certain authors have formed of the disease. It must be acknowledged that practice has almost always proved the falsity of these systematic views. Thus the use of *cinchona* and *sulphate of quinine*, based on the incorrect notion of a connection between cholera and intermittent fever; *charcoal*, directed by Biett and Parkin against a pretended miasmatic cause; *alkalies*, the use of which has been recently extolled, by a learned chemist, M. Baudrimont,[2]

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[1] *Traité de Thérapeutique*, 3e édit. 1847, t. ii. p. 249.

[2] *Bulletin de l'Acad. des Sciences*, Aug. 21, 1848.

with a view to remedy the thickening of the blood; *mercurial frictions*, advised at Paris, by M. J. Guerin,[1] and at Marseilles, by Dr. Robert;[2] finally, the so *unjustly praised* inhalation of the gases capable of reviving hæmatosis, as *oxygen*, or the *protoxide of nitrogen*, and the barbarous attempts at *transfusion of blood*, or the *injection of water into the veins;* such are the various means which have been recommended, with more warmth than reason, in epidemic cholera.

Ought we to rely more upon those medicaments, whose novelty rather, perhaps, than their peculiar properties, has recommended them, especially of late, to the notice of physicians, and among which, some have been already raised almost to the rank of specifics? We refer to the guaco, hachisch, chloroform, and naphtha.

Guaco, a species of climbing plant, of the family of synanthereæ, and found in Brazil, has been, according to M. de Chaniac,[3] recommended in cholera by Dr. Chabert, a French physician in the service of the Mexican government, as capable of producing a salutary reaction. It is taken in simple cases, in the form of a decoction made with ℥ii of the stalk, and ℥ss of leaves to ℥xx, or from twenty ounces to a pint and a half of water, and given every half hour, in the dose of a small cupfull.

Hachisch, this marvellous substance which exercises upon the nervous system such an energetic action, has been very recently experimented upon in the epidemic of Lower Egypt. Dr. Willemin, attacked in the gravest manner by the disease, attributes his recovery to its effects.[4] The preservation of so distinguished a professional brother, would be alone a result sufficiently considerable to attract the particular attention of practitioners. We can understand, moreover, by the phy-

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[1] *Gaz. Méd.* 1832, p. 177.

[2] *Journ. des Connaiss. Méd. Chirurg.* t. iii. p. 204.

[3] *Journ. des Connaiss Méd. Chirurg.* t. iii. p. 204.

[4] *Bulletin de l'Acad. de Médic.* Oct. 17, 1848.

siological action of hachisch, that it may be applicable, as Dr Moreau,[1] the learned physician to the insane, has so satisfactorily demonstrated, to some of the indications of cholera, and particularly to the depression of the nervous power, and the inactivity of the functions which depend upon it. In fact, it has been observed that it produces a direct and very powerful excitation, which revives the life already nigh exhausted. From ten to thirty drops of the alcoholic solution, containing from one to three grains of the active principle, should be administered.

Chloroform does not seem proper for trials of this sort, and yet it has not escaped experiment. In the month of October last, the idea suggested itself to Dr. Hill, physician of an insane asylum in the environs of London, of putting the cholera patients to sleep by means of choloform. Of seventeen patients, twelve were submitted to the inhalation, two had died, and six had completely recovered at the date of the communication.[2] Some slept twenty minutes, or half an hour; others, two whole hours. The cramps and vomiting returned upon awaking, and chloroform was again administered. But without placing too much confidence in this apparent success, it is well to bear in mind that, in all these cases, the most active and complete treatment was employed in concurrence with the inhalation of chloroform; which greatly diminishes the value of the facts just related. It may be added, that this is a remedy which seems least indicated in the algide period of epidemic cholera. Recourse cannot be had, indeed, without danger, during the great disturbance of the respiratory and circulatory functions which occurs in this stage to an agent, which, according to the most accurate researches of our learned colleagues, MM. Gosselin[3] and Regnauld, and of MM. J. Guérin and Lebert,[4] may cause direct

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[1] *Union Médicale*, Oct. 19, 1848.

[2] *Union Médical.* Nov. 11, 1848.

[3] *Arch. Gén. de Médic.* Dec. 1848, 4e serie, t. xviii. p. 385.

[4] *Acad. de Médecine*, Nov. 1848.

and almost instant paralysis of the heart. I do not hesitate, therefore, to say that, even with a view to combat the cramps and spasmodic state, we ought not to attempt the inhalation of chloroform, and still less to regard it as a specific in cholera.

Neither is this title merited by *the oil of naphtha*, which, in Russia and especially among the Cossacks, possesess an extraordinary celebrity, and forms an ingredient in the famous elixir of Voronej. This elixir which cannot be sovereign, if we judge of it by the ravages which the cholera has made in the very country to which it owes its name, is employed externally and internally. There are two kinds; the first, more feeble than the second. We are indebted for the knowledge of these formulæ to M. Contour, who noted them on the spot.

VORONEJ'S ELIXIR.

No. 1. Camphor, }
Sal. Ammoniac, }
Oil of Naphtha, } āā ʒij.
Essence of Turpentine, }
Nitric Acid, }
Turkey Pepper, 2 pods.
Vinegar, ℥ vjss.
Brandy, (made from grain) ℈iv.

No. 2. Sal Ammoniac, ʒx.
Oil of Naphtha, ʒvi.
Oil of Olives, ʒx.
Nitric Acid, ʒvi.
Nitrate of Potash, }
Turkey Pepper, } āā ℥iss.
English Mint, ℥viij.
Vinegar, Oj.
Brandy, from grain, Oiv.

We here conclude the enumeration of the internal means employed in the treatment of the first period of epidemic cholera.

EXTERNAL MEANS.

We have already several times remarked, that the action of medicines should be assisted by certain means capable of concurring efficaciously in the great end to be desired, that is, the re-establishment of the warmth and circulation. These means are of several kinds; some operate in producing artificial heat; some, in exciting a natural reaction; and, lastly, others in determining a more or less energetic reaction.

Artificial heat. — Among the first are ranked the application of warm sheets, or, as in Russia, warm felt, pieces of wool soaked in warm water, about the limbs and upon the abdomen; warm baths, dry fumigations, made in the bed with hot air, either by means of a heating apparatus, or by the no less simple than ingenious process of M. Professor Duméral, who inflames half an ounce of alcohol, contained in a saucer placed under the bedclothes, which are raised by two hoops; the applications, around the body, of bags of hot bran or oats, or a sack of gummed cloth. A general remark which applies itself to all these different means, and which is of great importance, is that they are all limited to the production around the patient of an atmosphere, the temperature of which, is carried artificially to a greater or less degree of heat; and, that the body may become warmed only in the manner of an inert body, which is not always without danger. M. Professor Trousseau and M. Dr. Pigeaux[1] have witnessed cases, in which the too great elevation of the temperature seemed to favor manifestly the asphyxia of cholerics. Artificial heat should, therefore, only be employed with great circumspection, and means should be preferred which are capable of exciting a natural reaction.

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[1] *Gaz. Médicale*, 1832, p. 155.

Natural reaction. — These means are less numerous, but they may become capable of great power. They are, first, stove baths, dry or moist, the employment of which cannot always be effected; and, secondly, affusions and applications of cold water. This last means is, without doubt, one of the most powerful which can be put in use; and M. Récamier has, better than any one, established its indications.[1] Dr. Casper of Berlin had already, in 1831, recommended this practice, which he made to consist in cold affusions and douches; in the application of iced water to the head, chest and abdomen, and injections of cold salted water.[2] Delpech applied ice to the epigastrium, and at the same time caused it to be constantly swallowed. MM. Récamier, Guéneau de Mussy, and Trousseau employed, simply, affusions simultaneously with the ingestion of small quantities of cold water. At the present time, recourse may be had to the processes of hydrotherapy, and especially to the means of sudation, which consist in enveloping the whole body in a sheet wet in simple or salted cold water, and in woollen blankets, and causing great quantities of cold water to be drunk, until the perspiration is established. We might certainly count more upon this means than upon simple affusions, and its power is, without doubt, sufficient to excite a natural reaction.

Revulsion. — The most energetic revulsives have also been employed in the cold period, in order to awaken the circulation and restore the warmth. Urtication, the application of sinapisms to the epigastrium, abdomen and limbs; general mustard baths, containing from one to two pounds of the flour of mustard, and frictions with more or less irritating liniments, have been advised for this purpose. This last means, in accordance with the remark which has been very often made, has the serious inconvenience, when unskilfully

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[1] *Du Traitement du Choléra.* Paris, 1832.

[2] *Traité du Choléra*, par Littré, *loc. cit.* p. 148.

applied, of exposing patients to become chilled. It is not, however, impossible to take sufficient precautions in this respect; and we ought not to deprive ourselves of a resource so useful in diminishing the terrible pains which the cramps may occasion. Dry frictions, with the hand or a brush, are sometimes made; camphorated or ammoniacal linament, is also applied in this way.

Dr. Foy[1] has made known the composition of one of these preparations most used in Poland, under the name of *Liniment des Juifs de Wissoritz*, and which appears worthy to be preserved.

Vinegar, Oj.
Rectified Alcohol, Oij.
Powd. Camphor, ℥i.
Powd. Pimento, ℥ss
Powd. Mustard, ℥i.
Bruised Garlics, ℥ss.
Powd. Cantharides, ℈iv.

This liniment was employed in frictions upon the entire surface of the body.

In connection with this preparation, may be mentioned the irritating plaster, composed by M. Ranque d'Orleans.[2]

Hemlock Plaster, } āā, ℥iss.
Gum Diachylon, }

"Soften this mass in warm water and add the following powders.

"Powder of treacle, (that is to say, only the pulverent substances which enter into the composition of treacle, the others are useless,) ℥j.
Pulv. Camphor. ʒiss.
Pulv. Sulphur. ʒss.

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[1] *Traité du Choléra en Pologne*, 1831, p. 72.

[2] *Guide des Practiciens dans le Traitement du Choléra*, par le Docteur Fabre. Paris, 1832, p. 126.

"Form of all a well mixed mass; cover with it a skin or linen cloth, of sufficient size for the entire abdomen, from the epigastrium to the pubis, inclusively.

"Before applying this epithema, sprinkle its surface with the following mixture:

Tart. pot. et antim. ʒiss.
Pulv. camph. ʒi.
Flor. sulph. ℥ss.

"Retain the epithema upon the abdomen, by means of a body bandage. Allow it to remain three or four days without being renewed, if there be amelioration of the symptoms; otherwise, it should be renewed the next day."

The endemic method has been made use of for causing the absorption of certain medicinal remedies at the same time that the blister operates as a revulsive; the following method, for which we are indebted to M. le Dr. Martin Solon, fulfils this happy combination.[1]

"Two strips of diachylon were placed along the entire course of the spine, from the lower part of the neck to the lower part of the sacrum, having between them an interval of about two centimetres. Vesication was then produced by means of liquid ammonia along the space included between the two strips; the epidermis was raised and the denuded parts sprinkled with from one to one and a half grains of hydrochlorate of morphine. In one of the cases in which it was employed, the almost immediate cessation of the cramps, and in the other a very perceptible amendment, followed its application."

Similar means have been employed in other cases in situations where the course of the nerves is most superficial, as in the poplitial space, in the hollow of the armpit near the brachial plexus, etc.

Fomentations of belladonna, and cataplasms containing

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1 *Guide des Practiciens dans le Traitement du Choléra*, par le Docteur Fabre. Paris, 1832, p. 121.

this substance have also been employed with much success, in the same nervous accidents.

In the severest cases of cholera, the action of external irritants also has been carried to a very great extent. M. Sandras[1] cites cases of unexpected recovery, attributed to the energetic means which we are about to describe ; a cloth was stretched upon the abdomen and saturated with alcohol, which was inflamed. There resulted from this, in some cases, a very superficial burn, in others, on the contrary, a deep eschar, and in all cases an acute pain and momentary excitation of the circulation.

M. Petit, physician of Hôtel Dieu,[2] during the epidemic of Paris, advised a more violent means, which succeeded in his hands and in those of M. Bouillaud. As soon as the disease appeared, a double flannel band was applied the whole length of the dorsal spine, slightly moistened with the following mixture : Liquid ammonia ℥i, essential oil of turpentine ℥i ; and over this flannel a double linen bandage, wet in warm water. A hot iron was passed slowly over this, with slight pressure. This operation, repeated every quarter of an hour, produced a very rapid vesication, the warmth and heat becoming re-established, and the vomiting and cramps sensibly diminishing.

Such are the means, internal as well as external, which appear to us suitable to be employed in the first period of epidemic cholera.

TREATMENT OF THE PERIOD OF REACTION AND OF SECONDARY AFFECTIONS.

We have seen, by the details into which we have just entered, that all the efforts in the treatment of the first period are designed to excite a moderate but sufficient reaction. A

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1 *Répertoire Complet des Diverses Méthodes de Traitement du Choléra Morbus*, par Ch. Fraisse et F. François. Paris, 1832, p. 77.

2 *Arch. Gén. de Méd.* 1e serie, t. xxviii. p. 470.

double indication will therefore remain for the second period. It consists, first, in limiting the reaction already excited, and secondly, in re-exciting it if incomplete. It is needless to say that we should limit ourselves to a purely expectant course of treatment, if the natural evolution of the disease goes on without checks and in an entirely regular manner. We should confine ourselves, in such cases, to fresh and diluent drinks, acidulated or emollient, and some very simple antiphlogistic means, as cataplasms upon the abdomen, injections, and a rigid diet.

An active treatment would be, on the contrary, positively indicated if reaction should come on with too much violence, and inflammation should supervene; we should have recourse to blood-letting, general and local, employed with prudence and in proportion to the energy and urgency of the inflammatory phenomena, as well as the strength of the patient. If the symptoms which present themselves under this nervous form are characterized by stupor, sub-delirium, or spasms, the remedies which we have already indicated in the first period will be found very useful as well as cold and ice applied to the head or given internally. Finally, if the secondary phenomena assume an intermittent form, as has been observed, the sulphate of quinine should be tried, and may offer some chances of success.

It must be acknowledged unhappily that, when reaction does not go on regularly, medicine is too often of little use, either from the extreme feebleness of the patient, which does not allow blood-letting, or the ineffectual employment which has been already made of all the active medicines. Besides, in this period there are many indications which may result from individual dispositions, and for which it would be impossible to lay down general rules.

TREATMENT OF CONVALESCENCE.

Convalescence from cholera is not exempt from accidents; and the importance of watching this period and removing

whatever may tend to its disturbance, cannot be too much insisted on. As in those cases of short continuance, and in which perfect recovery rapidly ensues, little caution may be necessary, so, on the contrary, the strictest regimen should be prescribed and the most minute precautions given, in cases where any thing occurs to disturb or retard convalescence.

Thus, to counteract the tendency to a return of coldness, it will be very useful to employ every morning affusions of water, either very warm or very cold. No other means would be more competent to restore the action of the skin, which it is so useful to reanimate and sustain, in convalescence from all grave diseases. Gastralgia, atony of the digestive powers, and flatulent dyspepsia, will yield to the use of bitters and certain tonics taken before and after eating. Persistence of the diarrhœa demands recourse to astringent and narcotic preparations, as catechu, rhatany and small doses of opium. In cases, on the contrary, where obstinate constipation succeeds the choleraic evacuations, with anorexia and gastro-intestinal derangement, it would be well to administer some slight purgative, especially the powder of rhubarb, and what may be still better, magnesia. When cramps and insomnia continue after recovery, they may be made to yield by means of tepid baths or some opiate preparation.

But that which should predominate in this period of convalescence, is a very particular attention to the strictest rules of hygiene; especial care should be had to guard against wet and cold. The greatest precautions should be observed with regard to food, which should be taken at first with extreme caution, and selected with great care. It is difficult, absolutely, to point out what, in all cases, would be the best. We should be guided in this respect, in every particular, by the tastes of the patient, and principally by the state of the digestive functions. It is particularly important not to omit these cautions until every symptom shall have disappeared, and recovery be secured.

REVIEW OF THE TREATMENT.

After having passed in review the different indications which may present themselves in the course of epidemic cholera, and the different modes of fulfilling them, we deem it useful to sum up in a few words, the general course which it is proper to follow in the treatment of the disease, taken as a whole.

The first capital observation is this; that, whatever may be the medication adopted, it is necessary to pursue it actively and with perseverance, without constantly changing the therapeutic means, and without allowing interruption in the bestowal of the proper care.

After the strict observance of prophylactic rules, the attention should be especially directed to the prodromes; and if they manifest themselves, we should, without delay, meet these precursory phenomena by a rigid and continued treatment.

At the beginning, in whatever form the attack of cholera presents itself, no means should be neglected for maintaining or restoring the heat and exciting perspiration, at the same time that efforts should be made to modify or arrest the evacuations. The external and internal means should be conjointly employed and continued without cessation, until a remission, or at least a transformation of the symptoms has been obtained.

The employment of the means which have served to produce this stimulation should be suspended, as soon as the heat begins to manifest itself and the pulse reappears. According to the eminently practical remark of MM. Trousseau and Pideaux,[1] a moderate stimulation produces reactions moderate in themselves, but sufficient, and in general exempt from that typhoid condition, accompanied as it often is with

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[1] *Loc. cit.*

interminable and ill conditioned phlegmasiæ, which carry off so many patients. In the case, otherwise, where the reaction is moderate and sufficient, if habitual abundant sweats supervene, and the symptoms successively diminish, every sensible practitioner will abstain from action, and, according to the expression of the editor of the *Instructions de l'Académie de Médecine de Paris*, "will remain a contented observer of such a state of things."

According to the mode of reaction, it may be necessary to return to different means indicated in the algide period, or, on the contrary, to recur to agents of an entirely opposite character. Complications and secondary affections will require a peculiar treatment, subordinate always to the constitution of the patient and the resources presented by nature.

We conclude by calling to mind the great care which convalescence demands, and the infinite precautions which should be used to prevent relapses, always so formidable an accident.

CHAPTER VIII.

SANITARY MEASURES.

If it is to private hygiene, that is to say, to regular habits and a proper regimen of life, that we are to look for the principal means of averting the attacks of cholera, there are also certain prophylactic measures which belong to public hygiene, and which alone can diminish the intensity of the epidemic and moderate its ravages. All governments have been engaged in considering with much wisdom and zeal, this serious question, and have availed themselves of all the resources at their disposal to scatter and disarm the scourge.

The measures prescribed for this purpose are not all of equal importance. Nevertheless, they deserve to be recalled,

for in the application of most of them there will be found real utility. They comprise four orders of measures, which we shall now consider: first, the means of isolation and sequestration; secondly, of rendering localities healthful, and maintaining their salubrity; thirdly, of public assistance; and, finally, instructions for the purpose of disseminating among the people generally, the best advice to be followed during the presence of the epidemic.

ISOLATION AND SEQUESTRATION.

We have alluded, in speaking of the causes, to the opinion at first so universally prevalent, upon the contagious nature of cholera; and the severity of sanitary measures suggested by this false doctrine. We have seen with what rigor quarantines and all the means of isolation and sequestration were every where established, precautions as vain as tyrannical, and against which the instincts of the people and the liberal spirits of some governments, the Prussian for example, have already revolted. At the present time the inutility of these measures is recognized in the places even where they were the most rigorously enforced; quarantines and sanitary cordons, which no longer deserve a place in the prophylaxis of epidemic cholera, should be consigned to just oblivion.

OF RENDERING LOCALITIES HEALTHFUL AND SALUBRIOUS.

It is within the domain of municipal authorities to combat, by all means in their power, the causes of insalubrity which contribute so actively to the development and extension of this disease. Besides keeping in repair the public ways, which should be constantly freed from all sorts of filth there liable to be collected, and the rigid inspection of insalubrious establishments, it would be expedient to direct the attention principally to those unhealthy habitations, where are crowded

together so considerable a portion of the population of large cities, and particularly to those lodging houses which become, as it were, foci doomed to the severest ravages of the epidemic. An extremely wise measure, which unfortunately is not often available, but one to which we should not fail to have recourse on every possible occasion, is the removal of the poorest and most numerous families from their confined lodgings, to whom place should be given for the time in the spacious apartments of public edifices, and various buildings which might serve for this purpose. Besides, it will be every where necessary to remedy the evil consequences of crowding, and to facilitate the aeration and ventilation of the places in which a certain number of persons may be collected together. If we remember what has been said in examining the etiological influence of insalubrity, we shall comprehend, without the necessity of recapitulation, in what way the measures for rendering localities healthy for the prevention of the ravages of the pestilence, should be directed.

There is a practice which has been adopted and followed with so much rigor, that it will be doubtless very difficult to demonstrate its inutility; it is the use of disinfecting substances, especially the chlorides and camphor. It will be recollected that at Paris very few houses, indeed, very few persons escaped these disinfecting measures, the penetrating odor and properties of the substances employed not being always without inconvenience. We do not hesitate to consider them as more hurtful than advantageous, and we agree in the judicious remark of M. Monneret: "How many persons there are who prefer to swallow a drug sold by an empiric, or to submit themselves to some singular or ridiculous practices, or to carry a specific, or infect with some rank odor the atmosphere they breathe, rather than regulate themselves, and their hygiene, in a manner conformable to reason and the laws of nature."

PUBLIC ASSISTANCE.

If aid is at all times a duty of society towards those of its members who are in want of the necessaries of life, it becomes an imperious law, and almost necessary for public safety, when threatened by, or experiencing, the ravages of an epidemic of cholera.

The first obligation of the public authorities, or of those who are charged with rendering public assistance, should be to insure to the poor a more healthy and more abundant nourishment, sufficiently warm clothing, and a proper shelter. These are the surest means of preventing the decimation of this unfortunate class of persons by the cholera, and at the same time the extension of its ravages in large cities.

The administration of aid to the patients confided to public authority should be perfectly regulated beforehand. But a serious question presents itself in regard to this subject, which at present appears to be a subject of much controversy, and upon which there is a division of opinion among the most experienced. It is that of determining whether hospitals should be multiplied by opening temporary asylums, or whether succor should be carried to the dwelling. It is far from my desire to favor the idea of contagion, in the name of which, in some countries, patients have been removed from the bosom of their families to be sequestered in special hospitals; but I do not hesitate to say that it would be very unwise to renounce the establishment of temporary asylums. In large cities the administration of aid at the dwelling would be always attended with extreme difficulties, and would be too often rendered impracticable by the deplorable condition of the habitation with regard to cleanliness and salubrity, and by the destitute condition in which the greatest number of those in need of assistance are placed. These difficulties become insurmountable during the existence of an epidemic so active and deadly as are generally those of

cholera. It belongs chiefly to the physician to combat these sad prejudices with all the authority that his knowledge, his devotion and his experience of human misery give him.

It must not be forgotten that, in multiplying hospitals, in increasing the number of beds and all the material resources which may be necessary, the facilities are increased for rendering more active and efficacious assistance at the dwelling. The establishment of numerous and well organized dispensaries has rendered, in many cities, especially in Ireland, the greatest services, and should be every where recommended. The commission of health in Dublin, in the very minute details which it has given upon the organization of aid to be furnished at the dwelling, recommends the physician in attendance to furnish himself with a box of medicines which he may carry to the patients.

" This box, which should be of small size, should contain packets carefully labelled, some containing carbonate of ammonia, others pills of opium and ginger, pills of opium and calomel, and phials containing tincture of opium, ether, and tincture of rhatany; all divided and labelled so as to permit immediate administration. It is advised also not to uncover the patient, in the employment of frictions with stimulant fluids, because the evaporation and lack of covering tend to destroy the advantages which we hope to derive from these remedies. Friction should be dry, and made with the hand, without deranging the bedclothes.

" One measure which is added to the preceding, and which we cannot too highly approve, has been put in practice at Berlin.[1] All the physicians were authorized by the municipality to deliver medicines gratuitously to the needy suffering from this disease, to whom they might be called. They have for this but to add to their warrants these words: '*Cholera pro paupere.*' The price of these medicines is carried to the budget of the expenses of the commune. This

[1] *Documents Communiqués. Union Médicale*, Oct. 26, 1848.

measure, as useful as it is wise, cannot fail to be found of great use; and the care and fidelity with which the members of the medical body put it into practice, does not allow us to suppose that there can result from it any abuse."

INSTRUCTIONS.

In almost all states which have been suddenly visited by the epidemic cholera, the governments or the municipal authorities have considered it their duty to give to the public such instructions as to allay their prejudices, throw light upon the causes of the disease, make known the best means of securing themselves from it, and to advise a course of conduct based upon the most certain data of science. These instructions may be eminently useful, and without here repeating all that have been published, we deem it our duty to give a few examples. We shall select in preference the instructions which, in the present epidemic, have been given by the government in Russia, and in England, by the General Board of Health.

"INSTRUCTIONS UPON THE CHOLERA ADDRESSED TO THE INHABITANTS BY THE RUSSIAN GOVERNMENT.

"The following precautions are recommended for the purpose of better security against cholera:

"To protect the body and particularly the stomach against the cold; for this purpose to wear around the abdomen, next to the skin, a woollen or nice flannel band; not to lie down upon the bare ground, nor sleep at night in the open air after having labored hard; not to drink, during perspiration, water or any other cold drink; to avoid acid drinks, and not to drink too much at a time; to take light food and with moderation; not to eat bread badly cooked, crude vegetables, green fruit, or meat, nor take drinks which may not be

[1] *Union Médicale*, Sept. 9, 1848.

perfectly fresh, and to abstain especially from the use of salt meats and drinks, and from whatever excites thirst; to observe cleanliness of body and dwelling; not to allow any species of sewer near the house; not to keep in the house either birds or animals, and to allow the entrance of pure air by means of ventilation; and where there are patients, to avoid all crowding.

"To cover the patient warmly; to rub the body with warm vinegar or brandy, to rub also the hands and feet, and the pit of the stomach with clear tar, or, in absence of this last, with strong brandy; to give to the patient often, and in small quantity, a weak, warm infusion of peppermint, or the essence of peppermint and a little sugar, one or two drops at a time; if there is no relaxation in the pains and vomiting, to apply to the pit of the stomach a mustard poultice; if the symptoms continue, to apply from twelve to twenty leeches to the stomach of an adult, from six to ten to that of an infant, but only in case the patient is of a strong constitution. A warm bath, if it can be prepared conveniently, is a useful aid; but in default of this means, a vapor bath may be prepared in the following manner: heat some stones or bricks; place over them a bedstead set up with a crossed cord; lay the patient well covered upon this; pour vinegar upon the stones or bricks, the vapor of which, aided by constant friction, will promote violent perspiration. If the vapor bath be impracticable, place around the patient bags of warm sand or ashes.

"During the last epidemic, no application was found so efficacious as powerful friction, either with the naked hand, or with a piece of cloth, or brush, also making use of clear tar or some other irritant. The essence of peppermint may be employed with more confidence than it has previously been. Lastly, great care should be observed in convalescence."

We will repeat, notwithstanding its length, the official document which was published in London, October 5, 1848, the importance of which will be at once recognized; for the precepts which are there contained, rest upon the accurate observation of facts such as our studies have shown them, in the different epidemics of cholera.

"INSTRUCTIONS UPON THE CHOLERA, AND ADVICE RELATIVE TO THE LAW FOR REMOVING CAUSES OF INSALUBRITY, AND PREVENTING DISEASES, PUBLISHED BY THE GENERAL BOARD OF HEALTH OF ENGLAND.[1]

"The General Board of Health, after having examined the official reports which have been received, upon the progress of the Asiatic cholera, since the last rendered accounts of the metropolitan commission of hygiene, and after having consulted the most eminent members of the faculty, possessing special knowledge upon this subject, comparison being made of recent information with the observations made upon the anterior mode of propagation of Asiatic cholera in Europe,

"Make known:

"That the experience acquired upon this disease, at the time of the last invasion, in 1831 – 1832, and the more extended experience acquired during its recent course through Persia, Egypt, Syria, Russia, Poland and Prussia, seems to modify some of the ideas which were at first formed in regard to it: these ideas bear principally upon the means which it is suitable to adopt, for the prevention or diminution of the evil.

"The collection of evidence, obtained from observers of all classes, in many countries, under different climates, and in the midst of populations presenting all possible varieties in their physical, political and social conditions, the coincidence of these evidences, and the authority which cannot be denied them, wholly invalidates the opinion which once prevailed, that the cholera is, by nature, contagious; this opinion, if it be erroneous, is extremely injurious in this respect, that it turns the attention from the true source of danger, and from the true means of avoiding it, to the evasion

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[1] *Documents Communiqués. Union Médicale*, Oct. 17, 1848.

of a phantom. It occasions panics, causes patients to be neglected and abandoned, enormous expenses to be incurred for measures at least useless, and sight is lost of that interval, which is so short, but so decisive, between the commencement and the development of the disease, during which, the action of curative means is the most efficacious.

" Although it is true that certain conditions may favor the propagation of the disease from one person to another, as for example, the crowding together of patients, in narrow and badly ventilated apartments, this bears in nothing upon the general principle of non-contagion ; besides, these conditions will, without doubt, never present themselves in our country. Moreover the precautionary measures founded upon the opposite system, as interior quarantines, sanitary cordons, and the isolation of the diseased, in which, till recently, entire confidence has been placed, have lately been abandoned in all countries where the cholera has appeared, so soon as the proofs of their inefficacy have been established.

" It is demonstrated also, that the cholera is almost always announced beforehand, by symptoms which indicate its approach and give time for the application of those means, most likely to arrest its progress. If it is correct to say that, in certain circumstances, its attacks may appear suddenly, as in those localities where the infection is concentrated upon an isolated point, or in individuals offering a peculiar predisposition to receive the disease, nevertheless, the certainty acquired, that the cholera in itself is not contagious, and that it generally gives distinct indications of its approach, constitutes two great facts, fully competent to eradicate the most frightful ideas of the disease, and to demonstrate the importance of preventive so superior in their effect to curative measures.

" The identity of causes which favor the origin and development of epidemics generally, and, particularly, of the Asiatic cholera, seems to indicate the proper precautionary measures to be taken for the prevention of a pestilence,

which, after an interval of sixteen years, and at the time when other epidemics are making extraordinary ravages, menaces an irruption for the third time. The board of health calls, therefore, for the cordial coöperation of all classes of society, for the execution of those measures which the most thorough examination enables them to recommend; and it is convinced that this coöperation, with the special powers which are ceded to it by the law, although they may not be as extensive as necessary, and in spite of the short time which perhaps remains for their exercise, will not fail to produce the most happy results.

"For the purpose of putting in practice, all the disposable means of precaution against the danger which threatens us, the board recommends to the overseers of the poor in England and Wales, to the board of the parish for the interest of the poor in Scotland, and to all those in their employ, to hold themselves in readiness to execute the orders which may be, at different times, transmitted to them, by virtue of the law, given in the 11th and 12th years of the reign of Queen Victoria. This law is entitled 'An Act to renew and amend a law of the 10th year of the reign of H. M. the Queen, for the more rapid removal of certain causes of insalubrity, and for the prevention of contagious and epidemic diseases.'

"The overseers of the poor and the board of the parish will probably be required to make, either themselves, or by the interposition of those in their employ, or special agents, whom they shall name for this purpose, visits among the houses in their respective districts, and to make reports to their administration of that which shall concern the reigning disease, and the remediable causes by which it may appear to be nourished. These household visits will be especially enjoined in dangerous districts where the typhus or other epidemic diseases frequently occur.

"The board of overseers and the board of the parish will enforce vigorously, whenever it shall seem necessary, the

articles of the law above mentioned, relative to the causes of insalubrity.

"The cleansing which took place at the time of the first invasion of cholera having presented great advantages, and experience having shown that the preventive measures adopted against the cholera are equally beneficial against the typhus and other epidemic and endemic diseases, the boards would recommend immediately all practicable measures to insure the internal and external cleansing of the habitations in the badly situated districts.

"The causes which predispose to all epidemics, and principally to cholera, are humidity, uncleanliness, the decomposition of vegetable and animal matters, and in general all that contributes in any way to vitiate the atmosphere; all these causes tend to enervate the system and to render it more accessible to the disease, especially in the young, in the old, and in persons of a feeble constitution.

"Attacks of cholera are always more frequent and violent in districts situated upon the banks of rivers, in the vicinity of sewers, and wherever there is an accumulation of filth, especially in the habitations of men. In a proclamation recently published in Russia, the influence of these or of analogous causes is noticed, and it is consequently recommended, to keep the houses well cleaned, to observe the greatest cleanliness of person, not to allow cess-pools to exist near the dwellings, not to allow birds or other animals to enter, to establish a constant ventilation in all the apartments, and to avoid crowding where there are patients.

"The inhabitants of all classes are warned, that their principal means of safety consist in the removal of dung heaps and all accumulation of fœcal matters, both of a solid and liquid nature, from their houses and appurtenances. Although persons accustomed to such a neighborhood may not perceive any thing disagreeable from it, and may not think it injurious, nevertheless all those who wish to insure themselves from danger should endeavor to remove all filth, and clean

their houses from top to bottom; and the law will, moreover, oblige them to do it, as well for the interest of their neighbors as their own.

"After the measures for cleanliness, the removal of dampness should be principally sought; it will be necessary, consequently, to keep sufficient fires, especially in damp and unhealthy localities, where fire is as useful as a means of ventilation, as for the purposes of warming and drying.

"New documents from Russia show, that in those barracks and other establishments where many persons are collected together, and in which these conditions were fulfilled, the epidemic was comparatively insignificant; the same results may be obtained in private houses. In some parts of England, while the epidemics raged with great violence in private dwellings, in the same localities the public establishments, although the system of ventilation was still imperfect, were almost entirely exempt.

"But although the head of each family may render his habitation healthy to a certain extent, the means of completely purifying the atmosphere, in narrow places where the population is much crowded, are beyond their reach.

"Consequently, the last law, 11th and 12th of Victoria, chap. 123, sect. 1st, stipulates that in cases of incapacity, insufficiency, or negligence, the charge of taking measures for cleanliness shall devolve upon certain constituted bodies, such as municipal boards, syndicates, or committees on paving, water-works, or lighting the city, the police, or any other like institution, commissaries of sewers, overseers of the poor, etc.

"It is ordered that, upon a written notification signed by at least two inhabitants, stating that such a house or construction is in an unclean or unhealthy condition, that cess-pools, sewers, choked or infected drains or ditches, or heaps of ordure, or swine kept in such a manner as to become a source of insalubrity, are found among them, the authorities shall examine or cause such places to be examined. If, after examination, or upon a certificate delivered by two titled

physicians, it be shown that any thing of an unhealthful nature exists, the authorities shall enter a complaint before the justices of the peace, who shall be enjoined to provide the proper remedies. The amended clauses which this law contains, ought to be studied beforehand, published and put in force, especially those which order the clearing of infected drains, by the day laborers under the charge of the inspectors or surveyors of public highways.

"The officers of health of the Union, who are called upon to relieve the indigent and sick patients, necessarily know the places in which diseases manifest themselves and are dangerous; these are, invariably, the most uncleanly places, and those which it is most necessary to render healthful. But the law upon the causes of insalubrity imposes upon the overseers of the poor, the duty to order, and cause to be put in execution, all measures for the removal of such causes.

"In many districts, the agents of the police, in their habitual rounds, have rendered great services in signalizing, day by day, the houses, courts, alleys and streets in their circuits, which most needed cleaning, as well as the negligence of the public sweepers in the execution of their duties, and all causes of insalubrity. The boards of overseers, and the special committee appointed from among them, will do well to have an understanding with the special committee of the municipal boards, who have, through the intermedium of their committee of vigilance, the right of control over the police, and to insure themselves for this object the concurrence of this institution.

"The clergy of the parishes, and other ministers of religion, in associating themselves with the committee of laymen, for the purpose of following out the system of visiting families, have rendered immense services in the poorest localities. It is recommended to the boards of overseers, wherever this is possible, to add to the special committee, members taken from among them, who could be for the

time excused from all other duty ; they will call to their aid the clergy of their parishes, ministers of other sects, the assistance of the physicians and others in the employ of the *Union* (alms house).

"These parish committees were, among others, very useful in making known to the poor classes, the preventive means in their power, and in making them comprehend the urgent necessity of observing, under this circumstance, in their persons and habitations, the greatest cleanliness, the importance of ventilation, and of following a well regulated and temperate regimen.

"By the law for the prevention of contagion, the board of health is obliged to publish orders for aiding and directing the overseers of the poor, and other local authorities, in the execution of the duties which are imposed upon them, whenever the country is invaded or threatened by an epidemic or contagious disease. Consequently, the board is eager to connect itself with the commissaries of the poor law, with a view to take all possible precautions against the scourge which is approaching our shores with measured tread ; and the board is occupied in preparing a system of general measures, which will be published and carried into effect in the districts, as soon as their particular position, in a hygienic point of view, shall have been made known.

"In the mean time, if, notwithstanding all the precautions taken, this disease should unhappily appear in any district, it will become essential to the safety of the inhabitants that, they be deeply impressed with the importance of giving instant and careful attention to the precursory symptom which announces the commencement of the attack.

"This symptom consists in a looseness of the bowels, which may be considered as generally preceding the dangerous period of the disease. Sometimes, it is true, in circumstances already indicated, when the poison exists in an unusual degree of intensity, or when there is a very marked

natural predisposition, the first period seems to be wanting, as is seen sometimes in violent attacks of other diseases; but in the cholera, this case is so rare, that it is not considered in practice. Every where, and in all circumstances where the disease has had an epidemic character, experience is, upon this point, always found in accordance with what is at present observed at Hamburg.

"In most of the attacks, writes the British consul, on the subject of the epidemic which has just appeared in that city, the disease is manifested by a relaxation of the bowels, which yields if remedies are applied without delay, but which, if neglected, is soon followed by spasmodic attacks, and death generally in the space of from four to six hours.

"This intestinal relaxation may be accompanied by sufferings generally not very acute; but most frequently pain is not felt, and for many hours and even days, the trouble of the stomach is so slight, that it may appear insignificant; so that if one was not forewarned of the importance of this symptom, he might pay it no attention.

"It should be repeated, moreover, that whenever Asiatic cholera is epidemic, the least relaxation of the bowels should be considered as the commencement of the disease, and treated accordingly, since, at this point, it may be arrested by very simple means, but if neglected only for a few hours, it may take a fatal turn.

"It is indispensable, therefore, that, after the first appearance of the cholera, the local authorities take steps to establish family visits in the poor quarters of their respective districts; this being the only means, in the most exposed places, and among individuals the most susceptible of the disease, of enabling them to discover the precursory symptoms in time to arrest their progress.

"The heads of families, boarding house keepers, directors of poor-houses, proprietors of large establishments, such as manufactories, workshops, mines, stores and docks, ought themselves to assume the part of inspectors, or to charge a

competent person to examine, daily, every individual whom they employ, and to administer suitable remedies as soon as the precursory symptoms manifest themselves.

"Each member of a committee of inspection should be provided with remedies prepared in proper doses, and ready to be administered on the spot, as soon as the precursory symptom shows itself, and also to note the individual to whom he has given it, in order that he may receive a visit from the physician as soon as possible.

"Dispensaries should be established for the treatment of intestinal colic, at convenient points, where the people of the neighborhood may address themselves to receive remedies, and the advice of a physician, as soon as they shall be attacked with the precursory symptom.

"Experience having demonstrated the unsuccessfulness of hospitals for cholera, the best possible measures should be adopted, for rendering assistance at the houses of individuals, where it may be necessary. One of the most efficacious means will be, without doubt, to select persons who shall be instructed to render, as nurses, such services as the circumstances demand, and who shall be paid for devoting all their time to taking care of the sick at home, under the direction of the officers of health.

"It will be also necessary to name a certain number of physicians, who shall be employed, by means of suitable fees allowed them, to devote all their time, some to the dispensary, day and night, others to visiting of the sick at their houses.

"Moreover, as cases of extreme distress may present themselves, in localities and in houses, where it would be impossible to pursue the proper treatment, measures ought to be adopted for the reception of the patients, in such cases, either into the hospitals, or into poor-houses, prepared for this purpose, and properly warmed and aired.

"Physicians whose opinion is authority, are agreed that the proper remedies for the precursory symptoms, are those

which are found most efficacious in cases of common diarrhœa; that the most simple remedies will suffice, if given upon the first appearance of this symptom. The remedies below, which are within the reach of all, may be considered as the most useful.

"These are one grain[1] of the extract of opium, mixed with two table spoonsful of peppermint water, or with a little brandy largely diluted with water, which may be repeated every three or four hours, or more often if the attack is violent, till the looseness is arrested;

"One ounce of chalk mixture (mist. cretæ comp.) with ʒiss or ʒij of aromatic confection (conf. aromat.), and from five to ten drops of laudanum, repeated in the same manner, to which ʒiij or ʒiv of tinct. catechu may be added, if the attack be violent.

"But half this dose should be administered to those under fifteen years of age, and the doses should be still more reduced for infants.

"It will be well to continue these remedies morning and night, for several days after the diarrhœa has ceased; but in all cases, every endeavor should be made to obtain medical advice upon the spot, as soon as the trouble commences.

"After the use of these remedies, the most important point is, the manner of living and dressing. Wherever cholera is epidemic, many persons are invariably observed to show an extraordinary tendency to intestinal irritation. This is enough to prove the importance of abstaining from aliments which may aid in bringing on diarrhœa, such as green vegetables of all kinds, cabbages, cucumbers and salads, cooked or raw. Fruits of all kinds, even ripe and cooked, dried or preserved, should also be abstained from. The most healthy vegetable aliments are well cooked bread without shortening, rice, oatmeal and potatoes of good quality.

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[1] In the original, one gramme or fifteen grains, probably a typographical error. — Tr.

Pickles should be avoided. Various aliments and drinks, which, in ordinary times, are healthy and proper for individuals, may under these exceptional circumstances become very dangerous.

"Solid rather than liquid food should be taken, and persons who have the choice ought to live principally upon meat which offers the most concentrated and strengthening aliment, avoiding salt or smoked meats, pork,[1] salt fish, shell fish, cider, perry, ginger beer, lemonade, acid drinks, and alcoholic liquors.

"Great temperance in eating and drinking is absolutely necessary, as a measure of safety, *during the entire duration of the epidemic.* A single excess has often brought on a violent and fatal attack. The interval between the meals should not be long, the cholera having invariably raged with an extraordinary violence among the classes who observe long fasts in the East and in some countries of Europe.

"Striking examples may be cited to give weight to these important cautions. Dr. Adair Crawford states that in Russia the most violent attacks are those which occur after a solid repast, preceded by long abstinence. In England, at the time of the first invasion, the most frequent and fatal attacks came on in the middle of the night, some hours after an undigested supper.

"The three fatal cases which have just occurred among the sailors who had been to Hamburg, and had arrived sick at Hull, happened, as the inquest proved, after these men had eaten a large quantity of prunes and drunk sour beer;

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[1] In the "Directions relative to the Prevention and Treatment of Cholera, by the Royal College of Physicians of London," signed by Paris and Hawkins, we find the following sentence: 'The committee likewise think it not advisable to prohibit the use of *pork or bacon;* or of *salted, dried, or smoked meat or fish,* which have not been proved to exert any direct influence in causing this disease. Nothing promotes the spread of epidemic diseases so much as want of nourishment; and the poor will necessarily suffer this want, if they are led to abstain from those articles of food, on which, from their comparative cheapness, they mainly depend for subsistence. *Prov. Med. and Surg. Journal,* Nov. 15, 1848.— Tr.

and the two fatal cases which took place still more recently on board the Volant, occurred in two drunkards who continued to drink in spite of the cautions which were given them against the dangers of intemperance.

"On account of the intimate connection which exists between the epidermis and the internal membrane of the intestines, warm garments are very important; it will be well therefore, to wear flannel next to the skin. It has been found lately on the continent, that it was very useful to wear a flannel band round the body during the day, and this precaution may become indispensable with us during the cold damp season which we are approaching.

"The greatest care should be taken to keep the feet dry and warm, to change the clothes as soon as they get wet, and to keep the sleeping chambers and other apartments well aired, dry and warm.

"The use of cooling purgatives, such as Epsom and Glaubers salts, and Seidlidtz powders, should be guarded against; they become dangerous at this time, in whatever quantity they are taken. Drastic purgatives of all sorts, such as senna, colocynth, and aloes, ought not to be employed except by special order of the physician.

"It is not deemed necessary or suitable to give instructions for the treatment of the disease; the above suggestions will suffice until the arrival of a physician, when the particular symptoms of each individual will receive such treatment as they may demand.

"Although the time of danger may impose upon all classes extraordinary efforts and sacrifices, we may think that this period will not be of long duration, since, in the preceding invasion of cholera, it rarely maintained itself in the localities which it attacked beyond a few months or weeks. On the other hand, it may be reasonably hoped that the improvements recommended for the purpose of arresting its progress, will aid with equal success in abridging its duration, and that these measures will not be temporary, like the occasion

which calls them forth, but that they will produce pemanent advantages.

"In conclusion, the General Board of Health would again insist upon this remark, that all preventive measures against cholera are alike useful against the typhus and every other epidemic disease subject to return. It calls the attention of all classes to this fact, as palpable as it is consolatory, with regard to the cholera, that, under its most intense form and in its most advanced period, there are none against which it is more in the power of man to guard himself, either as individuals, or as collective institutions, by watching with attention the disease in its first period or in the precursory symptoms, and by suppressing the causes which are the known agents of propagation in all epidemics. Therefore, although events do not depend upon us, we await with hope and even confidence the result of the precautionary measures which experience and science have really placed within our power, if applied with resolution and perseverance."

We will conclude by a brief exposition of the wise measures which were taken at Paris upon the approach of the epidemic of 1832, and which may be given as a model. If we have a new attack of this scourge to fear, we can only hope that the administration will follow in every respect the same course previously adopted.

"PRECAUTIONS TAKEN AT PARIS BY THE ADMINISTRATION BEFORE THE INVASION OF CHOLERA.

"The prefect of the police, in concert with the prefect of the department, adopted, August 20, 1831, a decree, which created at once a central commission of health, composed of forty-eight members, twelve commissions of the arrondissements charged to coöperate with them, and who should be themselves in understanding with commissions appointed in each of the forty-eight quarters of the city and the two arrondissements of the department.

"Physicians, chemists, apothecaries of note, and honorable citizens presented by the mayors, were designated to form these commissions, and that they might lack no useful or necessary information, the surveyors of streets and commissaires of the police were joined to them.

"The commissaires of the quarters were more especially charged with visiting the particular houses, with investigating the state of vaults, pipes, wells, and cess-pools; with the inspection of institutions, schools, wet nurse establishments, hospitals for weaning children, "maisons de santé," and those houses which are inhabited by the keepers of horses, dogs, pigs, rabbits, poultry, and pigeons. They were also to direct their attention to landlords, graziers, tanners, bath-keepers, gut-spinners, chiffoniers (a very low class of people in Paris); in fine, to workshops of all kinds, capable of becoming prejudicial through a bad tenant, or from the odor which they exhaled.

"The commissions of the arrondissements, intermediary between the central commission and the commission of quarters, had for their duty to receive the reports of these last, to examine them, and to verify their correctness whenever they deemed it necessary, and afterwards to make an extract destined to be sent to the central commission; they were also to aid by their advice, and support by their approbation, the zeal and the proceedings of the commissaires of the quarters.

"Finally, the central commission, adding to its own information the knowledge of all the facts acquired by it, was in turn to enlighten the administration, and to propose to it the adoption of new measures, if necessary, or only the modification of the old, if this were judged sufficient. The commission took upon itself also the surveillance of the large public establishments of the capital.

"Many offices of aid were established in each quarter, medical ports in which a physician, an apothecary, and a certain number of students, attendants and nurses should

hold themselves in readiness, day and night, to carry the first assistance to those for whom it might be demanded. These offices were furnished with every material necessary for their purpose, such as medicines, beds, blankets, litters, etc., and placed under the immediate direction of the mayors, who were charged to notify twenty-four hours beforehand the physicians and apothecaries who were designated to their service.

"Finally, the central commission caused instructions to be published, (Nov. 15, 1831,) upon the proper regimen to be followed for preservation from the cholera, and upon the course to be adopted in case of attack; it recommended cleanliness of garments and habitations, temperance in diet, moderation in pleasures, and above all it charged the citizens to guard against the pretended curative means, the virtues of which were daily extolled by charlatans in the newspapers, and in the bills with which the walls of the capital were covered.

"The administration of hospitals, on its part, did not remain inactive; it occupied itself in preparing new wards for the reception of patients attacked by the epidemic; it caused the old ones to be purified, and increased the number of internes and attendants; finally, not wishing to neglect any precaution which prudence seemed to indicate, it ordered the suspension of all courses upon anatomy.

"Such were the measures adopted by the administration against the epidemic with which Paris was threatened. It is useless to say that the greater part of these measures were common to the capital and to the department."

We are unwilling to close this exposition of the prophylactic means employed against the cholera, without recalling what the city of Paris owes to the commission which has collected all the facts relating to the history of the cholera in Paris and in the department of the Seine. The names of devoted and laborious men, and the conscientious and modest savants who composed it, deserve to be held up to public gratitude and

esteem. It is our duty here to name them: MM. Benoiston de Châteauneuf, Chevallier, Léon Devaux, Louis Millot, Parent-Duchatelet, Petit de Maurienne, Pontonnier, Trébuchet, Villermé and Millot. This commission did not limit its zeal to the study of the past, to the observation of facts already accomplished; it extended its investigations into the future, it proposed those immense improvements which we have seen effected, since 1832, in public hygiene and in the conditions of salubrity of the city of Paris. There is not one which was not proposed, discussed, and demanded with the most praiseworthy decision in the resumé which terminated its remarkable report.

Of all these desires expressed in the name of the general interest and founded upon the too much neglected principles of public hygiene, many have been realized during the last fifteen years, thanks to the intelligent activity, to the persevering efforts of the municipality of Paris, and of the administration of the department of the Seine. But there is yet much to be done, and we may say again to-day, with the learned reporter of the commission: "Full of confidence in the magistrates, and convinced that, like the Roman orator, their first care, their undivided attention will be to provide for the happiness of those who are placed under their authority, let us rely upon their wisdom, their intelligence and their love of the public good, to furnish the proper means for lessening the severity of a scourge whose return to our capital nothing can prevent."

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Note A.

ETYMOLOGY, DEFINITION, AND SYNONYMES.

THE etymology and true derivation of the word Cholera are questions of great importance.

The explanation given by the author, and the derivation of the term according to M. Jobard, from two Hebrew words, (chol-era, in Latin, *aegrus malus*,) seems not only plausible, but far more in accordance with fact than the derivation from the Greek words, which explain the disease as characterized by a flux of bile (χολη, bile, and ρεω, to flow;) that not being a characteristic of epidemic cholera,[1] although applicable to other forms of the disease, so termed, there being, indeed, a form styled "Cholera Bilious," in which "redundancy of bile" is always remarked.—Copland, Med. Dict. *Art.* Cholera.

A more probable derivation, (when the word Cholera is applied as a generic term to the entire class of such diseases, both sporadic and epidemic) than the one last mentioned, is that from the Greek words χολη, intestine, and ρεω, to flow,

[1] See Watson, Lect. on Practice, Vol. ii, p. 141, Lond. Ed. Art. Epidemic Cholera. Also, Dissertation on Cholera Morbus. Translated by A. S. Doane, M. D. 1832, p. 3.

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—*intestinal flux;* or to χολερα, the gutter of an house to carry off rain; — both these refer to those organs upon whose functions and structure the disease produces such marked effects.

To show the correctness of the etymology preferred by the author, it is only necessary to ascertain the prevalence of of such a disease epidemically, before the creation of the Greek term χολερα; — and, if his assertion be true, that the termination of words into which the Greek radical ῥέω enters is in ῥοία, the question is equally well decided, as far as the derivation of the term is concerned. All those words composed in this manner, are found with the above termination on reference to the Greek lexicon.

There seems to be no room for a doubt, (in consideration of the evidence adduced by the author in his references to the use of the term "morbus malus" in the Bible and in ancient manuscripts,) that epidemic cholera, or a disease so nearly like it as to be almost identical in the descriptions given of it, did exist in those early times.

The term χολερα has been in use since the time of Hippocrates. Celsus used it to signify, literally, *bile-flux.* So with Hippocrates in his *Epidemics.* As epidemic cholera is not characterized by redundancy of bile, the term "*morbus malus*," which antedates the other, is, at any rate, far more appropriate.

The *definition* given by M. Tardieu is singularly elegant and concise. It will be noticed that he does not, in defining the disease, allude to the "accidental discharges" which arise from the various causes producing what would be properly styled cholera morbus, as that term is understood among us. Many writers, in defining epidemic cholera, particularly allude to vomiting and purging as constant characteristics. Upon this point, a quotation from an author who has observed the disease in India will be valuable, as it shows the greater propriety of our author's definition, which, while it mentions the usual gastro-intestinal discharge, refers in a

more marked manner to other characteristics which are decidedly more constant and important: — "The *algide symptoms* are, in fact, the disease; in proportion to them is the malignity and rapidity of the case; they afford the only measure of its severity, and from them only can a correct prognosis be formed. Whence it follows, that the vomiting, purging and cramps must be considered merely as usual, but non-essential symptoms of cholera, whose absence would not in the least affect the diagnosis of the disease, and that, consequently, it is within the bounds of possibility or even probability, that cases of cholera may occur entirely divested of these symptoms."—*Researches on the Pathology and Treatment of the Asiatic or Algide Cholera.* By E. A. PARKES, M. D. Lond. 1847. p. 94.

Dr. George Budd confirms the statement that the vomiting, purging and cramps are not all present in every case. He terms them, however, the "*most striking*" symptoms,—they are symptoms occurring *first*, and as such, doubtless more striking to many than the algide symptoms, or those of collapse, which come on later, but it may well be questioned if they are one half as distinctive of the disease. The peculiar fluid discharged, is an important characteristic.

Dr. Budd farther states that practitioners in India have described cases, very rapidly fatal, in which spasm was the only symptom. The characteristic fluid was, however, found in the bowels.

Of sixty cases described by Dr. Jackson, in his report on cholera in Paris in 1832, there were two without vomiting, and five in which there were no cramps. In twenty cases observed by Dr. Budd, there were two in which no vomiting or cramps occurred. — (*Lib. Pract. Med.* Tweedie. Am. Edit. Vol. iii. p. 101.) — In one of three cases observed by the editor of this volume, there was no vomiting, — the collapsed condition rapidly supervening and being the distinctive character of the disease.

In the Report made under the direction of the Counsellors

of the Mass. Medical Society, in 1832, we notice the following striking quotation from Bell on Cholera: "But, in all cases, there are the collapsed countenance, blue lips and nails, shrunken fingers, the total failure of the usual secretions, deficient animal heat, suspension of the pulse, and remora in the venous circulation."— (*Loc. cit.* p. 17.)

While, therefore, vomiting and purging are not *constant* characteristics of the disease, the algide symptoms are universally found, (in true epidemic cholera) and are sufficient, in themselves, to determine any case.

The following is a more extended "definition" of Epidemic Cholera: "Vomiting, and aqueous alvine discharges, of a white color and resembling a strong decoction of rice, with an admixture of albuminous shreds or flocculi; suppression of the urine, violet color of the integuments; rapid emaciation; a peculiar flaccidity of the skin, which is also cold; extinction of the pulse; painful cramps in the limbs; a sense of excessive oppression; very great weakness; the mental powers unaffected." — *Compendium de Médecine Pratique.* Par M. Louis De La Berge *et* M. Ed. Monneret, Docteurs en Médecine de La Faculté de Paris. *Tome Deuxième*, p. 236. Paris, 1837.

Copland's definition is as follows: "I. *Nosological.*—Anxiety and oppression in the chest, epigastrium and præcordia; disturbance of the bowels, with nausea, faintness, giddiness, and depression of vital power; frequent ejections of an offensive fluid resembling rice-water, from the bowels and stomach, followed by spasms, tremors, distress; a cold, clammy, purplish, and shrivelled state of the surface; coldness and rawness of the expired air; a sense of painful or burning heat at the epigastrium, with urgent thirst, and rapid disappearance of the pulse; the distemper being often preceded by indigestion and diarrhœa, and frequently followed by febrile reaction, affecting chiefly the brain and abdominal organs.

"II. *Pathological.* — A discharge from the bowels and

stomach of the watery portion of the blood; more or less complete paralysis of the lungs, and arrest of the changes effected by respiration on the blood, and of the hepatic and renal secretions; depression of the heart's action; the circulation of a thick, dark, or venous blood through the arteries, with congestion in the large veins, and imperfect circulation through the capillaries, owing to the thick, glutinous state of the blood; the congestion of the viscera in many cases being followed by an obscure or asthenic reaction, affecting chiefly the encephalon and abdominal viscera." — *Med. Dict. Art.* "*Pestilence, Choleric.*" Amer. Ed.

Synonymes of Epidemic Cholera. — Asiatic Cholera, Cholera Asphyxia, Algide Cholera, Malignant Cholera, Cholera Spasmodica, Pestilential Cholera, Pestilential Asphyxia, Oriental Cholera, Indian Cholera, Choleric Pestilence, Ganglionitis peripherica et medullaris, Trisplanchnia, Hyperanthraxis, Morbus oryzeus, (because supposed by Tytler to be caused by damaged rice,) Trousse-galant. Nysten. — (Louis De La Berge and Monneret. *Op. supra, cit.* p. 222. Parkes. *Op. sup. cit.* Dunglison, *Med. Dict. Art. Cholera.* Copland, *Med. Dict. Part X, Art.* "*Choleric Pestilence.*" Kennedy, R. H. M. D. "*Notes on Epidemic Cholera.*" Crawford, Adair, M. D.) The terms Epidemic or Asiatic Cholera are those now most generally in use.

Dr. Parkes uses the term "Algide Cholera" as a synonyme for the "Cholera Gravior" of Orton and others. He remarks, "The term 'Algidus,' first employed, I believe, by Chomel, and, since then, by several French writers, seems to me to point very happily to the most remarkable symptom of the disease, viz., the diminution of animal heat." (*Op. supra cit. Introductory Remarks.* p. 5.) A striking term applied to the disease by the Asiatics is given by Dr. Parkes, viz., "jurree màrhi," or "rapid death." — p. 78.

Note B.

DESCRIPTION.

The distinctive characters of cholera are so strongly marked, that a true case can hardly, by any possibility, be mistaken, as is remarked not only by M. Tardieu, but by all writers on the subject. Dr. Parkes says, *(Op. sup. cit.* pp. 48, 49*)*, "*One case is, in all its essential features, a copy of all cases,* and, with endless varieties, the symptoms present little variation in their mode of succession and in the influence they exert on each other."

The characteristic phenomena of algide cholera are the following: " more or less vomiting and purging of a peculiar fluid, cramps, sweating, suppression of urine,[1] thirst, diminished circulation and impeded respiration, causing coldness of the tongue, surface and *breath*, (a striking phenomenon, constantly noticed. — Ed.) lividity of the lips and skin, alteration of the voice, lessening of the respiratory murmur, diminution or absolute disappearance of the pulse, and at last complete arrest of the circulation."

It is well said, in the excellent article before referred to, contained in the Compendium de Médecine Pratique, " that the description of the numerous functional disturbances characterizing epidemic cholera, comprehends a collection of very many and various phenomena, closely connected, associated in groups more or less distinct, and generally, succeeding each other with remarkable regularity. Authors have found themselves obliged to adopt a certain number of divisions, in describing the disease, in order to give the clearest narration of facts, and present, as it were, a picture of the most striking accidents observed." (pp. 246, 247.)

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[1] Watson mentions a case, where recovery occurred, in which not a drop of urine was passed from Sunday morning till the following Wednesday afternoon. (*Lect. Practice Physic*, Vol. ii. p. 462.)

Very many observers, (among whom is our author), have adopted only two divisions. Of these, the authors of the "Compendium" mention Bouillaud and Dalmas.—Three, and even five, periods are made by others; (J. Brown, M. Gendrin.)

The judiciousness and truth of the division and accompanying remarks by the authors of the "Compendium de Médecine," cannot fail to impress the reader. Speaking of the various divisions of the disease, as given by authors, they remark, "one class, with too much restriction, comprises, under the same head, a great number of accidents, not simultaneous in their manifestation; another seems intended to include in a general description, the history of certain varieties, which would be more properly treated of elsewhere; and most frequently, these methods do not, apparently, admit the precursory or prodromic phenomena, to be actually a portion of the history of the disease.

In order to avoid these slight inconveniences, the above writers divide the disease as follows: "1. Prodromes referable to the nervous and intestinal functions. 2. The stage characterized by vomiting and diarrhœa, (*phlegmorrhagie.*) 3. Cyanosis or algide stage. 4. Stage of reaction. (*état febrile,—periode œstueuse.*)" We cannot but consider the division into four stages, as the one best suited to give a clear and well defined idea of cholera.

The division into *two* periods, although apparently more simple, as has previously been mentioned, brings together phenomena not of simultaneous occurrence, or even fairly belonging to one and the same period. We extract, however, some descriptive remarks by Dalmas, who divides the disease into two periods. The whole of his remarkable article may be perused with great profit and interest.

"In the majority of cases, we observe, first, spasmodic symptoms, and next, symptoms of sinking and collapse: the first set of symptoms are characterized by pain, evacuations, expressions of suffering, etc.;—the second, by suppression

of the pulse and of the voice, as well as of the urinary secretion, and also of the animal heat, a phenomenon which has especially attracted attention, and has given to this stage of the disease the appellation *algide period.*" (*Dict. de Médecine*, Tome VII. p. 490. *Art. Cholera Epidémique.*)

The most remarkable phenomena of the disease are admirably grouped and described by Dr. Müller, in the second of four reports, made by him to the Hanoverian government, in 1848. He gives four divisions, the description of which we take the liberty of transcribing from the Medico-Chirurgical Review, (January, 1849, pp. 10, 11.) Although an extract of considerable length, it cannot but prove acceptable, and in connection with the description of cholera, is highly appropriate; — the language, at once accurate and vivid, sets before us a lively and faithful portraiture of the various phenomena.

The four stages are, " Stadium prodomorum, invasionis, algidum, et reactionis."

" 1. The *premonitory stage* was generally present; it lasted from two to eight days ; the digestion was disturbed ; there were flatulence, diarrhœa, languor, etc. Whether these symptoms were present or not, after some fault of diet, or exposure to cold, or mental emotion, the cholera itself suddenly came on.

" 2. The *stadium invasionis* was characterized by diarrhœa, vomiting of the peculiar cholera matter, cramps, and a heavy burning, paroxysmal pain at the navel. This condition sometimes lasted minutes, sometimes hours, till,

" 3. The *stadium algidum seu paralyticum* appeared.—In this stage the patient fell, sometimes as if struck by lightning; the extremities became ice-cold and blue ; the skin became wrinkled ; the eyes fell back in the head, and deep blue circles surrounded them ; (Grisolle describes this phenomenon thus, '*les yeux sont caves, bordés de noir.*' — *Pathologie Interne*, — *Du Cholera Asiatique*, Tome i. p. 709. — Ed.) — the conjunctivæ were generally

reddened with venous congestion; the lips were duskily blue; the voice was peculiarly hoarse, hollow-sounding, and tuneless; the already interrupted pulse was lost entirely, or remained only like a thread; the heart's action was heavy and slow, the rhythm irregular, the first sound unheard; the respiration was heavy and sighing; the evacuations continued; hiccough sometimes occurred; consciousness did not fail; the patient lay with half-closed, heavy eyes; he wished merely to satisfy his craving thirst, and complained only of the burning pain at the navel; the abdomen was seldom tympanitic, and pressure gave no uneasiness. The cramps continued, particularly in the extremities, and ceased and recurred at intervals. This state lasted for hours, or even days.

4. The *stadium reactionis* approached sometimes very rapidly, sometimes slowly and gradually. The skin became a little warmer, and a general warm perspiration appeared; the heart's action was revivified; the pulse became stronger, but remained slow; the respiration was uniformly hastened; the discharges, if they had continued, gradually abated, and all the phenomena of the algide stage faded more or less rapidly. Then ensued affections of the brain and lungs; and the quicker the reaction, the more were these affections, and gastro-intestinal inflammations, to be apprehended. The affection of the brain often came on very rapidly; persons of whose recovery great hope was entertained, sometimes became, almost suddenly, soporose; others fell into delirium, with stupid heavy glance, and a slow, (40—60) laboring pulse. The temperature of the skin sank again. Dissection shew only congestion of the brain and its coverings; very seldom did true meningitis occur. (M. Tardieu, it will be noticed, refers to cases where well characterized meningitis accompanied with trismus is observed. — Description, — *Secondary affections*, p. 24.—Ed.) Erysipelas faciei, furunculus, and a peculiar exanthem (which consisted of red spots, running a course of from one to three days, and terminating in

extensive epidermic desquamation), often followed this state. The affection of the lungs was almost always combined with this cerebral congestion, or with the next form of reaction, which is termed typhus. This peculiar typhus, which is considered by Schönlein as *a fifth* stage of the disease, is not so constant that it can be considered absolutely necessary."

In addition to this admirable and complete account of the phenomena observed in cholera, we may be permitted to call attention to one or two points which are considered in detail by M. Tardieu, and which are among the most striking and constant appearances of the disease. 1. *The remarkable alteration of the voice*, which is described in the text as becoming, from merely feeble, — hoarse, hissing, and sometimes *extinct;* also, its gradual return in the period of reaction. 2. *The oppressed respiration and the remarkable facts announced by authors in respect to the state of the expired air.* Davy, in India, assures us that less oxgen was absorbed, and, consequently, less carbonic acid was yielded in respiration. M. Baruel declares that the respired air from choleric patients undergoes no alteration, but is expired in the same state as it entered. (*Compendium de Médecine, loc. sup. cit.*)[1] The experiments and conclusions of M. Rayer, in 1832, (which are mentioned by Tardieu) would seem to explain satisfactorily the loss of the animal heat, the alteration of the blood, and the very deficient hæmatosis. 3. *The "cholera visage."* This is so constant and striking a characteristic as at once to arrest the attention of the observer. Truly is it described as being "more terrible than that of the dead." The description given by M. Bouillaud is one of the most exact and graphic we possess. "M. Magendie says correctly, that cholera, at its highest degree of intensity, instantaneously *cadaverizes* the patient, ("*cadavérisait, en quelque sort, subitement, les malades.*") The face assumes the *hippocratic* character, (*s'hippocratise,*)

[1] See also, p. 18.

and becomes absolutely hideous: the temples and cheeks are sunken, the nose is pinched, the hairs at the opening of the nostrils are covered with pulverulent matter; the eyes, dry, dull, faded, and as if lifeless, are sunken within the orbits, and surrounded with violet, livid or even black, circles; they are, in a short time, rolled upwards, remaining half open, and the portion of the sclerotica which is not covered by the eyelids, being deprived of its usual moisture, becomes irritated by the contact of the air, is injected and covered with red, bloody spots; the face is cold, covered with a thin coating of viscous exhalation, its color is violet, bluish or livid, especially around the lips; this blue tinge is likewise observed upon the hands, feet, and external genital organs, etc., etc. In touching the body, the sensation is like that communitated by *touching the skin of a reptile*, (Tardieu, Bouillaud et alii.) The great *diminution of volume* of the body is remarked by all observers; and this serves to distinguish the cyanosis of cholera from that of asphyxia proper, and also from that accompanying certain cardiac diseases. (Bouillaud, *Compend. de Méd. sup. cit.* p. 252.) The alteration of the features and the wrinkling of the skin are often so extreme, that young persons present the appearance of advanced age: the skin when pressed between the fingers retains for a considerable time the impression thus given to it. Boisseau noticed that plethoric females, whose menstruation was irregular, fell rapidly into the algide or cyanosed state, which was in them strongly marked and more obstinate during life, and very apparent after death. In males and females of a delicate organization, nervous and non-sanguineous in their temperament, cyanosis was slow in supervening and less distinct. (*Comp. de Méd. sup. cit.*) 4. The *feebleness of the circulation.* This, gradually becoming more marked throughout the disease, is so excessive in the algide period, that the temporal, and even the radial arteries, when opened, have discharged no blood. (Magendie, *Leçons sur le cholera.* Bonnet, *Archives Gén. de Med.* t. xxviii. See also, p. 19.) The veins

are hardly perceptible through the skin; if the flow of blood be arrested in them by pressure upon them for an instant, it is but very slowly re-established; if a vein be opened, a few drops of blood are, with difficulty, obtained; — the blood is black, viscous, furnishes but little serum on coagulation; the clot resembles black currant jelly, and no oxygenation occurs on its exposure to the air. 5. *State of the pulse.* From the early part of the disease, small, depressed and thread-like, in the algide stage the pulse wholly disappears. The most remarkable fact in this stage, says Magendie (*loc. cit.* p. 24,) is the diminution of the ventricular contraction of the heart. Generally, the left radial pulse disappears a short time before the right; afterwards the pulse ceases in the larger arteries . . . . the movements of the heart become accelerated, *but lose in force minute by minute;* at last, continues M. Magendie, the clear sound of the heart alone is heard, the second sound has ceased. The other sound also ceases somewhat later in the disease, and it might be supposed that the contractions of the heart had ceased also; this, however, is not the case, but the heart has not sufficient force to enable it to strike against the parietes of the chest. (*Compend. de Méd. loc. sup. cit.*) 6. *Duration.* (See the table, page 27.) The *rapidity* of the disease is always remarkable. The medium duration of the disease, from the table given by the author, is sixty-one hours and twenty minutes. The average duration estimated according to the age of the patients, as calculated by the commissioners for the department of the Seine, was sixty hours forty-one minutes. From birth to one year of age, the disease never lasted over forty-three hours; from one year to five, the duration was forty-nine hours; from five years to ten, forty-two hours; from ten years to fifteen, fifty-five hours; from fifteen years to sixty, sixty-four hours; from from sixty years to eighty and upwards, sixty hours. Thus, with the exception of the period of life between five and ten years, the power of resistance manifested by nature against the disease is in a direct ratio to the physical strength belong-

ing to the different periods. But in this sad struggle, where nature is so rarely victorious, the only result of her efforts seems to be a delay of the fatal termination, not for weeks, or even days, but only for a few hours.

The average duration of the *precursory* period, is, for the portion of it characterized by diarrhœa, two days; for that marked by phenomena of nervous disturbance, one day. (Gendrin.) The period mainly characterized by gastro-intestinal discharges and cramps, is, on the average, of three to four hours' duration. If the disease prove fatal during the algide period, life is rarely prolonged beyond the fourth day; if during the period of reaction, it is more difficult to determine the precise duration; it is, however, rarely more than ten or twelve days.

Season. — If we rely upon the observations made upon one thousand individuals, it would appear that, during the month of April, the average duration of the disease is sixty-one hours, and in July, or during the recrudescence of the disease, (the writer is referring to the epidemic from which the above statistical items are all taken, reported by the commissioners above mentioned, published at Paris, 1834,) it is given as forty-three hours. In May, June, August and September, during which months the epidemic manifested much less violence, the average duration was eighty-four hours; — three days and one half. (*Compendium de Médecine*, *loc. supra cit.*) The authors state the following reasons for giving the above statistical facts, which we offer in vindication of introducing them in this place: "We have reprinted the statistical results furnished in the commissioners' report, because we do not think that sufficient publicity has been given to them, they not having been adduced in the principal monographs upon cholera, and because they are founded upon a considerable number of observed cases, which imparts to them a great value and importance. It is to be regretted that the data, from which the moment of invasion of the disease is assumed, are not accurately determined by the authors of

this remarkable work. This defect will doubtless induce some persons to accept with some hesitation the above results."

Several authors remark that, in general, the duration of cholera is in proportion to the power of resistance possessed by the patient. (Grisolle, *Path. Int.* vol. i. p. 712. Dr. Budd, *Loc. supra cit.*) "In forty-seven fatal cases," says Dr. Parkes, (*loc. cit.* p. 50,) "the average length of life after the patient was first seen by a medical man, and was undoubtedly laboring under cholera, was fourteen hours and three-quarters. In thirty-one Europeans, separately considered, ten hours and three-quarters. In the sixteen Asiatics, the average is, on the contrary, raised, being twenty-four hours. The cases of the Europeans were taken at the height, while those of the Asiatics were taken towards the close of an epidemic. The greatest length of time that an Asiatic was in the hospital, was ninety-seven hours; the shortest time, one hour. Europeans, longest time, thirty-six hours; shortest, four hours. Of the whole thirty-one cases, there were only two longer than twenty hours. If, instead of calculating the time from the patient's admission into the hospital, we take it from the first stool, or from the period assigned by each individual as the commencement of his illness, the average length in forty-one cases was twenty-seven hours and a half."

The period assigned by each individual as the commencement of his illness, as a starting point from which to calculate the actual duration of the disease, seems open to the charge of indefiniteness; for certain individuals might, as it were, resist the idea that they were experiencing the approach of the disease, and so give a period as its real commencement, which might, very possibly, be far subsequent to its actual invasion; — precisely the contrary might be true of other persons.

Dr. Parkes says in another connection, "In the *latter stages* (the italicising is not the author's) of a case of cholera, the numerical method on a large scale may be considered of

little use, as the conclusions drawn from a few cases are of equal accuracy with those drawn from a great number, (from the perfect similarity of the cases, after a certain stage;) and this, perhaps, is true even of the whole course of the disease; — for, if we exclude all anomalous and obscure cases, and restrict the term cholera to the form I am about to describe, *we shall isolate a peculiarly well marked disease*, presenting great uniformity in symptoms, and having a definite course and termination."— (p. 48, *op. cit.*)

It is this isolation of the disease, and the distinctive features then belonging to it, which demand the attention of the observer of epidemic cholera: we have endeavored to point out the most striking phenomena, as observed by some of the most reliable authorities. Many more descriptive extracts might, with advantage, be adduced, were it not that this note, already of considerable length, would occupy too much space, and that time does not permit us to follow out this topic and many others, to the extent to which the interest awakened by their examination would lead. The reader is referred, with confident assurances of being rewarded for his research, to the elaborate works and articles from which such large quotations have been made.

Forms. — No division can be more simple, and, at the same time, more comprehensive than that given in the text. (See p. 29.) Dalmas, in speaking of *Cholerine* (2d Division of Tardieu,) styles it the "*disease in miniature*" — ("*véritable diminutif du fleau.*" — *Dict. Med.*) He refers both cholerine and cholera to the same cause, — although he does not treat of the former as a division or *form* of cholera; he looks upon it rather as a *herald* of the true disease. Magendie has seen fatal cases of simple cholerine: this is, however, very rare. — (Grisolle, *Path. Int.* vol. i. p. 710.)

The forms termed by Dr. Müller, rheumatic, gastric and inflammatory, (*First Report,*) are animadverted upon, very correctly as it would seem, in the article already referred to, contained in the Medico-Chirurgical Review for January,

1849. The reviewer remarks: "The violent convulsive form is not allied to rheumatism; it is seen in countries in which rheumatism is very uncommon; it is very doubtful whether rheumatism, if sometimes a sequel of cholera, ever accompanies the characteristic stage. The third, or dry form, again, is not inflammatory; it is a misnomer so to call it, — it is merely the extreme form of the disease. If any distinctions are admitted, the "dry" and the "gastric," as distinguishing the severe form with moderate discharges, and the slighter form with great discharges, are perhaps the most accurate terms." — (*loc. cit.* p. 10.)

"The symptoms *constant* in all the forms were the rapidly appearing ice-coldness, (even of the tongue,) the heavy, sighing respiration, the thread-like, soon interrupted pulse, and the almost entirely suspended functions of the kidneys."— (*loc. cit.*)

Several forms of reaction are mentioned by Müller, beside the "peculiar typhus" previously spoken of; among others, "in feeble subjects, a cachectic state, with entirely prostrated nutritive power, a dry, cool tongue, watery intestinal discharges, and rapid emaciation; generally, this form proved fatal; entire absence of the epithelium of the mucous membrane of the intestines, and considerable redness of the mucous coat itself, were observed on dissection. Dysentery, dropsy, and scurvy, occasionally showed themselves.

The reviewer points out one remarkable omission in Müller's description of these forms of reaction, viz., his neglect to notice the state of the blood, particularly as to the enormous quantity of urea it contains in some forms of consecutive fever. (*loc. cit.* p. 11.) Urea has also been detected in the bile of choleraic patients. It was first discovered in the blood by Dr. O'Shaughnessy. (Budd, *loc. cit.* p. 100. — Also, Extract from *London Lancet.* Report of Committee under the direction of the Counsellors of the Mass. Med. Society, 1832, p. 20.)

One remarkable phenomenon mentioned by M. Tardieu in

the Article "Description," viz. the spasmodic twitching and movements of the muscles after death, and referred by him to galvanic action, is noticed by Dr. Watson, (vol. ii. p. 463, *op. cit.*) and several other writers.

Note C.

PATHOLOGICAL ANATOMY.

The authors of the "*Compendium de Médicine*" (*sup. cit.*) divide the anatomical appearances observed after death into two classes; 1. Those representing the period of cyanosis; 2. Those alterations noticed subsequent to complete reaction. — p. 236.

Exterior of the body. — The remarkable characteristic appearance of the surface of the body arrests the attention of all observers. The blue or livid color noticed during life, remains nearly the same for some time. Generally the cyanosed appearance disappears sooner from the lower extremities than from the shoulders, arms and hands. Irregular violet colored spots are observed; the subcutaneous veins are occasionally dilated.

The physiognomy generally retains the expression it offered during life; the countenance is wrinkled to an excessive degree, even in young subjects; the bony eminences are very prominent, by reason of the excessive emaciation; the ears are of a violet color and seemingly retracted; the lips flattened and tightly drawn over the teeth; the mouth half open, etc. (p. 237, *op. cit.*) According to M. Rochoux, the face is sometimes observed to be swollen, being the effect of previous capillary congestion.

The tunics of the eye are dry and resemble parchment. The sclerotic appears considerably thinner than is natural, and allows the black tint of the choroid pigment to be seen

through it. "It has been supposed," says Gendrin, (*Monograph. sur le Choléra Morbus*, 1832, p. 87,) "that the above is the result of the exposure of the eyes to the contact of the air, during the latter stage of the disease, when they remain half open; the appearance is confined to the lower half of the anterior segment of the eye, below the transparent cornea, or at any rate below the point corresponding to the lower margin of the pupil. An eye presenting this dryness of the sclerotic, when placed in contact with some other anatomical specimens, soon presented the usual appearance observed after death from other diseases. A layer of very tenacious, viscous mucus often obscures the transparent cornea.

In respect to the *eyes*, M. Bally observes, "Who does not recollect the frightful aspect of the unfortunate beings suffering under the algide period? How astonished and stupefied their air, what uncertainty in their looks! Was ever a more painful spectacle seen, than the globes of the eyes colored by numberless delicate arborizations, often giving rise to bloody patches; or those horrible stigmata blackening the sclerotica, exposed to view by the convulsive expansion of the eyelids. The sclerotica, too, acquired a demi-transparency due to its partial desiccation, which allowed the blackness of the choroid to be seen through it." — (M. Bally, "*Anatomie de La Choladrée Lymphatique ou Hydrocholadrée.*" *Med. Chir. Rev.* vol. ii. p. 389.)

The remarkable fact of the rise of animal heat observed in the dead bodies of choleraic patients, noticed by M. Tardieu, is strongly attested by various authors. Dalmas says, (*Dict. de Med.* vol. vii. p. 497,) "When death has supervened rapidly, during the algide stage, it is not uncommon to observe a remarkable degree of *heat*, instead of the *coldness* observed during life. However astonishing this may seem, it is nevertheless true, and is noticed by the servants employed in carrying off the dead bodies, as well as by the physicians who dissect them. This warmth vanishes, usu-

ally, when rigidity commences. The cadaveric rigidity is generally of early occurrence."

Dr. Wederstrandt, of New Orleans, (Physician in the Charity Hospital,) says, in a letter to Dr. Brigham, Superintendent of the State Lunatic Asylum, Utica, New York, under date of December 25th, 1848, "About half an hour after death, the body, which was cold as ice just before, becomes as warm as in health." In connection with the phenomena next to be noticed, Dr. W. states that "the cramps, or contraction of the muscles, which annoyed the patient so much during life, continue for at least half an hour, and in some cases nearly an hour after death." — (*Boston Med. and Surg. Journal*, vol. xxxix. p. 496. See also Dr. Paine's *Letters on the "Cholera Asphyxia" observed in New York in* 1832, Letter vi. — Parkes, *op. cit.* p. 8.)

Persistence of muscular contractility. — This phenomenon, (to which the author of the present work alludes in the chapter entitled "Description,") has been observed by several writers. "Before the body became cool, contractions of the muscles of the limbs were often observed, and less frequently, of the thoracic muscles, also. MM. Alibert Boudard, Dalmas, Dubled and Sandras, in the report made by them to the Academy of Medicine, in December, 1831, state that they observed the following phenomenon in the body of an old man, dead of cholera. The arms, being withdrawn from their position upon the body, spontaneously resumed that position, and during this movement the wrists successively passed through the motions of pronation and supination, as if under the control of the will; artificial excitation renewed these contractions, at pleasure; they even occurred in portions of muscle removed from the body. The heart never exhibited this persistence of contractility. Very many observers state that they have never verified this phenomenon." — (*Comp. de Med.* p. 237.)

M. Bally (*loc. supra cit.*) speaks thus of the *Automatic movements:* "At the instant of the extinction of life a rapid

movement of the lips was observed (*marmotage*,) exactly resembling that which takes place in some persons while reciting their prayers. It continued a short time *after* death, and at the same time movements of the forearm were observed. These first produced pronation, which was slowly, but with complete regularity, followed by supination — such alternation continuing for several minutes. If great care had not been observed, it might easily have been believed that these meteoric motions of the lips and arms were directed by consciousness. Frequently, a vermicular or oscillatory motion of the muscles of the thorax was visible." — (*Op. cit.* p. 393.)

Condition of the Digestive Organs. — The appearances nearly *constantly* observed in these organs, are the shining, adhesive, viscous exudation upon the peritoneal surface mentioned by M. Tardieu; — the remarkable vascular injection of the digestive mucous membrane, as described particularly by M. Bouillaud, who says, "This membrane presented every shade of injection and redness, from a rose or lilac tint, to a brownish tinge, the color of lees of wine, or verging more towards black. The redness is sometimes continuous, sometimes in patches." (*Comp. de Méd.* p. 241.) M. Bouillaud found more or less of this reddening and injection in *all* the cases he examined. The greatest degree of injection was found in the cœcum, the commencement of the colon, and in the rectum. The remarkable experiments of Magendie may appropriately be referred to here. Having thrown an aqueous injection into the intestinal arteries, the fluid, in its passage through the sub-mucous capillary system brought away the coloring matter of the blood, and the blood itself, so that the intestine became as clear and white as if it had never been filled with blood. Magendie concludes from this fact that the different degrees of redness are owing to a venous *stasis* of the blood, rather than to inflammation. (*Op. sup. cit.* p. 242. See also page 36, Tardieu.) Injections seem thus to be a sure mode of determining whether redness of the intestinal surfaces is inflammatory or merely static.

Consistence of the mucous membrane. — M. Tardieu pronounces the gastro-intestinal mucous membrane to be usually normal; M. Bouillaud says, that softening, thickening, or the opposite, is not uncommon. M. Velpeau never observed ulceration, softening, or fragility of the tissues which could be referred to cholera. Gangrene of the small intestine was *once* observed by Bouillaud. M. Gendrin observed sphacelus of the tip of the tongue, *once;* twice he noticed a gangrenous tendency in vesicated surfaces.

The peculiar tuberculated elevations or corpuscles, noticed by all observers, and which induced Serres and Nonat to give the name *Psorenterite* to cholera, ("*Cholera violacé*," *Comp. de Méd.* p. 243,) also *Psorenteria*, ("*Cholera sans inflammation*," *loc. cit.*) are said by Magendie and Velpeau to occur in other affections, and that the appearance is not uncommon; they think it a natural alteration, and that all diseases where great quantities of fluid are discharged from the intestines tend to increase it. It will be seen that injections have (by aid of the microscope) been seen to pass into these corpuscles, (see Tardieu, p. 38,) which had not been effected when the article on cholera, by the authors of the "*Compendium de Médecine*," was written. (*Vide Compend.* p. 243.)

Liquid contents of the stomach and intestines. — "More or less fluid is always found, in the stomach and intestines, of a nauseous odor, white and flocculent, which is compared by writers to a decoction of rice or gruel.

"The mucous membrane is often covered with a grayish-white matter, of a creamy consistence. Chemical analysis shows the choleraic liquid to be identical in composition with the serosity of the blood. Bile, both yellow and greenish in color, or a reddish sanguinolent fluid, are occasionally found. The lymphatic vessels are not altered." (Grisolle, *Path. Int.* vol. i. p. 709.) MM. Amussât and Ripault report having seen the lymphatic vessels very small, empty, slightly redden-

ed by vascular injection and evident stagnation of the blood; they also noticed an alteration in the mesenteric ganglions.

The spleen was found by M. Bally (*loc. cit.*) to have undergone a rapid atrophy; this was also observed by Magendie and Serres, although in other epidemics this organ has been found congested. M. Bally believes that the Anglo-Indian practitioners have attached too much importance to altered conditions of the *liver*, which he regards as secondary only. According to Grisolle, the biliary vessels undergo no alteration. Other writers, however, state that they are found slightly contracted.

State of the blood and circulatory organs. — The change in the physical qualities and in the composition of the blood is constant, and is fully explained by the author. Very extended examinations have been made of this fluid, which, however, is found in excessively small quantity in the dead bodies of cholera patients. (Grisolle, Monneret.) Nearly all the microscopic observations represent the globules as not being appreciably altered. There is, however, a difference of opinion upon this point. Donné considers them to be in a normal state. So also MM. Capitaine and Francœur. Magendie, Hermann and Chevalier think differently. The deficiency of water in the blood of cholera patients has been alluded to previously. The specific gravity of the serum has been found as high as 1.045, (Lecanu) which implies a reduction of nearly half the natural proportion of water. "The extraordinary decrease of the water of the blood, which occurs in malignant cholera, renders the blood so thick that it cannot circulate freely, and this change is the chief cause of the cessation of the pulse, lividity and other signs of obstructed circulation. No such effect is known to follow from any of the other causes of deficient water." (Williams, "*Principles of Medicine*," sect. xii. pp. 140, 141, Eng. edit.) Dr. Horner always found the blood thick, and in very small quantity; the coronary veins turgid; blood dark colored in arteries, as in veins. (*Amer. Journal of Med.*

Science, vol. xvi. pp. 58, 277, etc.) According to Dr. Rochoux, who has made very elaborate comparisons, the least black blood in cholera is blacker than the blackest blood of other diseases.[1]

Respiratory organs. — The cadaveric appearances noticed in these organs present many points of interest. Several writers pass over them with an apparently too hasty notice. Dr. Parkes (*op. cit.* pp. 13 – 21 and 106,) appears to have examined them with peculiar care. He states that "in the majority of cases the larynx and trachea were unaltered."

Another author remarks in regard to the state of the respiratory organs: — "The most careful examination of all the component parts of the *larynx* did not explain the "*veiled voice*" perceptible in this disease, unless this arose from the marked dryness of the parts. It is probably due to loss of power; other exhausting diseases, as hæmorrhage, producing the same effect, though perhaps none so rapidly. The *trachea* was frequently found injected, as were sometimes the *bronchi* also; and occasionally a granular or follicular eruption, such as that seen in the digestive canal, was found in the air-passages. The parenchyma of the *lungs* was unaltered; crepitating, though less forcibly than natural, under the fingers. If the bodies remained long in the dissecting-room, hypostatic *engorgement* was observed. Sub-pleural ecchymoses were found at the surface of the lungs. The *pleura* itself was always (during the cyanic period,) without traces of inflammation, and sticky, probably from the absorption of the more subtile portion of its lubrifying material." (Bally, *Path. Anat. of Cholera*, *Brit. and For. Med. Chirur. Rev.* vol. ii. p. 390.)

We extract the following table from the work of Dr. Parkes:

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1 Bally, "*Anatomie de la Choladrée Lymphatique*," *Med. Chir. Rev.* vol. ii. p. 391.

Average weight of the lungs.

	oz.	drs.
The average weight of the right lung in 22 Europeans, was - - - - -	14	0
The left, - - - - - -	12	6
Ditto, right lung, 16 Asiatics, - -	11	7
The left, - - - - - -	11	0

The greatest weight of the right lung among the Europeans was 25 ounces, and the smallest weight 8 ounces.

The greatest weight of the left lung among the Europeans was 22 ounces, and the smallest 6 ounces. From this statement, adds Dr. Parkes, the average weight of the lungs appears to be lessened in cholera. If an European standard be taken, and the average weight of both lungs in adult males be considered to be 26 ounces, according to Dr. Clendinning, or 43 ounces, according to Dr. Reid, then the diminution in the case of both lungs in cholera will be 17 or 20 ounces. *Op. cit.* pp. 13, 14.)

The lungs were generally pale anteriorly, becoming red on exposure to the air; they were often in the state described by Annesley and Twining, as "a bruised, semi-hepatized, or fleshy appearance;" often they were considerably collapsed, appearing in some cases almost like the lungs of a fœtus. (Parkes.) Another frequent appearance was pitting on pressure; not apparently depending on the œdema, or being in proportion to this, but being most marked in the superior lobes, and on the upper surfaces.

Accompanying this state was often a soft, leathery, or oily feel of the lungs. Neither of these appearances are peculiar to cholera, but from their frequent occurrence in this disease, they demand notice. (*Op. cit.*) "The most common appearances in the lungs are, the presence of blood in the large vessels, chiefly or solely,—the collapse, and the deficient crepitation, arising from the more or less complete absence of air and blood, and from the approximation, from some unknown cause, of the molecules of the pulmonary substance. In other cases there is more blood in the minute

structure, a corresponding dark color of the lung, and a variable amount of frothy serum; the quantity of frothy serum bears an inverse ratio to the degree of collapse. — (Parkes, *op. cit.* p. 20.)

The antecedent diseases of the lungs were *tubercles* and *emphysema.* (It will be recollected that M. Tardieu, quoting M. Contour, notices the rarity of tubercles in the lungs of cholera patients. — Ed.) Unsoftened tubercles were present in small quantity in three Europeans. In one Asiatic, a cavity existed in either apex, and hard, gray tubercles were also scattered through the upper lobe.

Pulmonary emphysema was noted in two Asiatics and in one European. It existed partially in three or four other cases. (Parkes, *op. cit.* p. 30.) In regard to emphysema, Dr. Parkes has the following remarks: — "An observation which I find recorded in my notes of 1843, possesses some interest. I find it noted that in several cases in Asiatics, there was a greater or less degree of pulmonary emphysema. Now this disease is certainly uncommon in Asiatics, who are little subject to bronchitis, and I thought the repeated occurrence of this pathological state somewhat remarkable. But these observations were often hurriedly made, and not to be depended upon; and, from the analysis of the more accurate post-mortem examinations, upon which this treatise is founded, it appears that pulmonary emphysema is not so often present as I at one time supposed. It was seldom found among the Europeans. It is, however, a curious coincidence, that Jackson should have noticed, in Paris, in 1832, the occurrence of emphysema in no less than eight cases out of twenty-five, in persons dying without reaction. (*Cases of cholera in Paris*, 1832.) Of the eight cases of emphysema, six are in bodies examined in the latter period, so that it may be supposed that some cases of emphysema were overlooked in the earlier period. In *that* period, in Dr. Jackson's record of cases, the state of the lungs and heart is very cursorily described. In twenty cases in Europeans. Dr. Morehead, of Bombay, found

more or less extent of emphysema in seven. (*Bombay Transactions*, 1844, pp. 80 – 90.) According to these observations, therefore, in forty-five dissections there were fifteen cases of emphysema, or exactly one third. The addition of my own observations reduces the number to nearly one fourth. But still this is a great number, when it is remembered that both my cases and those of Dr. Morehead were in young Europeans. The average age of Dr. Morehead's patients was rather more than twenty-seven years.

The observation of Dr. Jackson, with which I was totally unacquainted in 1843, has certainly a singular accordance with my remark. Perhaps some peculiar disease of the lungs or heart, yet to be discovered, may in some way influence the respiratory process, and therefore assist the action of the poison on the blood in the lungs. I never could discover any antecedent disease of the heart, although my attention was particularly directed to this organ, in consequence of the well known opinions of Dr. Mackintosh. Certainly there is a peculiar constitution, or perhaps condition, of the blood, which predisposes to cholera." — (*Op. cit.* pp. 196, 197.)

The facts above recorded seem sufficiently important to warrant us in extracting so largely from the author's remarks in reference to the subject, which possesses an interest likely to lead observers to its further investigation.

State of the nervous system. — The authors of the "*Compendium de Médecine*" have never found any appreciable change in the consistence or color of the brain and spinal marrow, as has been sometimes noticed by M. Contour, (see p. 42.) Others, as MM. De Laroque and Laugier, consider that the lesions of the spinal marrow are sufficiently important to account for the disease. In Dr. Müller's valuable reports, (See *Med. Chir. Rev.* Jan. 1849,) we find the following extract: "The brain was generally tough and firm, and of a remarkably white color. At the commencement of the epidemic, and chiefly in the most rapid cases, the brain was, however, soft. The spinal cord was also firm,

with congested vessels, and serum in the arachnoid space. The larger portion of observers are, however, agreed, that the encephalo-rachidian contents are nearly always exempt from actual alteration. "In the arachnoid," says Müller, "were often little corpuscles. At Moscow, this appearance, (which otherwise is often seen) was held to be characteristic of cholera?" (*Loc. cit.* p. 13.)

Coloration of the bones. — This appearance has been noticed by M. Gendrin. He refers to the fact that the teeth present it constantly, and adds, that it has been likewise observed in the teeth of persons who have died of small-pox. M. Velpeau declares this modification in the coloration of the bones to be constant. In this he is supported by M. Bouillaud. — (*Compend. de Méd.* p. 238.)

Condition of the urinary organs. — The kidneys are natural in size and texture. In most cases, the cortical substance is purplish throughout, or pale, but presenting dark congested vessels; and from the mamillary points, a whitish fluid, having somewhat the appearance of pus, can be squeezed out. "Some pathologists have laid great stress on the white, creamy fluid thus expressed from the kidneys, as a character peculiar to malignant cholera; but we have met with it in subjects who died of other diseases. It probably consists of mucus, and the constituents of the urine, in a state of concentration." (Budd, *loc. cit.*)

The urinary bladder is constantly found contracted and empty, in those who die during collapse, (Horner, *op. cit.* Delaberge et Monneret, Parkes and Budd, *loc. cit.*) In those who have died in other periods of the disease, a small quantity of urine has been found.

In forming our opinion of the anatomical changes observed in the bodies of cholera patients, every one will perceive the importance of distinguishing between the two classes of morbid appearances noticed, — some being referable to the algide stage, and others to that of reaction. In this connection, the summary given by MM. De la Berge and Monneret is

highly valuable. They collect the most remarkable appearances as follows:

"We find, in nearly all cases, a remarkable diminution of the serous fluid, which in health pervades most of the tissues of the body; — a change in the blood, whereby it is rendered less fluid; — a very generally existing engorged state of the capillary venous radicles, giving to the parenchyma of the various organs composing the body, a deep violet color, quite peculiar; — an alteration in the serous membranes, which become sticky and glutinous upon their surface; — the evolution of corpuscles, more or less elevated above the mucous surface of the intestines; — the effusion of a peculiar fluid, of a white color, and of a gruelly consistence, which distends the alimentary canal. Such are the principal lesions met with in those who die during the *period of cyanosis.*

"The principal pathological changes noticed in subjects who die during *reaction*, are less characteristic of *cholera*, than they are of the various complications that may supervene during that period. M. Gendrin thus sums up the most important appearances. Venous congestion less marked; the livid tinge of the body, belonging to the former stage of the disease, has disappeared, except in some cases where *coma* has been manifested early in the reactive stage, or after a feebly declared and short reaction; the heart is no longer gorged with blood exclusively in the right cavities, and the blood in the aorta is no longer black, like that of the vena cava; the quantity of serum it contains increases in proportion as the time has been longer from the period of reaction; it may even happen, that this element of the blood may exist in greater quantity than in healthy blood; the lungs are no longer empty, nor collapsed, as in the algide stage; they are often congested. The serous membranes regain their usual moisture; the cholera fluid is not found distending the intestines, but in its place is observed a yellowish or brownish, greasy matter, and gaseous accumula-

tions, having the odor of fæcal matter. The corpuscles, which are formed in such numbers, and so distinct, in the former period, are not so elevated or numerous, while Peyer's patches are often seen swollen and showing evident traces of inflammation. (Serres et Nonat.) Bouillaud says that ulcerations of the follicles, in a nascent state, are sometimes observed. The bladder, in individuals dying in a comatose state, is occasionally distended by healthy urine. (Magendie.) The creamy matter found in the kidneys in the stage of cyanosis, is not seen. The duodenum is sometimes inflamed, and contains a greenish bile. The stomach is very strongly contracted, and nearly empty; it only contains mucus, or a little bile, and its internal surface is marked with thick and numerous rugæ, resembling somewhat the cerebral convolutions in their appearance. A universal, punctuated, arterial or capilliform redness is observed upon the mucous membrane, thus wrinkled." (*Compend. de Med.* pp. 245, 246.)

We would refer to an interesting article upon "Microscopic examinations of the mucous membrane of the stomach and bowels in cholera," by Dr. Ludvic Boehm, successor to Professor Dieffenbach of Berlin. (*The article is contained in the American Journal of the Medical Sciences for April*, 1849, p. 519.) The appearances considered are the following. 1. *Loss of intestinal epithelium by excessive desquamation.* 2. *Microscopical observations on the contents of the stomach and intestines.* Dr. Boehm remarks, "The flocculi which have been described by others, consist merely of larger and more perfect portions of epithelium." — (a.) *Bilious contents.* "The functions of different glands, as the kidneys, the salivary glands, (the absence of the salivary secretion has been very reasonably alluded to by authors, as one cause of the excessive thirst observed in cholera patients, — Ed.) those of the eye and liver, &c., are discontinued during an attack of cholera; therefore, and sometimes for days, no secretion of urine takes place, the mouth and eyes are dry,

and the biliary ducts are found to be empty and collapsed. The desquamation of the epithelium is noticed in the biliary ducts as in the intestines. (*Loc. cit.*) (b.) *Bloody contents.* "Intestinal hæmorrhage, although rarely profuse, is always a fatal symptom. In this blood, few corpuscles are found, and those always altered in form; — the mucous membrane is found ecchymosed and marbled with red lines and spots." 3. *The flocculi found in the urine of cholera patients.* Epithelium desquamation. — 4. *Oily fluid found in the intestinal villi of cholera patients.* "The villi are filled with oil, and seen with the naked eye, give the intestine an appearance as if it were sprinkled over with many yellow transparent globules." — 5. *A vegetation, similar to the saccharomycis cerevisia, found among the contents of the intestines of cholera patients.* "Dr. Boehm has found in the contents of the intestines, microscopical, colorless corpuscles, of a regular and mostly oval form, connected with longer or shorter chains, giving off lateral branches, and resembling a ramificated figure. In the stomach, they are developed into far-spreading, tree-like ramifications, generally enveloped in mucus. He found a large number in the small intestines, fewer in the colon, although, in some cases, only there. They were also in the fæces and vomited matters." 6. *The cryptæ mucosæ in cholera.* White corpuscles fill the apertures of the glandulæ lieberkuhnianæ, or mucous crypts, which, in the healthy subject, are seen as black points. There is alternate desquamation and reproduction of the epithelium in the crypts. 7. *The changes in the glandulæ solitariæ and Peyerianæ in cholera.* As in severe diarrhœa, so in cholera, the capsules of the glandulæ Peyerianæ are softened, and their tops or apices ulcerated, so that their contents are evacuated, and the capsules, as so many open mouths, or fossæ; they also lose their granular and assume a reticular appearance; besides which, they become elevated, or protruded, by exudation taking place in

the subjacent cellular tissue. Real ulceration is not found in these glands. (*Loc. cit.* Extract from *The Medical Times*, June 24th, 1848.)

Chemical nature of the evacuations of cholera patients. — "In the *Comptes Rendus* for 1847, M. Andral gives an account of the fæcal evacuations. The most important fact which he observed, was the entire absence from these liquids of the serum and fibrine of which it was supposed they chiefly consisted. He could not discover in them any trace of albumen; and M. Favre also found, as the result of his analysis, that the organic substance contained in the choleraic liquid, possessed none of the properties of albumen. The observations of these pathologists are strikingly confirmed by the results of a recent analysis by Alfred S. Taylor, F. R. S., from which it appears that albumen is not necessarily a constituent of the choleraic liquid, although there are many theories respecting treatment which are based on the assumption that the blood forces out its serum through the intestinal mucous membrane. Not a trace of albumen existed in the specimen examined by Mr. Taylor; fibrine was also absent, as there was no spontaneously coagulable principle, and the sediment was insoluble in acetic acid. The animal substance dissolved in the clear liquid, differed from gelatine, in the fact that it yielded sulphur, and had no tendency to gelatinize. The animal matter may have consisted of bile altered by disease, or of some morbid animal product poured out by the blood under the influence of the choleraic poison. The large quantity of chloride of sodium contained in it is consistent with the view generally entertained by pathologists, that, under an attack of cholera, this salt is abundantly secreted from the system, — not by the kidneys, (for the urine has been found deficient in chlorides,) but by the gastro-intestinal mucous membrane."

The liquid analyzed by Mr. Taylor was "that vomited by a child nine years of age," and of the "rice-water" character.

Its constitution was as follows : —

	Animal matter, - - - - - - - - - -	2.5
Salts,	Chloride of sodium in large proportion,	
	Sulphate of Soda, - - - - - - - - -	0.8
	Water, - - - - - - - - - - - - -	96.7
		100.0

M. Andral, subsequently to his examination of the fæcal matters, " was induced to examine the blood, and he found that the proportion of albumen was almost unaltered. There was neither manifest increase nor diminution. Dr. Buchanan states, that in a certain stage of the disease, which he denominates the albuminous, he has found the evacuations in cholera to contain albumen. It would thus appear that their composition is liable to vary. It should be observed that the liquid whose analysis is given above, was the product of the second vomiting in an early period of the attack, and more than three hours after food had been taken.

In the paper published by M. Andral, he speaks of the fæcal evacuations in cholera having a highly alkaline reaction, like serum ; but in this respect his opinion seems to have undergone some change. At a recent discussion in the Academy of Sciences, he states that he has almost constantly found the vomited matters to be *acid*, as well as the mucous membrane itself. The liquids discharged by vomiting and purging have hitherto been regarded as similar, and the more recently expressed opinion of Andral is in conformity with the fact observed in the present instance. M. Burguières states that the vomited matters in cholera were evidently acid, but he commonly found them mixed with portions of food partially digested. This gentleman also states, that after the patients had vomited three or four times, the acidity disappeared, and they became alkaline. The alkaline reaction especially existed when the vomited matters assumed the white and flocculent appearance, characteristic of the evacuations of cholera. Dr. Heller found that the matters

vomited during the progress of the disease were very watery, and of a greenish or yellowish green color. They also had a slightly acid or neutral reaction ; and from his examination, he considered bile to be the principal ingredient. This pathologist observed that the chlorides were almost entirely absent from the urine.

The nature of the white sedimentary matter appears to be very obscure. It did not in this instance present the physical and chemical characters of coagulated albumen, fibrine, mucus, or pus. It bore a strong resemblance to the last mentioned morbid compound, with the exception that it behaved differently when treated with potash : besides, the deposit was mixed with a quantity of white curdy matter, altogether unlike pus in its appearance and chemical properties. M. Andral, who has also carefully examined this peculiar deposit, states that it does not consist of fibrine : under the microscope he could not trace any filamentous structure. He found it to be composed of numerous nucleated and nucleolated cells, closely resembling pus globules. Besides these globules, which were very abundant, the masses contained numerous particles of epithelium.

One fact appears clear from these researches, that the cholera liquid is not to be regarded as a mere excretion of the watery parts of the blood mixed with fibrine. At the commencement of the attack, the vomited matters are acid, and mixed with a morbid product analogous to pus, but differing in properties from all the organic compounds hitherto found in the living healthy body. — (*London Medical Gazette*, February 2, 1849. In *Amer. Journal of Med. Science*, April, 1849.)

The *ascaris lumbricoides* is very frequently found in the bowels of cholera patients. Dr. Whiting noticed several instances during the late access of cholera at New York.

M. Bally says, " Like other epidemic diseases, such as typhus, plague, yellow fever, &c., the cholera is remarkable, short as is its duration, for the development of the *ascaris*

lumbricoides. Dr. Briére, who died in 1832, had been only ill for seven hours, and had for some days prior to the attack, been taking the bichloride of mercury, which is a powerful anthelmintic ; and yet several lumbrici were found."— (*Loc. supra cit.* p. 392.)

Note D.

COURSE OF THE CHOLERA IN AMERICA.

A concise account of the course of the epidemic of 1832, as manifested in the United States, together with the facts published in regard to the manifestation of the disease, from its reappearance in 1848, up to the present time, will here find its appropriate place. It will be impossible to enter into a detailed narrative of all the points of interest, an undertaking which would be incompatible with the limits of a single note, and which, moreover, is rendered unnecessary, by reason of the accounts already given of the epidemic of 1832, by various writers,[1] among whom may be mentioned Dr. Martyn Paine, (*Letters on the Cholera Asphyxia as it appeared in the city of New-York*, 1832,) and Dr. Edward Warren, ("*Sketch of the Progress of Cholera in Boston*," 1832.)

Some historical items in relation to the disease in 1832, are given by Dr. C. B. Coventry, of the Medical Institution of Geneva College, and of the Medical Department of the University of Buffalo, in the form of a "Report," (July, 1848.) See also a paper in the Boston Medical and Surgical Journal, (December 27th, 1848,) for some account of the course of the disease. Dr. Halphen's description of "Chol-

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1 See "*American Bibliography, &c.*" Art. "*Pestilence, Choleric.*" Copland's *Med. Dict.* Amer. Edition. (Dr. C. A. Lee.)

era and Yellow Fever which prevailed in New Orleans in the fall of 1832," is also of value in this connection. From several of the medical journals we derive the statistics which mark the progress of the disease in the former and latter epidemic. A map of its progress would have been a valuable addition, had time permitted its preparation.

THE EPIDEMIC OF 1832.

"On the 11th of June, 1832, the Quebec Board of Health made their first Report, from which it appears that the epidemic broke out at Grosse Isle and Quebec on the 9th inst. (W. W. Reid, *Reminiscences of Cholera in* 1832.) On the 12th of the same month, the Board of Health of Montreal state that there was no case of *malignant* cholera, although several patients had died of the common cholera of the country. (Coventry, *loc. cit.* p. 25.) "On the 13th, however, it was reported that there had been fifteen cases and seven deaths in Montreal." (Reid.) On the 18th, only six days from the report of the 12th, which declared no *malignant* cholera to be evident, we find reported two thousand five hundred and sixteen cases, and four hundred and thirty-seven deaths, — but even this was thought at the time to be below the true estimate; the panic prevented accurate records being kept. On the 21st of June it was stated that the disease was abating in Quebec. No account of the whole number of cases in the city is given.

In the hospital, the number of cases from the commencement to that date, was six hundred and ninety-nine; — the number of deaths, three hundred and sixty-one. On the 22d it was said to be rapidly subsiding in Montreal, and on the 24th, Dr. Bronson, who was sent out by the authorities of Albany, writes from Lapraira, "I have come over to this place on account of the cessation of the cholera at Montreal." On the 22d day of June, 1832, an act was passed, establishing quarantine regulations between the State of New York

and Upper and Lower Canada, on account of the supposed existence of the Asiatic or malignant cholera in those provinces. At the same time, the officers of the different towns, villages and cities, were authorized to form boards of health, and to adopt such measures as they should deem necessary to avert the threatened pestilence.

Notwithstanding the precautions which had been adopted, on the 21st of June the cholera appeared in New York. (Dr. Reid (*loc. cit.*) says, the New York Board first reported on the 4th of July, and from this we learn that the first fatal case was on the 27th of June.) All the intermediate places on the seaboard, as New Brunswick, Nova Scotia, Maine, Massachusetts, remaining free from it.

Supposing the disease communicated, how did all these intermediate places, which were in constant intercourse with Montreal and Quebec, escape? Dr. M'Naughton says, two fatal cases occurred in Albany on the 3d day of July: "We have no reason to attribute its commencement to intercourse with Canada. During the latter part of June, diarrhœa and common cholera became frequent."

From New York it extended south, appeared in Philadelphia on the 4th of July, and in Baltimore in the course of the same month, and reached Charleston in November. In February, 1833, it was in Havana, Cuba, and the same year it reached Mexico.

To retrace our steps; — from Montreal it extended westward, up the St. Lawrence and along the great lakes. Whilst extending from Albany, in a similar direction, along the course of the canal, visiting in its course Utica, Syracuse, Rochester and Buffalo, it subsequently appeared in Detroit. A detachment of troops, who left Buffalo in health, halted a short time at Detroit, where the disease was not then raging, — were attacked by it on their route to Chicago, and suffered severely. About the 1st of October, it appeared simultaneously at Madison, Louisville, and St. Louis, and by the latter end of the month had reached New Orleans.

In its passage, it extended to Tennessee, Illinois, Indiana and Kentucky; visiting Lexington, Maysville and some other places severely.

The disease lingered in different parts of the country for two years; in 1834 it re-appeared in several places where it had formerly been, and visited some that had escaped in 1832. Its general course was the same that it had been in Europe, following the course of navigable waters and principal highways, passing by many places without affecting them.

In the city of Utica, where the author resided, there had been one case with all the symptoms of the epidemic cholera, the latter part of July, but the patient recovering, it was not reported by the board of health as a case of cholera. About the same time, another patient, a man of dissipated habits, died in the third stage of measles, with all the most malignant symptoms of the disease.

On the 12th of August, the citizens were startled by the annunciation that four cases of cholera had appeared. In less than twenty-four hours all were dead, and these were among the most respectable citizens of the place. All were distinct from each other, in different parts of the city. Two were females, who, from the nature of the case, could hardly have been exposed to any contagion. From the 12th to the 27th, there were 172 cases and 51 deaths; from the 12th to the 3d of September, 192 cases and 61 deaths.

In the city of New York, the number of cases reported, up to the 29th of August, when the board resolved to cease to report, was 7118, the number of deaths reported by the board, 2250. The number of interments reported by the sextons, give 3967 as from cholera.

In Albany, the board of health ceased to report on the 31st of August; number of cases reported, 1142; severe, 587; deaths, 410. In Philadelphia, up to September 1st, 2156 cases, and 716 deaths. In Rochester, from the 20th to 27th, 372 cases, 103 deaths. In Buffalo, it was announced

on the 28th of August, that the cholera hospital was closed, but it again broke out with increased severity. The whole number of cases up to the 28th, was 184, and 80 deaths.[1]

In addition to the places mentioned, it appeared in the State of New York, at Ogdensburg, Poughkeepsie, Troy, Flat Bush, Sing Sing, Whitehall, Peekskill, and some other minor places. On the other hand, the city of Hudson, the villages of Auburn, Geneva, and Canandaigua, (all of which are on the great thoroughfares,) either escaped entirely, or only had those cases that came from other places.

In the neighborhood of Utica, the villages of Whitestown, New Hartford, Clinton, and Trenton, were thronged by those who had fled from the city, yet the disease never spread to the residents of those villages. How are these facts to be reconciled with the idea that the disease is contagious? (C. B. Coventry, on *Epidemic Cholera*, Buffalo, 1849, pp. 25 – 29.)

The disease appeared in Cincinnati on the 30th September, 1832. (Dr. Drake. *Western Journal of Medicine and Surgery.*) The board of health did not, however, announce the invasion of the disease until October 9th. Cholera

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[1] The following table is taken from the American edition of Dr. Copland's Medical Dictionary; (Art. "*Pestilence, Choleric.*") The editor, Dr. Charles A. Lee, appends the following note. "The table does not include the whole period of the epidemic, but may serve to give a comparative view of the disease in those cities, respectively to the dates mentioned. The population of New York, is estimated not from the usual ordinary number at the period mentioned, but of those remaining in the city." "The table was compiled by Prof. J. Jackson, of Philadelphia, and exhibits the deaths in Quebec, Montreal, New York, and Philadelphia, with the ratios of cases and deaths to population and to each other." (*Loc. cit.*)

Date of raport and place.	Populat.	Cases.	Death	Ratio of cases to population.	Ratio of deaths to cases.	Ratio of deaths to population.
Sept. 2d, Quebec,	32,000	5,783	2,218	1 in 517	1 to 2 1-2	1 in 14 1-2
" 21st, Montreal,	28,000	4,440	1,904	1 in 65	1 to 2 1-3	1 in 14 2-3
Aug. 28th, N. York,	140,000	5,814	2,935	1 to 24 1-2	1 to 2	1 in 47
Sept. 13th, Phila.	160,000	2,314	935	1 to 70	1 to 2 1-2	1 in 17

appeared simultaneously at Cincinnati, Ohio; Madison, Indiana; Louisville, Kentucky; and St. Louis, Missouri. This fact in the history of the spread of cholera is highly important, and throws much light on the mode of its propagation. About the last of October, the epidemic reached New Orleans, but the towns between Louisville and that city generally remained free from the epidemic.

On the American continent, the disease extended from Canada to Yucatan, invading nearly every place of importance immediate between these points. We may here remark a striking exemption from cholera. South America was not invaded, notwithstanding many portions of that country, especially along the coasts and in the vicinity of its great rivers, would seem, like the Delta of the Ganges, peculiarly favorable to the production of violent forms of disease. Returning, apparently, from America, cholera resumed its ravages in Europe, and at this time visited Spain, France, Rome, Sicily, portions of Germany; and, as some have asserted, destroyed its last victim on the banks of the Thames. We are not authorized to say that the epidemic of 1817 has ever subsided; it is true its ravages have for a time abated, but it is equally certain that it never ceased to exist in some portion of India. Within a few years, however, the disease has acquired a new activity, and now again appears as a wide-spread epidemic. (*Asiatic Cholera*, L. M. Lawson, M. D. *Western Lancet*, November, 1848.)

"While in each of the larger cities of the Union, some thousands of inhabitants were swept off by the ravages of the cholera, it was found that all the deaths which occurred in Boston, during its epidemic presence, hardly amounted to eighty in number." ("*Report on sanitary measures in regard to epidemic cholera, by the board of consulting physicians of the city of Boston.*")

The very able report made by Dr. Wm. J. Walker, then physician of the state prison of Massachusetts, to the Governor of the commonwealth, and which is lately (Dec. 6th, 1848)

republished by Dr. W. H. Thayer of Boston, in the Boston Medical and Surgical Journal, states that "the entire number of convicts attacked was 196, — of this number, 115 sickened within the first twenty-four hours, and the remaining 81, at various times after. The last patient severely attacked, was on the 7th of September — and the last discharged from the hospital, cured of this malady, on the 23d of October, having resided in the hospital seventy-nine days. Thus, the whole number finally recovered, notwithstanding the severity of the first symptoms, and the protracted sufferings of those, whose disease was not wholly arrested at the commencement." (*Loc. cit.* p. 375.)

The disease appeared in the prison "on the evening of the 5th of August." Dr. Thayer remarks, in connection with the above report, that, "as doubts were expressed at the time, as to the identity of this disease with Asiatic cholera, it may be well to sum up the principal facts, although the evidence is clear enough to make it almost a work of supererogation.

"The epidemic began while cholera was prevailing in Canada, Albany, New York and Philadelphia; and within ten days before the first undoubted case occurred in Boston, and about the same time that cases were seen in other towns in the eastern parts of Massachusetts.

"Of all the symptoms which characterize cholera, in its worst form, not one was absent excepting *cramps;* which did, however, occur in one of the worst cases. But the symptoms which express the essential character of the disease, those of serious obstruction of the circulation, were fully marked."— (*Loc. cit.* p. 370.)

It may, we think, be reasonably suggested whether the disease, as manifested in the prison, may not be referred to that class of cases, which come under the title "*cholerine*," or the *cholera benigna* of M. Tardieu. It will be remembered that cases are cited by Magendie, styled cholerine cases, whose termination was *fatal;*[1] — the term "be-

[1] See p. 187.

nign" is, therefore, strictly comparative, and detracts nothing from the alarming features of the cases alluded to in the state prison report; — we are rather led to wonder at the excellent results obtained, even under the promptly rendered and judicious medical services.

It is stated above, that the symptoms expressive of the essential character of the disease, — those of serious obstruction of the circulation, — were fully marked; — we do not find that the blue and shrunken aspect of the stage of complete collapse is noted; the only use of the term "livid" is as applied to the tongue, which is spoken of as "*inclined to a sub-livid color:*" — this seems to strengthen the opinion that the disease was cholera in the cholerine form, or "cholera benigna," which, if admitted, would hardly allow the statement, that "all the symptoms which characterize cholera in its *worst* form, were present, if cramps be excepted." There is but one case mentioned, in which it was found difficult to draw blood; — in the worst form of cholera, this difficulty is uniformly experienced when the practice is resorted to.

The above report is highly valuable, both as a matter of history, and as evincing the effect of proper medical management.

EPIDEMIC OF 1848.

We confine our notice of the progress of what is styled the "present epidemic," chiefly to its course in the United States, so far as hitherto authentically reported. Dr. Coventry, in his late report, says, referring to Europe and Asia,— "A minute account of its progress would be merely a repetition of its former history; its course, its manner of progress, its symptoms, and, in short, all its features, — and, we are sorry to add, its results, are nearly the same." (p. 30.) Tho following from the "Report on the Origin and Progress of the Cholera at Quarantine, Staten Island, N. Y., by Alexander B. Whiting, M. D., made to the Sanitary Committee of

the Board of Health," is the best account that could be presented of the recent manifestation of the disease.

"On the 2d of December, the packet-ship New York arrived at quarantine, with a number of persons sick, having lost seven during the last week of her voyage, with a disease that has since proved to be Asiatic cholera.

"The New York left Havre on the 9th of November, with three hundred and thirty-one steerage passengers, twenty-one cabin, and thirty-three crew; a total of three hundred and eighty-five. All continued well until the 25th, Saturday, when one of the steerage passengers, a German, aged twenty-nine years, in robust health, was attacked with vomiting and purging, accompanied by cramps of the muscles of the upper and lower extremities.

"The captain supposed it to be cholera morbus, and prescribed judiciously for the symptoms, but they continued until the third day, when death occurred.

"At the time when these cases first occurred, November 25th, the ship was in N. lat. 42°, long. 61°, about 140 miles S.S.W. from Sable Island. On the 23d and 24th, the two days preceding the appearance of the cholera, the wind was N.N.W. On the 25th it changed to the southward, with squalls and rain. In the morning the barometer was at 30 inches, and fell during the day to 29½ inches; the thermometer 60° Fahrenheit. Sunday and Monday, 26th and 27th, wind westerly and fresh. Tuesday, 28th, moderate, from N. W.; barometer 30, thermometer 42°.

"The next case occurred on the 26th, Sunday, when an old man, aged sixty-two, in feeble health, was attacked with vomiting and purging, with coldness of the whole body, and violent cramps and spasms. He died on the second day after the attack.

"Monday and Tuesday, 27th and 28th, two cases occurred. A girl, aged five years, died in two hours, and a boy also aged five, died in four and a half hours after their first attack, — both perfectly well previously. Wednesday, 28th,

a man, aged forty, was attacked at 8 o'clock, A. M., and died at 3, P. M. of the same day. On Thursday, two children sickened and died, after six and eight hours' illness.

"The ship came to anchor at quarantine on Friday night, and from that time until Sunday noon, when the passengers landed, twelve new cases occurred.

"The sick were sent to an excellent hospital room, and good nursing and medical attendance immediately provided. Since the arrival of the ship at quarantine, eighteen cases have occurred, making with the twelve taken from the ship, thirty cases, of which number twenty have died.

"The whole number, from the first case at sea, has been thirty-seven, of which twenty-seven have proved fatal.

"In the cases that have occurred here, diarrhœa has preceded in only a few, or about one third. A majority were attacked in the morning, between the hours of two and eight.[1] The average duration of the disease, in the fatal cases, has been ten hours.

"December 18th. Since the above was submitted, further observations are as follows. Since the 11th of December to date, there have occurred thirty-three new cases. All but three have been of the same class of Germans from Havre, as the other cases. One, and the only one that has occurred among the French passengers of the New York, was a Frenchman from Paris, — a fatal case. Two others were inmates of the hospital, — Irish; they were just recovering from typhus fever, and located in a hospital most distant from the cholera hospital.

"The whole number of cases thus far, at quarantine, has been sixty-three. Of these, twenty-nine have died. A large proportion have been children under fourteen years; twenty, or about one third of the whole number, having been of this class.

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[1] The great majority of attacks of cholera occur in the night; this is noticed by many writers. To a certain extent the same is true of the attacks of our common cholera morbus. — [Ed.]

"Of the thirty-three cases that have occurred since the report of the 11th, only nine were fatal; and, as there appears no difference in the severity of the symptoms at the outset of the disease, the diminished fatality may reasonably be attributed to a more happy plan of treatment:" (and doubtless much may be ascribed to better hygienic position and influences. — Ed.)

Manifestation of Cholera in New Orleans. — It has been questioned whether the disease which manifested itself to such an extent in New Orleans is of *Asiatic* origin and should be styled Asiatic cholera. There is no doubt, however, of its *epidemic* character.

We find the following remarks in the March (1849) number of the Charleston Medical Journal. "Considerable difference of opinion has prevailed, not only among the professional, but also non-professional public, in regard to the real nature of this singular disease. Some will have it that it is the real *bona fide Asiatic Cholera*, — others, an aggravated form of *cholera morbus*, — others, again, designate it as *cholera maligna*, etc. etc."

This is not the place for a reference to the question of the "origin" or "importation" of the disease, to which we shall have occasion hereafter to allude: we proceed to give an account of the progress of the epidemic cholera as observed in the south and south-western states, since its disappearance from the quarantine station at Staten Island. In the New York Journal of Medicine, for March, 1849, the editorial gives the following information. "In this city (New York) there has no new case occurred since one on the 20th of December, and at the quarantine station none since January 4th. At New Orleans the disease has prevailed to a great extent.

On the 11th of December, 1848, the ship Swanton, from Havre, arrived at New Orleans with two cases on board. When she left Havre, the passengers and crew were all in good health, and there was no cholera in that port, but some

of the passengers were from Germany, where the cholera was raging. When about two weeks at sea, the cholera broke out, (the analogy is remarkable in the manifestation of the disease on board the packet ships New York and Swanton; — both sailed from Havre — in both instances a German immigrant, we believe, was the first attacked by the disease — the age of the two patients was nearly the same, one being 25, the other 29, — the manifestation of the disease was at very nearly the same period from the day of sailing — the mortality on board was nearly equal. — Ed.) and in the course of a few days seventeen persons died and were thrown overboard.

On the arrival of the ship at New Orleans, there were two cases on board, and they were, on the 12th, taken to the Charity Hospital. The following day several cases appeared about the shipping and wharves." "The third case was that of a woman carried directly from the ship to the Hospital, in a state of collapse; she died, as did the two who were previously taken from the ship. The next case reported was a man working as a stevedore on board the ship Elizabeth, in the third Municipality, at least a mile and a half from the Swanton.

After this the number of cases increased rapidly, and on the 21st of December the cholera was pronounced to be epidemic by the Board of Health." — (*New Orleans Medical and Surgical Journal*, March, 1849, p. 619.)

From the same journal we extract the following remarks, which are of considerable significance. "On the 5th of December, Dr. Fenner states that he 'attended a gentleman on Custom-house street, who labored under vomiting, pain and spasms in the bowels, and prostration to such a degree, that *if epidemic cholera had been supposed to be here, no person would have hesitated to pronounce him a case.*'" "We are the authors of the italics, and desirous to call particular attention to the fact stated. This was six days before the arrival of the ship Swanton, after a passage of 39 days from

Havre, with 280 steerage passengers, chiefly Germans, — some French." — (*Loc. cit.* p. 618.)

Some days previous to the arrival of the Swanton, Dr. Fenner informs us (in his interesting article published in the Picayune, January 28th, "on the late Epidemic,") "that three or four negroes were attacked with *cholera morbus* on the same night and at the same house, in Gravier street. Similar cases were observed in the practice of a number of physicians in different parts of the city, all going to show, as it appears to me, that the epidemic influence of cholera was gradually being matured and developed in our midst." — (p. 619.)

A ship also arrived from Hamburg on the 6th of December, with about 250 steerage passengers, after a passage of fifty-five days. Cholera was prevailing at Hamburg when the ship sailed, and six or seven fatal cases occurred on board the vessel while she was still in the river Elbe. From the time she was at sea until she arrived at New Orleans, there was no case of cholera on board. A man supposed to be one of the immigrants from Hamburg, died in the Charity Hospital soon after the epidemic broke out here, (New Orleans) who stated that he had recently arrived from Germany, on board a vessel which had lost several passengers by cholera. — (Dr. Fenner.)

The distinct manifestation of the disease as *an epidemic*, dates from the arrival of the "Swanton" at New Orleans.

The official accounts give the following reports of fatal cases. "For the week ending December 16th, 17 deaths; from the 16th to 21st, 87; on the 22d, 46; 24th, 84; 25th, 77; 27th, 61; 28th, 92; 29th, 84; 31st, 71; January 2d, 84; 4th, 39; 5th, 44. Whole number of deaths from cholera, from the 11th of December to the 5th of January, inclusive, 1115. Since this time the disease has been gradually disappearing. On the 6th of January the deaths were 38; and on the 8th, the Board of Health reported the disease 'rapidly disappearing and no longer epidemic.' On the

16th there were 15 deaths; on the 22d but 4, and the Board of Health had ceased to report daily, as previously. On the 7th of February, the city was declared free from the disease." — (*New York Journal of Medicine*, *loc. cit.* p. 252.)

"From New Orleans the disease extended in various directions. Many cases occurred on the upward bound boats. On the 24th of December several cases were declared at Vicksburg. On the same day a fatal case is reported to have occurred in Cincinnati." [The course of the late epidemic has been the reverse, in regard to *general direction*, from that of 1832;—then, it extended from Canada, west and south, — now, first manifested at New York, next at New Orleans, it follows, mainly, the great water communication from the latter city, northward, westward and eastward; — by the "Nashville Banner" of March 28th, the deaths from cholera there, from the 13th to the 22d ultimo, (Feb.) were stated to have numbered eleven. — Ed.] "Another death occurred at Cincinnati on the 24th. [? Ed.] From this time the disease gradually increased, and on the 2d of January, 1849, there were six deaths. It does not appear that the disease became at all epidemic in this place, for, on the 7th, there were but four deaths. On the 10th, the city was reported to be free from the disease." — (*Loc. cit.* p. 253.)

During the time of its prevalence at New Orleans and Cincinnati, cases continued to occur on board the steamboats plying on the river; such also was the case in the several cities intermediate between these two places.

On the 8th of January, at Memphis, it was reported that the average number of deaths per diem was ten. Six cases were reported in St. Louis on the 17th of January; and on the 24th, the board of health reported seventeen cases as having occurred during the week. It is said that the disease has also appeared at Mobile and Montgomery, and that at the former place, there were thirteen deaths during the week ending the 3d of January. It has likewise made its appearance in Texas, in as severe a form as at New Orleans. At

Fort Lawson, the eighth infantry have suffered horribly; forty deaths occurred in one night. — (*Loc. sup. cit.* p. 253.)

From the data furnished, it would seem that cholera has appeared in a strictly epidemic form, only at New Orleans: The editor of the New York Journal of Medicine says, "*perhaps* in Texas, (we say perhaps, for our data on this part of its history are particularly unsatisfactory.)"

"Do not the facts, thus far developed, as to its progress, favor the idea that the disease was imported into the city of New York by the ship New York, and into New Orleans by the ship Swanton, and by steamboats from the latter place, transported to Cincinnati and the intermediate places along the river? And above all, do they not seem to favor the doctrine of its *communicable* character?"

The editor of the Buffalo Medical Journal, (April, 1849,) says, "The packet ship Liverpool, from Liverpool, with 400 passengers, recently arrived at New York, with cases of cholera on board; forty cases having proved fatal during the passage. The vessel and passengers were placed in quarantine, where they are still detained. No new cases, however, have lately been developed, nor has the disease made its appearance out of the vessel.

"We have no information of the existence of cholera as an epidemic, at the present time, in any part of our country. Isolated cases are reported to occur occasionally at New Orleans, and other south-western towns, showing that there is not entire exemption from the specific cause, and, consequently, from the probability of the reappearance of the disease in an epidemic form."

COMPARATIVE MORTALITY OF THE EPIDEMICS OF 1832 AND 1848.

Dr. Fenner, in a letter to the New Orleans Picayune, (January, 1849,) remarks as follows:

"The mortality from cholera at its late visitation, com-

pares most favorably with that of 1832, when it first scourged our city. The number of deaths by cholera from the 12th of December, 1848, to the 20th of January, 1849, as appears from the reports of the board of health, amounts to near 1400, — 596 of which occurred at the Charity Hospital.

" We learn from an interesting memoir on the cholera of 1832, addressed to the Academy of Medicine of Paris, by Dr. M. Halphen, a French practitioner of this city at that time, that the disease made its appearance about the 25th of October, in the midst of an epidemic of yellow fever; that in a few days it raged severely, and that in the short space of twenty days, it killed about 6000 people. Dr. Halphen says, that the mortality amounted, on some days, to 500 a day. He estimates the full population of the city at that time, at 50,000; and as cholera broke out during the prevalence of yellow fever, before the absent citizens had returned, and before the customary visitors dared to come in, he does not think the population at that time exceeded 35,000; thus showing the frightful loss of about one-sixth of the people in about twenty days.

" When we read over these sad details, we may well congratulate ourselves upon our happy deliverance from the late pestilence. In 1832, *the living could not afford decent burial to the dead.* Dr. Halphen states that on some days upwards of 100 corpses were accumulated at the cemeteries, waiting for interment. Large trenches were dug, into which cart-loads of uncoffined bodies were heaped indiscriminately; and in the dead of night, a great number of bodies, with bricks and stones tied to the feet, were stealthily thrown into the river. The same rate of mortality at the present time, would demand 20,000 victims."

From what can be gathered from foreign journals, it may be said that, *in general*, the present epidemic compares favorably with the former, in intensity, violence and mortality. There are doubtless many exceptions. Scotland, in many parts, has suffered most severely. The editor of this

volume has lately received a letter from Dr. George Robertson, an eminent practitioner in the city of Glasgow, in which Dr. R. says, "Since cholera broke out among us in November last, (the letter bears date March 23, 1849,) we have been worn down with professional toils; that fearful pestilence has, I trust, now been removed from us, — it has carried off from 5000 to 6000 of our population. At this time, unlike the visitation of 1832, no rank, condition or age has been exempt. Indeed, the wealthy and comfortable classes seem to have suffered more than the poor and destitute. In the severe grades or forms of the distemper, medicine appears to exert no beneficial influence over it."

In our own country, thus far, the details show a very great difference between the two epidemics. It remains to be proved, whether in the opening of spring, the disease may not, from some quarter, resume its fearful march.

The duration of the late epidemic in New Orleans, was fourteen days; the greatest number of deaths in twenty-four hours, during that period, was 114, of which number, 92 were from cholera. Dr. Fenner declares the disease "not to have been very malignant" in New Orleans. It raged most severely from the 22d to the 30th of December, having reached its height about the 28th, on which day the deaths by cholera were 92.

From the 16th to the 22d, the weather was oppressively warm, the mercury rising to 84°. From the 22d to the 30th, it was cool, wet, and gloomy; on the morning of the 1st of January, there was a white frost, and from that time the disease declined steadily.

Unlike what has been noticed as occurring at Glasgow, Dr. Fenner states that "the lower classes of the people have suffered most, which may be attributed to ignorance or neglect. I have not a doubt, that seven tenths of the people who have recently perished in this city, (New Orleans) might have been saved, if they had procured proper medical aid at the onset of the disease."

The cholera attacked and carried off a great number in the New Orleans Charity Hospital, who were laboring under chronic diarrhœa.

Since the above was written, we have remarked an extract from "*The Military Medical Gazette*" of Russia, which gives the following statistics of the number of deaths in that empire. Since the appearance of the epidemic, there were seized at St. Petersburg, from the 30th of June to the 21st of July, 19,772 persons, of whom 4834 recovered, and 11,068 died. In the whole of Russia, since the first appearance of the cholera, the 28th of October, 1846, to the 5th of July, 1848, 290,318 persons were seized with the epidemic, and 116,658 died. On the 28th of July, there were, at St. Petersburg, 2,396 cholera cases: in the course of the day, 137 fresh cases occurred; 211 recovered, and 82 died. On the 29th, there were 2240 sick, — 132 new cases; 188 recovered, and 68 died. On the 30th, there remained 2116 cases under treatment.—(*Wilmer & Smith's European Times, quoted in Charleston Medical Journal, September*, 1848.)

We find it stated in another place, that the disease was manifested at Cairo, with peculiar malignity.

In regard to Russia, several statements make the present epidemic far more terrible and fatal than the former. As before, the people imagined themselves to be poisoned.

COURSE OF THE CHOLERA IN 1848.

M. Tardieu remarks, that the epidemic of 1846 – 1848, in Europe and Asia, has been nearly the same as in the former epidemic. M. Müller, (*Reports, supra cit.*) however, declares that considerable difference may be remarked between the present and the former epidemic in Europe.

"In some places, it broke out very suddenly and severely in the greatest cold of winter; and then suddenly appeared to be arrested. In Moscow, on the other hand, it did not

disappear for a whole year, but occasionally lessened, and then again increased. In 1831, the disease progressed regularly, from east to west; but in the late epidemic, it arose suddenly in an opposite direction, and passed northerly, to the Black Sea.

"The wind had, apparently, no influence upon it; on the contrary, many were of opinion that it pursued a directly opposite course.

"The water-courses appeared, as formerly, to be chiefly affected; and there was noticed, as in 1831, a considerable mortality among the fishes. Müller states that the present epidemic is distinguished from the former, — 1. By its sudden spread. 2. By the frequent jumps from place to place, in contrary directions. 3. By its long duration and frequent recurrence in the same place."—(*British and Foreign Med. Chir. Rev.* January, 1849, p. 6.)

In the same review, again, we find exactly the opposite statement made by M. Lasègue, who was sent by the French government to Russia, and followed, step by step, the course of the disease.

"He asserts, that there is very great similarity between the phenomena and progress of the former and of the present epidemic. He also states, that the mortality has been nearly the same. The inhabitants, generally, considered the disease much milder than formerly, probably from not regarding it with so much apprehension; but the official returns differ very little in the two epidemics. The disease always followed frequented routes, and water-courses on which navigation was active, equally in 1847 as in 1830. The governments which were most exempt in 1830 – 1831, were this time also less severely attacked. A table, with dates of the attack of the disease at different places, is appended; the reviewer remarks that too much stress must not be laid upon the curious coincidences observed, and that there are striking exceptions.

"In the further progress of the disease, the coincidences

are likewise remarkable. Cholera appeared at Moscow, in the beginning of October, 1830; at the end of September, 1847. At St. Petersburg, on the 25th of June, 1831; and in the beginning of June, 1848. The first cases occurred in Berlin on the 31st of August, 1831; about the 12th of August, 1848.

"In Great Britain, the coincidence has failed, for cases of cholera have already occurred in all parts of the kingdom, from Edinburgh to Plymouth, within a short space of time." — (*Loc. cit.* pp. 7, 8, 9.)

In the United States, the first manifestation of cholera, in 1832, was in June, the 21st day of the month; — in Quebec, it appeared on the 9th. In 1848, it was first declared at New York, on the 2d of December. There is thus considerable difference between the periods of access of the two epidemics. Peculiar attendant circumstances may make it hardly proper to compare the coincidence or non-coincidence, in the old and new world.

The reviewer, in referring to M. Lasègue's remarks, says "If it be correct that the cholera has thus followed a route so similar to that which it took in 1830 – 1831, and has produced a mortality so nearly the same, it is certainly remarkable that the two epochs should have differed altogether, in their meteorological characters. In 1830 – 1831, the summers were dry and hot; great rains, and great changes of temperature have occurred during the late epidemic." (*Loc. cit.* p. 9.)

We have noticed, above, the difference to be remarked in its course in the United States, and it must be allowed that this fact supports, to a certain extent, the doctrine of "importation" and "portability;" to which allusion will be hereafter made.

The tendency of the present epidemic, to follow great water-courses and thoroughfares, as remarked by our author in regard to it, elsewhere, cannot fail to strike the least attentive observer, — although instances of the capricious-

ness of its progress and mode of propagation are not wanting.

It has been remarked, at Berlin, as elsewhere, that the disease first commences to exhibit itself among boatmen, or persons residing close to the water; its quicker progress along rivers and the coasts of inland seas, or of oceans, is remarked by M. Tardieu and others, — still it has swept over sandy deserts as surely, if not quite as rapidly.

PRECURSORY AND CONCOMITANT PHENOMENA AND DISEASES.

The state of the atmosphere, previous to the outbreak of cholera in New Orleans, deserves attention.

There had been very heavy rains. — The "Annual Report of the Board of Health" thus describes the condition of the earth and air:

"Probably, since the time when the first paving was done in New Orleans, the streets had never been in so bad a condition as at the beginning of the month of December. The continued rain, and the saturated state of the earth, had rendered repairs useless or impracticable; the elements of fermentation and putrefaction accumulated fearfully in every direction, until the atmosphere was polluted with poisonous exhalations, in which a sickly, acid smell, at times, predominated, and which were frequently pressed down in a concentrated state near the surface, by the dismal fogs, which shrouded the river and the city in gloom.

"Under such circumstances, it was apparent to all intelligent persons, that malignant and fatal disease of some kind or another, was inevitable, unless the air should be purified by frosts. Rains, alternating with a damp, sultry atmosphere, however, continued; the highest weekly range of the mercury in the month of December, is set down as 79° by Mr. Lillie, — but there were days when the temperature was higher; 80°, and even 84°, were noted on good authority."

Dr. Crawford states, while observing the epidemic in St.

Petersburg, in 1848, that remarkable variations in the atmosphere were indicated by the barometer, which sometimes rose or fell suddenly, *one and two inches.* The thermometer indicated equally great changes of temperature, from 84° or 90° Faht., there would be a descent of 50° in a few hours. A disturbed state of the electricity of the atmosphere was also noticed. The electric machines, to a great extent, lost their power. Müller gives a similar account. "Throughout the whole duration of the epidemic, the air was oppressive, heavy, and very changeable in temperature; thunder-storms occurred often, but had no influence, either on the number of attacks or recoveries. Rain fell almost daily; the heavens were gloomy, the evenings foggy, and the sun was seldom visible." *Report*, p. 5. "These meteorological conditions and vicissitudes seem to have had but slight influence on the disease. In this attack at St. Petersburg, the cholera seems to have showed itself comparatively independent of temperature, barometrical changes, and electrical viscissitudes. Reagents did not, in the least, indicate the presence of ozone in the atmosphere. A particular influence of the air on animals and vegetables is not yet determined, says Dr. Müller, yet the leaves, this year, withered early, a mortality among the fish was observed, and the swallows altogether left the city." — (*Vide Medico Chirurgical Review*, Jan. 1849, pp. 4, 5.)

"Rheumatic and catarrhal affections were abundant; — so also, were diarrhœa and dysentery — and general disturbance of digestion and assimilation was of frequent occurrence." — (*Report, sup. cit.*)

The antecedent or concomitant prevalence of other epidemics, has often been noticed in connection with that of cholera. The concurrence of yellow fever with cholera, at New Orleans, in 1832, has already been mentioned; — the plague coexisted with cholera, at Constantinople, (M. Tardieu); and influenza has been so frequently noticed by writers, and the public in general, as occurring previously

to, or in connection with, cholera, that it is hardly necessary to do more than mention a fact so well established.

Professor Harrison, of the Medical College of Ohio, alludes to this, in a lecture upon cholera, published in the Western Lancet, February 7, 1849, — and it is well known, that influenza prevailed in 1832, in France, England, and the United States, previous to the invasion of cholera.

Professor Harrison says, "An epidemic catarrh is now prevalent in our community; this wide-spread affection of the pulmonary (naso-pulmonary?) mucous membrane points most emphatically to that atmospheric distemperature which preceded the cholera, in 1832."

We insert, in this place, a remarkable table, taken from the excellent Monograph, by Gérardin and Gaimard, upon cholera, as observed by them in Russia, Austria, and Poland. The table is drawn up from observations in Berlin.

Mortality during the prevalence of Influenza in Berlin.		Mortality during the prevalence of Cholera at its period of greatest intensity.	
Number of deaths from May 15th, to May 28th 1831, -	562	Number of deaths from Sept. 18th, to Oct. 1st, 1831, -	560
Average mortality for two weeks, - - - - - - - -	308	Average mortality for two weeks, - - - - - - - -	308
Extraordinary mortality, -	254	Extraordinary mortality, -	252

Disturbances in the nervous system preceded the outbreak of the epidemic at St. Petersburg; all diseases bore a nervous character; intermittent fevers were frequent, and also neuralgia; and particularly pains in the face and head, and dragging, tearing pains in the extremities.—(*Med. Chir. Rev.* Jan. 1849, p. 14.)

We may be allowed to allude, in this connection, to the analogy existing, in many particulars, between epidemic cholera and some other frightful epidemics.

Dr. Babington, in his preface to "Hecker's Epidemics of the Middle Ages," refers to this fact in speaking of the "Schwarze Tod," or "Black Death," a translation of which was published by him in 1832, — he supposing that an account of that disease would prove interesting at a time

when cholera was vividly remembered. — (*Hecker's Epidemics of the Middle Ages. Preface* vi. xxiii. *Edit. Syden. Soc.*)

The (London) Medical Times has pointed out an analogy between the English sweating sickness and cholera, in the period of return being the same in each, viz. sixteen years as an interspace. The sweating sickness returned five times at such intervals precisely.

It is a fact sufficiently remarkable to be particularly noticed, that Switzerland has remained, hitherto, uninvaded by cholera, which has raged so fearfully all around it. We believe that Greece has likewise been exempt, and, upon this side of the Atlantic, the entire escape of South America has been already noticed.

Note E.

CAUSES.

The etiology of cholera is quite fully examined by M. Tardieu. We may, however, with advantage, adduce some of the peculiar views entertained by different writers in respect to the generating or specific cause of the disease. Most correctly does our author affirm the mysteriousness of its nature, and, like all others, yet with more readiness than has sometimes been manifested, candidly confess the utter ignorance in which we are with respect to the mighty and inappreciable agent of such fearful results.

Telluric Influence. — We follow, as in previous notes, the division and terms employed by the author, not conceiving that the words " telluric influence " convey an "obscure " idea of a writer's intention, when speaking of the action which various states of the earth's surface, or more internal

structure and composition, may exercise upon the development, continuance and severity of any epidemic disease. We do not see, — because it may be difficult to explain such an influence, or even to assert that any exists, — that the use of the term implies a desire " to retreat behind a hard name, rather than acknowledge ignorance," as the author of an elaborate article on the "Contagiousness of Asiatic Cholera," published in the " Boston Medical and Surgical Journal," (December 27th, 1848), asserts. We conceive that many " influences," besides miasmatic exhalations, may be exerted by the earth, at different times, according to the different conditions in which it is at those times ; as of heat and moisture or dryness ; abundance or non-abundance of vegetation ; qualities of the soil, &c. It is certainly possible, and many consider it certain, that such variable conditions of the earth's crust and interior, may, and do, affect widely prevalent diseases, and render any that are decidedly contagious more or less easily communicable.[1] Not to forestall the subject of contagion, or unnecessarily to defend farther the use of an

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[1] Dr. Parkes, speaking of the " diffusion of the choleraic poison," says, " The extraordinary influence which the soil often exerts upon the virus, — an observation made even by Girdlestone, and since his time confirmed amply by the experience of observers, both in Asia and Europe, is one of the points that may be said to be nearly determined. Sometimes the poison seems to adhere to the soil, and to be contained only in the lowest strata of air ; at other times it seems to be possessed of greater volatility, and to pass with rapidity over large tracts of country." — (*Loc. cit.* p. 157.)

" It must not be supposed, however, that in addition to the immense influence of impure and humid air, the poison of cholera is not affected by other circumstances, which require much investigation. Thus there is no doubt that a great influence is exerted upon it by soil; it often adheres to the soil, and refuses to cross roads and narrow rivers ; it has been supposed to avoid volcanic soils more than others ; and it is a remakable fact, that, in 1832, it is said to have made quite the circuit of Auvergne, which is altogether volcanic, but to have never penetrated into it. Sandy soils are also unfavorable to its spread ; and this has been attributed to their absorption of water, and the consequent comparative dryness of the atmosphere." — (*British and For. Medico Chirurgical Review*, July, 1848, p. 75.)

established and widely received term, this may be considered an appropriate place to refer to the opinion expressed by Dr. C. T. Jackson, that in those sections of country in which lime is found, the cholera has invariably exhibited its most deadly activity, and it is in such regions alone that the greatest danger in this country is to be apprehended. Dr. Jackson thinks, per contra, that New England will be not at all, or but slightly attacked, as the disease never has been very destructive in granite regions. In the Tenasserim provinces, where the first epidemic of cholera was observed, "the larger hills, which bound the immense plains, are composed of granite, quartz and gneiss; the smaller ones of limestone and sandstone. About half a mile from the river Salween, is a low range of limestone and red sandstone hills; between this range and the river, stands the cantonment, &c. &c."—(Parkes, *Op. supra cit.* pp. 243, 244.) It would be interesting to know whether granitic or limestone formations prevailed in the above provinces; for, although it is stated that the "larger hills" are composed of "granite, quartz and gneiss," yet, in the aggregate, limestone may prevail, for Dr. Parkes says in another place, "in the rear of the cantonment is an immense plain, stretching for about forty miles, intersected by two or three rivers, and with its surface diversified, here and there, by detached masses of limestone rock, which, covered with trees to the summit, rise isolated and abruptly to the height of from four to eight hundred feet."—(*Loc. cit.*)[1] The saturation of the

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[1] See the article on cholera in the January No. of the *British and Foreign Med. Chir. Rev.* (1849,) where an account is given of the prevalence of the disease in the barrack on the *granite* rock of Bellary, 250 miles from Madras. "The causes of this prevalence are to be found in the fact, that never were men placed under worse hygienic conditions than those living or quartered in the fort. There are no marshes, no rivers, no dense and exuberant vegetation which may afford to cholera a congenial soil."—(*Loc. cit.* p. 26.)

By reference to the "geological map of the United States, Canada, &c."

soil by periodical floods and rains, and its subsequent desiccation, afford, as it seems to us, another source of telluric influence. The debris of the rivers, deposited on the flooded lands, causes the wonderfully rapid and exuberant vegetation noticed in the Tenasserim provinces.

Atmospheric Influences. — Dr. Prout states, that shortly before, and during the prevalence of the malignant cholera in this country (Great Britain), he noticed a small but decided increase in the weight of the atmosphere, as if from the addition of some ponderous gas. (Williams' "*Principles of Medicine*," p. 61, Eng. Edit.) Grisolle says, (*Path. Int.* vol. i. p. 714,) "It is reasonable to suppose the existence of a specific cause diffused in the atmosphere; but we have no actual proof of this being the case."

Dr. C. A. Lee (Copland's *Med. Dict. Art.* "*Pestilence, Choleric*,") remarks: "The disease, as it prevailed in this country, (America,) was essentially *atmospheric;* in other words, it was an epidemic depending, chiefly, on certain unknown atmospheric causes for its extension. Some regard the disease as entirely atmospheric, depending upon changes in the ponderable or imponderable elements of the air, without the addition of some new ingredient." — (*Op. cit.*)

It is certainly more in accordance with facts to consider the air as being only the medium of communication, or the vehicle of the unknown agent or poison which is the specific cause of the disease. Dr. Copland may be considered the leader of that party who attribute but a limited effect to atmospheric vicissitudes, ascribing its transmissibility solely to human intercourse.

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in Mr. Lyell's "*Travels in North America*," (vol. ii.) it will be noticed that "blue limestone" surrounds Cincinnati and Nashville — that there is much limestone in the State of New York, and that St. Louis is marked on the map as situated amid carboniferous limestone. Cholera has of late been manifested at Cincinnati and Nashville, and more extensively at St. Louis. New Orleans is situated in the region of "alluvium and post-pliocene" formation. — [Ed.]

The action of the various winds has been previously referred to. In many places the prevalence of easterly winds has been observed during the epidemic,[1] — the disease passing with the wind, — but it has advanced, steadily, against the wind.

The phenomena and disturbances of the *electricity* of the atmosphere have often been cited, and attempts have been made to refer to these the origin of the disease.

Sir James Murray ascribes great influence to this disturbance in the electricity of the atmosphere, and recommends camphor and vigorous rubbing with warm dry flannel, to restore the natural electricity which may have been conveyed away from the body. He says, "Perhaps I may be excused for mentioning that in the awful break of balance between the atmospheric electricity and terrestrial magnetism, in 1832, I found no remedy equal to an abundant use of camphor, in creating and maintaining healthy voltaic action during the first and second stages of cholera." — *London Lancet*, Oct. 1848.

Dr. Castle, of New York, has an article in the "Boston Medical and Surgical Journal," Nov. 29th, 1848, ascribing the disease to "Electric Influence." He gives a sketch, illustrating the course of the electric currents in a general direction from east to west, in a series of angles. The diagram represents these "tacks" of the fluid from Jessore to New Orleans.

It seems impossible to attribute so decided an influence to disturbance of the atmospheric electricity as is proposed by many. While it might well aid in advancing the disease when existing, can it be, for a moment, set down as its originating cause?

It is well said by a writer in the British and Foreign Medico Chirurgical Review, (vol. ii. pp. 92, 93,) speaking of the nature of the specific cause of cholera: — "But, if peculiar

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[1] See Williams' Principles of Medicine. — (*Loc. cit.* p. 62, note.)

conditions increase the mortality of epidemic diseases, we are still as far as ever from accounting for them. These conditions are not the primary and specific agencies; they are only the accessary causes which give them power." "What then," he continues, "is the nature of the indispensable cause or agent? We think it a fair assumption that there is a specific cause or agent, because all the atmospheric causes that have been assigned may be excluded either in one epidemic or another, and yet the disease remains with unchanged characters. It is not great heat with moisture that causes cholera, because it has prevailed in cold countries in the period of their greatest cold; it is not excessive moisture, because it has prevailed with every degree of this, short of absolute dryness; there is no evidence that it is any electrical condition of the air, for this, at present, cannot be proved to undergo any change during an epidemic. But other and stronger arguments still, support the hypothesis of specific virus." * * *

Mr. Thom says, "By a combination of atmospheric agencies, peculiar to certain seasons in the peninsula of India, the human system is subjected to changes engendering a choleric diathesis, which, by great intensity of the remote causes, may run into the disease in its worst form * * * * The atmospheric causes to which I refer are high temperature, associated with a degree of humidity of the atmosphere approaching to saturation, assisted by a decrease in the pressure of the air, and diminished proportion of oxygen.

"The consequence of this deficient inhalation of oxygen is, that the same quantity as usual of carbonized and azotized matter being introduced into the system, which cannot be eliminated by combining with oxygen, carbon accumulates. The increased action of the liver and skin, however, diminishes this. But the secretion from the skin, which, in hot climates, is vicarious of the urine, is checked by the diminution of the evaporation in the moist atmosphere. This state of things, then, produces the 'choleric diathesis.' The most

intense condition of this state of things merges the choleric diathesis into an actual attack of cholera. This ingenious hypothesis, however, the reviewer is inclined to consider doubtful, and farther on adduces some reasons: '1. Cholera has prevailed in a variety of atmospheric conditions; not merely in those presumed to be capable of retaining carbon in the system. 2. It has often been absent when the presumed atmospheric causes have been present in their greatest intensity. 3. It seldom commences or extends like an atmospheric disease, etc. etc.;' he concludes by declaring his willingness 'to ground the argument for a specific virus on this single plea; that in a certain town, cholera will occupy one section of it, will prevail here, and here only (there?) for months, and will last through several seasons, thereby clearly indicating that its *existence* is independent of general atmospheric causes, although its *diffusion* is influenced by them.'"— (*Loc. cit.* p. 96.)

Moral influences.— We would direct attention to the inadequate degree of power, as it seems to us, allowed by M. Tardieu to the influence of the affections and passions upon the disease. Setting aside the specific cause, can it be doubted that the depressing passions, that fear and an excited imagination, have a great influence in predisposing to, or in preparing individuals or masses of a population for, the attacks of epidemic diseases,— and that those diseases rage far more fearfully under such influences? The author's observation that the proportion of demented persons, to those of sound mind, attacked by cholera, is nearly the same, does not, we conceive, invalidate our position. On board the immigrant ships, where cholera broke out, on their passage to this country, may it not be assumed with reason, that the depressed condition of the spirits, which must necessarily, to a great extent, have prevailed among the immigrants, at any rate aided the action of the grand exciting cause of the disease? Such is the opinion of many who have observed the disease, and it seems as natural as the occurrence of ship

fever, under the debilitating influences of previous famine and misery, added to the crowded state of the packet ships, and the filthy habits that have often been permitted on board, — both which latter items are a disgrace to those who allow such conditions in the transmission of immigrants.

M. Tardieu is not supported by the authors of the *Compendium de Médecine*, (*loc. cit.* p. 271,) in attributing but little influence to great mental emotion, excessive suffering, fear and other influences, which we are accustomed to consider as very powerful agents, affecting either the production or course of widely prevailing disease.

M. Tardieu, in speaking of the influence of age, remarks that all observers have noticed the small number of children, under seven years, attacked by cholera;[1] (p. 108, *Constitutional influences.*) It is worthy of notice that in the prevalence of cholera at New York quarantine station, and on board the packet, a large number under fourteen years of age died of the disease. (See Note D, p. 215.)

MM. De la Berge and Monneret have an elaborate and extended statistical account in regard to the influence of occupation (see *Hygienic Influences*) upon the development and violence of the disease. — (*Compend. de Médecine,* pp. 270, 271.)

We have not space for the statistical details, which are highly interesting and important, and well repay a perusal. The liberal professions, according to these authors, in 1832, at Paris, escaped with less mortality than at times when the epidemic was not prevalent: while, from the calculations made, this class should have lost 2651 persons by the cholera, the actual loss was only 2073. The commercial class of the population suffered, on the contrary, more than when no epidemic prevailed; it should have lost but 1422 by cholera; the actual loss was 1816; — the mortality being

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[1] See also, *Compend. de Médecine,* De la Berge and Monneret. — (*Loc. cit.* p. 269.)

most evident among those most exposed to residence in moist and unhealthy places. The mechanics, again, suffered less in proportion to the ordinary mortality; — expected loss, 7066; actual loss, 6523.

A rapid enumeration of the more powerful predisposing, exciting, and occasional causes may be admitted in this place. The crowded state of a population in unhealthy localities, either in cities or the country, — more particularly the former; ("*encombrement des individus*," — "*entassement*,") insufficient clothing; exposure to the alternate influence of heat, cold and wet; gluttony, and the ingestion of crude and indigestible articles, — such as pork, salted or dried meats; ("*viandes faisandées*" of the French authors; and which have been kept "until they have acquired the taste of venison." — *New Orleans Med. and Surg. Journal*, vol. v. No. 4, p. 497, Note.) So also, we should judge, any meats which have thus been too long kept, and have become tainted, — which often, together with game termed "high," inexplicably form delightful meals and tit-bits for epicurean palates; — sea-fish, green vegetables and unripe fruit, especially melons, cucumbers, etc.[1]; undue quantities of very cold drinks, (Dalmas, *loc. cit.* p. 472); coitus, especially when excessive; and all those influences which cause a great or sudden change in the usual functional routine of the body. All debilitating influences, whether physical or moral; previous ill health or exposure to excess of any kind; and, very particularly, intemperance. M. Bouillaud pointedly refers to this latter cause, when speaking of patients under his care at the Hospital La Pitié. In addition to having been previously ill fed, their often frightful physical condition might be ascribed in many instances to their excess in the use of alcoholic liquors. All pathologists admit this as a powerful cause in the production of choleric disease. MM. Monneret

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[1] See also Scouttetten, "*History of Cholera Morbus*," Doane's Trans. p. 21.

and De la Berge, in their long article upon cholera, quote the following statistics, taken from a "Report of the Temperance Society of New York." "Among 336 victims of cholera, there were 195 drunkards, 131 moderate drinkers, 5 temperate persons, 2 members of the Temperance Society, 1 idiot, and 2 individuals whose habits were unknown." The first patient attacked in New York, in 1832, (26th June,) was "an intemperate Irishman, who had not been out of the city for some weeks, but was attacked after a debauch and falling into the dock;" — a fatal case. — (See Copland's *Med. Dict.* Amer. edit. Dr. Lee. *loc. cit.* p. 127.)[1]

Among the predisposing causes, Grisolle enumerates, particularly, the crowding of individuals together, — and Piorry mentions the vitiated state of unrenewed air in apartments, — ("*non-renouvellement de l' air*"); many writers, also, mention damp dwellings,[2] adult age, female sex, poverty and deprivation, excesses, hard labor, mental trouble. Among the occasional causes, those most frequently remarked are, chilling of the body, any excess, indigestion, and the like. (*Path. Int.* vol. i. pp. 713, 714.)

TRANSMISSIBILITY OF CHOLERA.

The various shades of meaning attached to the terms employed in the discussion of this exceedingly important question, have so confused the subject in its details, and the difficulty of prescribing exact limits to those terms is so great, that we deem it advisable to abandon entirely their use, (except where quotations may introduce them,) and to bring forward the little additional matter that is suggested by

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1 See also "*Treatise on Epidemic Cholera,*" by D. M. Reese, M. D. New York, 1833, p. 59, 60.

2 The entresols or first stories above the rez-de-chaussées or ground-floor apartments, as well as the latter, have always been noticed to furnish the greatest number of fatal cases of cholera. De la Berge and Monneret.— Foy.

a consideration of the *facts* we possess in the history, either of former epidemics, or of the late invasion, — in the form of replies to the following questions.

1. Is cholera capable of being communicated, either by *contact*, or by *inoculation?*

2. Is cholera capable of being communicated by *emanations from the sick?*

3. Is cholera capable of being carried by means of *fomites?*

FIRST QUESTION.

Is cholera capable of being communicated, either by *contact*, or by *inoculation?*

There are no facts to prove an affirmative reply to this question. We have authentic accounts of the hardiest and most courageous experiments, undertaken in order, thoroughly, to test the means of communication above referred to. A few of these trials may be enumerated.

"Dr. Foy, to prove that the cholera is not contagious, breathed, for half a minute, the breath of a person affected with cholera, tasted the liquids vomited, and on the 4th of June, 1831, in the presence of Drs. Jankowsky, Floris, and several other Polish physicians, inoculated himself with the blood of a patient who died forty-eight hours afterwards. Dr. Foy was not in the least indisposed.

"Dr. Scip. Pinel[1] has repeated nearly the same experiments, and with a similar result.

"Dr. Wayrot, who, after arriving at Warsaw, carefully observed the cholera, wished to renew these experiments, taking the strictest precautions, in order to give them, at the same time, an authenticity which could not be impeached.

"He, therefore, after much entreaty, persuaded the president of the committee sent by the French government,

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[1] In the Monograph by M. Foy, the name of M. Veyrat is also found.—[Ed.]

to inoculate him with the blood of a person affected with cholera, in the following manner.

"Saturday, July, 15th 1831, he went with M. Charles Londe, president of the committee, to the hussar barracks, into the apartments of those patients affected with cholera. There, in the presence of the physicians, M. Londe received some blood on a lancet, from the vein of a patient affected with the worst symptoms of cholera, and who had vomited previous to the venesection: he was inoculated in two places; the lancet was not withdrawn until all the blood had entirely disappeared. The incisions were left on him to dry; a light bandage was then put on to protect them from the clothing. This experiment, supported with the utmost tranquillity of mind, was attended with complete success. M. Wayrot only felt a few pains, which immediately left him, and which he attributed to the electric state of the atmosphere.

"If direct experiments had not succeeded, a final objection might be made to the non-contagionists: viz. that the experimenter, necessarily in a focus of infection, would contract the disease in this manner, and not by direct contact. From these facts and reasonings, we are led to conclude, — 1st, that the means of developing and propagating the cholera, reside in the miasmata existing in the atmosphere. 2d. That in order to produce the disease, these miasmata must be accumulated in one place, and thus form a focus of infection. 3. That a man in health never carries with him enough of the miasmata to propagate the cholera."—(Scouttetten. *History of the Cholera Morbus*, translated by Doane, 1832, pp. 47, 48.)

Should not inoculation, in order to be fully tested, be practised out of the immediate atmosphere surrounding the sick? i. e. the person who is to be the subject of the trial being at a distance, and wholly isolated from the neighborhood of the disease, let the blood drawn be then inoculated: the only objection occurring is, that the blood, unlike

the virus of small-pox, or the vaccine matter, might, in transmission, lose the supposed power of communicating the disease: inoculation, to be fully tested, should be practised as is done in the case of vaccinia; and, moreover, should be tried on differently constituted individuals, and those showing various degrees of vital power. Still, were cholera communicable by inoculation, why should not any of the trials have yet resulted in its production? — [Ed.]

It is well known that inoculation of the virus of small-pox was observed to be ineffectual on the west coast of Africa (Copland. Norris. Dr. Dobson, *Philos. Trans.* 1781. *British and For. Med. Rev.* vol. xxiv. p. 318,) during the prevalence of the extremely dry wind, called the harmattan; and Dr. Copland asserts, on the other hand, that the above virus becomes extraordinarily developed, and is extensively diffused and fatal at other times, when the air is moist and hot. This would lead us to suppose that what is commonly understood by contagion is "simply an accidental property impressed upon a poison by conditions which are necessarily variable and uncertain. We may feel justified in doubting how far the division into diseases communicable only by contact, and diseases transmissible without direct contact and inoculation, may not be hereafter proved to be only an expression of greater or less volatility and diffusion."—(*Rev. sup. cit.* pp. 318, 319.)

Dr. Copland says, "We know that the mere contact of persons suffering from scarlet and typhus fever, will not communicate them even to the predisposed:" it requires, he continues, the inhalation of the morbid effluvium given out from the body or bodies of the affected. In like manner, he thinks, is cholera communicated. (*Med. Dict.*) Now, in the case of Dr. Foy, if any effluvium were to be received from the choleraic patient by means of inhalation of his breath, and the consequent close proximity to his person, we may reasonably suppose it would have affected the experi-

menter. We do not understand how Dr. Copland can cite the experiment of Dr. Foy as one where access of the effluvium arising from the sick into the lungs of the experimenter was prevented. (*Vide Med. Dict. loc. cit.*) If the statement above given by Scouttetten[1] be correct, the possibility of the non-reception of such effluvium (supposing it to exist) cannot be allowed. In respect to the inefficacy of inoculation, facts, then, give us abundant proof.

A distinguished reviewer ("*British and Foreign*") says, "It is admitted by all parties that cholera is not communicable by inoculation. The observations on this point are perfectly conclusive, and, indeed, undisputed."

Do not also the instances related of healthy individuals occupying the same bed with cholera patients, and thus in close contact, disprove the idea of communication of the disease under the other condition of the first question? And does not the evidence so largely adduced of the almost exclusive exemption of those who handled the dead, either in their preparation for burial, post-mortem examinations,[2] and sepulture, add immeasurably to this amount of proof?

SECOND QUESTION.

Is cholera capable of being communicated by *emanations from the sick?*

The evidence from facts, which leads to a negative answer to the second question proposed, is, we believe, overwhelming. Not to repeat any thing which, under the former head, ("communication by contact, &c.,") would go to

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[1] M. Foy, in his Monograph on Cholera, alludes generally to the experiments he had tried.

[2] See Dr. Mackintosh's Practice of Physic. "Two hundred and eighty bodies were examined; each examination, on an average, lasted three hours; they were made in a room eight feet square, six or eight persons being present, the operator's hands were irritated, and often punctured; no bad results observed."

strengthen the opinion against the doctrine of the communication of the disease by emanations from the sick, it may merely be remarked, as was previously hinted, that the above mentioned experimenters *were* exposed to emanations of this nature. Next, may be adduced the very striking freedom from attacks exhibited by those in attendance on the sick — physicians, hospital servants, nurses, &c. — all of whom are closely and frequently, some constantly, exposed to contact with, and emanations from, the sick. Dr. Copland, indeed, denies this exemption of the attendants. "He adduces three instances of positive evidence," says the reviewer, to whom we have just referred, which instances are taken from India. "There are a few other instances from the Indian reports which he has not noticed. The negative evidence from India, opposed to this view, is very definite and conclusive."

"In the 'Bombay Report,' 1819, we find thirty-nine letters, of which thirty-seven are from different medical officers. Of these, twenty-three do not allude in any way to the question of contagion, and mention nothing about their hospital attendants; six believe in contagion, but of these, three mention that the assistants and hospital attendants were not attacked: of the other three, who profess their belief in contagion, two cite the same instance of hospital attendants being attacked, and the remaining gentleman does not refer at all to hospital attendants.

"In the 'Madras Report,' published in 1824, there are eight instances where the reporters state that those nearest the sick were attacked, but several of these are very doubtful cases, being imperfectly and loosely reported. The greater number of reporters do not make any statement on one side or the other. Thirteen gentlemen expressly state that their hospital attendants were never attacked. In addition, Mr. Scott, the editor of the Report, brings forward many other cases 'of the most striking immunity from the disease under the most intimate personal intercourse.' Of a list of medi-

cal men, numbering from two hundred and fifty to three hundred, in Bengal, most of whom saw the disease largely, only three persons were attacked, and only one attack proved fatal. In Egypt, Clot Bey states that no hospital attendants were attacked; and Mr. Orton, who held the doctrine of communication by personal intercourse, after examining into the evidence on the point in question, says: 'We are *therefore forced* to the conclusion, however at variance with the common laws of contagion, that in this disease, at least in India, the *most intimate intercourse* with the sick, is not in general productive of the disease.'—(Orton *on Cholera*, 2d edition, p. 326.)

"In Paris, the physicians and surgeons of the Hôtel Dieu, which received a great number of cholera cases, signed a declaration that they had not observed any circumstances authorizing them to suspect contagion. This, of course, implies the immunity of the attendants. To this declaration, are appended the names of Dupuytren, Gendrin, Breschet, Magendie, Petit, Récamier, and others of equal celebrity. We do not see how we can avoid the conclusion, that there is not sufficient evidence to prove that those nearest the sick are more liable to attack, than others not so exposed. The negative evidence preponderates greatly over the positive evidence." — (*British & Foreign Medical Review*, April, 1847, pp. 323, 324.)

In striking opposition to the above evidence, are one or two cases, which may be here adduced. The case of the brig Amelia,[1] wrecked on Folly Island, on the 31st of October, 1832, about twenty miles from Charleston, is well known; some of her passengers had cholera, and from them it is asserted, with undeniable force, the disease was communicated to a boat's crew who visited the island, to one of the three attending physicians, one nurse, some negroes

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[1] *Essays on Pathology and Therapeutics*, by S. H. Dickson, M. D., vol. xi. p. 92.

living on the island, and to some of the guard sent to preserve the quarantine regulations; — this case is one of the strongest on record, to sustain the doctrines of direct communication, and of transmission by emanations from the sick. Perhaps it may be termed the case *par excellence*, for it is quoted by all who favor the above named doctrines; who are inclined to make the most of it, from the fact, doubtless, of its being an isolated case; — the few others that are cited, where direct influence was supposed to be traced to effluvia from the sick, or to actual contact, being of infinitely less value.

We quote the following from Dr. Charles A. Lee, the American editor of Dr. Copland's Medical Dictionary. (*Loc. cit. Art.* "*Pestilence, Choleric.*")

"While in attendance upon the Greenwich cholera hospital, in 1832, a medical gentleman, Dr. C., from Vermont, called on me, and requested the privilege of seeing some of the cases. I accordingly accompanied him through the different apartments, in which there were about seventy patients in all stages of the disease. This occupied about twenty or thirty minutes; and, on reaching the door, after completing a hasty examination of the cases, he suddenly complained of faintness and nausea; in a moment more, I perceived him staggering, and likely to fall. I accordingly supported him in part, while he sunk upon the floor, apparently in a perfect state of asphyxia. By the application of cold water, stimulants, &c., with the aid of a horizontal posture, he soon revived sufficiently to be removed in a carriage to his hotel, where he was immediately seized with cholera in its worst form, and barely escaped with his life. This gentleman had reached town only an hour previous to his call at the hospital, had not been previously exposed to the disease, nor had he any fear of an attack. I regarded it, and still do, as a very striking example of the influence of cholera effluvium, when intense, in affecting the human system, even if not predisposed." — (*Loc. cit.*)

Considerable research does not afford us any more instances of this decisive nature. In regard to the case just cited, even if it be safely affirmed, that the individual was not predisposed to the disease, does it not seem reasonable to suppose that his system possessed an exceeding susceptibility to be impressed by the morbific cause, whatever that cause may be? Add to this, the epidemic constitution then established, which may have had an influence.

Let the facts on both sides be now contrasted, and there seems sufficient evidence to warrant us in giving a negative reply to the second question, — qualifying, however, the negative, by the admission, that there are a few instances of apparent communication under the above conditions, in direct opposition to the overwhelming number that favor the contrary opinion; — which obliges us to say that communication of cholera by emanations from the sick cannot be considered at all established, or likely ever to be proved: The cases tending to support such an idea are exceptional; referable rather to the action of the unknown virus, through the medium of the air, — incited, or powerfully aided, by a predisposition on the part of the individual, and influenced strongly by the pervading epidemic constitution. The cases of seeming communication of this nature are, then, proved the rare exceptions, and by no means the rule. We may, however, in the doubt that must exist, in respect to the question, see a sufficient reason for admitting the "contingent" communication of Dr. Lee,[1] and the "accidental" transmission of M. Tardieu, ("*contagion accidentelle.*")

THIRD QUESTION.

Is cholera capable of being carried by *fomites?*

The recorded facts that we have been enabled to collect, which demand a negative reply to this question, decidedly

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[1] Copland's *Med. Dict.*, Amer. Edit., "*Choleric Pestilence.*"

outnumber those of an opposite nature. Certain evidence from responsible authorities may be adduced.

"I have said nothing of quarantine on goods, because I have never heard or known of any evidence to prove that the disease can be so conveyed. When washerwomen wash with safety the clothes of cholera patients, and servants lie down with impunity in the beds which have just been cleared of the dead bodies, or use the bedclothes of those who have died, we shall scarcely have reason to fear the introduction of the disease into a country, by tallow, hemp, or ox-hides."—(Mr. G. H. Bell, *Cholera Asphyxia.* "Report" Mass. Med. Soc., 1832, p. 89.)

Dr. Foy declares cholera not to have been communicated by the clothing, still warm, of a patient just dead, nor by goods, — and mentions, in this connection, the impunity, before noticed, from inoculation of the blood and of the intestinal matters — inhalation of the choleric patient's breath, etc. etc.—(*Du Cholera Morbus en Pologne*, Paris, 1832, pp. 34, 35.)

In a house in Haddington, Scotland, in 1831, where two persons died of cholera, several others who had been with the sick persons, and "*who were exposed to the same causes in the poisoned locality*,[1] sickened, and one of them died: for three days after the death of the husband, all his bedclothes remained in a heap at the side of the bed, *to which the niece was removed immediately after her uncle's death;* and in the same room, (ten feet square,) a family of eight or ten individuals resided. No others were attacked." — ("*Report*" *Mass. Med. Soc.* p. 109.)

"At the hemp and flax wharves of St. Petersburg, where several thousand tons of these articles arrived during the spring and summer of this year, (1831,) from places in the interior, where cholera existed at the time of their departure for the capital, the persons employed in bracking or sorting,

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[1] The house is stated to have stood "in one of the dirtiest closes in town."

and who generally passed the night among the bales, did not suffer so early in the season, nor so severely, as other classes of the general population." — (*Loc. cit.* 131.)

The only instances we are able to find that offer any marked differences from those above stated, which latter might be multiplied with ease, are the following, and they are, to our apprehension, equivocal : —

" Mary Brown went from the centre of Kirkintilloch, to wash the clothes and house of Mrs. Dunn, who had died of cholera. She remained some time about the premises, returned to her own house, took the cholera and died ; but not one of her neighbors have been affected."

It will be noticed that, although the washerwoman came in contact with fomites, &c., she was also exposed to other causes of the disease, even admitting fomites to be capable of transmitting the virus; she was in a vitiated atmosphere, where the choleraic poison had been singularly virulent and concentrated, for the narrator states that " it was confined to eight houses in the village of Hillhead." " No communication could be traced between many of the patients who died and those previously laboring under the disease."—(*Loc. cit.* p. 103.)

" Mendicants from Edinburgh, visited places in the neighborhood, imbibed the local poison, returned and died, but did not communicate the disease to those around them." (*Idem.*)

Another instance is given, where the son of a deceased cholera patient " carried some articles of furniture from the house where the death occurred, to his own — he sickened and died ; but it is stated that he had been sitting by the patient's bedside, and exposed to the same influences which surrounded her : the wife of this latter patient had the disease, but recovered."— (*Loc. cit.* p. 106.)

A case is related by Dr. Simpson, of Edinburgh, where a father wore his son's clothes, who had died of cholera thirty-four miles from home. The father died of cholera in a few

days afterwards. In this case, the father went to the place where his son died, from a healthy locality; he was therefore exposed to the influence of the causes which were producing cholera in the place where the son's death occurred: the contact with the dead man's clothing cannot safely be affirmed to have been the only influence exerted: others, such as apprehension, or, at any rate, fatigue, grief, and exposure to an atmosphere doubtless impure, &c., may be mentioned.

While negative replies must be given to the above questions, if they are to be decided by a preponderance of facts that is certainly overwhelming, there are many interesting points to be determined in regard to the diffusion of the choleraic poison, which present, perhaps, even more difficulty than those to which we have already referred.

Among these may be mentioned the seeming evidence of the accumulation of the virus in the holds of ships, among the dense crowd of passengers, and its degree of excessive concentration and virulence under such circumstances. Does not cholera present a striking analogy in this respect with typhus and yellow fever as observed on shipboard?

What is more reasonable, moreover, than that a multitude of immigrants landing, even in a healthy port, should, for a time at least, create a cholera atmosphere around them, wherever they may go? this poison, which has accompanied them, will then be communicated or not, as it may find its suitable conditions for diffusion, or otherwise. If the epidemic influence prevail in the place where the immigrants land, if persons who come in contact with them are, from any causes, predisposed to the disease, then is the epidemic likely to commence, and to progress while it finds such conditions.

In this sense, the term "portable," used by Dr. Watson, when speaking of the transmission and propagation of cholera, seems quite appropriate and correct.

The history of the late epidemic in New York, New

Orleans, &c., seems to afford an illustration of these views; and, indeed, it is difficult, if not impossible, to explain the remarkable facts recorded in regard to the probable introduction of the disease, and its sudden cessation at New York, while it extended, and still does extend, from New Orleans in various directions.

And first, the interesting and rather difficult questions naturally arise, in relation to the outbreak of cholera on board the packet ships coming from Europe to the United States, — was the poison communicated to the passengers before leaving the European port? — was it self-generated on board the vessel, or, as a writer has expressed it, (Whiting, *Report*, etc.) was it communicated "from contact with an advanced wing of the grand cholera army?"

If the latter were the medium of communication, how should not the said "advanced wing" have reached the United States as soon (at least) as the vessel whose arrival depended on the same winds that may be supposed to be the vehicle of the choleraic poison? But no choleraic disease was manifested in New York before the arrival of the ship that was smitten by it in mid-ocean; and, moreover, if the "advanced wing" were the source of the disease, how should not its effects have been distinctly and widely perceived on its arrival in this country, which arrival, in some part of the country, we take for granted, supposing it actually to have been on its way through the atmosphere, for, if turned by changing winds from one part of the country, it would, doubtless, have fallen upon another; and, again, the instances are numerous, where, when once in progress, it has advanced, not only against the ordinary currents of air, but against the strength of the monsoon.

In regard to the first question, that of communication previous to sailing, the latter fact cannot be proved, it being very distinctly stated that no cholera existed at Havre, nor the surrounding country, when the ship sailed thence; and the immigrants, among whom the disease was manifested, had been residents there for some time.

The second proposition remains, that of self-generation of the disease on board the vessel, implying its spread, by continual reproduction of the essential virus, and supporting, decidedly, the doctrine of "portability" and communication of the disease; — in what manner, unless by what has been previously termed contingent or accidental communication, it is not easy to explain. Had the choleraic virus *then* existed, diffused in the atmosphere, why should not cholera have prevailed from one end of the city to the other, instead of being restricted to those who landed, and to the comparatively small number exposed to contact with the bodies, or to the influence of any effluvium or inappreciable cause that might be supposed to arise from those attacked?

Dr. Whiting particularly instances "the depressing influence of grief" upon the German immigrants, as an exciting, or rather a predisposing, cause for the manifestation of the disease in them alone, (no other passengers were attacked,) their accommodations, food, and opportunities for getting the air, having been the same as those of their companions.

The short continuance and limited extent of cholera at New York seem to find an explanation either in the dilution and gradual extinction of the virus, in an atmosphere not adapted, by its existing constitution at that time, for the development and extension of the inappreciable agent of the disease, — or in its not finding any more bodies suited to its reception; — in other words, that those who came within the sphere of its influence were able to resist it by reason of sufficient inherent vital power, — and that none but such came within that influence; — the wise sanitary regulations and preventive measures employed, efficiently assisting in the attainment of this result.

In New Orleans, previous to the arrival of the Swanton, many indications were observed which declared a readiness for the reception, and a probable facility for the spread, of an epidemic disease. These indications were alike atmospheric, hygienic, and personal.

There has been much doubt expressed whether the disease manifested at the time alluded to, in New Orleans, has been rightly termed "Asiatic cholera;" — this will again involve the question of importation, already referred to, — and, moreover, the main argument employed by those inclined to dispute the identity of the disease with epidemic cholera, is, that one or two cases had been observed, previously to the Swanton's arrival, by a highly intelligent physician, which would have been termed true cholera had an epidemic been prevailing. From these facts non-importation is argued.

Now the disease, when epidemically manifested in New Orleans, bore all the characteristics of epidemic cholera, and to argue that it was not Asiatic cholera, even if it be proved that it was not imported, is but a dispute upon mere terms; if the disease was identical with what is understood by Asiatic cholera, the adjunct of its derivation, may, for all practical purposes, be dropped.

But is it certain that the disease observed in one or two instances previous to the grand epidemic outbreak, was true epidemic cholera? Without asserting any importation for the subsequent epidemic, we may safely admit a doubt of the character of the cases observed before it. Sporadic cholera, as is well known, may assume an appearance closely allied in individual cases to epidemic cholera. Thus, Dr. Parkes speaks of cases, which he classes under the head of "disorders, either epidemic or sporadic, which have an absolute approach to it (epidemic cholera) in their prominent symptoms. As examples, the pseudo-cholera seen during an epidemic, the sporadic cholera of India, the common autumnal sporadic cholera of Europe, or certain forms of serous diarrhœa, attended with loss of animal heat, etc." — (*Op. cit.* p. 175.)

Some pages subsequently, after detailing the post-mortem appearances of certain cases of doubtful character, the author says, "I think, after reading these cases, every one will be disposed to admit the difficulty, perhaps the impossi-

bility, of drawing any valid mark of distinction between them and the epidemic disease — * * * * * from a consideration of symptoms alone, it is impossible to solve this difficult point. A full knowledge of the changes in the blood, in each of these diseases, can alone afford us a satisfactory solution." — (p. 189.)

It is evident that the existence of such cases at New Orleans, showed a disposition to that class of diseases; and none can assert that the peculiar state of the atmosphere and all the concomitant conditions productive of cases of the above nature, may not evince the presence of the virus, which in due time causes the outbreak of the actual epidemic —which outbreak, if thus explained, would render the arrival of the Swanton with her sick, merely " a coincidence." — Is it not peculiarly remarkable, however, that the epidemic should have delayed its manifestation until the time of that significant arrival? and is not the difference between New York and New Orleans, in regard to the prevalence of the disease, reasonably attributable to the different conditions in which the disease, if brought, found the two cities and their inhabitants?

The progress of the disease, since its manifestation at New Orleans, and all its characteristics, are those of epidemic cholera, so far as we can rely upon the accuracy of the descriptions given, and the faithfulness of the accounts rendered, which are, in those reports and writings we have consulted, beyond a doubt.

HYPOTHESES TO ACCOUNT FOR THE PROPAGATION OF CHOLERA.

The two grand hypotheses of the animalcular and fungous origin, and mode of propagation of cholera, may fitly be spoken of in this place. Mention has previously been made of the electric theory, and many other explanations have already been touched upon, under their appropriate heads.

The theory which attributes the origin and spread of chol-

era to insect life, advocated first by Dr. HOLLAND,[1] reverting to the well known views of Linnæus, has, we believe, found but comparatively few adherents. DALMAS speaks thus in regard to it, in his very complete article upon epidemic cholera, (*Dict. de Médecine*, *sup. cit.* p. 477.)

"This hypothesis belongs, properly, to the pathology of infinitesimal size, ('*des infiniment petits*') and of indivisible atoms. Consequently, Dr. Hahnemann was sure to adopt it. Received favorably by certain northern savants, it has but few observations to support it, and those equally go to establish other modes of explanation; — for example: In certain establishments for the preparation of animal carbon, sulphur, or mercury, on a large scale, cholera has never appeared. The town of Idra, situated in the neighborhood of a mine of quicksilver, has been exempt from the disease; — this is also true of certain persons treated mercurially. These facts are ascribed entirely to the *insecticide* properties of the different emanations from these substances." [It is elsewhere remarked that charcoal manufacturers are exempt from the disease, and carbon has consequently been administered internally, with considerable success. Of one hundred cholera patients, in the algide stage, treated by this alone, in doses of one half, to a whole, drachm every hour, fifty-five recovered. (Dalmas, *loc. cit.*) MM. Gueneau de Mussy and Biett have used this remedy most frequently. — ED.]

"In addition to the above observation, in many places an abundance of yellow dust, of a peculiar odor, has been noticed; insects of a new species have been seen; finally, it is indisputable that the cholera exhibited an eccentricity ('*bizarrerie*') in its ravages, sparing certain places and certain individuals entirely, and attacking others. What is this, ask the supporters of the theory, but the instinct of an organized being, — the proof of the unknown habits of an animalcule?" — (*Loc. cit.* p. 478.)

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[1] See *Pathological Researches*, Henle. *Brit. & For. Med. Review*, April, 1840.

The theory of the cryptogamous origin of cholera has found an able illustrator in Dr. Cowdell, an analysis of whose work is contained in the "British and Foreign Medico-Chirurgical Review," (July, 1848.)

Dr. Cowdell's propositions are the following:—

"1. *The aptitude of fungi for entrance and localization in the human body.* 2. *The known effects of fungi.* 3. *The capability of fungi to produce the phenomena of pestilential cholera.* 4. *The consideration of the circumstances which probably concur to produce from the germs of fungi the effects of pestilential disease.*"

The reviewer remarks, "With all the doubts which every one must feel in these difficult matters, we think the doctrine of the fungous origin of cholera more probable, based on stronger arguments, and on more scientific foundations than the animalcular theory of cholera." — (*Loc. cit.* p. 101.)

We extract the following remarks in regard to the communicable nature of epidemic cholera, from Dr. J. K. Mitchell's late work: [1]

"Contagion might explain the progress of the disease, where there are always materials to form a line of march, but contagion cannot account for its solitary advance over untravelled wastes, or untenanted seas. Contagion cannot explain its presence in the atmosphere of the mid-ocean, nor its manner of assailing a city at once, at its most extreme points. Contagion is at fault, as explanatory of the *exemption of classes*, [this, it will be remembered, is not constant; witness the facts referred to previously, as noted in Glasgow, during the late epidemic. Ed.] the almost exclusive invasion of low, damp, dirty habitations, and the uniform appearance of a general premonitory state, before the irruption of cholera itself. The attacks of cholera, within a few hours after exposure to infection, the introduction into hospitals of large

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[1] "*The Cryptogamous Origin of Malarious and Epidemic Fevers.*" By Professor J. K. Mitchell, of the Jefferson Medical College, Phil. Pa.

numbers of cholera patients, whilst the old inmates enjoyed complete immunity, as at the Odinka, at St. Petersburg, the diseased condition of a single vessel, the Dreadnought, in the Thames, in 1837, the great exemption of physicians and nurses, the attack of the old rather than of the young, or of those at puberty, all militate against the notion of a propagation by contagion. On the other hand, many cases are cited, where the cholera came with bodies of men, caravans, and ships, and seemed to be propagated by personal communication. At one time, it confined itself to one wing of an army; at another, it spread progressively from left to right, along the line of encampment. Sometimes it affected but one out of thirty men, in each of a great number of large tents, and sometimes restricted itself to one or two such tents, which it completely desolated. * * * The animalcular, being an organic theory, would explain well enough the phenomena of progress, were it not for the apparent absurdity of supposing that animalculæ of tropical origin could exist and procreate in a Russian winter. The want of proof that animalculæ are poisonous, or that they fulfil the conditions for such a theory, has been already stated.

"But if we assume for cholera a fungous origin, all difficulties vanish; and, as in the case of yellow fever, an easy explanation may be given of every apparent incongruity. We have only to suppose, what is known to happen in other cases, that the fungi, on which cholera is assumed to depend, acquire, at times, as do the germs of some contagious diseases, an unusual power of reproduction and diffusion, a greater potency of expansion. Such germs may be carried by men, and goods, and ships, or may make a slower progress by their own unaided activity, or be scattered by the winds, to regerminate, wherever special conditions are found.

"Thus can we see, why the poison prefers the route of streams, or infests the damp parts of cities; and why classes living in clean apartments, in dry districts, suffer so little.

[Not constant.] We can see why women escape better than men, [their less degree of exposure to the morbific influences most powerful in the production and spread of epidemic diseases, — as fatigue, atmospheric vicissitudes, and excesses, — should be taken into account. ED.] why both cholera and yellow fever, by the natural tendency of the vegetable cause to the organs of generation, almost always cause miscarriage of pregnant women, and why, when a city or country is unhealthy, the fungiferous causes of death, by over-stimulating the organs of reproduction, usually make a compensation by the births, for the unusual mortality.[1] Can we not thus explain the appearance of contagion,

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[1] We cannot conceive of the possibility of any demonstration of this idea, but it reminds us of a remarkable passage in Hecker's Epidemics :—

"After the cessation of the black plague, a greater fecundity in women, was every where remarkable — a grand phenomenon, which from its occurrence, after every destructive pestilence, proves to conviction, if any occurrence can do so, the prevalence of a higher power, in the direction of general organic life. Marriages were, almost without exception, prolific ; and double and treble births were more frequent than at other times ; under which head, we should remember the strange remark, that after the 'great mortality' the children were said to have got fewer teeth than before ; at which contemporaries were mightily shocked, and even later writers have felt surprise." (*Op. cit.* p. 31) [The author goes on to explain the latter circumstance, which explanation, not being pertinent to the subject under our immediate notice, we do not adduce. Ed.] In this connection, another striking peculiarity of "vital statistics" should be mentioned. "Dr. Emerson, of Philadelphia, while engaged in compiling tables illustrative of the vital statistics of that city, for 1830 – 40, found the excess of male births, which was usually some hundreds, and had been, the year before, 415, sink down to 38 in 1833. Examining the subject more closely, he found that the female births, during April and May (590) exceeded the male (532) by 58, i. e. 10 per cent ; and, as the ordinary male excess had been 7 per cent., this made a diminution of 17 per cent. Now, these two months include the period nine months after the *cholera* had so severely prevailed, viz., August and September, 1832. The amount of conceptions, six months subsequent to its appearance, exhibited a preponderance of females, viz. 1851 to 1826 males. A corroboration of this view is found, Dr. Emerson states, in examining the returns from *Paris*, curiously modified by the fact of illegitimacy. Taking the whole year 1832 through, the *legitimate* male births exceeded the female by 6½ per cent., the *illegitimate*, by only 3½ ;

where there is no contagion, and the absence of contagion, while there is an obvious conveyance of the epidemic poison from place to place?"—(*Loc. cit.* pp. 108 – 110.) "The interruption of progress by a road or wall, justifies this view of the mode of conveyance, and the many facts which show the narrow limits of the poisonous activity, enforce it strongly. The place, the very spot, where the disease is found, must reproduce the cause of it for itself, and, if the conditions of growth are not present, then will the spot be exempt, even if very near to the most poisonous places. Thus may we, and only thus, explain the occurrence of agues, yellow

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but if we compute only the births for December, i. e. nine months after the most fatal ravages of the cholera, we find the exeess of males replaced by that of females.

		Males.	Females.
The births for 1833 were —	Legitimate births,	11,852	11,434
	Illegitimate births,	5,039	5,042
		16,891	16,476
The births for December were —	Legitimate births,	645	679
	Illegitimate births,	200	199
		845	878

"It was among the lower classes, which furnish the greater bulk of illegitimate births, that the disease especially prevailed. Examining the city by *arrondissements*, it is found, that the male legitimate births in 1833, which took place in the parts of Paris nearly exempted from cholera, reached the high preponderance of 7½ to 7¾ per cent., and even the illegitimate ones, 6 per cent. But in those parts where it prevailed most, the excess of male legitimate births sank to 3½ per cent.; while among the illegitimate, it was converted into a female preponderance. * * * *

"Dr. Emerson only adduces this deduction in relation to the influence of the cholera, as illustrative of the general remark, that whatever exerts, directly or indirectly, morally or physically, a depressing effect upon a community, is followed by a conspicuous reduction in the proportion of male births. After the subsidence of an epidemic or pestilence, that has carried off the feebler portion of the population, an *increase* in the amount of males will soon exhibit itself, — the parents being endowed with more than the average amount of vital energies, as seen in their exemption or recovery from disease."—(*Am. Jour. Med. Science*, vol. xvi. pp. 78 – 85,— quoted in *British & Foreign Medico Chirurgical Review*, vol. ii. pp. 560, 561.)

fever, and cholera, on only one side of a house, or one end of a room, or one side of a street, or wall, or road." — (*Loc. cit.* p. 100.) [This cannot be the cause which renders the death of fish so common a phenomenon, just antecedent to epidemics, and, as is often mentioned, to that of cholera. What is then the nature of that cause? and is it not reasonable to suppose it identical with that which subsequently acts upon man? Ed.]

Proofs are still wanting to establish either the animalcular or fungous theory of the origin of cholera; and, although the ingenuity of their construction, and the interest attaching to the subject, would make us eager to accept any additional demonstration, we are not, at present, justified in adopting any of the numerous hypotheses offered; and, in the words of Dalmas, we conclude, — "cosmical and telluric influences, and all causes referable to the external universe, animate or inanimate, being set aside, the cholera remains."

TRANSMISSIBILITY OF CHOLERA. — OPINIONS, ETC.

Dr. Frettenbacher, of Moscow, in an elaborate statistical report of the progress and ravages of cholera throughout the Russian empire, during the last two years, gives the following general conclusions as the result of his observations on the subject of its propagation: —

"1. Intermittent fevers had prevailed throughout the whole extent of the empire, previously to the appearance of the cholera. In 1846, they had assumed in many places an epidemic character. In 1847, when the cholera appeared, these fevers ceased, and they reappeared as the cholera declined.

"2. The cholera was preceded, almost invariably, by disorders of the digestive organs and intestinal canal. These derangements increased with the appearance of cholera, and decreased in severity as it disappeared. They prevailed throughout the whole extent of Russia in Europe, even where cholera was not present.

"3. The cholera followed the course of large rivers and the chief lines of human intercourse. Prevailing winds had no influence on its progress.

"4. When the cholera appeared in places out of its principal route, it was generally found to have manifested itself shortly after the arrival of persons from districts where the disease was prevailing.

"5. In localities where the cholera was thus conveyed by individuals, it did not always spread as an epidemic, but those only who came in contact with the affected had the disease, and if it did spread epidemically under these circumstances, its progress was very slow.

"6. In many places the cholera appeared in an epidemic form, without any communication with infected districts, under the influence of general causes, of which we have as yet no satisfactory explanation.

"7. The cholera propagated itself especially in low situations, in unhealthy and confined dwellings, where the inhabitants were previously debilitated by disease, intemperance, and other depressing causes.

"8. Some localities, which, from accidental circumstances, were carefully isolated, such as large establishments, and even entire villages, completely escaped the visitation.

"The preceding facts prove that this disease, originally epidemic, may become energetically contagious, or, in other words, communicable from man to man." — (*Gazette Médicale*, Jan. 13, 1849, and *Medical Gazette*, Feb. 2d, quoted in *Amer. Journal of Med. Science*, April, 1849, p. 524.)

We have extracted the above conclusions entire, both because the date of the observations upon which they are based is so recent, and also because the conclusions themselves are so positive. Let us contrast them with the following remarks from a long and elaborate article, entitled "The Causes and Diffusion of Cholera," which is contained in the *Medico-Chirurgical Review* for July, 1848. "During the past year the opinions of the medical press on the subject of

the contagion of cholera, have been singularly accordant * * * * * The conclusion arrived at by almost the whole medical press, was, that the doctrine of contagion, in the strict sense of the word, — that doctrine which supposes that there *must be* contact or proximity between man in man, in order that the morbid poison may pass from one to the other, — cannot explain the phenomena of the diffusion of cholera. * * * * It has been shown, — 1. That the vast majority of the most eminent authors disbelieved in the contagion of the disease. 2. That the reputed instances of contagion were often erroneously reported or interpreted, or were very indefinite or doubtful, or were decidedly untrue. 3. That the peculiar mode of spread in a certain direction, and the attack of the disease at one time, or its localization at another, were not explicable on the ordinary doctrines of contagion, that is, on the supposition that the active cause was generated and augmented only during, and by means of, its action on the living animal system. At the same time it seemed to be generally admitted, that it would require further research and deeper observation, before we could venture decidedly to affirm that the poison of cholera *could not* multiply itself during its passage through the body; * * * There can exist no doubt, that even if cholera be contagious, it cannot be localized and restrained by quarantines; theory and experience both demonstrate the inutility of measures of this kind.

"On this point we cannot be too explicit; cholera does not *require* human frames for its transit and its multiplication; it is not bound in by lines, nor circumscribed by empty spaces; wherever it finds its conditions of existence it can spread, although for miles no man is found, whose frame may be the test of its power. This point, we firmly believe, is settled; it requires no qualification; it needs no farther discussion; henceforth it must be a question which it would be a work of supererogation to re-open." — (*Loc. cit.* pp. 65, 66.) The evidence of Dr. Parkes is decidedly against the communica-

bility of cholera; so is that of Mr. Thom, (both referred to by the reviewer); the latter authority states, that "medical officers and attendants did not suffer more than others, although fatigue caused a greater numerical proportion to fall sick with diarrhœa." The reviewer thinks that the "portability" of the poison of cholera cannot be confounded with contagion. He admits the possibility of its transmission, although he declares it "comparatively rare:" — "the two things," he continues, "are quite different; and though it should be hereafter proved that a poison may increase in both ways, they are totally distinct." — (*Vid.* p. 72, *loc. cit.*) "We are also of opinion that the probability of the frequent or constant conveyance by a single person is as yet quite unsupported by evidence. That a person may convey the disease occasionally, we have already admitted, when we allowed that the poison might, in a very small minority of cases, be re-produced by the human system." * * * * (p. 73.)

"The College of Physicians in Moscow, called together by order of his Imperial Majesty, loudly declared it to be their opinion that the cholera could not be communicated from one person to another by goods or merchandise." — (*Report of the Medical Board of Riga, — quoted in Report to Counsellors of the Mass. Med. Soc.* 1832, p. 99.)

"Rags have been imported from Smyrna so often, when the plague has prevailed there, without introducing that disease among us, that we cannot think it probable that they will introduce the cholera." — (*Loc. sup. cit.* p. 127.)

It may be mentioned that the high authority of Dr. Graves is upon the side of those who favor the opinion of the transmissibility of cholera by personal contact, etc.;[1] upon the opposite side, in addition to those already mentioned, are found the names of Dr. Southwood Smith and Professor

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[1] See also the opinions of Dr. Thomas Laycock: "*Lecture on the Prevention of Asiatic Cholera.*" *London Med. Gazette*, October, 1848.

Owen. — (*Vide* "*Report of the Metropolitan Sanitary Commissioners*," London.)

Note F.

TREATMENT.

The great importance of immediate attention to the slightest indications of disturbance of the functions, during the prevalence of cholera, is insisted upon by all writers with evident reason, — and the remark of M. Tardieu, that non-professional persons should be impressed with the necessity of having instant recourse to remedial measures, upon the occurrence of indisposition, must recommend itself at once to every intelligent person.

The powerful influence of judiciously instilled *fear* might be of essential service to those whose ignorance or unrestrained passions deprive them of the advantages to be derived from due care of their health, avoidance of excesses, and early attention to threatening symptoms.

This influence might easily be exerted in such a manner as not to cause a panic, which, instead of proving prophylactic, would become predisposing; a dread of exposing themselves to any influences likely to induce disturbance of the system, would save numbers of this class. Their inclination to moral and physical irregularities would be restrained, and an opportunity afforded to enlighten their ignorance.

A proper supervision of the poor and ill-informed, and information suitably communicated to them at those seasons when an epidemic is expected to prevail, or is already in full action, would also tend to remove another powerful means of increase in the amount of suffering, and in the rate of mortality: viz.: the blind resort to empiricism, with its

grand promises and its sure specifics, which very naturally imposes itself with great facility upon the sort of persons to whom we have referred.

Although it might require much exertion, and often, doubtless, prove a fruitless task, sufficient good might be effected to warrant an extended trial of efforts of this nature. Whatever would diminish, in the least, the suffering and mortality during the invasion of a pestilence, is not to be slighted. Public hygiene and sanitary regulations would find in such measures very efficient assistance.

The chapter on Treatment in the work of Dr. Parkes, from which copious extracts have already been made, is characterized by great good sense and clearness.

The author remarks,—"The great difficulty in the treatment of cholera, and the cause of the contradictory and opposing statements which have been made respecting the value of particular medicines, is to be found in the peculiar action of the choleraic poison. This action, by arresting the circulation, and thereby rendering absorption difficult, opposes itself to the common method of administering remedies. After a certain period of the disease, medicines remain in the stomach, and do not pass into the circulation, or do so with great difficulty and slowness. At least this is to be inferred, both from the circumstance that in the advanced stage, calomel, acetate of lead, creosote, opium, turpentine, etc., have been found in the stomach, hours after they have been taken,—and that fluids taken to appease thirst, remain in and distend the stomach, if they are not vomited,—and also from the evident languor and delay of the circulation,—states which are considered unfavorable for absorption.

"The treatment of algide cholera, therefore, naturally divides itself into two parts, according as it is applied in the earlier period, while circulation still goes on with sufficient vigor to allow of absorption, and according as it is used after this period, when, from the arrest of the circulation, absorption is prevented, and it becomes useless to pour drugs into the

stomach." — (*Op. cit.* pp. 200, 201.) Dr. Parkes then designates two "points of view" that include the aspect of every case of cholera, except the most malignant, when considering the appropriate treatment. They refer, "1st, to the watery exhalation, and 2d, to the deeper changes in the proteine constituents, as opposed to each other. Therefore, in the treatment of most cases of cholera, two indications have been generally followed; and remedies have been given either for the purpose of arresting the watery purging, or of acting directly upon the latent changes in the blood, which constitute the essence of the disease. * * * * It may, I think, be satisfactorily proved, that the arrest of the watery elimination, in the cases of inferior intensity, is attended, on the whole, by positive and undeniable benefit." (p. 201.) Dr. Fenner, of New Orleans, in his remarks on the late epidemic observed there, calls attention to the good results which are always to be expected, (and which, indeed, have often been observed to result) from checking the watery discharges: — the frequent success that has been obtained by thus early combatting the disease need not be mentioned. There can be no doubt, that had such cases been suffered to go on without interference, a fatal termination would in the majority of instances have taken place. It is undeniable, as Dr. Parkes says, "that the arrest of the watery purging is not synonymous with the cure of cholera;" this, daily experience confirms; but "Nature may be assisted," he continues, "in restraining or repairing the primary changes in the blood, by removing those earlier, slighter, and non-essential symptoms, which appear to have so much influence in certain cases, in inducing, or in increasing, the essential and fundamental alterations." — (p. 203.) Dr. Parkes considers "the attempt to cut short the disease," when fully established, "and to rouse the system from a state erroneously compared to debility and to exhaustion, has certainly often accelerated the progress of cholera. It is a most important point, that cholera runs a certain course:

when the algide symptoms have once shown themselves, a case cannot be cut short. * * * The treatment of cholera, therefore, naturally divides itself into two periods, each having a double signification. In the first period, absorption is possible, and serosity is eliminated. In the second period, absorption is, to a greater or less degree, arrested, and there is comparatively little purging. A certain number of cases of the greatest degree of severity will present themselves during this period, and these are the cases which are almost invariably fatal." — (*Loc. cit.* pp. 204, 205.)

PERIOD WHILE ABSORPTION IS POSSIBLE.

"The benefit derived from bloodletting was generally more marked according as the disease was in its earliest stage,[1] and according as it tended towards the several varieties of pseudo-cholera."—(p. 205.)

"Of all the astringents which have been used in cholera, none has appeared to me so efficacious as the one recommended by Dr. Graves, viz., the acetate of lead." Dr. Parkes gave "two or three grains with a quarter of a grain of opium, every half hour, for the first two or three hours, and then every hour for a variable period, according to the intensity of the case. It was often found that the vomiting first ceased and then the purging; the algide symptoms were of course unaltered, but, as already said, no remedy yet known possesses any influence over them, and it is the best way to leave them altogether to themselves, and take the chance of their not advancing to their full extent." — (p. 207.)

"Warm baths, vapor baths, and warmth applied in any way to the surface, never appeared to me to be of the slightest service in true cholera. The spasms were sometimes relieved, but the algide symptoms were almost invariably increased.[2] The depressing effect of the warm bath was sometimes marked and unmistakeable. * * * I cannot

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[1] (Vide Tardieu, p. 131.)

[2] Ibid. p. 139.

find in my notes a single case in which the warm bath appeared beneficial. * * * If warmth is used at all, I think it should be only during the earlier periods of the case, and as recommended by Dr. Copland, it should be in the form of the hot-air bath." — (pp. 209, 210.)

"Cold to the surface was a measure much more grateful to the patients than warmth. * * * The cold affusion, even in the last stage, two or three hours before death, sometimes caused the pulse to become again perceptible. Perhaps the application of cold to the surface may affect the respiration in some way; the gasping inspiration which the shock of the falling water generally induces, may influence the circulation in the lungs, like the first impression of the cold air on the body of the newly-born infant."—(p. 211.) Dr. Parkes, however, notices the rapid disappearance of these reviving effects of the cold affusion, in this stage of the disease.

REMEDIES TAKEN BY THE MOUTH.

"Large doses of calomel, such as fifteen or twenty grains, were given in many cases, certainly without benefit, perhaps even with positive injury. I observed in several cases, that when calomel was given in large doses, or in small doses frequently repeated, at the time when absorption was possible, the algide symptoms seemed to be increased. I do not wish to attach any weight to this observation, — it was perhaps an error: calomel and opium were largely used in England in 1831 – 1832, and were considered beneficial, although certainly the arrest of the vomiting and purging which small doses of calomel and opium occasionally accomplish, may have led to the belief that the disease itself had been checked by the mercury."—(Parkes, pp. 211, 212.) Dr. Whiting of New York, in his "Report," says, "The treatment that has proved of most service, has been calomel in scruple doses, combined with opium and camphor, followed at two or three hours' intervals, by smaller doses of calomel, until reaction is indicated by some action of the liver. This plan,

combined with the faithful application of external heat, &c., I am satisfied has proved of most advantage in the cases that have come under my notice. Every case in which the slightest bilious evacuation was procured,[1] commenced to recover from that moment, and although of itself unable to effect the reaction necessary for its own peculiar action, calomel will doubtless always prove the most potent auxiliary in the catalogue of remedies for cholera." [May not the difference of climate have a certain influence in bringing about so opposite results and opinions? The nearer similarity of the climate of Great Britain to our own, may explain the similarity of the action of calomel and opium in these two countries — Ed.]

"Dr. Jones Lamprey, in an article in the *Medical Times*, (Jan. 6, 1849,) states that the terchloride of carbon was originally used as a remedy in the treatment of cholera, by an English physician practising at Calcutta, and was lately tried at St. Petersburg, by the Russian physicians, on whose recommendation it was introduced into Berlin by Professor Throshell.

"Chloride of carbon, Ch 4, C 4, was originally discovered by Mr. Faraday, in the year 1821, who produced it by bringing olefiant gas in contact with chlorine, and exposing the whole to the influence of light; when chlorine is brought in contact with olefiant gas, which is a compound of four equivalents of carbon, and four of hydrogen, the latter is abstracted and replaced by the same amount of carbon; hence, the different chlorides of carbon, all which, with the exception of the perchloride and the subchloride, are colorless, volatile, ethereal liquids, having a pungent and sweetish taste, when given internally, are found to act instantaneously, as powerful diffusible stimulants to the nervous and

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[1] "M. Cazenave found that the stools of cholera patients treated by carbon, soon manifested bile." [Fauconneau Dufresne on the Bile. *Memoirs of the Royal Academy of Medicine. — British and Foreign Medico-Chirurgical Review*, Jan. 1849.] Has this fact any connection with the alleged great success of the treatment by carbon? Vide p. 254. — Ed.

circulating organs, at the same time allaying pain and spasm, similarly to chloroform; chloride of carbon is also somewhat diaphoretic. * * * * * The medical properties enumerated above, make it highly valuable as a remedy, in the treatment of certain stages of cholera, though comparatively useless when applied without the assistance of other remedial agents; as when cholera patients were brought into the hospital, they were always found in a state of great collapse, * * * the cold affusion, as a powerful stimulus, was found in many cases to have its effect prolonged by terchloride of carbon; unfortunately, this was not the case in all instances. After the vital powers of the patient had been stimulated by the cold affusion, a dose of five drops of the terchloride was given, which had the immediate effect of increasing the stimulus, — giving the pulse greater volume, raising the temperature of the body, and restoring the natural color and elasticity of the integuments. The dose was repeated every hour, and in extreme cases every half hour.

" This treatment was applied to the worst cases, and frequently attended with astonishing success; but unfortunately, though many bad and hopeless cases recovered, it did not prove uniformly successful, (not more than half the number of cases so treated, having recovered,) nor did it prevent the occurrence of the usual fatal complications.

"At first, its action was thought to have been specific, but, like all other remedies, recommended as such for this disease, it was found equally valueless, when applied without the assistance of other remedial agents; it was also found to be quite inert, without the previous application of the cold affusion, — as a case that was treated with warm applications, frictions with warm flannels, extensive application of sinapisms, with other stimuli, and in which the terchloride of carbon was given, in addition to the above, terminated fatally."—(*American Journal of the Medical Sciences*, April, 1849, pp. 522, 523.)

Mr. E. W. Tuson, speaking of the use of terchloride of carbon, says, "That this preparation will produce the utmost benefit, I have no doubt, not only as an internal remedy, but as an external application to the pit of the stomach, in solution with spirit or water. I may also add, for the benefit of the profession, that when this remedy fails to act, a few drops of vegetable acid, administered to the patient, will often produce an immediate result; or it may be combined with a few drops of the solution of the acetate of morphia, with the utmost advantage."

"Several cases of cholera, cured by the use of Fowler's arsenical solution are reported, by Mr. Martin, Mr. Slater, and Dr. Gregory, in the Medico-Chirurgical Transactions of London." — (Wood and Bache, *U. S. Dispensatory.*)

Very different accounts, in regard to the results obtained by the use of chloroform are found in late English journals.

"Dr. James Hill* states that the chloroform, the use of which was first suggested by Mr. Francis Ferguson, the assistant surgeon of the Peckham House Asylum, has been employed in ten cases of malignant cholera, with perfect success, and has likewise received the sanction of Dr. Clutterbuck, the visiting physician, and Mr. Fiddler, the visiting surgeon of the establishment." — (*Dublin Med. Press*, Nov. 8, 1848. — *Amer. Jour. Med. Soc.* Jan. 1849.)

The following, from the London Lancet, Nov. 18, 1848, reported by Messrs. Hill and Ferguson, is quoted in the same review.

"Total number of malignant cases,	42	48
" " Relapses,	6	
Recoveries, 33.	Deaths, 15.	

Treated by chloroform as the sheet-anchor —

Cases,	37	43
Relapses,	6	
Recoveries, 31.	Deaths, 12.	

* See p. 137.

"Two of these, however, were dying before the chloroform was thought of as a remedy.

"The great object is to get the patient under the influence of the chloroform before the collapse is extreme, and the system has been drained by excessive discharges, in which cases the amendment has appeared to be merely temporary."

Dr. Wm. Robertson, (*Monthly Journal*, Dec. 1848,) says, "Truth compels me to state, that, although chloroform has done much for the *comfort* of my cholera patients, it has done nothing for their *cure*."

The efficacy of chloroform in controlling spasm of the muscles in cholera, is of course undoubted; — the only questions that arise are, first, — if used, is it not properly restricted to the stage of the disease prior to that of collapse, before circulation and respiration become so strikingly impeded? — and secondly, in regard to the general safety of its employment. — (See a paper entitled "*Effects of Chloroform as a Narcotic Agent:*" — Dr. J. C. Warren. *Amer. Jour. Med. Scien.*, April, 1849, pp. 400, 401.)

We may venture to conclude this note in the words of Dr. Parkes:

"Although the treatment of the severest forms of cholera has not hitherto been successful, yet, considering the virulent nature of the active cause, I think there is reason for congratulation that the medical art can do so much. It can arrest the disease in its premonitory stage; it can, with tolerable certainty, carry the patient through the consecutive febrile affections. It can successfully treat the milder cases seen towards the end of an epidemic. If, at present, the deep algide stage is beyond its control, there is no reason to dread that such will be always the case. I firmly believe that some great discovery will speedily reward the efforts of the pathologist, and that a more certain knowledge of the morbid changes in the blood, will indicate to us the antidote to this poison, at present so terrible and resistless." — (*Op. cit.* pp. 239, 240.)

Note G.

SANITARY MEASURES.

The subject of sanitary regulations is fully and ably treated by M. Tardieu. We append some excellent remarks from an article in the *Medico-Chirurgical Review*, (vol. i. p. 248); the writer, having spoken of contagion, comes naturally to the influence of quarantines and sanitary measures in general. The observations constitute a review of the work of Dr. Parkes, previously referred to, and of a pamphlet by Dr. Milroy, entitled, "The Cholera not to be arrested by Quarantine: a Brief Historical Sketch of the Great Epidemic of 1817, and its Invasions of Europe in 1831, 1832, and 1847; with Practical Remarks on the Treatment, Preventive, and Curative, of the disease." (London, 1847.)—In quoting the extract entire, the subject of transmissibility is necessarily again referred to.

"A general review of the whole case, then, leads us to this conclusion; that where the epidemic influence is strongly developed, infection is not likely to have any perceptible influence in propagating it; that the general march of the disease cannot be dependent upon human communication, and that quarantine regulations and similar restrictions upon intercourse are therefore utterly incapable of checking its progress; and that *if* human communication be, in any case, the immediate agency in its transmission, it can *only* be so when a strong predisposition has been occasioned by epidemic influence, the development of that epidemic influence being chiefly dependent upon those health-destroying conditions, which it is the object of the sanitary reformer to remove. And thus, to use the emphatic language of Mr. Farr, in the last quarterly report of the Registrar-General,—

quoted by Dr. Milroy as the motto to his pamphlet, — 'Internal sanitary arrangements, and not quarantine or sanitary lines, are the safeguards of nations' against epidemic diseases. 'As surely,' says Dr. Milroy, 'has cholera always sought out and settled down upon the abodes of misery and filth in every city of Europe that has been visited by it, as the vulture-crows in the East ever congregate where the most offal and garbage are to be found.' * * * efficient sanitary measures, therefore, constitute all that can be done with any utility in the way of prevention."

In the second volume of the same Review, the article already cited in a former note,[1] is thus concluded: —

"The true philosophy of the science of medicine is the knowledge of the causes of disease. Or, if these causes be too subtle and refined for our gross senses, it is the knowledge of the several conditions, external or internal to the body, which give those causes power. In the future history of medicine, we shall see men returning to the principles promulgated by its earliest founders. They will perceive that the treatment of the fully formed disease, is, at the same time, the most difficult, and the least useful part of their noble profession. They will learn to arrest the evil at the fountain-head, and not to dam the current swollen by a thousand tributaries. And if the principles which we have analyzed in this article be correct, it will not be the least triumph of this philosophy, that it has indicated the true mode in which the great epidemic of our time can be most easily and most effectually controlled. It bars out the disease, not with quarantines and cordons sanitaires, but with a cleanly people and uncontaminated air. The evil which springs from the bosom of nature, only needs for its removal an observance of the rules which nature herself reveals." — (p. 107, *loc. cit.*)

The following is the report of the Board of Physicians of

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[1] "Causes and Diffusion of Cholera." — See Note E.

Boston, in regard to the sanitary measures to be adopted on the approach of the cholera:

"During the former prevalence of cholera in this country, in 1832, and at the time of its expected arrival in Boston, the opinion of the consulting physicians was required by the city council in regard to the prevention and management of the disease. A report on the subject was at that time presented by this board, and other reports, emanating from different medical bodies in this city, were also furnished to the city authorities. In these several reports, certain cautionary measures, relating both to private life and to public sanitary arrangements, were presented to the city government, and urged upon the citizens generally. These measures for the most part consisted, as far as individuals were concerned, in the observance of cleanliness, regularity of life, and avoidance of excesses, and of other known causes of disease. And in regard to public precautions, measures were recommended for the purification and ventilation of dwellings, the removal of nuisances, the rigid inspection and expurgation of the dwellings of the poor, as well as of cellars, vaults, drains, and other receptacles of impure and noxious substances. These measures were adopted and carried into effect by the city authorities, and, at the same time, provisional hospitals were established for the reception of citizen patients of the poorer class.

"The events which followed, showed as far as we can judge, the wisdom of these precautions. While in each of the larger cities of the Union, some thousands of inhabitants were swept off by the ravages of the cholera, it was found that all the deaths which occurred in Boston from the disease, during its epidemic presence, hardly amounted to eighty in number.

"The undersigned are not aware, that during the years which have elapsed since the former appearance of the epidemic among us, any more effectual means of obstructing its progress have been discovered than those which have now been recounted. The vehicle by which cholera passes from

one city to another, is unknown. And the means of excluding it from any given place are not better understood than those of arresting influenza, or any other extensive epidemic. All that can therefore be expected in the case, is that the population of our city may be placed in such a position as shall, under the blessing of Providence, enable them to meet the invasion of the disease, should it come among them, with the smallest sacrifice of life and of health.

"For the promotion of this desirable object, the undersigned recommend, that all citizens in times of expected cholera, should endeavor, by a strict course of hygienic rules, to keep themselves in the best state of mental and bodily health of which their respective constitutions admit. Persons who are well, should endeavor to keep so, by the use of daily and regular exercise in the open air, not carried to the point of extreme fatigue; by great attention to cleanliness, both of the skin and of clothing; by daily ablutions with water, which should be cold in all persons who possess sufficient vigor to insure a ready reaction; by regular hours of sleep, of meals, and of occupation; by cheerfulness, courage, and useful employment of the mind; by moderation in the quantity, and care as to the quality of the food; by strict temperance in regard to stimulating and intoxicating liquors; and by the avoidance of all excesses, irregularities, and debilitating influences.

"Among the sources of danger, principally to be guarded against, intemperance is, without doubt, the most prominent. The abuse of stimulating liquids predisposes the body to the attacks of this disease, and renders recovery nearly impossible. A drunkard rarely survives the attack of cholera. And even the lesser degrees of indulgence, may be regarded as more unfavorable to escape from the disease, than habits of general abstinence. Nevertheless, it is not recommended that persons accustomed to the moderate use of stimulants should make any sudden or violent change in their mode of living, during the epidemic prevalence of the disease.

"Errors in diet, consisting in the use of unripe fruits, of coarse and indigestible vegetables, of stimulating and high-seasoned animal dishes, and even of common food in excessive quantities, such as over-tax the digestive powers, are things equally to be avoided, as tending to excite the disease.

"Long exposure to a damp atmosphere, confinement in crowded rooms or heated carriages, with subsequent exposure to cold or night air; residence in low and foggy situations, especially in the neighborhood of impure stagnant water; proximity to the mouths of drains, and of mud containing decomposing organic matter; exposure to collections of offal and other nuisances which abound in cities; and, lastly, residence in a district already much infected with cholera, — are circumstances which increase liability to the disease, and should therefore be avoided by those who have the power to govern their own movements.

"In regard to the general sanitary arrangements, which are within the control of the city authorities, the undersigned respectfully recommend, that a course of inspection, purification, and ventilation, in most respects, similar to that pursued in 1832, be carried into effect as promptly as may be practicable, by ward committees appointed for the purpose, or otherwise, as the wisdom of the city council may direct. They advise that the condition of cellars, wells, vaults, and of drains, and their discharging outlets, should be generally examined, especially in the low and crowded parts of the city, and that all sources of nuisance, which may exist, should be speedily corrected or removed.

"It is also recommended, that two or more suitable buildings, in different parts of the city, be forthwith engaged, and provided with proper furniture, nurses and other attendants, together with fuel, litters for the conveyance of the sick, and such other appurtenances as are necessary in these establishments, and may require time for their preparation. And should the disease begin to appear on this side of the Atlantic, those buildings, or a part of them, should be imme-

diately occupied, and provided with medical officers, and other necessary agents, together with such comforts, remedies and appliances as the condition of the sick may require. To these hospitals, patients attacked with the disease should be early removed, provided the city is chargeable with their support, or provided they cannot be comfortably lodged and attended in their own dwellings.

"The Consulting Physicians are of opinion that neither quarantines by sea, nor sanitary cordons by land have been found effectual in protecting cities or countries from the visitation of cholera. Nevertheless, the tranquillity of the public mind, and a respect to the opinions of those who may think differently, may, perhaps, require that vessels arriving from places in which the disease exists should be subject to the visitation of the health officer, and to the removal of any cholera patients, and their effects, either to Deer Island, or to any other similarly insulated place provided for their reception.

"Finally, it is obvious that most benefit is to be expected by all, from a steady and judicious precaution, which shall not be characterized by supineness on the one hand, or by any panic and agitation on the other. Should the disease appear on this continent, it is very probable that it may visit this city in its progress. But we trust that the comparative salubrity of our soil, the comfortable condition and temperate habits of a great majority of our population, and the history of our former experience with cholera, may justify a confident hope that if the disease should again appear in our city, the annual average of mortality may not be greatly increased by its presence.

JOHN C. WARREN,
JACOB BIGELOW,
GEORGE C. SHATTUCK,
GEORGE HAYWARD,
JOHN WARE.

BOSTON, Oct. 31, 1848."

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The subject is a highly important one. The certain means for the relief of the pangs of parturition, is unquestionably to be hailed as a blessing that should not be rejected for any trivial cause or mere hypothesis. But, however desirable may be the means for rendering childbirth painless, the simple fact that such means has been discovered, cannot be received as any valid argument for its employment. The important point to be settled, as Dr. Channing very properly remarks, relates to its safety — can it be employed without injury to the mother and child? The question as to its safety is not alone, however, whether, under its use, labor, in the great majority of cases, will go on, and terminate favorably in respect to both parent and offspring; but whether, under its use, risk of injury will be incurred by the one or the other, in any case. For, inasmuch as a remedy whose only object is to quell

pain, is not absolutely necessary, in natural labor at least, — shall it appear that in any given number of cases, be the number great or small, risk of injury will be incurred from the employment of etherization, — unless such cases can be determined beforehand, we are not warranted in its employment in any. Dr. Channing, by the facts he has collected, has certainly offered a very respectable amount of evidence in favor of the general safety and absence of risk in the employment of the anæsthetic agents to quell the pains of labor. . . . His views are stated fully and freely, and from a sincere belief that they have a legitimate basis in numerous and well-established facts.

FROM THE NEW YORK JOURNAL OF MEDICINE,

March, 1849.

. . . We now take our leave of Dr. Channing, with hearty thanks for the valuable mass of information he has collected. If he has not settled the vexed question, he has undoubtedly given facts enough to justify, and in our opinion to demand from the profession, further trials — a continued use of anæsthetic agents.

That the end proposed to be gained by these means is of great importance, few will deny: few experienced obstetricians will doubt, that, in not a few cases, the pain of labor and that inflicted by obstetric operations, especially turning and removal of adherent placenta, is not only a very great present evil, but that it renders convalescence uncertain and protracted. If, without great danger to life, this pain can be mitigated or controlled, great will be the benefit thereby conferred upon woman. That anæsthetics will do this cannot be positively asserted; but that they may do it, every humane mind must ardently hope and devoutly pray.

FROM THE NEW JERSEY MEDICAL REPORTER,

Jan. 1849. Edited by Joseph Parrish, M. D.

This is a neat volume of four hundred pages. We take pleasure in introducing it to our readers, as it appears to us to contain a candid statement of facts, which have been accumulated by its author from various physicians in Boston and elsewhere. The principal objection urged by those who oppose etherization in childbirth is fairly considered. The *safety* of the practice is established beyond controversy. The special, physical, moral, and intellectual effects are detailed in the report of the several cases; and,

near the close of the work, they are arranged in tabular form with considerable accuracy. The first table contains the returns of five hundred and sixteen cases: all these are classed under the head of natural labor. . . . . .

The application of this remedy of pain to ordinary diseases accompanied by spasm is taken up, and cases given. It has been used even in phthisis, to relieve the distressing dispnœa and anguish of the last stages; in tetanus also, and other spasmodic disorders, in puerperal convulsions, cholera, and typhoid fever accompanied with spasms. These cases are detailed in the Appendix, which constitutes a very valuable portion of the work. The book should be in the hands of all who take an interest in the progress of etherization.

FROM THE PHILADELPHIA MEDICAL EXAMINER,

December, 1848. Edited by R. M. Huston, M.D. and Prof. Jefferson Medical College.

Professor Channing was one of the first, if not the very first, to employ ether for the purpose of relieving the pains of childbirth: it is peculiarly appropriate, therefore, that such a work as the present should come from him, as well as from the city to which we are indebted for our knowledge of the wonderful powers of the agent. His position, and great experience, too, with its use, imposed this obligation upon him; and we are sure, that every member of the profession who has the opportunity of reading the work will unite with us in returning thanks to him for the labor and ability he has bestowed upon it.

FROM THE SUMMARY OF THE TRANSACTIONS OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA,

From September 6, 1848, to January 2, 1849, inclusive.

In America, Dr. Channing, of Boston, has bestowed much labor and care on the investigation of this subject. An octavo volume of four hundred pages, published the latter part of the past year, is the result of his assiduity. This work presents the subject to the profession in a manner calculated to claim attention. The cases referred to by Dr. Channing, in which ether or chloroform were used, amount to five hundred and seventy-four. They occurred in his own practice, and in that of upwards of forty other respectable practitioners, many of them of high standing.

FROM THE BUFFALO MEDICAL JOURNAL,

Jan. 1849. Edited by Austin Flint, M. D.

In examining the work, we find it is chiefly made up of facts, in other words, cases occurring in the practice of the author, and of his numerous friends. This is the kind of book which is wanted; and, having stated this, we have not the vanity to suppose that it would add to our recommendation of the work, if we were prepared to express opinions formed after the careful perusal which we are impatient to bestow upon it. Let the reader obtain the book, study the facts, and draw his own conclusions.

FROM THE BOSTON MEDICAL AN SURGICAL JOURNAL,

November, 1848.

If Dr. Channing were not familiarly known to the whole profession, it might be proper to detail some prominent points in regard to him, in order to give more importance to the volume which prompts to these observations. Nothing of the kind, however, can be necessary to recommend the work, beyond saying that he is and has long been Professor of Midwifery and Medical Jurisprudence in Harvard University. The book, a handsome octavo, containing four hundred pages, is entitled "A Treatise on Etherization in Childbirth, illustrated by five hundred and eighty-one cases." Dr. Channing has done the profession great good in the timely production of this mass of evidence, in proof of the true value of etherization in midwifery, as well as in various phases of human maladies, where it both ameliorates disease and saves life.

FROM THE PHILADELPHIA BULLETIN (MEDICAL.)

We do not see how any medical practitioner, who wishes to keep pace with science, can manage without this treatise. If the author's views are correct, the use of ether is a great public blessing, which ought to be received joyfully by the profession: if, on the contrary, its deductions are wrong, the sooner the empiricism it teaches is exploded, the better. In either event, the work must command attention, and secure for itself a wide sale. It is printed in an extremely elegant manner, and may be had of the Philadelphia agents, Messrs. Lindsay & Blakiston, north-west corner of Fourth and Chesnut.

TREATISE

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gressive improvement of medicine, which impart to it additional attraction, and very much enhance its usefulness.

We have to add, that the translation is faithfully executed. It adheres as closely to the original as the idiom of our language will allow, and evinces throughout the bestowal of much care and attention. The notes which have been introduced by the translators are few in number, but, for the most part, judicious and appropriate, and the mechanical execution of the work bears those marks of neatness and good taste, which we are accustomed to look for in the issues of the Boston press."

FROM THE MEDICO-CHIRURGICAL REVIEW.

The general Pathology of Professor Chomel is, as we need scarcely observe, one that well deserves the attention of the student of Pathology. Its especial excellence consists in the fullness and clearness of its chapters on Semeiology and Diagnosis, and the well known practical skill of its distinguished author in the detection of obscure diseases, gives to these chapters a far higher value than they could have possessed as the productions of a mere theorist, however ingenious.

The translation reads well, and appears to have been carefully executed.

FROM THE BOSTON MEDICAL AND SURGICAL JOURNAL.

We hail with genuine pleasure the appearance, in a beautiful English dress, of this truly classical and admired work of the justly celebrated French teacher. Chomel, is most eminently a practical writer. He deals with facts; and though his arrangements of these is worthy of all praise for its clearness and vigorous exactitude, he avoids systems, and thus it is that the faithful student is enabled to generalize as much from the observations of this great master, as if the facts enumerated passed before his own eyes.

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As a work of reference to the young, and indeed to every practitioner, it has a value that is contained in no other volume in the range of our reading. And we hope those, especially, who need

a rudimental work on the important topics comprehended in this digest, will hasten to provide themselves with a copy. It should have a place in every student's library, however limited.

FROM THE DAILY TRANSCRIPT.

CHOMEL'S ELEMENTS OF GENERAL PATHOLOGY.—A translation of this sterling work, which ranks among the *classics* in medical science, has been made by Dr.'s F. E. Oliver and W. W. Morland, of the Massachusetts Medical Society, and published in a handsome volume by Ticknor & Co. The task of the translators has been executed with great industry, fidelity and ability. Their original notes and comprehensive index add much to the value of the work.

FROM THE BOSTON DAILY ADVERTISER.

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