

fever, measles, etc., it is much most often met with in children; but this is merely from their susceptibility under exposure; as adults also have it.

Belonging with the zymotic diseases, and caused by a specific morbid poison, the spasmodic nature of the cough points to the nervous system as in main part the seat of its action. Yet the expectoration, as well as early (and afterwards occasional) febrile symptoms, show that bronchial inflammation exists secondarily at least. The asserted discovery, by Letzerich,¹ of a fungoid vegetation in the epithelium of the air-tubes, requires confirmation. Similar observations, however, are reported by Buhl, Hüter, Tomasi, Oertel, and Nasiloff. Another view is, that the spasmodic affection may be produced by the pressure of enlarged bronchial glands upon the pneumogastric and recurrent laryngeal nerves.

Treatment.—Mild cases need only care to avoid exposure to damp and cold. After the first few days, if there be no fever nor soreness of the chest, the patient need not be kept in the house in good weather. Indeed, he will cough least when most out of doors. When the cough, at first, is tight and painful, with little expectoration, syrup of ipecac or squills may be given. As soon as the spasmodic character of the cough declares itself with some violence, the "milk," or the tincture, of assafetida may be given, with or without other expectorants, according to the case [F. 153]. Severe cases may be quieted by belladonna or musk; but I have been especially satisfied with the effect of the fluid extract of hyoscyamus, in the dose of from four drops in a child of ten or twelve years of age, down to a fraction of a drop at a time in a young infant [F. 154, 155, 156]. *Atomization* of belladonna has been used with good success by Dr. Haynes.² Coffee, hydrocyanic acid, bromide of ammonium (from two to twelve grains at once for a child), nitric acid, alum, clover-tea, *chestnut-leaf* tea (Unsicker, Davis) or fluid extract, and benzoic acid are among the other remedies often employed to allay the violence of the paroxysms. Application of strong solution of nitrate of silver to the larynx has some advocates. Dr. Gibb's preference is for nitric acid, given internally.

Binz,³ Dawson, and others assert decided advantage from quinine, in considerable doses, during the height of the disease. Hydrate of chloral is said by Drs. Lorey, P. B. Porter, and others, to be of great value in this affection.⁴ Inhalation of the steam of boiling water containing ammonia (f ζ j) of strongest *liq. ammon.* in a gallon of water) is advised after the third week by Dr. J. Grantham (*Brit. Med. Journal*, Sept. 16, 1871).

In protracted cases counter-irritation to the chest and back of the neck may be required. I once met with great relief upon the application of a small blister to the nucha. *Tonics* are also not unfrequently called for toward the end of the attack in a feeble child; especially quinine or tincture of bark (Huxham's), iron, or

¹ Quarterly Journal of Microscopical Science, April, 1871.

² Phila. Med. Times, April 25, 1874.

³ Am. Journal of Obstetrics, May, 1870. See also the same Journal, Feb. 1873.

⁴ New York Med. Journal, Aug. 1873.

cod-liver oil. There is very seldom need to restrict the diet in this disease, unless during the first week.

Dr. W. S. King has reported several cases seeming to show that the air of *gas-works*, freely breathed, is curative of whooping-cough.¹

DIPHTHERIA.

Synonyms.—*Pseudo-membranous Angina; Putrid Sore Throat; Diphtheritis.*

History.—Though the name diphtheria (from *διφθερα*, a skin or membrane) was only given to this disease by Bretonneau of Tours about forty years ago, it appears to have been described by Aretæus of Cappadocia as a disease of Egypt, and was mentioned also by Macrobius and Cælius Aurelianus among early writers. Hecker gives an account of its prevalence in Holland in 1337; Carnevale, at Naples, 1620; Tamayo, at Madrid, called it *garotillo*, in 1622. Ghisi first clearly described the pseudo-membranous formation, at Cremona, 1740. In France Chomel saw it in 1743-9; in England Fothergill, in 1754; Douglas of Boston, in this country, in 1736; and Samuel Bard of New York in 1771. Huxham, Cheyne, Rosen, Albers, and Guersent also described it under different titles. Bretonneau most fully made it out as a distinctive disease, in 1826. Since that time it has been recognized and treated of by nearly all medical authorities.

Late epidemics of it have been principally those of Paris and Boulogne of 1855-7, passing to England in the latter year; and of our own country beginning in California in 1856, and in the Eastern States a little later, gradually increasing in prevalence until 1860. Since that time it has declined in frequency, although still existing, and sometimes attended by great local fatality. Bretonneau, not unreasonably, supposes Washington and the Empress Josephine to have died of diphtheria. Stephanie, the beautiful queen of Portugal, and Valleix, the eminent French physician, were victims of it.

Varieties.—1. Simple; 2. Croupous; 3. Ulcerative; 4. Malignant diphtheria.

Symptoms.—Premonitory, but not distinctive, are general *malaise*, slight sore throat, and swelling of the lymphatic glands behind the jaw. Then, in the **simple** form, fever occurs, with headache, furred tongue, constipation, and difficulty of swallowing. On examination, a swollen and very red or purple appearance of the fauces will be observed, as well as of the palate and tonsils. Over one or both of the latter there may be seen, often as early as the second or third day, a whitish or yellowish-white membranous deposit. All the symptoms continue in this form from five to nine days, when, in favorable cases, convalescence follows.

The **croupous** form has caused the greatest number of deaths, especially in children. This seems especially prone to follow measles or scarlatina. In it, after the same early symptoms as those above described, but sometimes with violence from the beginning, increase of discomfort in the throat is complained of. Then an abundant yellow or brownish leathery exudation is

¹ Phila. Med. and Surg. Reporter, May and June, 1867.

found to cover the tonsils and fauces, which, under the exudation, are much swollen. Often quite early in the attack, the pseudo-membranous inflammation extends to the larynx. This is shown by the usual symptoms of croup; the barking cough and voice, and difficult inspiration, becoming whistling or sibilant when the obstruction to breathing is the greatest. A fatal termination may occur by asphyxia in a very few days. This can only be averted by the detachment and expulsion of the membrane without its re-formation.

The **ulcerative** variety is not common. When destruction of the palate and tonsils has attended it, with copious dark-colored and pulpy exudation, and some extravasation of blood, it has been mistaken for, and described as, gangrene; whence the old name "putrid sore throat." The occasional existence of true gangrene cannot be altogether denied.

Malignant Diphtheria.—At the commencement of this, there is, with intense headache, not unfrequently vomiting, which is uncommon in the milder varieties, and hemorrhage from the nose, mouth, stomach, or rectum. Great dysphagia soon exists, and enormous engorgement of the submaxillary, parotid, and cervical glands. The tonsils, pharynx, and palate are covered thickly with a leathery deposit, at first yellowish, but soon becoming ash-colored, brown, or almost black, and of an offensive odor. The tonsils may suppurate or even slough. The nostrils are also sometimes involved, being swollen, lined with false membrane, and emitting an acrid and fetid discharge. Extreme prostration comes on at a more or less early period; it may be from the first day. The pulse becomes very rapid, the face lividly pale, morbid heat of the skin being followed by clammy coldness. Coma often precedes death. The latter may take place in three, four, or five, occasionally in one or two days; sometimes from the constitutional impression of the disorder before the local affection has been fully developed.

Special Symptoms and Complications.—*Albuminuria* is present in most severe cases of diphtheria, from an early time in the attack. A diphtheritic affection of the *skin* has been now and then observed. A blistered or otherwise abraded surface will usually in the course of the disease be covered by false membrane. *Pneumonia* is an occasional and dangerous complication. *Endocarditis* (Bouchut, Lagrave) is not rare, although its symptoms may be masked and overlooked. *Heart-clot*¹ sometimes makes death certain, in an otherwise doubtful case.

Sequelæ.—These are especially long-continued debility, paralysis of the soft palate, and general paralysis in various degrees. In the last of these, deglutition, articulation, vision, and locomotion may be involved. A fatal result may occur after a few weeks, or recovery after a longer period; sometimes from two to eight months.

Morbid Anatomy.—The pellicle or deposit, formed upon the highly-injected and tumefied mucous membrane of the fauces and throat, constitutes the anatomical peculiarity of the disease.

¹ J. F. Meigs, Am. Journal of Med. Sciences, April, 1864.

Minutely examined, the false membrane is found to vary from $\frac{1}{20}$ th to $\frac{1}{4}$ th of an inch in thickness, and to be fibro-laminated; i. e., of layers of fibrinous network, including epithelial cells, and having on its free surface exudation corpuscles or "pyoid globules," and granules; these forms appearing to be only stages of degeneration. No process of organization or development occurs in the mass; it is aplastic. In some cases only a granular superficial infiltration of mucous membrane is observed, without even distinct fibrillation.

The common deposit of diphtheria differs from the false membrane of simple inflammatory croup, and still more from the "coagulable lymph" of inflamed serous membranes, in being thicker, more tough, yellow, and less capable of anything like organization.¹ (Dr. B. Sanderson asserts that he discovered evidence of development of the exudation in one or two specimens of the simple form of diphtheria.)

Pathology.—Excluding from the title of diphtheria all instances of accidental or merely inflammatory "diphtheritic" or pseudo-membranous formations as they occur, for example, in croup and scarlet fever, we must admit that there is a special zymotic or "enthetic" disease, for which that name is appropriate, and should be reserved. It is a toxæmic or "dyserasial" affection, in which the morbid change in the blood has its main and characteristic local manifestations in the throat.

Causation.—Not doubting the existence of a special material cause, yet unknown except by its effects, we can only say further that the disease is generally epidemic or endemic, with a special tendency to limited localization. It acts with intensity in confined centres; as, a small village, a crowded school, a numerous family; inflicting therein often a terrible loss in proportion to the numbers attacked; a sort of domestic pestilence.

Is diphtheria transmitted by contagion? I incline to believe that it sometimes is so, although clearly not dependent upon that mode of propagation in its epidemic migrations. The certain examples of its extending from one person to another are few; but I think I have known of one at least.

Valleix, the celebrated French physician, is said to have lost his life in this way.

Children are much more liable to diphtheria than adults. Climate and season do not seem to affect its prevalence. Nor does it always (it certainly does sometimes) show any very decided preference for otherwise unhealthy places, where filth or crowd-poison abounds. Even its promotive causation, then, seems to be at present less known than that of most other diseases.²

Diagnosis.—From *scarlatina*, diphtheria is distinguished by the absence of the eruption, and of the peculiar punctated or brick-dust-like flush of the throat, and "strawberry" tongue. That

¹ Bretonneau long since, and Dr. Sanderson a few years ago, imitated the diphtheritic exudation, by injecting oil of cantharides into the throats of animals. The principal difference was in the manifest tendency to organization in the cantharidal pseudo-membrane.

² Sir W. Jenner considers the absorption of septic matter from the throat a cause of increased danger in diphtheria, as well as in scarlatina.

scarlet fever *predisposes* to diphtheria, as a subsequent attack, is a well-established and not unimportant fact.

With *membranous croup*, it is contrasted in the following manner. That disease is a sporadic and sthenic local phlegmasia, whose general symptoms are, as much as in any inflammation, dependent upon the local affection; while diphtheria is a constitutional disorder, usually epidemic, in which the local symptoms are secondary. More directly, in practice, we may mark the commencement of the pseudo-membranous deposit, in diphtheria, about the tonsils and pharynx; in croup, in the trachea or larynx. That of diphtheria rarely extends, in any case, below the larynx; that of croup, not unfrequently even into the bronchial tubes. After the laryngeal complication or extension has occurred in diphtheria, the croupal symptoms are really the same as those of any other laryngeal obstruction, and thus are not different from those of croup. There is no albuminuria in croup, and the sequelæ of paralysis never attends recovery from it.

From *thrush*, and *aphthæ*, diphtheria is known by the deposit being much larger and thicker, never vesicular, and mostly duller in color; and attended generally by more severe constitutional symptoms. Thrush begins in the mouth; it is, moreover, much more uncommon in adults than diphtheria; and is never epidemic.

Prognosis.—*Simple* diphtheria is not very dangerous to life. The croupal form is decidedly so; and the malignant is fatal in a large majority of cases. *Insidiousness* is a trait often belonging to the disease in children; a name which has been applied by some, for that reason, is "creeping croup."

Treatment.—No specific remedy having been discovered for this disease, we must be governed in our tentative treatment of it by our idea of its nature; while concluding upon its therapeutics, finally, through experience. Nothing, it may be confessed, is very satisfactory, as yet, in the management of bad cases of it. All agree that it is not a mere local inflammation, but a systemic affection primarily; and that its type is most generally asthenic. Much depletion is therefore not to be thought of. I would never bleed from the arm in diphtheria. In simple, open cases, I have used leeches to the throat, with seemingly decided advantage, within the first three days. Even their use, however, must be exceptional. Moderate purgation, as with citrate of magnesium, or Rochelle salt, at the very beginning, is suitable in the simple and croupal, though not in the malignant form.

Chlorate of potassium is a favorite medicine with many in this disease. My best results in bad cases have attended its early and free use. An adult may take twenty grains in solution every three hours; I have given five grains every two hours to a child five or six years old [F. 156].

Tincture of chloride of iron is relied upon by some; from ten to twenty drops every three hours for an adult; with or without the chlorate of potassium [F. 157]. Prof. Clar¹ uses sesquichloride of iron in glycerin; giving half-teaspoonful doses of a mixture con-

¹ Practitioner, July 1, 1871.

sisting of twenty drops of "liquor ferri sesquichloridi" in two ounces of pure glycerin. Sulphate of quinine is also given, alone, or at the same time with the above remedies, by a number of practitioners; say, of quinine, for an adult, a grain every two or three hours.

Besides these, or instead of them, for internal use, permanganate of potassium has, after trial (C. Bell), the recommendation of some observers. A drachm of it may be dissolved in a pint and a half of water, a fluidrachm of this being taken every hour. Chlorine water is urged by others. It may be given in teaspoonful or even tablespoonful doses to an adult. Sulphite of sodium, ten grains every two or three hours, is worthy of trial in this, as in other zymotic diseases; and carbolic acid likewise. Trideau recommends highly copaiba and cubeb.¹

Concentrated liquid food must, as a rule, be given throughout an attack of diphtheria; milk, beef-tea, and very often wine whey or brandy or whisky punch; in small quantities at short intervals, according to the degree of prostration present.

Local treatment is, by most physicians, regarded as very important. Experience has shown, I think, that it ought not to be violent. Ice in small pieces melted in the mouth slowly, is probably as useful as any application. Muriatic acid and honey, equal parts, applied freely with a large camel's hair pencil; or diluted with water and used as a gargle, I believe to be serviceable. Creasote dissolved in glycerin [F. 158]; lime-water; chlorinated soda dissolved in twenty parts of water; diluted carbolic acid, and permanganate of potassium (a drachm in a pint), make also appropriate gargles. M. Revillout (Gazette des Hôpitaux, 1874), on the basis of long experience, recommends pure *lemon-juice* for this purpose. Dr. Hotz,² of Chicago, speaks highly of the application to the throat, with a brush, of a solution of a drachm each of carbolic acid and alcohol, with half a drachm of tincture of iodine, and five drachms of water. Dr. J. Lewis Smith³ prefers the following: Acidi carbolici gtt. v; Liq. ferri subsulphat. ʒij; glycerinæ, ʒj. M. This is applied by means of a brush. Dr. H. Reynolds⁴ has used with success equal parts of carbolic acid and glycerin, locally applied. In a young child, ice is often the only local application possible without a struggle so disturbing as to make the benefit of it doubtful. Cold water compresses may be applied outside of the throat in the early stage, while there is excess of heat. Later, flannel wrung out of hot water, to which an equal amount of spirits or vinegar has been added, will give more comfort.

Inhalation of the steam of lime-water is worthy of trial in diphtheria, especially in the croupous variety; or, the *atomization* of lime-water by the *nephogene* or some other apparatus constructed for the purpose.

But I believe the local treatment to be, after all, secondary. And especially is the effort (which I have seen practised) to

¹ Brit. and Foreign Medico-Chirurg. Review, Oct. 1868, p. 417

² New York Med. Record, Aug. 15, 1871.

³ Ibid., April 1, 1874.

⁴ Medical News, December, 1872

remove the patches of exudation by force, as by excision or actual cauterization, to be deprecated, as likely to do harm rather than good.

GLANDERS.

Synonym.—*Equinia*. Though not common in the human subject, it is important to know that this affection can be taken from the horse. It is said to occur either in the *acute* or the *chronic* form; generally the former.

Symptoms and Course.—After an incubation of from two to seven days, with febrile symptoms, the nostrils become inflamed, and at the same time pains in the joints occur, like those of rheumatism. Over parts of the body the skin becomes red in patches, which may grow dark and even gangrenous. Crops of pustules also appear, one after another, on the face and limbs. In the course of a week or so, a muco-purulent discharge comes from the nostrils, which are swollen, ulcerated, or gangrenous. The fauces, pharynx, larynx, even the lung, may become seriously involved. The face and eyes inflame and become oedematous. Throughout, fever of a low form continues, with great thirst, delirium or coma, a fetid odor from the skin, and diarrhoea. Death almost always occurs within three weeks; sometimes one or two weeks later.

Chronic glanders is rare; it is described as milder than the above, and much less fatal.

Treatment.—This must be purely tentative. Most worthy of trial are carbolic acid and the sulphites, as sulphite of sodium. Locally, I would use creasote or carbolic acid dissolved in glycerin—dilute chlorinated soda, and lime-water.

INFLUENZA.

Synonym.—*Epidemic Catarrh*.

History.—Although, among persons exposed to the same weather, catarrhal affections are of course common at certain times, there is evidence that, apart from the conditions of humidity and temperature of the air, *epidemic catarrh* sometimes occurs as a zymotic disease. It is recorded as having been quite fatal in France in 1311 and 1403; in 1570 also it prevailed, and in 1557 spread over Europe and extended to America. It occurred again in 1729, '43, '75, '82, 1833, '37, with notable violence. In the United States, one of the most remarkable epidemics, for extent, was that of 1843. Another was that of 1872, following nearly the course of the *epizootic* amongst horses of the latter part of that year. The local prevalence of influenza may occur at very irregular periods, and sometimes so mildly as not to be distinguished from common sporadic catarrh.

Symptoms and Course.—The ordinary symptoms of "a bad cold" are those of influenza; but the illness of the latter is somewhat more severe, and prostration is generally greater. Of this there are all grades, however. Bronchitis, sometimes capillary, and pneumonia, are not rare complications. Old people are especially apt to be carried off by influenza. Its mortality is very small

among persons in early or middle life. The *duration* of an attack is commonly from three to ten days.

Causation.—The hypothesis has been entertained, in consequence of the irritating effect of ozone upon the air-passages, that an excess of it in the atmosphere may be the cause of influenza. But no facts raise this supposition beyond conjecture.

Treatment.—Mild cases require housing, and little more. A warm mustard foot-bath at night, followed by a large draught of hot lemonade if there be chilliness, or the same taken cold if fever exist—and a dose of solution of citrate of magnesium or Rochelle salt or senna tea in the morning, will generally suffice. Sweet spirit of nitre may be added to the night-draught if the skin be dry and the urine scanty.

Great prostration, especially in old people, may call for support, by quinine and stimulants. Hot whisky punch is, for such a case, not out of place. The *abortion* of an attack of influenza is sometimes practicable within the first two days, by giving quinine, in four-grain doses, thrice daily. Bronchitis or pneumonia, as complications, will require treatment as in other cases.

DENGUE.

Synonym.—*Break-bone Fever*.

History.—Frequently in the Southern United States, occasionally in the Northern (at least Dr. Rush seems to have described it at Philadelphia in 1780), and in the East and West Indies, this disorder has occurred. English writers regard it as a variety of scarlet fever; naming it *Scarlatina rheumatica*.

Symptoms and Course.—Usually after a chill, fever comes on, moderate in degree, but attended by considerable debility, and severe pains in the head, back and joints; the latter being somewhat swollen. In about two days, or less, the fever subsides, and the pains lessen, though they do not disappear. Toward the end of a week from the commencement of the attack, a rash breaks out, resembling that of scarlatina, of duller and more in patches. The fever returns often, about the fourth or fifth day, and lessens or ceases after the eruption has come out. All the symptoms gradually subside, leaving the patient well but very weak, by the beginning or middle of the second week of the attack. This disease, without complication, is never fatal; nor does it leave any sequela except debility.

Its **causation** is not known, beyond what is comprised under the term "epidemic influence." It is noticeable that it affects more persons at one place and time than almost any other epidemic: nearly all the population may have it in one season; all ages and both sexes being alike attacked.

In **treatment**, dengue requires merely good nursing—regulating the bowels, and relieving or mitigating the pains with Dover's powder or other opiates, especially at night; or by the local application of laudanum, etc.

MALARIAL FEVER.

Varieties.—*Intermittent*, *Remittent*, and *Pernicious* Fever. These may all be properly regarded as grades or modifications of the same type of disease; agreeing in the nature of their cause, the periodicity of their symptoms, and their natural convertibility. Each will, however, require a separate description.

INTERMITTENT FEVER.

Synonyms.—*Ague*: *Chills and Fever*.

Varieties.—*Quotidian*, when the paroxysm occurs every day; *tertian*, when it is every other day; *quartan*, on the first and fourth days; also, *quintan*, *sextan*, *septan*, and *octan*. The quotidian and tertian are common; the octan, or weekly return of the attack, is not unfrequently met with; the others are very rare. The time between two paroxysms is called the *intermission* (apyrexia); the period from the beginning of one chill to the beginning of the next is the *interval*. Paroxysms are sometimes *double*: as, double quotidian, with two paroxysms on one day; double tertian, with a paroxysm every day, but those of every other day corresponding in time or character, etc. These also are rare. I have, in a large number of cases of malarial fever, in the suburbs of Philadelphia, never met with a double paroxysm of either type.

Symptoms and Stages.—No disease has ordinarily so regular a succession of definite stages as intermittent fever; viz., the *cold*, the *hot*, and the *sweating* stage.

Cold Stage, or Chill.—Beginning with languor and yawning, a sensation of coldness comes on, often creeping and shivering, with chattering of the teeth and *rigors* or tremulous movements. The skin has a sunken appearance, and the lips and finger-ends may be blue. The *sense* of coldness does not prove a low temperature of the body; which the thermometer sometimes shows to be even hotter than natural. Thirst exists, with loss of appetite; occasionally, vomiting. Headache, depression of spirits, and drowsiness are common. Perspiration is absent, but the urine is abundant and nearly colorless, with a low specific gravity. The duration of a chill varies from ten minutes to two or three hours; averaging not more than three-quarters of an hour.

Hot Stage; pyrexia.—Gradually warmth is felt to return; the shivering ceases; a flush succeeds the pallor or lividness of the face. A real increase of the heat of the surface is found by the thermometer; sometimes reaching 105° to 110°; seldom more than 108°. The mouth becomes dry, the tongue furred; vomiting is common, with total anorexia. Headache is apt to be violent; but delirium is rather exceptional. The pulse is accelerated, and generally strong and full. The bowels are constipated; the skin dry, the urine scanty and high-colored. The hot stage may last from an hour or two to sixteen or eighteen hours.

Sweating Stage.—This also comes on gradually; the face first becoming moist; then the trunk and limbs. This is attended by increased comfort; the headache lessens, the stomach, if disturbed,

becomes quiet, the patient often goes to sleep and sweats profusely all over. After this, the fever disappears; the pulse is slow and soft, the skin cool. The urine now is passed freely, and deposits a brick-dust like (lateritious) sediment. There is no definite length of time to be assigned to the sweating stage.

Of the three stages, now and then one or two may be wanting. There is then only a chill, or a fever, or a sweat, occurring daily, or every other day, at the same hour. Or, a paroxysm of pain may occur in one part of the body with the same regularity. One form of this is called "brow ague." *Dumb ague* is a popular name for an attack in which the chill is absent or obscure, the other symptoms recurring periodically. There seems to be no doubt that a single limb or even a single finger, may go through all the three stages—cold, hot, and sweating; the rest of the body being unaffected. Intermittent *neuralgia* is very common in malarial districts, especially after chills and fever. In the same regions, *all* complaints are apt to take on periodicity; so we may have intermittent dysentery, pneumonia, etc.

The *intermission* is often a time of apparent health, except for some debility, and perhaps headache and want of appetite and of good digestion.

The greater number of paroxysms of intermittent occur in the daytime. An attack which began as a tertian, may become a quotidian; or the converse may happen. Intermittent sometimes passes into remittent fever; though much less often than remittent becomes intermittent.

Sequelæ.—Protracted intermittents are often accompanied or followed by anæmia, of a marked character, and by enlargement of the spleen and liver; especially of the former. Dropsy is a quite frequent result of these visceral affections and of the anæmia.

Morbid Anatomy.—*Melanæmia*, or pigmentary degeneration of the blood-corpuscles, with extravasation and deposit of pigment granules in the liver, spleen, kidneys, brain, etc., is almost a characteristic of malarial disease. Enlargement and softening of the spleen, and engorgement of the liver, with a bronzed appearance of it, are the only other peculiar changes of structure.

Diagnosis.—*One* chill can hardly ever be certainly pronounced to be malarial, because very many acute disorders begin with a cold stage. Two, with a distinct apyrexia, cannot often be confounded with anything else, except hectic fever. In the latter, there is usually a known *cause* for the symptomatic febrile symptoms; the patient is weak and emaciated, the paroxysm is irregular in time and duration, there is a bright roseate flush upon the cheek, and headache is usually absent.

Prognosis.—Left to itself, intermittent will sometimes get well as early as the seventh, eighth, or ninth paroxysm; more often it will last ten weeks; sometimes for as many or more months.

When under treatment, it is almost always possible to *break* the chills by cinchonization; but they frequently return: especially at the end of one, two, or three weeks. It is a good sign for the paroxysm to occur later and later in the day, and to become shorter and shorter. Tertian ague is generally the most readily cured; quartan the most intractable, though comparatively uncom-

mon. Death, in modern times, since the discovery of the properties of Peruvian bark, almost never happens from the ordinary type of intermittent; the *pernicious* form is very dangerous.

Pathological Nature.—As to this, it is possible only to speculate at present. It is most probable that ague is a *toxicemic neurosis*. The importance of the blood change attending it is shown by the (melanæmic) disintegration of the blood-corpuscles (Frerichs, Meigs), and deposit of pigment in various organs.

Causation.—Upon the origin of malarial fevers, the following facts seem to be established:—

1. They are reasonably designated as *autumnal* fevers, because very much the largest number of cases occur in the fall of the year. Spring has the next greatest number of cases.
2. They are always strictly localized in prevalence.
3. They never prevail in the thickly built portions of cities.
4. An average summer heat of at least 60° for two months is necessary to their development. Their violence and mortality are greatest, however, in tropical and sub-tropical climates.¹
5. They prevail least where the surface of the earth is rocky; and most near marshes, shallow lakes, and slow streams. The vicinity of the sea is free from them, unless marshes lie near it.
6. The draining of dams or ponds, and the first culture of new soil, often originates them.
7. Their local presence in the autumn is always checked by a decided frost.

Upon these facts, it was a legitimate hypothesis (urged especially by the late Prof. J. K. Mitchell, of this city), that the material cause of malarial fevers is a minute vegetable organism, whose substance or emanations enter the body. Professor Hannon, of Brussels, relates that he learned in 1843 from Prof. C. Morsen, and verified the statement in his own person, that the exhalations of certain fresh-water algæ would produce ague.

Dr. Salisbury, of Ohio, recorded in the January number of the *American Journal of Medical Sciences* for 1866, some observations and experiments, tending to show that minute cryptogamic plants of the family of Palmellæ, abounding over the surface of marshes, can generate intermittent fever, when transported to localities otherwise free from it. Such results require of course repeated investigation to make them actually matters of demonstration. If confirmed by such means, they will make a very important contribution to etiology.²

Treatment.—One remedy, in this disease, overshadows all others; *cinchonism*. By this we mean, the production of the constitutional impression of the cinchona bark, or of one of its essential constituents. At any stage it appears to be safe, unless it be the very height of the pyrexia. Nor, as a rule, is any special preparation necessary.

It is well, always, during the chill, to promote speedy reaction

¹ Of 1,855,034 deaths from all causes in British India, in 1869, 824,256 (nearly half) resulted from "bilious fever."

² See *Am. Journal of Med. Sciences*, Oct. 1868, p. 333, for an attempted refutation of Dr. Salisbury's theory, by Prof. H. C. Wood, Jr. Its arguments are cogent.

by external warmth, and perhaps by hot drinks, of a not too stimulating character. The bowels ought to be opened well; and the stage of fever may be palliated by the free drinking of cold water, made more diaphoretic by the addition, if necessary, of neutral mixture or effervescing draught. Then, as soon as sweating fairly begins, the quinia, or cinchonia, or bark in substance, may be prescribed.

The sulphate of quinine has the most universal reliance. Some give it in doses of several grains each, twice daily. I think experience warrants me in preferring to give one grain every hour [F. 2, 159]. The amount required in the intermission of ordinary intermittent is about 15 grains. Less may often cure, but can hardly be depended on. The quinine may be given in pill or in solution. I direct that, in tertian ague, the patient begin early on the day of the intermission, and take one grain every hour till he has taken twelve grains. The next day let him begin at the same rate, and, if no chill occur, take ten grains. The third day, nine; and so diminishing daily until six grains are reached. Let this be continued till a week from the last chill, when a greater tendency to return will exist; on that day let ten grains again be given. After that time, if no paroxysm has occurred, he is, for the time at least, well.

Sulphate of cinchonia, in doses one-half greater (gr. jss. instead of one grain) [F. 160, 161] has always succeeded with me, in a considerable number of cases; as it has with others. It generally produces much less ringing in the ears than quinine, and can be taken by some whose heads do not well bear that medicine. Quinidia, quinoidine, and other extractives of bark I have not tried, and would prefer not to trust; though some favorable experience with them is recorded. Dr. Jos. Dougall, of the Madras army,¹ treating 108 cases with the different alkaloids, found their order of efficacy to be as follows: 1. Quinine. 2. Quinidia. 3. Cinchonidia. 4. Cinchonia. Bark in substance, especially Calisaya bark (an ounce in the intermission), is of course perfectly reliable; but it is disagreeable and oppressive to the stomach, and should only be used when its derivatives cannot be obtained.

Other remedies in considerable number, have obtained more or less reputation in the treatment of ague. Opium, given in full dose (say 60 drops of laudanum) shortly before the time of an expected chill, has been found generally to abort it. Lind and others have even given opium at the beginning of the hot stage. This seems contrary to ordinary therapeutic experience in other cases. Arsenic (10 drops of Fowler's solution thrice daily) is considered to approach very nearly in certainty to the preparations from cinchona. Sulphate of copper is asserted by some (in $\frac{1}{4}$ grain doses) to be anti-periodic; and so is nitric acid (10 drops thrice daily, diluted); and common salt (a drachm at a dose, half an ounce during an intermission). Dogwood bark; pepper and its extractive, piperin; willow bark, and salicin obtained from it, have also some reputation of the same kind. Bromide of potassium has been found successful at Guy's Hospital.² Chloroform, taken by

¹ *Edinburgh Med. Journal*, Sept. 1873. ² *British Med. Journal*, June, 1870.

the mouth, has recently been used with success by Dr. Merrill. He gives ℥j at once, at the beginning of the chill. It may be diluted with mucilage.¹ Picric acid and picrates (Ashland) are said to have succeeded when quinine had failed. Carbolic acid has been employed in the Mauritius by Barraut, and by Treulich in Germany. In Manilla, the *dita* bark (*Echises scholaris*) has been found efficacious. Powder of the fire-dried green leaves of *Laurus nobilis* is said, in gramme (15.5 grains) doses, to have cured obstinate cases. Polli, and, later, Ronzani,² found sulphite of magnesium curative, in 30 to 60 grain doses, taken thrice daily. Dr. Chubb,³ of Cambridge, Mass., arrested the paroxysms in twenty-five out of twenty-seven cases, with hyposulphite of sodium. In Australasia the leaves of the *Eucalyptus globulus* are used; as well as *eucalyptol*, a liquid camphor, obtained from that tree. A strong impression of almost any kind upon the system, during the apyrexia, may arrest or prevent the paroxysm. So may act the drawing of a blister upon the spine; or a cold shower bath. I have known one case to be cured by the patient being solemnly assured (without medicine) by a quack that "he would never have another chill."

But the *breaking* or interruption of chills, though generally curative of a first attack, is not nearly always so in a second or third.

Chronic intermittent may maintain a constant tendency to relapse, in spite of cinchonism. In such a case, *anaemia* and the malarial cachexia, are usually present. Here the great remedy is *iron*. This has never disappointed me; that is, I have never failed to cure a case of uncomplicated chronic intermittent, even of several months' duration, by breaking the chills first with quinine, and then causing the patient to persevere for a month or two with iron. I prefer the pill of the carbonate, Vallex's mass; with a grain of quinine in each pill [F. 162].

REMITTENT FEVER.

Synonym.—*Bilious Fever*.

Varieties.—Simple and malignant. The latter, however, will be described under *Pernicious Fever*.

Symptoms and Course.—Although the premonitory stage is usually short, and not unfrequently wanting, its general occurrence is well established. Its symptoms are those of general *malaise*, with some headache, slight nausea, and furred tongue. These increase until a chill, not violent, but lasting sometimes half an hour or an hour, fairly begins the attack. Or, an ill-defined cold stage, with a feeling of chilliness, languor, and debility, and perhaps cerebral oppression and gastric disorder, may occur.

After this, the febrile condition is developed. The skin becomes

¹ Pollacion and others in Spain have found the internal use of chloroform successful in intermittent. Bonafont reports the cure of fifteen cases by *inhalation* of chloroform.—*Dublin Quar. Journal of Med. Sci.* Feb. 1867, p. 167.

² *Annali di Medicina*, November, 1870.

³ *Am. Journ. of Med. Sciences*, April, 1868.

hot, dry, and harsh; the *pulse* rises in force and frequency, although less hard and tense than in some diseases, and not exceeding generally, during the first exacerbation, 110 or 115 beats in the minute. The face is flushed; *headache* is throbbing and severe; the faculties being unfitted for any mental exercise. *Violent pain* is almost always felt in the back, and very often also in the limbs. *Epigastric uneasiness* is nearly universal; nausea and vomiting extremely common. Bilious matter is in many instances ejected from the stomach. The *bowels* are costive; when opened, however, the stools are colored with bile. The *urinary* secretion is scanty. *Thirst* is always great; cold drinks being much preferred. *Respiration* is hurried, although free.

After a continuance of from eight to twenty hours, these symptoms abate more or less, even without treatment. The feelings of the patient are more comfortable; he sleeps, and wakes with a skin less hot, and moist, perhaps even with considerable perspiration. Headache and some pain in the back remain; and the pulse does not subside to the natural standard. In some instances it is little altered. The stomach, however, is less disturbed, and thirst is somewhat less intense.

There is reason to believe that a few cases of genuine malarial remittent may, by prompt treatment during the hot stage, be quelled so as not to advance beyond the first exacerbation and remission. We ascribe their facility in yielding, chiefly, to a less degree of intensity in the morbid cause.

Mostly, in from six to twenty-four hours, the patient's discomfort again increases; the skin becoming even hotter than before, and quite dry; the pulse rises to 120 in the minute; thirst is great, although sometimes less than in the first paroxysm; the headache returns, and with it usually severe pain in the back. The tongue is now thickly furred, often with a yellowish hue. Nausea and disgust for food are again felt, and in a large number of cases vomiting returns; the stomach rejecting everything, even cold water. The stools, when obtained, are sometimes slate-colored; but more often decidedly colored with bile. Diarrhoea is uncommon, and is most apt to accompany a later stage. *Delirium* is common only in violent cases; restlessness is almost universal. *Yellowness* of the skin appears in a majority, in various degrees.

The advance of the disease, after the second paroxysm, is exceedingly various. The periodical character, however, is maintained throughout. The remissions may occur at any hour—in moderate cases being as often in the afternoon as in the morning; in the protracted, more commonly in the morning, the fever lasting through the night. Quite frequently a *double tertian* type is observed; the exacerbation occurring one day in the morning, and the next in the afternoon; and sometimes with different degrees of violence.

Duration.—Favorable cases often terminate in six or seven days in an intermission, which in some becomes a cure even without any antiperiodic treatment. The more violent, especially if ill-managed or in an abnormal constitution, may be protracted for three, four, or occasionally five or six weeks. We should distinguish, however, between the true periodical disease and its *sequela*.