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1885

# ESSENTIALS

OF THE

# PRINCIPLES AND PRACTICE

OF

# MEDICINE.

## A HANDBOOK

## FOR STUDENTS AND PRACTITIONERS.

BY

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FIFTH EDITION, THOROUGHLY REVISED AND IMPROVED.

WITH

One Hundred and Forty-Four Illustrations.

PHILADELPHIA:
HENRY C. LEA'S SON & CO.
1881.

Medical Lib

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# PREFACE

TO THE

FIFTH EDITION.

SINCE the publication of the last edition of this work, in 1874, medical knowledge and thought have received additions such as, fully set forth, might occupy several volumes. If it should seem a hopeless task to present a summary of the most important of these within the compass of a few score of pages, such an endeavor appears, nevertheless, to be called for by the purpose and antecedents of this volume of "Essentials." It has therefore been undertaken; with what approximation to success, my readers must judge. Several hundred brief additions have been made throughout the work; a number of new subjects have been written upon, especially in connection with the pathology of the Nervous System; the illustrations have been considerably added to, and a large number of new and carefully selected formulæ for the administration of medicines have been introduced. An account is given, also, for the first time, of the method of prescribing according to the Metrical system; and a section is added upon Eyesight, its Examination and Correction.

While thus endeavoring to do justice to all real medical improvement and progress, it appears necessary for me still to remain in the minority upon a few subjects of current opinion. Especially, it does not seem to me that the time has arrived for Clinical Medicine to surrender at discretion to Physiological Therapeutics. Whatever of valuable suggestion

or explanation may rightly proceed from the physiological or toxicological laboratory, the true field of decision in Experimental Medicine must, according to my belief, always lie in clinical observation and experience. Some farther remarks upon this topic, which has latterly become one of prominent importance, are ventured upon near the close of the Introduction.

The besetting medical error of almost all periods, the *nimia diligentia*, doing overmuch, was, about the middle of this century, put aside for a time, by an era of scepticism in therapeutics, logically followed by inert expectancy Now we have, under new theories, a revival of heroic medication; with the use of drugs, especially narcotics and stimulants, capable of great usefulness, but also of misuse, as serious as ever befell the lancet, calomel, or antimony in former times. Through all, however, true science must in the end prevail.

References to authors cited in this book have, through accumulation, become somewhat cumbrous. I have, nevertheless, concluded to retain most of them; believing that instruction may be derived from even so partial a record of the recent history of medical observation and opinion.

Although still having to regret many imperfections, I trust that my readers, to some of whom I send greeting as far off as Japan, may find the work, thus revised, more serviceable than hitherto, in facilitating their acquaintance with the most important facts and principles of Practical Medicine.

H. H.

GERMANTOWN, PHILADELPHIA,
August, 1881.

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THE

# PRINCIPLES AND PRACTICE

OF

# MEDICINE.

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## INTRODUCTION.

### *SYSTEMS OF MEDICINE.*

BEFORE Lord Bacon, and before, in fact, all others whose writings have come down to us, Da Vinci, the architect, painter, and engineer, proclaimed, in the first half of the sixteenth century, that in the study of natural truth we must consult *experience*, *experience* rather than reason. "Those," said he, "who in the study of the sciences do not consult nature, but authors, are not the children of nature ; they are only her grandchildren." "Nature begins from the reason and ends in experience, but we must take the reverse course,—begin from the experiment and try to discover the reason." "Theory is the general, but *experiments* are the *soldiers*."

Not that these were the first utterances in all time in favor of the value of observation and experiment in acquiring a knowledge of nature ; but only that now, for the first time, these began to be the *governing ideas* of science and philosophy. Aristotle was a naturalist, although still more emphatically a dialectician ; Leucippus and Democritus founded a school whose dependence was almost exclusively on the evidence of the senses; and even Cicero, who paid little attention to natural science, wrote this wise sentence : "Præstat naturæ voce doceri, quam ingenio suo sapere." But it is especially interesting to us to recall the fact that most clearly, perhaps, of all the ancients, was this reliance upon nature enunciated, and most practically was it exemplified, by Hippocrates of Cos. He asserted again and again in his works that "nothing should be affirmed concerning the nature of man until after having acquired a certainty of it by the aid of the senses." And, although this may seem very obvious indeed to us, yet it is a familiar fact that the great intellects of

antiquity, from the sages of the Vedas and from Pythagoras and Plato downward, had more confidence in the truth-compelling powers of their own reason; and even Hippocrates himself often forgot his own maxims, and became dogmatic beyond his knowledge.

It is not my purpose here to go into any historical discussion of philosophy, which would be inappropriate in this place. Nor will I attempt to crowd into a few pages the history of medicine itself. But it appears to me that I cannot better occupy space, in this introduction, than by endeavoring to place before the mind of the reader such a succinct view of the *most essential* phases and mutations of medical opinion, in times past and present, as will enable us to apprehend all that bears upon the aspects and prospects of the theory and practice of Medicine.

In the midst of the multitude of authors who have written upon medicine, in every age which has possessed a literature, the number of cardinal ideas, of distinctive methods, opinions, or principles, has not been great. Those who may be considered to have been original thinkers or leaders in medical philosophy have been few; or, if we cannot refuse to a larger number the credit of originality, yet that of actual novelty is not often theirs, as they have merely started anew an idea, a principle, a system, or theory, which had long ago its propounders, its advocates, and its opposers, although it may have been again forgotten.

Yet, few as these essential ideas have been, it will be impossible to do more than mention them, as it were, in catalogue at present.

A work, for example, might be, and more than once has been, written upon the doctrines of Hippocrates, and of the writings classed under his name alone. Suffice it for us to recollect that the leading idea of this greatest of physicians was *reliance* upon and *observation* and *imitation* of *nature*. Yet he theorized upon health and disease, upon the four elements and the four humors, and his system has, therefore, been styled *Dogmatic*. To him, also, is traced the principle of medication by contraries; *τα ἐναντία των ἐναντίων ἐστιν ἰήματα*. The greatest value of the Hippocratic writings undoubtedly consists in their numerous and admirable descriptions of the symptoms of disease, and of the relations of symptoms to prognosis. The study of hygienic laws and influences also received from his school much attention.

Contrasted with the Hippocratic reflective or dogmatic method of studying nature, was the more detailed and less systematic plan of the contemporaneous Cnidian school.

Later, with Philinus and Serapion of Alexandria, the distinctly *Empirical* method was promulgated, in which observation, and this alone, especially as to the use of remedies, was urged. No reasoning about *why* or *how*, but only *what*, engaged the minds of these industrious men; whose materials thus accumulated only too fast for their limited powers of classification. Their most elegant writer was Aretæus, who is not always credited to them, but whose descriptions of disease have seldom been equalled, even down to our own day.

It is less easy to characterize, in a few words, the school curi-

ously called *Methodist*, which originated with the opinions of Cleophantus of Alexandria, and of Asclepiades the Bithynian, the friend of Cicero, and was established by Themison, their disciple, at Rome. Dismissing the expectant study of the course of diseases inculcated by Hippocrates, which they laughed at as a "meditation upon death," and denying his theory of "coction" and "crisis," they dogmatized in a different way upon the changes occurring under disease in the condition of the solid structures of the body, and in the movement of its atomic components. Making but two essentially different pathological states, the "laxum" and the "strictum," they simplified the theory of medicine very much. Chiefly, however, was Asclepiades distinguished for the moderation of his practice; rejecting complex, violent, and perturbatory remedies, and aiming, as he said, to cure "tuto, cito, et jucunde." A somewhat complicated course of alterative treatment is, however, ascribed to his successors by Cœlius Aurelianus, under the name of the "metasyncritic circle."

The most judicious as well as one of the most learned of physicians was Aulus Cornelius Celsus. He selected from the opinions and practice of his predecessors and contemporaries those of the greatest soundness; so that, not having propounded any exclusive dogma, nor yet being limited by the narrow results of observation alone, he may be justly styled *eclectic;* or, as that term has been made odious of late by the usurpation of a set of pretenders, *episynthetic*, or *comprehensive*, might be a preferable title.

Galen, less carefully selective, although undoubtedly an admirable man, excellent practitioner, and learned writer, renewed and added further strength to the hypothetical as well as the practical views of Hippocrates.

From this time but little of original force appeared in medical literature until after the period of several centuries of mediæval darkness had been broken in upon by the revival of learning and intellectual activity, in the fifteenth and sixteenth centuries.

In this revival it was natural that much recourse should be, at first, had to the treasures of the ancients. Plato and Aristotle divided the newly-revisited realm of philosophy, while Galen, as the exponent of Hippocratic doctrine, almost monopolized that of medicine, until Da Vinci, Telesius, Cæsalpinus, Campanella, and Bacon established the *inductive* method of observation and experiment, most obviously necessary for advancement in the physical sciences, of which medicine is one,—one, too, which, as Lord Bacon expressed it, had been previously "more labored than advanced."

*Chemistry*, which had already received much attention from the Arabians, and which, under the fascination of alchemy, had reached valuable discoveries—which, in fact, in the hands of Albertus Magnus, Roger Bacon, Basil Valentin, Isaac Hollandus, and others, had performed wonders, and, in the trumpetings of Paracelsus, had made still more extraordinary pretensions—chemistry was now ripening into a great science. In the seven-

teenth century its influence upon physiological and pathological theory much increased, and the practice of medicine could not fail to be consequently affected. By Sylvius, of Amsterdam and Leyden, and by Thomas Willis especially, a school of *Chemiater*, iatro-chemists, or chemical physicians, was instituted.

Following the discovery by Harvey of the circulation of the blood, in the investigations of Sanctorius and Borelli, of Pisa, *mechanics* likewise found a place in the study of the functions of the body, in health and disease. An *Iatro-mechanical* school may be thus said to have existed, to which the distinguished Sénac, physician to Louis XIV., among others, contributed, in a work of great ability.

Boerhaave, professor at Leyden, endeavored to combine these, the chemical and mechanical modes of studying the body and its disorders, into an ingenious but complex eclectic system of his own; which his influence, as a man of genius, and one of the first of modern clinical lecturers, enabled him to extend far and wide. It was rather a dogmatical than an empirical eclecticism.

The latter was admirably exemplified in the writings of Sydenham, who has been well called the modern Hippocrates. Certainly there was a great resemblance between the methods of the Greek and English fathers of medicine.

At the beginning of the seventeenth century there grew up, in the University of Halle, two opposing theories: the *Animism*, or psycho-vitalism of Stahl, and the *Solidism* and neuro-pathology of Hoffmann. Stahl's doctrine was, in brief, that the *soul* of man governs health and disease. An expectant or do-nothing practice naturally followed from such a view. Hoffmann taught a less simple scheme; but that part of it which seemed to the renowned and learned Cullen, the nosologist of Edinburgh, to be the most worthy of his adoption, was his appreciation of the importance of the *nervous system* in the production of the phenomena of disease.

But the most brilliant of the meteors that have crossed the horizon of medical science, not disappearing, indeed, any of them, without leaving some solid precipitate of knowledge, was the *Sthenic* system of John Brown, of Edinburgh, the pupil, friend, rival, and enemy of Cullen.

All life, according to this bold and able, although too reckless dogmatist, depends upon *stimulation;* all disease upon too much or too little excitement, causing direct or indirect debility. Ninety-seven cases of sickness out of a hundred, in his therapeutics, require stimulation for their relief or cure. Wonderfully simple this! Haller's doctrine of the irritability of organic tissues was, very possibly, its source; but so nearly akin was it to the great idea of *vitalism*, dimly seen by Pythagoras, announced by Hippocrates, but lost for ages until revived and distorted by Van Helmont and Stahl, and afterwards rendered more positive by J. Hunter and Bichat—so near was it to this imperishable idea, that Brown's theory, thus supported at once by ancient philosophy and modern discovery, had an unprecedented influence upon medicine. All theories, and theorists, during and since his time, unless we except the discreet vitalism

of Barthez, of Montpellier, have reflected or refracted, with various modifications, the Brunonian ray.

What have we had since, in fact? Rasori, in Italy, adopted Brown's physiological basis, but considered that excitability and excitement were *multiple*, and *unequally distributed*, in disordered states, in different organs; and, moreover, that *over*-excitement was much more frequent, and demanded more attention in practice than Brown had supposed. Hence arose his sedative or "contro-stimulant" method, by large bleeding and tartar emetic; so famous once, especially in the treatment of inflammatory affections of the chest.

Broussais, in France, proceeding upon the same original basis, saw in *local irritation* and *inflammation*, mostly of the alimentary canal, the seat and centre, the *fons et origo* of the dynamic or excitational error which caused all diseases. His practice varied from both Brown and Rasori; his whole object being to calm and allay the central irritation by diluents, demulcents, local depletion, and counter irritation, avoiding all heroic treatment.

In this country, which can hardly be said to have had a system before Rush, that noble and independent mind was also influenced by the Brunonian radiation; although a still different view of pathology and therapeutics resulted from his reflections and observations. The "unity of disease" was, with him, a favorite idea. Although his strong good sense did not allow this to exclude from his appreciation remedies and modes of treatment not easily reconciled with such a scheme, Rush evidently leaned much toward the opinion that all acute diseases were but different "states of fever;" for the mitigation of most of which the lancet was the potent and indispensable remedy. In this he resembled Rasori rather than Brown or Broussais. Even earlier than the universal dissemination of the teachings of the latter, the distinguished successor of Rush, Dr. Nathaniel Chapman, of Philadelphia, claimed and afforded evidence that he had first taught the theory of the local origin of fever, in irritation of the alimentary canal; but he did not allow it to modify his practice in the same manner as Broussais. A part of the practice of Brown has, under the teachings of the late Dr. Todd, of London, constituted a medical "fashion" of the day, as an almost undiscriminating alcoholic *stimulism*.

Now, let us look back. Who have been the *ἰατρό-προφῆται*, the great leaders in medical speculation, the reformers and deformers of medical practice? The list is not a long one, although its scope of time reaches over two thousand years. Let me hazard their enumeration. Hippocrates, Serapion, Asclepiades, Celsus, Sylvius, Harvey, Borelli, Sydenham, Boerhaave, Stahl, Hoffmann, Haller, Cullen, Avenbrugger, Brown, Jenner, Hunter, Bell, Bichat, Barthez, Pinel, Rasori, Rush, Laennec, Broussais, Louis, Liebig, Virchow, Brown-Séquard.

And what have been their essential *ideas*, stripped of all their complexities and environments? *Naturalism*, *empiricism*, *eclecticism*, *humoralism*, *solidism*, *chemicism*, *mechanicism*, *neuro-pathology*, *stimulism*, *phlogisticism*, *pyrexism*, *vitalism*, and of recent date *cellular pathology* and *physiological therapeutics*. I leave

out of the list the Thomsonian extravaganza of thermalism, and the Hahnemannic homœopathism, as, however serious may have been their detrimental effect upon the welfare of the public at large, they have scarcely influenced the progress or present status of medical science, either for good or evil.

By *naturalism* I mean dependence upon nature, and systematic imitation, in practice, of her spontaneous curative processes. We have already referred to this as the leading Hippocratic idea. It was rejected by the early Methodists, practically repudiated by Cullen, and systematically excluded by Rush. More recently it has been conspicuously illustrated and defended in the lucubrations of Sir John Forbes, following those of Dr. Bigelow, of Boston, upon "Nature and Art in Disease;" to the former of which the sobriquet of "Young Physic" has been applied.

"Expectancy" is a term now frequently used, to dignify what amounts sometimes to absolute inertness of practice; upon an idea, latent or declared, that all medicines are impotent, and that active interference with the self-limitations of disease is never justified by science. This is but a reaction, certainly extreme, from the *polypharmacy* and *hypertherapy* of the past.

*Empiricism* is strict adhesion to experience; the accumulation of means of treatment simply by observation and experiment, independently of physio-pathological reasoning. The most favorable example of this among the ancients, was Aretæus; of distinguished moderns, Sydenham, Laennec, and Louis.

*Eclecticism* or *episythetism* is, of course, the selection or combination of what is deemed best in several methods, as, in practice, of means or measures, some of which have been obtained by mere observation, and some from physiological reasoning or deduction. Celsus afforded the most beautiful early example of this; it has been exemplified, although at the same time, somewhat paradoxically, derided, in our own period, by Trousseau, of Paris.

All of the other systems which I have named are phases of *Rationalism*, which is the proper antithesis of Empiricism.

*Solidism*, first broached perhaps by the ancient school of Asclepiades, with its *laxum* and *strictum*, was urged to its farthest limit in the *mechanicism* of Borelli, and in the neuro-pathology of Hoffmann, Cullen, and Henle. It was taught in Philadelphia for twenty-five years by Professor N. Chapman.

*Humoralism*, the older view, which saw in changes of the fluids all that was essential in disease, pervaded the system of Galen, and the Galenists of the fifteenth and sixteenth centuries. The chemists generally have had a natural leaning towards it. In this country it was represented at one time by Dr. Hosack, of New York. A very distinguished example of it has lately been known and respected in England, in the lamented Robert Todd, of London.

*Chemicism* was boldly inaugurated by Sylvius De Lebö, in the seventeenth century, but has received its ripest contributions in the two last decades; especially from Liebig and the other chemical physiologists, Lehmann, Moleschott, etc.

*Mechanicism*, as an exclusive system of physiological or pathological reasoning, was never permanently established, its influ-

ence, as affording even a predominant bias, having been always confined to a few thinkers during a brief period.

*Neuro-pathology* has had a more important place; dividing with a modified humoralism the domain of medical theory, even down to the present hour. We can never dismiss the consideration of the nervous centres and their communicating nerves from the study of the human functions, healthy or morbid. So that, although it is decidedly an error to say, as some have done, that man is *all brain*, or that the "nervous mass" is the animal, yet the nervous system must be made prominent in all medical inquiries.

Enough has been said already to explain the nature and powerful influence of the Brunonian theory of excitement, or of sthenia and asthenia, which I have named under the title of *stimulism*. It was one step towards the application to pathological and medical truth of dynamic physiology, that study of the *forces* of the living body, in connection with the constantly acting forces of external nature, which is now, or soon, destined to rule supremely, not as excluding, but as *guiding* our investigations of the chemical and mechanical changes both of the solids and of the fluids. Life is *not merely* excitation; but normal excitation is one of the requisite *conditions* of the performance of all the functions of the body, not even excepting that of growth and development itself; since to this a certain degree of *heat* at least is essential.

Rasori was, moreover, right in saying that excitement is *not a unit* for the whole body, but may be unequal in its different parts; and, moreover, that *excess* of excitement of one or more organs or functions is as frequently present in acute diseases as the reverse.

So, too, Broussais made a just amendment of the same scheme, to a certain extent, in noticing the *sympathetic* and *secondary* effects of *local irritation;* although he, as well as our Chapman, undoubtedly exaggerated the relative importance of irritation of the stomach and intestinal canal.

We need not pause for a moment over the Stahlian theory of the organic soul or *autocrateia;* although very lately a view much like it has been again taken, by Laycock and Morell, under the cognomen of the "unconscious soul;" and in biology, under that of "plastidule soul," by Haeckel.

A recent phase of revolution in the scientific basis of medical opinion, has been that which, in the language of its most eminent leader, Virchow, of Berlin, we may designate as *cellular pathology*. Associated in similar, although not quite identical views, have been Prof. Bennett, of Edinburgh, and Dr. Addison, of London.

It has been a favorite idea with the physiologists of our period that, in the general law of organic cell-genesis, the fact that every living being, human, animal, and vegetable, springs from a globoid *germ-cell*, while most of the separate tissues also have the cell for their first starting form; that in this we have the great central radical fact of physio-pathology, out of which (as in physical science out of the Newtonian law of gravitation) all truth in

the history of the animal organization, and thus in medicine, must grow. But Dr. Bennett, an earnest teacher of molecular physiology,[1] denied that to the cell doctrine can be awarded such a place or potency; as it is not a *universal* law, but has its manifest exceptions. Dr. Beale, also, a leading British authority in histology, insists upon some essential modifications in Virchow's theory.

It does not belong to me to discuss this point here; but, as it bears largely on the theory of medicine, I will merely say that if there *be* one fact or idea which more than any other is the gravitative centre of all truth in physiology, pathology, and medicine, it is that of the peculiar agency and supremacy in the body of the *life-force*, and of its intimate relations with the other physical forces;[2] of its being, in fact, capable of *degrees* of *life temperature*, like those of heat temperature, in the body as a whole, and in its various parts and organs; of its manifesting *attributes* or *laws*, like the other forces or phases of impetus and molecular movement in nature; which must be much more patiently and thoroughly studied than they have yet been, before we can be said to understand the human economy, even so well as astronomers now do the solar and sidereal systems.

This brings us towards the conclusion of our inquiry. We have been examining, in this brief manner, several schemes of *rationalism*. But as the use of facts and ideas in the *practice of medicine* is our standpoint, we must now ask, Is rationalism *available* for the treatment of disease? Is physiology perfect? How much of it is positive?

We are compelled to answer—Physiology, and with it necessarily pathology, is one of the least matured, because one of the most complex of the sciences. What would be said, then, were a man to undertake to repair a watch, when he had never seen its *works in motion*, and had no *proven* knowledge of the mode of action of nearly all its machinery? If he should find on *trial*, that hanging it up, or laying it down, or shaking it when it stopped, or keeping it warm or cold, promoted its good time-keeping—very well; let him do so. But if, in this state of uncertain knowledge, he should seize and alter, with fingers or forceps, the delicately arranged and complicated wheels and springs, would not the chances be that he would do more mischief than good? Nor would reasoning about possible or probable watches, theories in chronometry, avail him much towards the medication of the particular timepiece in his hands. Yet this is our position, as physicians, regarding the present relation of physiology and pathology to the actual treatment of disease. It seems, therefore, only a slight over-statement of Trousseau's that *Rationalism in medicine leads only to absurdities.*

We might easily confirm Trousseau by other authorities, early and late. Stahl spoke of the materia medica of his time as a "stable full of offal." Sydenham complains that practice was "pestered with too many eminent remedies." It is said that when

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[1] Clinical Medicine, Introductory Lecture.

[2] See *Grove*, *Carpenter*, and others, on the Correlation of Physical and Vital Forces; *Inman*, Foundation for a New Theory and Practice of Medicine; *Chambers*, Renewal of Life, etc.

Sydenham was asked by Sir R. Blackmore what book to begin his medical studies with, he replied *Don Quixote*. Bichat denounced the vague theories of medication prevalent in his day, and declared that but little was really positive in our knowledge of the action of remedies. Pinel had so little confidence in therapeutics that his only study of disease was for a naturalistic classification: "Given a certain malady—to find its place in the nosological system." Laennec considered physiology and pathology "vain amusements of the mind." Says Lebert, "We cannot yet, unhappily, construct therapeutics on the basis of scientific medicine; and with the best intentions in the world we can regard the greater part of its precepts but as the result of empiricism."

But, some may exclaim, this is treason! This would remove the practice of medicine from science altogether, and leave it at the mercy of Paracelsus, and Cagliostro, and the old women! Not so. We have only to turn back to the grand platform of Bacon, on which all modern science is built, to see that to found the practice of medicine on *observation* is to make it *eminently* scientific. What science can do without empirical observation? Can physics, or astronomy, or chemistry? None of them. How irrational, then, to attempt to reason out, *a priori*, therapeutics, or to place it upon any other principal basis than clinical observation! Blind, uninstructed, unsystematic empiricism is a bane to society, and a disgrace to the human intellect.[1] But *scientific* empiricism constitutes the most rational practice attainable, while physiology is imperfect. What is most wanted now, is more *positivism* in medicine; more *exact observation* of clinical and therapeutical facts. It is otherwise in most of the natural sciences. Agassiz, one of the great leaders in science, remarked that *thought* and *generalization* are now especially required amongst naturalists; who are in danger of being buried among their multitudinous detailed facts, as knights of old, sometimes, were borne down by the weight of their own armor. But it is not so in our science. *Medicine needs more fact and less theory.* I could sustain these positions by argument, by citation, and by example; but we have no room. The proposition must be barely stated, that the most complete knowledge possible of a disease will never *alone* inform us, what will be the effect upon it of any remedies, until *experience* has put them to the test. The two blades of the scissors of practical medicine are, diagnosis and clinical proof; physiology and pathology may, perhaps, be compared to the handles; but to the former, rather than to the latter, belongs at present the chief function of *guidance* in our action. Our total ignorance of the *modus operandi* of any agent does not in the least interfere with its availability in the treatment of disease, when that treatment has been proved to be successful. We do not know—nor does the chemist require to know—*why* sugar is sweet, or sulphuric acid sour; or why the latter will redden litmus, while an alkali will render turmeric brown.

[1] I advise no one to imitate the follies of Cato the Censor; who, while he forbade his son ever employing a physician, yet dosed his own wife to death, attempted to reduce dislocations by repeating magical words, and wrote a book, in which he recommended cabbage as a sovereign remedy for many diseases.

It is no more *necessary*, although it would be interesting, to know how bitters improve the appetite, or iodide of potassium cures syphilitic rheumatism. We may use opium to produce sleep, or lull pain, although we know little more than Molière's doctor —"opium facit dormire, quia est in eo virtus dormitiva."

It was, in fact, as was long ago observed, "only after men had found remedies, that they commenced to reason upon them." The most remarkable treasures of medicine have been discovered almost by accident, and have obtained their place in the materia medica often against the protests of the theorists. Opium is one of the oldest of drugs. Iron is nearly as ancient. Mercury was a contribution of the alchemists. Arsenic and colchicum appeared first as secret remedies. Iodine (in burnt sponge) and sulphur were popular and domestic before they were professional medicines. And did not the French Academy formally denounce tartar emetic? Did not all the schools disbelieve in cinchona, because it neither sweated, puked, nor purged? And Jenner, who drew the idea of vaccination, by a most sagacious induction, from a popular tradition of the country, against what strong theoretic opposition did his noble discovery have to establish itself!

*Nolens volens*, then, we have to acknowledge our indebtedness, in therapeutics, to empirical observation. But it is the vocation of the true physician to make it scientific. To know that two cases of disease are *really* alike, and not only apparently so, in order for the application to them of the same remedies; to make *accurate comparison* of the virtues of different modes of treatment, avoiding the "post hoc propter hoc" fallacy; and to appreciate the conditions and circumstances which *modify* the actions of medicines, as they do the course of diseases; these are tasks which enlist the highest faculties of analysis, as well as of observation.

Moreover, medicine is progressive. Even an incompleted physiology may suggest safe and proper experimentation. For good *diagnosis* we need pathology; for pathology, physiology is indispensable. We do not admit, then, with Laennec, that these beautiful sciences are but "vain amusements." We look forward to the day, when the laborious and intelligent culture they are now receiving, will be repaid by a tenfold harvest, practical as well as abstract. The time *may* come, when the why and how of therapeutics may be largely as well as accurately explained. But practical medicine, having its crying necessities, cannot wait for such an era; let it use its facts, and not be misled by false expectations.[1]

Yet, we must remember, that it is the facts, not of the experience of an *individual*, which most of all is "experientia fallax," but of the *aggregate* experience of the *whole profession*, in *all time*, that constitute the body of therapeutical science; which should, as Dr. Todd has said of pathology, be reviewed and reconsidered

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[1] "When there is no certain knowledge of a thing, a mere opinion about it cannot discover a sure remedy." "Medicine ought to be rational; but should draw its methods from the *evident* cause; all the obscure being removed, *not from the attention of the artist, but from the practice of the art.*"—CELSUS, *Treatise on Medicine.*

from time to time; but which can never be abandoned or rejected. It is not well, then, to call the great physicians, our predecessors, as Dr. Bennett has done, "blind guides." Rather may we, with the late Dr. Alison, believe that a disagreement between a newly-broached pathology and the practical experience of all time is a much better reason for setting aside the new pathology than the old practice.

Just now (1881) a form of medical rationalism is particularly in vogue, under the guise of *physiological* or *experimental therapeutics*. Since its principal reliance is the application to the treatment of disease of inferences drawn from the effects of drugs upon living animals, it may be called, without injustice, the system of *toxico-therapy*. That experiments with medicines upon animals may have very considerable suggestive value, there is no doubt. The error here, as in regard to the kindred subject of vivisection in connection with normal physiology, consists in overrating its *comparative authority;* as if it were, instead of a subordinate method, supreme above all others. Objections to its being permitted to rank higher than, or equal to, clinical observation (the *true experimental medicine*) are, briefly, these: first, the frequent differences between the effects of the same agent upon man and upon animals, as well as amongst animals themselves; and, secondly, the great importance of differences in the action of drugs in *states of health* and *states of disease*, whether of men or animals.[1]

We may sum up the substance of the foregoing remarks, by asserting that the therapeutical methods or principles upon which we may deal with the treatment of disease are essentially three:[2] the *natural*, hygienic, or expectant; the *specific*, or purely empirical (including the tentative); and the *conditional* (including the perturbative or alterative). Of the first two quite enough has been said. Of the last it will suffice to say that it is the most of all open to suggestion from positive physiology and enlightened pathology. It comprises the rational treatment of diseased conditions of the body, for which no direct or *specific* remedy has been discovered; a part of medicine of very great importance, but in which the greatest variation has necessarily occurred in the past, and continues yet to exist. This is the debatable ground, upon which tournament upon tournament and crusade after crusade have been fought; the world at large looking on sometimes with more amusement than profit. The lesson of these petty wars, however—pre-indicated clearly by the old clas-

[1] A clear account of the former of these difficulties may be cited with advantage from an extreme advocate of "physiological therapeutics," Prof. H. C. Wood. In his Treatise on *Therapeutics, Materia Medica*, and *Toxicology* (2d edition, p. 423), while discussing the calomel question, this writer says: "The canine diet and digestion are so different from the human, that it is to be expected that medicines acting upon the digestive apparatus will influence dogs differently from man." Hence, experimental evidence must be "all laid aside when we desire to study the question as to the cholagogue action of remedies upon man; and our conclusions must be based solely upon clinical evidence." Without *laying aside* any of the facts concerning experiments upon animals, we may unhesitatingly apply the concluding words of the above sentence *generally;* by saying that whatever suggestions or explanations may be contributed by physiology and toxicology to practical medicine, its *final conclusions* upon the *treatment* of *disease* should always be based upon *clinical evidence alone.*

[2] Lordat. See Renouard's Hist. of Medicine.

sical writers upon medicine—has been at last tolerably well learned: *Not to do harm when we are unable to do good;* the reversal of the old maxim, "melius anceps quam nullum remedium," because, in the restoration of a patient from disease, the physician is not the only nor even the stronger agent, nature being the principal, he only the accessory.[1] Some have given credit for this medical gospel to distinguished recent writers, as Dr. Bigelow and Sir John Forbes; but they are revivers of the doctrine only, not its discoverers. Hippocrates distinctly recognized the self-limitation of many diseases. *Τὰ κρινόμενα καὶ τὰ κεκριμένα ἀρτιως μὴ κινέειν μηδὲ νεωτεροποιέειν, μήτε φαρμακέησι μήτ' ἄλλοισιν ἐρεθισμοισιν, ἀλλ' ἐᾶν.*[2] So also did Asclepiades, notwithstanding the protest of his sect against Hippocratism, when he said that the best cure for a fever is the fever itself.[3] So did Sydenham[4] and others who wrote long ago. We may, perhaps, safely divide the progress of historical medicine (as to its predominant tendencies) into three great periods. 1. *Indefinite*, often heroic, always venturesome *tentative* practice; lasting from archaic times down to near the middle of our nineteenth century. 2. Under a somewhat despairing reaction from this has come the era of medical *scepticism, minimism, expectancy;* which qualities characterize much of the ordinary practice of to-day. 3. Following this, it may be hoped, will yet come the *scientific medicine of the future:* definite in its facts, clear in its indications, positive in its therapeutic measures; in accordance with a well-ascertained knowledge of the body, in health and disease.

And now, although Dr. Bennett, of Edinburgh, predicted the "approaching downfall of empirical practice," yet his co-laborer, Dr. Todd, of London, urged in his last words the importance of its support in clinical research; and the philosophic medical historian, Renouard, seconding the efforts of Louis, the founder of the numerical method, and followed by the lamented Niemeyer, Sir W. Jenner,[5] and others, has foretold the coming *triumph* of *rational empiricism* or *inductive medicine.* We may well believe that this prophecy will yet be fulfilled.

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[1] Chomel. [2] Aphorism 20, Section 1st. [3] Cælius Aurelianus.

[4] "To imagine that nature always needs the aid of art is an error, and an unlearned error, too."

[5] "It is to the experience of the mass of the profession that we look for the final establishment of doctrine, and of rules of practice."—*The Practical Medicine of To-Day,* 1869, p. 7.

# PART I.

# PRINCIPLES OF MEDICINE.

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## SECTION I.

### *GENERAL PATHOLOGY.*

DISEASE may be defined as a perversion either of the functions or of the structure of the body or of any of its parts. It is, in other words, a deviation from the normal physiological state or action of the organism, under the disturbing influence of **morbid causes.**

The **seat** of disease may be

In the **constitution**: *e. g.*, secondary syphilis; scrofula.
In special **tissues**: *e. g.*, mollities ossium.
In particular **apparatus**: *e. g.*, dyspepsia; neuralgia.
In individual **organs**: *e.g.*, pleurisy; cirrhosis; hydatids.
In the **blood**: *e. g.*, anæmia; scorbutus; typhus.

Of course disease may be, and generally is, not limited to what is to be regarded as its principal or original seat. For example, in cholera, while its cause, no doubt, acts first upon the blood, the *ganglionic* system also is affected, as well as the stomach and bowels, etc.

*Morbid states* of the **system**:—

Fever;
Toxæmia;
Anæmia;
Plethora;
Cachexia;
Depression;
Exhaustion.

*Morbid states* of **organs**:—

Hyperæmia;
Hyperæsthesia;
Hypertrophy;
Inflammation;
Atony; Exhaustion;
Atrophy;
Degeneration.

Of the above, the *most important general* or *systemic* morbid

states may be included under **fever, toxæmia,** and **cachexia**; constituting a sort of "tripod" of systemic disease.

A similar tripod of the most frequent and important *local* disorders may be established, of **irritation, inflammation,** and **atrophy.**

## GENERAL PATHOLOGY OF AFFECTIONS OF THE SYSTEM.

### FEVER.

In using the term **fever,** as applied to a morbid *state* of the system, we must remember that the same word is also used as a part of the designation of several *complex diseases:* as typhus fever, yellow fever, remittent fever, etc. This double use of the word is unfortunate, but cannot now be avoided.

**Symptoms of Fever.**—*Increased heat* of the whole body;
*Dryness* of the skin, mouth, etc.;
*Diminution* in *bulk* of the *excretions;*
*Muscular debility;*
*Frequency of the pulse;*
*Functional disturbance* of stomach, brain, etc.

**Heat** is the most essential characteristic of the febrile state, having given name to it in all languages.

Notwithstanding the scantiness in *quantity* of the stools, urine, and perspiration in fever, it has been shown by Virchow, Vögel, Böcker, Parkes, Jenner, and Hammond, that the *actual amount of solid matter excreted,* especially by the kidneys, *is generally increased.* We have, in the *heavy, offensive odor* of the breath, evidence that it, too, contains an excessive amount of decomposing organic material. It is highly probable, also, that *much excrementitious matter is,* during fever, *retained in the blood.* It has been observed, that if a *local inflammation,* as pneumonia, occurs during the febrile attack, the *excess of secreted solids disappears* until the inflammation has passed. Dr. C. Anton Errald, as well as Leyden and Frankel,[1] upon the basis of numerous careful observations, asserts that the amount of carbonic acid excreted is always increased during fever.[2] Ammoniacal matter, also, is present in the breath exhaled, in sufficient amount to form (Fothergill) crystals of chloride of ammonium when a glass slide moistened with hydrochloric acid is held under the nostrils. Brattler[3] ascertained a close correspondence between the amount of urea passed in the urine and the temperature; "the greater the amount of urea, the greater the temperature."

When perspiration is absent, there is evidently, also, a **diminished loss** of heat from the body, which, of course, promotes its accumulation. This is very important.

This increase of the disintegration of the substance of the body is, at present, one of the most prominent and interesting phenomena connected with the pathology of fever. The whole subject, however, is surrounded by obscurity, notwithstanding the fact that

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[1] Centralblatt, f. d. Md. Wissenshaft, Sept. 28, 1878.
[2] Philadelphia Medical Times, September 20, 1873; translated from Archiv für Anatomie, Physiologie, etc.
[3] Quoted by Murchison, in his work on Fevers.

the *symptoms* and aspects of the febrile state have been familiar ever since man became a prey to disease.

On the basis of the facts observed and scrutinized at the present time, I think we may venture to throw out a comprehensive **theory** of fever. Thus—its essential phenomenon is increased **heat** of the body; this being produced by **excessive tissue-metamorphosis,**[1] under an abnormal "tension-condition" (Virchow) of the **ganglionic nerve-centres,** which abnormal condition is the result (Addison) of either, 1, **corpuscular** toxæmia, or 2, **plasmic** toxæmia, or 3 (Campbell and Müller), sympathetic **irritation** from local inflammation. The hypothesis of the existence of a "heat centre," and a "heat-inhibitory centre" in the cerebro-spinal axis, which has found favor with Dr. H. C. Wood, in his elaborate monograph on Fever,[2] is too unphysiological (although in keeping with many other theories of the day) to be accepted without much more and better evidence than has yet been brought forward to sustain it.

A pathological classification of fevers, convenient for some purposes, is, into **irritative, paroxysmal, and toxæmic** fevers. The *ganglionic* nervous system would seem to be most involved in the first, or *phlegmasiæ* (pneumonia, pleurisy, etc.); the *spinal* system in the second (intermittent and remittent fevers); the *whole* nervous system, and prominently the brain, in the third, as typhus, typhoid, and "spotted" or cerebro-spinal fever. Dr. Allbutt compares *intermittent* fever, as a periodic discharge of tension with disengagement of *heat*, to epilepsy, which is a periodic discharge of tension in the form of *motion*.[3]

## TOXÆMIA.

**Toxæmia,** more properly *toxicohæmia* (from τοξικον, poison, and αἱμα, blood), is a term used to indicate *poisoning of the blood.*

After all the long and reiterated disputes between the advocates of the exclusive *solidist* and *humoral* pathologies, it has become a matter of general recognition that *both* the fluids and the solids are involved in almost every disease—their mutual interdependence making the contrary impossible.

Certain diseases, however, more than others, are believed, upon the strongest evidence, to depend upon a chemical and functional *change in the blood*, to which the name of toxæmia is applied.

Toxæmia may originate: 1. By the introduction into the blood of morbid poisons *from without;* as in syphilis, small-pox, remittent fever, etc. 2. By morbid alteration from processes occurring *in the blood itself.* 3. By *absorption* of poisonous material, by the vessels, from diseased parts of the body; as in purulent infection after wounds, etc. 4. By the non-excretion, and consequent accumulation in the blood, of post-organic or excrementitious sub-

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[1] The directness of the relation in the body between temperature and oxidation is well illustrated in the researches of Prof. H. C. Wood, Jr. (Am. Journal of Med. Sciences, July, 1871), upon the action of nitrite of amyl. This substance, whose influence in retarding oxidation can be demonstrated in a jar containing phosphorus, exhibits a remarkable power of lowering the temperature of animals to which it is administered.

[2] Washington and Philadelphia, 1881.

[3] Brit. and For. Medico-Chirurg. Review, July, 1870, p. 155.

stances, which, by their own properties, or by the chemical changes they undergo, prove injurious to the system. Obstructive jaundice and uræmia afford the best examples of this last occurrence.

1. All of the *zymotic* or *enthetic* diseases (*e. g.*, exanthemata, yellow fever, diphtheria) have their origin explained by the first of the above modes of blood-poisoning.

Yet, our knowledge of the very existence of several of these "morbid poisons" is inferential only. Our idea of their nature is conjectural; and our reasonings upon their mode of action upon the blood and system at large are entirely speculative.

Some facts, however (see *Simon's Lectures on Pathology*), are well deserving of notice.

*a.* The effects of these poisons, when introduced into the body, are both *local* and *constitutional* symptoms. The *constitutional* symptoms, which begin the attack, are *nearly alike for them all;* the *local* symptoms are *peculiar for each one.*

*b.* The small-pox virus is the most readily studied of all of these causes. The material is, if not **volatile,** at least portable by the air,[1] as it acts often through *considerable distances;* and it is **soluble,** because it infects, sometimes, the fœtus in utero, which has no communication of fluids with the mother, except by placental *endosmosis.* The poison of **primary** *syphilis* is not thus transmissible, although it is directly **contagious** by *inoculation;* that of **secondary** syphilis is not[2] usually contagious, but *is* **transmissible** by descent.

*c.* **One** attack of small-pox, scarlatina, measles, whooping-cough, usually gives **immunity** for the rest of a lifetime. It may, from this, be argued that besides the *materies morbi* or *causative* matter, *another* material must exist *in the blood* of the susceptible person, which *combines* with the former (thus producing *the disease*), and which is *exhaustible.*[3] (Illustration: the saturation of a carbonated alkali by an acid; after a certain portion of the latter has been added, it will *cease to effervesce* with any subsequent addition of the same.) Paget believes that the change effected occurs in the solid structures of the body.

**Vaccination** can be best explained upon this view. Just as more than one acid will neutralize potassa or soda, etc., so that after it has been saturated with sulphuric acid it will not react with nitric—so the virus of the vaccine disease appears capable of *saturating* and *exhausting that material in the body, the presence of which constitutes the susceptibility to variola.*

No such immunity after a single attack is found to exist in the case of the miasmatic fevers (remittent intermittent). That element in the blood for which *their* morbid poison has affinity is,

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[1] Chauveau's experiments, if accepted as entirely exact, disprove the *volatility* of the virus, and show it to be composed of *particles.*

[2] Recent experiments have occasioned doubt as to the correctness of this commonly accepted statement. Indeed it appears to be proved by Lee, Waller, Pelizarri, and others, that *occasional* transfer of constitutional syphilis by inoculation is possible. See Lectures on Surgical Pathology, by Henry Lee, F. R. S., 1870.

[3] Reflection will show that there is no real incompatibility between this theory and that of *zymosis,* to be mentioned presently. We have not space, however, for the further discussion of so speculative a subject.

therefore, not exhaustible. Several reasons exist for conjecturing this element to be the *red corpuscles* themselves.

Of the different hypotheses propounded in regard to the *modus operandi* of **zymotic** or **enthetic** (epidemic, endemic, infectious, or contagious) causes upon the blood, that which has best stood its ground is that of **catalysis**, or continuous molecular action.

Liebig first urged this theory, upon the analogy between the action of yeast in producing fermentation, and that of a virus, as of small-pox, in producing its effects upon the system, through the blood. It is true, that the blood does not *ferment;* the action is therefore not *similar*, but **analogous.** Chemical action of a certain kind, going on in the particles of the yeast, or of a virus, is by their contact with another substance, communicated to or instigated among the particles of the latter. A *mechanical* analogy to illustrate this is the setting in motion of one cog-wheel by another. A physical illustration, less remote, is that of the extension of fire from a burning body to other combustibles near it.

Davaine, Hallier, Oertel, Salisbury, Obermeier, and others have asserted the discovery of special organic forms, chiefly of microscopic fungous vegetation, in the blood and other fluids of patients suffering with carbuncle, cholera, intermittent fever, syphilis, gonorrhœa, etc. The importance of these forms in the causation of disease is denied positively by Thudichum among medical authorities, and by Berkeley, a distinguished naturalist. The question is certainly yet *sub judice.*[1]

2. Toxæmia from *spontaneous changes in the blood itself*, under causes or conditions which do not affect the solid structures of the body, if it occur, must be rare. *Heat-stroke* may be, in part, an example; that is, the dangerous or fatal effect of extreme heat, with exhaustion, away from the direct influence of the rays of the sun. Here the blood probably undergoes a chemical change which renders it unfit to vitalize the nerve-centres and other organs.[2]

Perhaps **pyæmia, ichoræmia,** or **septæmia**[3] (pus-forming blood —contaminated blood—blood-decomposition), as nearly the same affection is called by different authors, may be supposed to occur sometimes spontaneously. Much more often, however, such an affection is ascribed to the next mode of causation.

3. Absorption of deleterious material, by the blood-vessels or lymphatics, from parts of the body in a state of disease, may cause *purulent infection*, or **pyæmia.**

*Absorption of pus* (containing pus-cells) is unlikely to occur without a solution of continuity in the vessels. But in *arteritis*, or *phlebitis*, suppuration of an artery or vein may introduce pus into the blood.

In the greater number of cases it is not pus, but an unhealthy material of a less definite nature, which contaminates the blood

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[1] See an article upon it by H. C. Wood, Jr., M. D., Am. Journ. of Med. Sciences, October, 1868.

[2] The experiments of Wood and others, which have been thought to show the absence of a fatal blood-change in heat-stroke, do not appear to me to establish that conclusion. Blood-corpuscles, nerve-cells, and muscle-elements are all disfunctioned by high temperature.

[3] *Sapræmia*, used by a few authors, has almost the same signification.

by its absorption. This may take place after wounds or surgical operations—from the womb in the puerperal state, etc. Pyæmia is attended by great prostration, rapid pulse, copious perspirations, low delirium, and the depositing of pus and formation of abscesses in different parts of the body. It very often begins with a chill (see Pyæmia, in Part II.). This is not the place to discuss the difficult question, whether *minute organisms*, or their spores (called disease germs, bacteria, bacilli, micrococci, microzymes, microbes, etc.), are *necessary* to the process of suppuration, ordinary or specific. Many facts support the view maintained by Dr. B. W. Richardson, that at least one kind of organic (post-organic) material, "sepsin," and most probably more than one chemical substance of similar origin, may produce *septæmia* or *sapræmia*, if not suppuration and pyæmia, without any germs or organisms being present. On the other hand, the following is a recent expression[1] of an able and careful investigator, Surgeon G. M. Sternberg, U.S.A.:

"In the light of what we already know, it seems very probable that puerperal fever, hospital gangrene, and the various forms of septicæmia known to physicians and surgeons, result from the development of *pathogenic varieties* of harmless and widely-distributed species of micrococci, as the result of especially favorable surroundings, such as are found in the lochial discharges of a puerperal woman or in the secretions from the surface of wounds in a crowded and illy-ventilated hospital ward. Just as differences in resisting-power to experimental septicæmia are exhibited by different species of animals, so, doubtless, individual differences exist in man, especially as the result of *lowered vitality*."

4. Toxæmia from **non-elimination** of the secretions may follow, of course, upon prolonged constipation, obstruction of the biliary duct, inaction of the liver, or suppression of the action of the skin and kidneys.

Effort is made (according to the adaptations of nature), when one emunctory fails to act, to carry out its *excreta* by other channels. Especially do the skin and kidneys act thus *vicariously* for each other.

When the blood is in no way rid of those effete particles which should make the *solids of the urine*, the resulting condition is called **uræmia** or **urinæmia.** Its symptoms are pain in the head, dulness of sight and hearing, vertigo, nausea, and vomiting; ending, unless relieved, in convulsions, coma, and death. Pregnant women sometimes have *urœmic convulsions* (C. Braun), from fœtal pressure obstructing the renal circulation.

The term **cholæmia** is less used, though quite as justifiable as uræmia. It means retention in the blood of the excrementitious matter of the bile, from inaction of the liver or obstruction of its duct. **Cholesteræmia** is a term preferred by Dr. A. Flint, Jr., who asserts cholesterin to be the excretory ingredient of bile. Fleischl has shown that the *lymphatic* vessels may reabsorb bile and convey it into the blood.

Jaundice is of two origins: 1, **obstruction** of the biliary ducts,

[1] National Board of Health Bulletin, April 30, 1881.

with reabsorption of bile into the blood; 2, **suppression** of the secretion of the liver. (A third is possible — perhaps present in the jaundice of infancy; viz., **excessive formation** of yellow pigment in the blood, and its deposit in the skin, etc., without disorder of the liver.)

In jaundice from obstruction and reabsorption, the symptoms are milder and the state less dangerous than in that from suppression of the action of the liver. Severe and even fatal disease of the liver may occur, however, without jaundice.

Dr. Harley has shown that the diagnosis between these two forms of jaundice may be made, on analysis of the urine, by finding the *coloring* matter of the bile always in the urine in *both*, but the biliary *acids* only in the *obstructive* form.

Slight and transient cholæmia is, no doubt, common. Although the term "biliousness" is much abused, it is not always quite a misnomer. As signs of the condition mentioned, we find nausea, bitter taste in the mouth, constipation, and dizziness, with yellowness of the tongue, conjunctiva, and skin.

**Acetonæmia** and **lipæmia** are referred to by authors (Kussmaul,[1] Cyr,[2] Balthazar Foster,[3] Sanders,[4] Hamilton,[5] Starr[6]), as both occurring in cases of advanced diabetes mellitus, especially when terminated by sudden death. Acetone is one of the products of a fermentative change in glucose (grape-sugar, diabetic sugar). It stupefies animals, when given to them, with an effect somewhat between that of alcohol and that of ether. It has been detected in the blood, urine, and breath of diabetic patients, but in such small quantity as to make it doubtful whether its accumulation can account for sudden death.

*Lipæmia* is an excess of fatty matter in the blood. It gives that liquid a milky appearance, which ether will remove; and the microscope may show the presence of oil-globules. *Fatty emboli* may form, and, by obstructing arterial trunks, may interfere with the functions of the organs which they supply. When this occurs in the pulmonary artery or its branches, *anoxæmia* (deficiency of oxygen in the blood) may result, with accumulation of carbonic acid in the blood and fatal coma. Uncertainty remains, however, in regard to the share which such a series of changes may have in producing sudden death.

## ANÆMIA.

**Anæmia** (*spanæmia*, *hydræmia*) is the common term indicating poverty of the blood. The density of that liquid is diminished, and there is a deficiency in the number of the red corpuscles. Hayem and Malassez also assert diminution of *size*, change of *form*, and reduction of *color* in the red corpuscles. Their amount of hæmoglobin may be lessened by more than three-fourths of the normal proportion. In marked cases of anæmia one hundred red corpuscles may occupy no more space than seventy-five corpuscles taken from healthy blood.

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[1] Deutsches Archiv. f. Klin. Med., August, 1874.
[2] Archives Gén. de Médecine, December, 1877, and January, 1878.
[3] Brit. Med. Jour., January 19, 1878.
[4] Edin. Med. Jour., July, 1879.
[5] Edin. Med. Jour., July, 1879.
[6] N. Y. Med. Rec., May 1, 1880.

The deficiency in number and healthy character of the corpuscles may be conceived as capable of production in either of two ways: **anæmatosis**, or *imperfect formation* and *development* of blood-elements; or **hæmophthisis**, *i.e.*, their degeneration and destruction after they have been formed.

Exhausting hemorrhages or discharges, severe attacks or long continuance of disease, insufficiency of food, etc., may cause the anæmic condition. Sometimes it occurs without such cognizable causes, being then designated as *idiopathic* or **progressive pernicious anæmia**. (See Part II.)

Anæmia is shown by paleness (sometimes with occasional flushes) of the face, even of the lips and tongue, as well as of the hands; debility; feebleness and excitability of the pulse; frequently palpitation of the heart and a *bellows murmur*, audible especially near the base of the heart, to be carefully distinguished from the valvular murmurs of organic disease. *Nervousness* and neuralgic pains are also very common in the anæmic.

**Chlorosis**, although sometimes separated from anæmia, is generally associated with it, occurring in young females. The name is given on account of the peculiar sallowness of the complexion. *Perverted appetite*, as for charcoal, slate-pencils, etc., is one of its occasional symptoms. (See Part II.)

**Ischæmia** is an interruption or embarrassment of the circulation of the blood in any part of the body. (Sometimes, also, this term has been applied to the *suppression* of a habitual *discharge* of blood, as of the menses, nose-bleeding, or bleeding from hemorrhoids.)

**Plethora** involves an *excess* in the density of the blood, and in the number of its red corpuscles; the opposite to anæmia. It is shown by a high color of the face, distension of the blood-vessels, a full, strong, but rather slow pulse, and general roundness of the figure. It may exist without actual deviation from health; but the plethoric are especially liable to acute inflammations, active congestions, and hemorrhages.

### CACHEXIA.

**Cachexia** (from κακος, bad, and ἕξις, habit) is usually understood to mean a *depraved habit of system*; an error of development and nutrition affecting the general state of the blood and organs with perversion.

There is, at the same time, no good reason why we should not speak of *local* as well as general cachexiæ; although this has not been usual.

*Melanæmia*, *Addison's disease*, and *leucocythæmia*, may be regarded as cachexiæ.

**Melanæmia** is the name given (Frerichs) to a state of the blood common in severe malarial fevers, in which the coloring matter (pigment) escapes from the corpuscles, and is deposited in the liver and other organs.

**Morbus Addisonii**, Addison's disease, is a rare constitutional malady, in which anæmia coincides with bronzing of the skin, disease of the suprarenal capsules, and progressive debility, usually ending in death. The capsular disease is not shown by

any definite local symptoms during life; and its frequent connection with the *cachexia* has not been explained.

**Leucocythæmia** (leukæmia) has been, after Virchow and Bennett, recognized as a condition in which the number of colorless corpuscles in the blood is *increased;* sometimes numbering one to four, three, or two, instead of one to fifty or more (sometimes four or five hundred), of the red corpuscles. Diminution in the number of red corpuscles also occurs. This, of course, can be ascertained only by means of the microscope.

Enlargement of the liver, and still more of the spleen, and disease in these organs as well as in the thyroid and lymphatic glands, and sometimes of the bones, are found to attend this disorder. It most frequently affects men. Its symptoms are, pallor, emaciation, diarrhœa, epistaxis (bleeding from the nose), or other hemorrhages, and dropsy. (See Part II.)

**Pseudo-leukæmia,** or Hodgkin's disease (*adénie* or lymphadenosis), is marked by general enlargement of the lymphatic glands, and most commonly also of the spleen, with anæmia and debility. It is a slowly progressive cachexia, terminating, after a duration of months or years, in death by asthenia; unless a fatal result occur sooner from obstruction to vital functions by the enlarged glands. It differs from leukæmia in that the colorless corpuscles of the blood are not absolutely increased in number, but only relatively to the red corpuscles.

Much more frequent, and therefore important, the most common and destructive of all cachectic affections, is tuberculosis.

While diverse opinions exist as to the essential nature of tubercle and its origin, there is a general agreement among pathologists and clinical observers upon many of the following points:—

1. **Tuberculosis** and **Scrofulosis** are identical as a *diathesis.*[1] The term *scrofula* is generally applied to certain slow inflammations, abscesses, ulcerations, and other disorders of the skin, mucous membranes, glands, and bones, which occur especially in young persons, and are characterized by the *moderate* degree of vascular excitement attending them, with the great *obstinacy* or *chronicity* of their career. In many cases, also, of external scrofula, particularly in the glands, a deposit of curd-like or cheesy material is found.

Through all the recent discussions as to what constitutes tubercle, it has been generally admitted that, while all *caseation* (cheesy formation) may not be tuberculous, true tubercles are often found in scrofulous lymphatic glands. Bazin, Köster, Friedländer, Nélaton, Roux, Lannelongue, and Brissaud have observed them in scrofulous diseases of the joints and long bones; Schüppel, in those of the skin; Wagner, Rindfleisch, and others assert their presence in nearly all cases of caseous pneumonia. Charcot declares that, in all instances of the latter affection, the caseous deposit is a truly tuberculous mass. Friedländer insists that tubercles are also found in old non-scrofulous ulcers, as of the cervix uteri, in syphilitic sores, etc. Virchow considers that

[1] Schönlein, Virchow, Jenner, and C. West are among those who have denied this.

local tuberculosis may occur irrespective of any general diathesis, although the scrofulous constitution undoubtedly predisposes to it.

In order to do justice to the views of those pathologists who regard tuberculosis and scrofulosis as not identical, the following comparative table is subjoined, from Aitken.[1]

| TUBERCULOSIS. | SCROFULOSIS. |
|---|---|
| Nervous system highly developed; mind and body active; figure slim; adipose tissue small in quantity; organization generally delicate; skin thin; complexion clear, superficial veins distinct; blush ready; eyes bright; pupils large; eyelashes long; hair silken; face oval and good-looking; ends of long bones small; shafts thin and rigid; limbs straight; the child cuts teeth, runs alone, and talks, early. *Tendencies.*—To fatty degeneration of liver and kidneys; growth of tubercle, and its consequences; inflammation of serous membranes. | Temperament phlegmatic; mind and body lethargic; figure heavy; skin thick and opaque; complexion dull and pasty looking; upper lip and alæ of nose thick; nostrils expanded; face plain; lymphatic glands perceptible to the touch; abdomen full; ends of long bones rather large; shafts thick. *Tendencies.*—Inflammation of mucous membranes of a peculiar kind; so-called strumous ophthalmia; inflammation of tarsi; catarrhal inflammation of mucous membrane of nose, pharynx, bronchi, stomach, and intestines; inflammation and suppuration of lymphatic glands on slight irritation; obstinate diseases of the skin; caries of bones. |

2. Of the **causes** apparently connected with the production of the tubercular or scrofulous diathesis, the most obvious and frequent is *hereditary* **predisposition.** As Sir W. Jenner says[2], "That tuberculosis is transmitted from parent to child, is one of the best established facts in medicine."

3. This diathesis may, however, undoubtedly be **acquired** without inheritance. *Change of* **climate,** from a warm to a *cold and damp* locality, will often induce it. Other **depressing** influences promote it, such as want of *food*, *light*, *pure air*, and *warmth*, *dampness of situation* (Buchanan, Bowditch), sedentary habits, etc. But all of these often fail to generate any form of tubercular disease. Dr. Wilks, of Guy's Hospital, London, reasserts the opinion of Barlow, that "tubercle is apt to be developed in an organ according to its functional and vascular activity;" supporting this by Rokitansky's observation, that cyanotic patients, having a preponderance of venous blood, are especially free from tubercular disease of the lungs. But Baudelocque, McCormac, Parkes, and others have adduced abundant proof that *close living*, in an impure air, is highly promotive of phthisis. Probably the *normally* active function and vascularity of the lungs render them particularly *susceptible* to injury when, in an impure atmosphere, this functional activity is impeded and depressed.

4. Tuberculosis may be pathologically defined as a constitutional tendency to the formation of blood, the plasma of which is defective in organizable capacity; so that, in nutrition, instead of healthy tissue, it forms in one, or very often in many, of the

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[1] Reynolds' System of Medicine, Article *Rickets.*
[2] *The Practical Medicine of To-Day*, pp. 47, 48.

organs, **aborted blastema,**[1] which accumulates as a deposit. This deposit is called tubercle; the process, **tuberculization.** This view of tubercle has been denied of late, it appears to me, upon insufficient grounds. Some even assert a *specific* character in tubercle. Villemin, Colin, Lebert, and others, declare that they have propagated it in animals by inoculation. It would appear probable, however, from the Report of a Commission of the French Academy of Medicine upon Villemin's experiments, that "*all inflammatory products* have, when inoculated, similar effects to those of tubercle." Dr. Marcet of London confirmed, by experiments upon animals, the inoculability of tubercle from the sputa of patients. Max Schottelius[2] produced tuberculosis in animals by compelling them to breathe air saturated with bronchitic sputa, powdered cheese, brain, etc. The investigations of Metzquer, Fränkel, Sanderson, and Wilson Fox, may be considered to have overthrown Villemin's hypothesis of *specific* tubercular inoculation.[3] Niemeyer believed that while a peculiar caseous metamorphosis, most frequently the result of inflammation, may, by resorption and infection, propagate phthisis in animals inoculated, yet "a purely contagious origin of actual tuberculosis has not been proven."

Among the most notable observations bearing upon this question are those of Drs. H. C. Wood and H. F. Formad (Suppl. No. 7, Nat. Board of Health Bulletin, 1880), in connection with the inoculation of rabbits with diphtheritic exudation. In every fatal case, necropsy showed tuberculization, often intense, in internal organs; making it appear that diphtheritic inoculation, in those animals at least, produces not the specific malady, diphtheria, but the non-specific cachexia, tuberculosis.

Chauveau, of Lyons, and Orth, of Gottingen, both assert that they have produced tubercular disease in animals by feeding them upon material from tuberculous lungs of cows. We might have expected that such material would prove very unwholesome food; but what *specific* disease has ever been shown to be directly thus transmitted? Even the virus of rattlesnakes' venom is usually harmless when swallowed, if no abrasion occasions its absorption unchanged into the blood.

5. But the scrofulous **diathesis** may exist *without tuberculization.* Its influence is then shown, especially, in **modifying** *inflammatory* or *other morbid processes;* giving them a *lower*, *slower*, and more persistent or intractable type. Thus, many cases of what is called *tubercular meningitis* in children occur, with fatal result, in which (Bouchut, Hughes Wilshire, etc.) *no tubercular* **deposit** *is found;* yet the disease is modified by the diathesis. Some regard phthisis as, in like manner, a *tubercular pneumonia;* but this designation can only apply, properly, to a certain proportion of cases.

6. Tubercle is distributed either in **regularly-formed** masses

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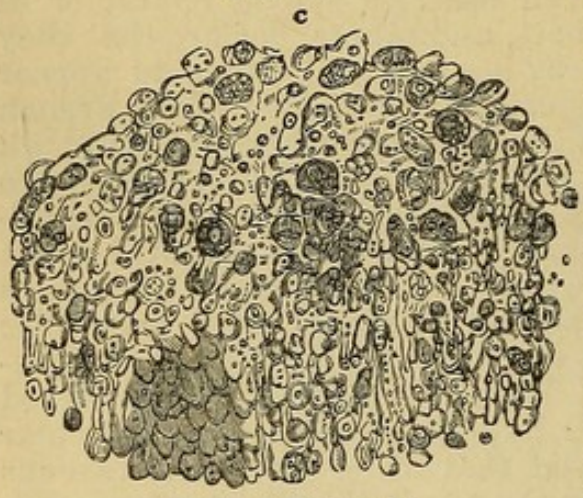
[1] From βλαστανω, I *bud;* used to mean *tissue-forming material.*

[2] *Lancet*, Nov. 23, 1878.

[3] See Brit. and For. Medico-Chirurg. Review, July, 1868, p. 26. Chauveau, however, is asserted to have shown that when tubercle and pus were injected in *filtered solutions*, only tubercle produced tubercle. (See Damaschino on the Etiology of Tubercle, Archives Gén. de Méd., Oct., 1872.)

(miliary tubercles, etc.), or **irregularly,** through the tissues of organs. The most amorphous (shapeless) and homogeneous examples of it have been called **infiltrated** tubercle. The *size* of the masses of tubercle varies from that of a pin's head to that of a hen's egg.

FIG. 1.




Yellow Tubercle.

7. The two varieties of tubercle heretofore described are the **semi-transparent, gray, granular,** and the **yellow, opaque, caseous** tubercle.[1]

8. **Neither** of these forms ever undergoes **organization.** They are never *vascular*. They are deposited outside of the blood-vessels, and not in *non-vascular* tissues, such as cartilage, etc. Dr. Beale inclines to the opinion[2] that tubercle corpuscles, sometimes at least, originate in the *nuclei of the vascular walls.* Cornil and Bastian[3] entertain analogous views. Schrœder van der Kolk, Radclyffe Hall and others consider pulmonary tubercle to result from a degeneration of the epithelial lining of the pulmonary air-cells. Dr. C. J. B. Williams has applied the term *phthinoplasm* to the degraded bioplastic material of the blood whose formation is attended by the wasting and other characters of "consumption." Virchow describes infiltrated tubercle of the lung as the cheesy metamorphosis of an *exudation.*

9. The **gray** tubercle, when *alone*, may be subject to **cornification**; *i. e.*, drying into a horny substance as hard as a shot. When

FIG. 2.

Gray Tubercle.

FIG. 3.

Tubercle Corpuscles.

*with the yellow* tubercle, or after conversion into it (Rokitansky),[4] the gray may undergo **softening.**

---

[1] Several pathologists now assert that only the miliary semi-transparent and opaque granular matters are really tubercular. Further allusion to this question will be made presently.

[2] Microscope in Pract. Medicine, 1867, p. 305.

[3] Edin. Med. Journal, 1867, p. 875.

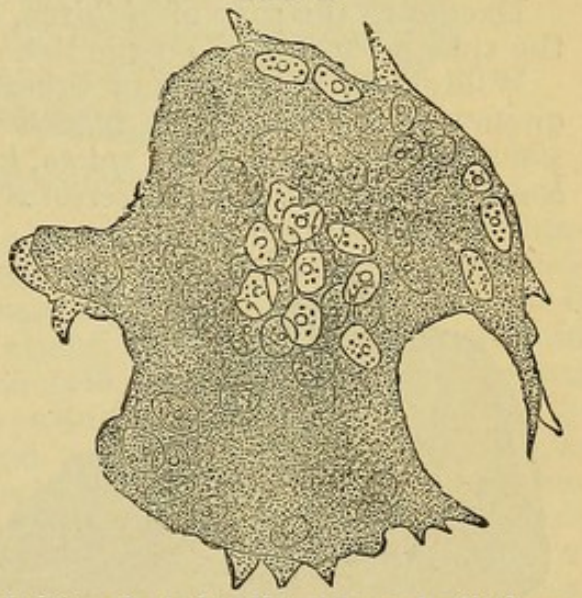
[4] Laennec accepted this conversion, which Rokitansky for a long time denied, but afterward considered frequent. Virchow admits it, and Hérard declares it to be universal.

10. **Yellow** tubercle *usually* **softens**; sometimes it **cretifies**; *i. e.*, becomes chalk-like, by degeneration.

11. The softening of tubercle is sometimes, at least, *spontaneous;* not depending upon any agency of surrounding parts. In regularly formed tubercles it commences at the **centre**; in the irregular, at *any* part. *Tuberculous* **softening** must not be confounded with *suppuration* of inflamed tissue; although they are often mingled, and have been considered identical by some pathologists.

12. Examined with the microscope, tubercle is found to consist essentially of: 1. An *amorphous*, *granular* material, containing *irregular solid* corpuscles (tubercle-corpuscles), considered (Virchow) to be *shrivelled nuclei.* 2. Elements of *disintegrated tissue* of the part involved; as epithelial cells, fibres, etc. 3. Results of *degeneration; e. g.* oil-globules, pigment, calcareous particles, etc. 4. Results of *inflammation* of surrounding parts; lymph, pus, exudation-corpuscles. 5. Extravasated *blood-corpuscles*, from hemorrhage, the effect of obstruction or ulceration of vascular trunks. With these, *giant cells* are observed. Rokitansky, Virchow, Wagner, and others have recognized these, under different names. Prof. Schüppel (of Tubingen) gives the following account of the constituent elements of a tubercle: 1. Multinuclear giant-cells, resembling the "myeloplaxes" of myeloid or giant-celled sarcoma; 2. Large cells of an epithelial type; 3. Small round cells like lymph-corpuscles; 4. A peculiar reticulum, in the meshes of which these cells lie. This pathologist considers the giant-cells to be the essential element of tubercle; although the bulk of it consists of cells of an epithelial type. As observed in the lymphatic glands, he asserts that, after a short stage of "development," each tubercle undergoes retrogressive changes. These are: 1. Necrosis, leading to *caseation* and its sequelæ or terminations, cretification, and softening; 2. Transformation into *fibrous tubercle;* 3. Formation of calcareous or other concretions in the centre of the tubercle; 4. Resorption, which is probably always preceded by necrosis of the tubercle.

FIG. 4.



Multinucleated Cell (with nucleoli) from lung in chronic phthisis (Green).

13. Tubercle contains **no truly specific,** heterologous **form.** All that it holds is the consequence of abortion and degeneration. The contrary has been asserted (1880) by Cohnheim and others, who speak of a tubercular "virus." I consider this to be neither proved nor probable.[1]

[1] Among the observations claimed to support the "inoculability" of tubercle, are those of Toussaint (Journal de Méd. et de Chirurgie, May, 1880) upon swine; producing "galloping consumption" in them by feeding or inoculating them with tuberculous

14. The process of **tuberculization** or deposit of tubercle in an organ may occur (Rokitansky)—

*a.* **Insensibly,** in the course of ordinary nutrition.

*b.* With **hyperæmia,** or local determination of blood.

*c.* With **inflammation**; *i. e.*, as a *product* or concomitant of the inflammatory process.

15. The effects of the tubercular deposit *upon the part* are: 1. **Obstruction,** and arrest or impairment of function. 2. **Inflammation**; *e. g.*, in phthisis pulmonalis (consumption), which has, in its usual form, been sometimes designated (Condie) *tubercular pneumonia*, from the common occurrence of inflammation of the lungs with deposit of tubercle. 3. **Ulcerative destruction** of the tissue by the repeated new formation and softening of tuberculous matter, producing **cavities.**

16. Tubercle, once thrown out, is never (as a whole) *absorbed.* It can only be *eliminated, cretified, or cornified.* Elimination is the most common. After this has happened, sometimes *callous* cavities are formed by a process of **cicatrization.**

17. The *order of frequency* with which different organs are affected with tubercle is (Rokitansky) as follows:

| | |
|---|---|
| Lungs; | Spleen; |
| Intestines; | Kidneys; |
| Lymph-glands; | Liver; |
| Larynx; | Bones; |
| Serous-membranes; | Uterus; |
| Brain; | Testicles. |

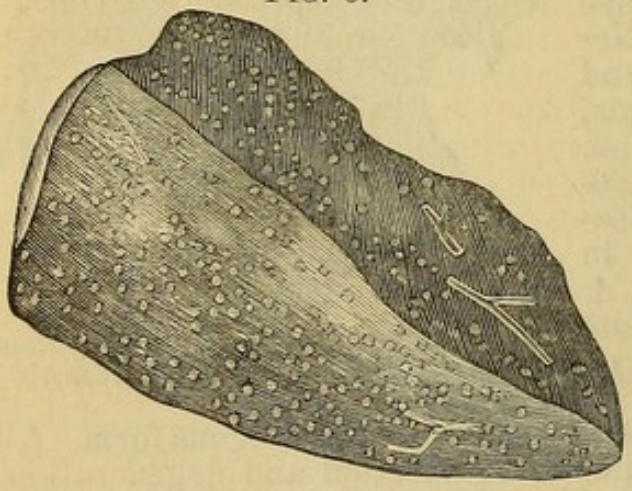
Except in the case of *children*, in whom the *lymph-glands* and the spleen stand first on the list.

Willigk, in 1317 cases of tuberculosis, found the order of frequency as follows: *lungs, intestines, mesenteric glands, larynx, lymphatic glands, peritoneum, spleen, kidneys, pleura, liver, air-passages, bones, genital organs, brain, cerebral membranes, urinary passages*, etc.

18. But the organs most frequently *first invaded* by tubercle are, at all times of life, the **lungs** and **lymph-glands.**

19. The *parts especially preferred* by tubercle for its deposit are, in the lungs, the apex; in the pia mater, about the base of the brain; in the brain, the gray substance; in bones, the cancellated structure; in the bowels, the lowest part of the ileum; in the testicle, the epididymis; in the female generative apparatus, the Fallopian tubes and fundus of the uterus.

FIG. 5.



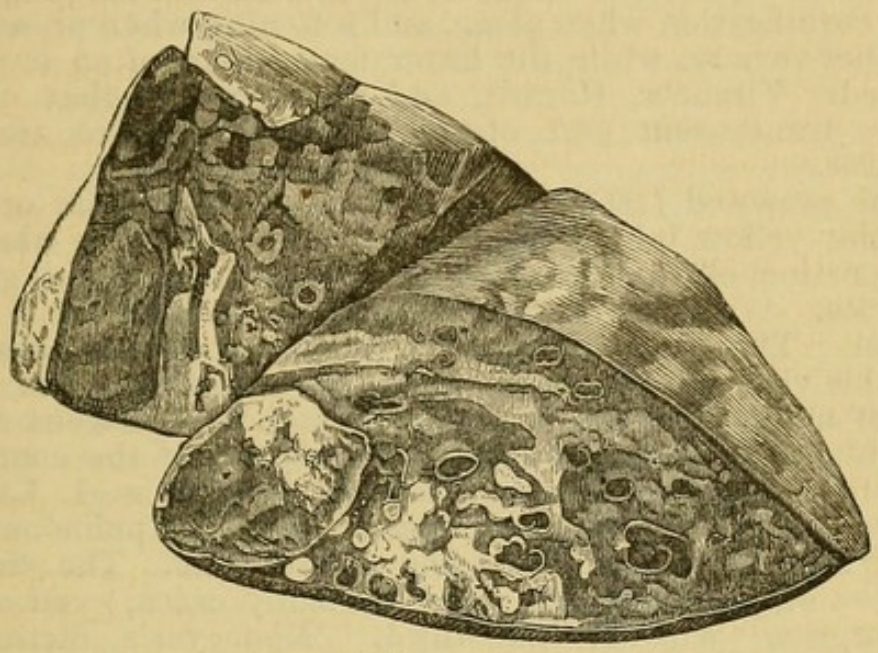
Miliary Tubercles.

matter, or by injecting blood from tuberculous animals. *Per contra*, reference may be again made to the experiments of H. C. Wood and Formad, who produced tuberculization by inoculation with *diphtheritic* matter.

20. The immense experience of Rokitansky has sustained to the statement that tubercle has certain general **incompatibilities**; the most important of which are, with cancer, with typhus, with ague, and with goitre (bronchocele, enlargement of the thyroid gland). These incompatibilities are, however, *general*, not *universal;* as, for instance, a considerable number of cases have been observed, in which cancer and tubercle were undeniably present in the same patient. Burdel (1869) observed this in more than a hundred instances.

21. The only possible cure of tubercular disease (*e. g.*, of the lungs in phthisis) after the deposit has occurred, consists in the

FIG. 6.



Apex of Tuberculous Lung.

total **elimination** (or absolute quiescence by cornification or cretification) of the tuberculous matter, and *improvement in the general* **hæmatosis** (*i. e.*, blood formation), so that *no new tubercle is formed.* The two great indications, therefore, in the treatment of pulmonary consumption (Radclyffe Hall) are, to gain **time** and **tone**; *time*, by allaying or preventing pulmonary or bronchial inflammation and irritation; and *tone*, by strengthening the patient's system by all possible hygienic and therapeutic measures.

The following additional remarks upon tuberculosis are made necessary by discussions in connection with the views of Virchow, Oppolzer, and Niemeyer, and others on the pathology of phthisis. A retrospect of the history of the subject will show that (after Bayle) Laennec[1] first established the doctrine, sustained after-

[1] Dr. Thomas Percival asserted, in 1789, that "inflammation is only an occasional concomitant of the formation and softening of tubercles." This has been admitted by Graves, Trousseau, Bricheteau, and Jaccoud. See Teissier, London Med. Record, Feb. 5, 1873.

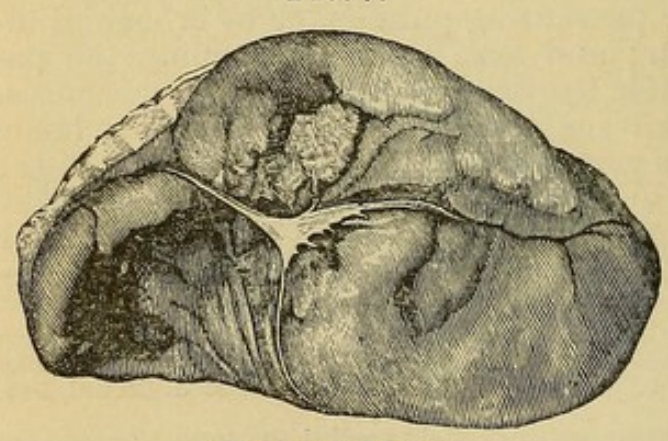
It appears to have been Portal who first definitely applied the term *tuberculous* to what are now commonly called *caseous* deposits. Sylvius, Mead, Cullen, Reid, and especially Baillie, described the process of their formation. Bayle anticipated Laennec in teaching the existence of a tuberculous diathesis; he made, however, six kinds of consumption, of which one was "granular," and another "tubercular."

wards with great vigor by Louis, that tubercle is a specific product of a diathesis; that there are two varieties of it, the miliary semi-transparent, and the yellow infiltrated; and that tubercle is, when deposited, *causative* of inflammation. Andral maintained about the same opinion. In consistency with his other pathological views, Broussais insisted that the yellow infiltration is certainly inflammatory, and that therefore the other variety must be so also. Louis, especially, denied this. Andral, Cruveilhier, Reinhardt, Addison, Condie, and others have, since Broussais, recognized the importance of inflammation as a *factor* in the history of pulmonary consumption. Rokitansky clearly declared the belief, that both the semi-transparent granular and the opaque caseous forms ought to be considered as tuberculous exudates: the gray undergoing cornification when alone, and softening when present with the other variety, while the latter may either soften or become cretified. Virchow, Hérard, and Cornil assert that only the miliary transparent and opaque *granular* matters are really tubercles.

Buhl proposed (1857) the theory of the *resorptive* origin of phthisis; yellow infiltration occurring first, and the absorption of a portion of this producing the semi-transparent granular tubercles. Waldenburg and others have supported a similar opinion. The idea of a specific tubercular *virus* is associated with this view. Niemeyer accepted the assertion of the dependence of miliary tubercle upon the presence of caseous masses; but without so positively stating the nature of the connection. The order of occurrence as described by him is—1. Catarrhal pneumonia or broncho-pneumonia; 2. Caseous pulmonary infiltration; 3. Secondary formation of tubercle. The first two of these stages may take place, in many cases, even of fatal consumption, without the third. Niemeyer's dictum has become quite famous, that "the greatest danger for the majority of consumptives is, that they are apt to become tuberculous."

On the other hand, the well-known experiments of Waldenburg, Fränkel, Burdon Sanderson, and Wilson Fox lend support to the view that the miliary granulation may be primary, perhaps inflammatory, and the yellow infiltration the result of *degeneration* either of tubercle, or of *any* inflammatory or other morbid product. Dr. C. Ellis, of Boston, U. S., propounded this as the mode of origination of yellow tubercle, in 1860. Virchow, moreover, has shown that "caseous masses" occur sometimes entirely without the previous occurrence of pneumonia.

FIG. 7.



Cicatrix of Lung.

With Profs. Austin Flint and Alonzo Clark,[1] the writer is not prepared to accept, as a whole, the resorptive theory of consumption, or in any sense the necessarily secondary nature of tubercular deposits. Dr. Austin Flint's careful analysis of 670 cases of phthisis (*N. Y. Medical Record*, Feb. 1, 1873) affords substantial clinical proof that *neither inflammatory affections within the chest, nor hæmoptysis*, can have much, if any, *causative* influence in the development of phthisis. Nor does the same experience present evidence that scrofulous disease of the glands has to do with the etiology of pulmonary tuberculosis. The following questions may be regarded as, at present, *sub judice:*

1. Are both the semi-transparent miliary granulations and the yellow caseous infiltrations to be called tubercules, or only one of these two forms; and, if but one, *which* is tubercle? This appears to be a question, not of fact, but of *nomenclature;* to be decided by the general suffrage of the profession. Meantime, accuracy in clinical description requires that terms be used which *define* the special lesions occurring in connection with phthisis, otherwise than by the use of the words tubercle or tuberculization alone. On the whole, it seems best to restrict the term tubercle (in accordance with etymology) to that which *began*, at least, as a nodule or nodules; while the terms caseous deposit and caseous infiltration may well apply to amorphous (steatomatous?) accumulations, in the lungs or elsewhere. Some pathologists (as Bastian) would drop the term tubercle altogether. *Granular* degeneration (Empis) is an expression used, almost in the same sense by a few authors. But nothing seems as yet to be finally settled upon this point.

2. Does one of the above-mentioned deposits always precede and produce the other? And, if so, which is primary? There is, as already said, much in favor of the belief that caseous deposits are often, if not mostly, secondary.

3. Does inflammation, as a rule, precede and produce tubercle, or tubercle inflammation? Likewise, does hæmoptysis produce tuberculization, or, as Laennec taught, tuberculization hæmoptysis? Against the general causative action of pulmonary hemorrhage, we have the valuable experiments of Perl and Lipmann[2] and Sommerbrodt, showing that *blood passing into the sound lung does not of itself act as an irritant*, but is gradually absorbed without producing any observable change, unless moderate emphysema.

Some facts in the clinical history of pulmonary and other affections in children militate against the "catarrhal broncho-pneumonia" and "resorptive" theories of consumption. Thus, 1. Scrofulous *caseous* formations or degenerations of glands, mucous membranes, and bones are common in children, without tubercle of vital organs following in many cases. Virchow has assented to the importance of this. 2. Catarrh, bronchitis, and even broncho-pneumonia, are more common in children than in adults; and

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[1] N. Y. Medical Record, Nov. 15, 1870. Mandl also rejects the "caseous-pneumonia" theory of phthisis; Traube and Skoda deny at least "phthisis ab hæmoptoë."

[2] Virchow's Archiv., Band xlix., Heft 2.

yet pulmonary phthisis is much more rare during childhood than later in life.

Litten, of Berlin, in some elaborate investigations of acute tuberculosis,[1] has sustained the statement that "tubercles may develop extensively in the membranes of the brain, without a trace of exudation." This must be admitted, I believe, by most pathological anatomists.

Considerable attention has been given lately to the *giant cells* found in tubercular deposits. Schrœder von Kolk described these many years ago as "compound cells, consisting of epithelium charged with the nuclei which become the ordinary tubercle-corpuscles." Virchow[2] referred to them as "larger cells with a manifold division of the nuclei, so that twelve, twenty-four, or thirty are contained in one cell." They are irregular in form, without any cell-wall, the largest about $\frac{1}{200}$ of an inch in diameter. Each contains from three or four up to thirty or forty nuclei, which are conspicuously nucleolated. Branching processes extend from many of them, making a *reticulated* arrangement, occupied with epithelioid elements. This *adenoid* (gland-like) *net-work* is regarded by Rindfleisch as characteristic of tubercle. Small round cells also infiltrate (in the lungs) the alveolar walls of the air vesicles. The giant cells do not appear ever to undergo further development.

What is their nature? It is not clear that they are entitled to the name of *cells* at all. Klein and Da Costa[3] believe them to be excessively developed or *fused epithelial cells.* Cornil holds that they result from the coagulation of plasma in capillaries in course of obliteration.[4] Malassez[5] believes rather that they are *vaso-formative cells*, which abort without development. Kiener and Poulet[6] assert the occurrence of a fusiform enlargement of a blood-vessel, or more rarely a lymphatic vessel, and an agglomeration of cells around this enlargement; the endothelial cells of the capillary walls also undergoing a "vitreous degeneration, and becoming fused together into a solid cylinder, a transverse section of which presents the appearance of a giant cell." Woodward[7] agrees with Virchow in interpreting the change as occurring, not in capillaries but in *lymphatic vessels.* "Around the vessel," he says, "at the point of obstruction, lymphoid cells accumulate in a group. These are probably a swarm of migrated white corpuscles, while the large endothelial elements are produced by the gradual enlargement of the fixed corpuscles of the area of connective tissue involved." The tendency of all the above interpretations is to sustain a view favoring the essentially *abortive* and **degenerative** nature of tubercle, rather than that of its being an *organized neoplasm*, as held by Wedl, Vogel, and Vir-

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[1] Volkmann's Sammlung Klinischer Vorträge, No. 119, 1878.

[2] Cellular Pathology, Lecture xx.

[3] Philada. Medical Times, June 19, 1880, p. 469.

[4] Cornil draws a distinction between the *scrofulous* and the *tuberculous* process, even when both occur in the lymphatic glands; the reticulated tissue belonging especially to the scrofulous formation. (Allg. Med. Cont. Zeit., Sept. 20, 1879.)

[5] London Med. Record, June 15, 1878.

[6] Gazette Médicale de Paris, Feb. 28, 1880.

[7] Second Medical Volume of Medical and Surgical History of the War, 1879; p. 593, *et seq.*

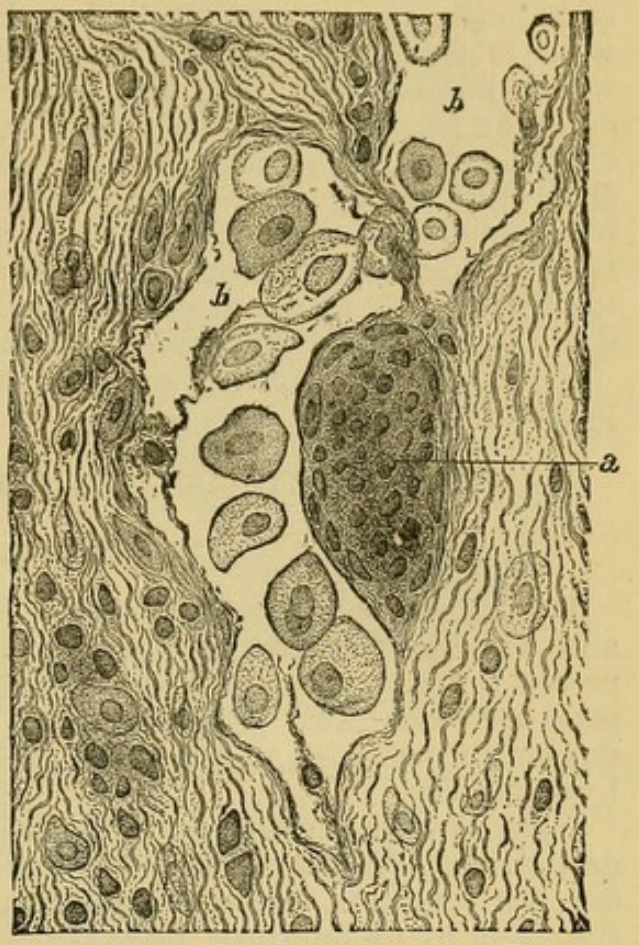
chow, or a specific *infection* or *contagion*, as lately urged by Cohnheim, Harnsell,[1] and others.

Amongst other prominent pathologists, Charcot (1878) distinctly avowed the conviction that "caseous pneumonia or pneumonic phthisis is a tuberculous disease." Da Costa[2] has expressed a similar opinion.

Cornil[3] asserts the discovery of a *pigmentary accumulation* in the giant cells of some tuberculous formations, by which solidity is given to the deposit, and thus the patient's life may be prolonged.

On the whole, without venturing to dogmatize on so difficult a subject, the following seems to be the most probable conclusion: That there is a certain constitution, often but not always inherited,[4] having a proclivity to the *precipitation*, under reduction of vital force, of semi-organized granular and corpuscular deposits from the blood;[5] in the glands, mucous membranes, and bones in childhood, constituting scrofula; in the membranes of the brain, at the same period, making tubercular meningitis; later in life, usually in the lungs, producing phthisis; that such deposition may occur without inflammation as a cause, and may then produce inflammatory disturbance; while it is, not rarely, thrown down under the influence of local inflammation, especially when pus is formed; also, that resorption is not the usual, but may possibly be an occasional mode of origination of tuberculization, in the lungs or elsewhere; and that by breathing, swallowing[6] or inoculation of tuberculous or other

FIG. 8.




Section through a Lymphatic in a Tuberculous Bowel. × 480. *a*, granular fibrin-clot; *b*, *b*, loosened endothelial elements. (From the Second Medical Volume of the Med. and Surg. History of the War. Photomicrograph by Surgeon J. J. Woodward, U. S. A.)

[1] Graefe's Archiv., 25, part iv., 1879.
[2] Philada. Medical Times, June 19, 1880, p. 472.
[3] Le Progrès Médical, 1880, p. 866.
[4] "It cannot be assumed," says Virchow, "that caseous pneumonia creates no inheritable tendency."
[5] Dr. W. Minor Logan, of Cincinnati, asserts the importance of *phosphatic* deposits in tuberculosis; owing especially to deficiency of oxidation.
[6] Toussaint, Journal de Méd. et de Chirurg., May, 1880; Bollinger, Archiv. fur Exp. Pharm. and Pathol., Vol. I., Nos. 4 and 5, 1873.

degenerated animal matter, the tendency to the production of tubercular deposits may sometimes be promoted. I persist, however, in denying the existence of a *specific virus* in tubercle, such as has been recently compared by Cohnheim to that of syphilis.

If these views be correct, it must be recognized as a fact that fatal pulmonary phthisis may occur under several forms: 1. Most commonly, as a progressively degenerative affection of the lungs, with intercurrent, usually successive attacks of inflammation, which hasten very much the fatal termination. 2. As a tubercular or "caseous" pneumonia; subacute in character, or even chronic; but, sometimes, so rapid as to be named "acute phthisis," or galloping consumption. 3. As a simple, slowly progressing, cachectic, non-inflammatory, degenerative disease; constitutional depravation and pulmonary disorganization going on together, and death occurring sometimes from general vital decline, and sometimes from pulmonary obstruction or disability.

(On *Depression* and *Exhaustion*, see Sect. iii., General Therapeutics.)

## GENERAL PATHOLOGY OF AFFECTIONS OF ORGANS.

### HYPERTROPHY.

Hypertrophy is, strictly, *overgrowth;* an increase of the size and weight of a part without change of tissue. It is only in recent times that this has been clearly distinguished from *enlargement with alteration of tissue;* which is really, in many cases, a *degenerative* change, and therefore akin rather to *atrophy* than to hypertrophy.

Hypertrophy is often, *per se*, physiological or natural; although depending on a morbid or pathological cause. When the bladder, for instance, becomes hypertrophied in consequence of obstruction by an enlarged prostate, although the *latter* is morbid, the increase in the strength and thickness of the muscular coat of the bladder is as normal as is that of the uterus during gestation; in due proportion to the necessities of its use.

A constant law of the animal economy is, that, within certain limits, the **growth** of an organ is in proportion to its **exercise**; provided that this exercise is not too violent, and is alternated with sufficient periods of repose.

The three **causes** of hypertrophy, then, are (see *Paget's Surgical Pathology*):—

1. Increased *exercise* of a part in its healthy functions.
2. Increased accumulation in the blood of the particular *materials* which a part appropriates in its nutrition or secretion.
3. Increased *afflux* of healthy *blood* to the part.

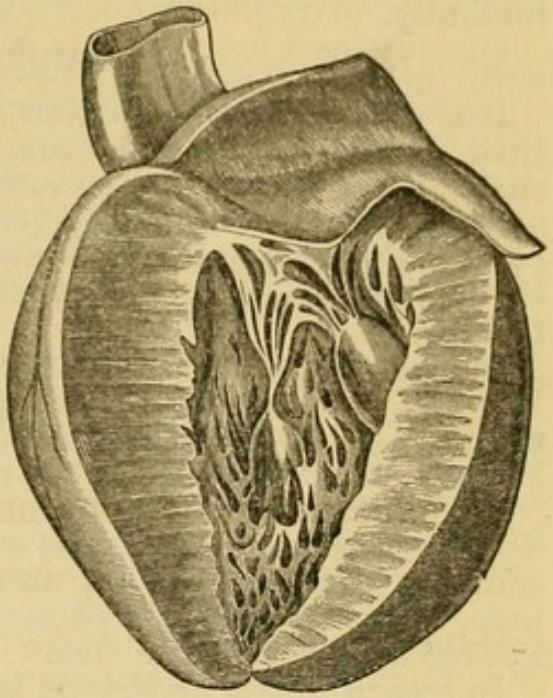
We may illustrate the first of these modes of causation by the blacksmith's arm, the legs of the *danseuse*, the cuticle of the *laborer's hand*, *the heart* in cases of *valvular obstruction*, etc.

An example illustrative of the second is found in the enlargement of a healthy kidney, when the opposite one fails, from disease, to remove from the blood its due share of urea, etc.

The third is exemplified in the large growth of hairs around an inflamed ulcer or osseous fracture; by the growth of the

bones of the limbs when their nutrition is increased by exercise; by hypertrophy of a bone, a portion of which has been subject to disease with vascular excitement; and by Hunter's interesting experiment of the transplantation of the spur of a cock to its *comb*.

FIG. 9.



Hypertrophy of Heart.

**Adaptative** hypertrophy is remarkably seen in the changes undergone by the skull in proportion to its contents. The cranium is subject to—1, eccentric, and 2, concentric hypertrophy. The first occurs in cases of *hydrocephalus*, the second in cerebral *atrophy;* the bony case in the one instance *expanding* with its contents, in the other *thickening* so as to fill up the abnormal void.

**Corns** illustrate hypertrophy extremely well.

*Intermittent pressure*, or attrition, causes *hypertrophy;* *constant* pressure, *atrophy* or absorption.

The formation of corns upon the foot illustrates the former of these laws; the wasting away of vertebræ under the incessant pressure of an aortic aneurism affords an example of the latter. *A Chinese woman's bandaged foot, with corns*, exemplifies *both*.

## ATROPHY.

Atrophy requires but a few words in this place. Simple atrophy is exactly the reverse of simple hypertrophy; viz., wasting and diminution of a part, without change of structure. But most pathologists include also under the same term such defects of nutrition as result in **degenerative** changes; constituting the two classes of—1, **quantitative**, and 2, **qualitative** atrophy. The latter (*e. g.*, fatty degeneration) is frequently attended by *increase* instead of diminution of *bulk* in the parts affected.

The **causes** of atrophy are:—

1. Deficient *exercise* of a part;
2. Deficiency in the *supply of blood;*
3. Defective supply of *nervous influence;*
4. *Disease* (inflammation, etc.) in the part.

Of the first of these, the atrophy of the mamma of the old maid may afford an example.

Of the second, softening of a portion of the brain from the obstruction of one of its arteries by a coagulum.

Of the third and first together, the muscles of a paralyzed limb.

Of the last, there are many instances familiar to the pathologist, although obscurity often attends their individual history; as the *gouty kidney*, etc.

Quantitative or qualitative atrophy may affect the heart, arteries, brain, muscles, bones, liver, kidneys, pancreas, testicles, etc., and also *morbid products*, *e. g.*, inflammatory exudations, cancer, etc.

Qualitative atrophy, or **degeneration**, will be again alluded to presently.

### IRRITATION.

Irritation and inflammation are at once the most familiar in their phenomena, and the most obscure in their nature, of all pathological processes or occurrences. I shall confine myself to a broad statement of what I believe to be most important truths concerning them; although a somewhat argumentative tone may be unavoidable, upon topics which are subject to so much controversy.

**Stimulation** and **irritation** are often inconveniently confounded. It would be desirable to confine the *former* term to excitation *within physiological limits;* applying the *latter*, irritation, only to such an *excessive* action upon a part as produces *morbid* effects.

With this, which seems to me a necessary postulate — I would define **irritation** as an *arrest of vital movement in a part.* This could only be elucidated by an extended allusion, inappropriate here, to the *correlation of physical and vital forces; life* being considered as a *molecular motion.*

In regard to the *circulation*, to the old and accepted maxim—

Ubi *stimulus*, ibi *affluxus*—

may be added a second—

Ubi *irritatio*, ibi *stasis*—

and, anticipating the account about to be given of *inflammation*, a third—

Ubi *phlogosis*, ibi *effusio.*

The **stasis** of **irritation** may be either *partial* or *complete; limited* to a very small surface, or widely *extended;* and *transient*, or *continued* for a considerable time.

If *complete*, *extended*, and *continued* in a tissue at all vascular, **inflammation** *follows.*

If the influence of the irritant be very *limited* and *transient*, a temporary stasis, with functional and sensational disturbance only, follows.

If it be *extended* and *continued*, or *repeated*, and yet of power enough to produce a *partial stasis only*, a condition may result to which the name of **chronic inflammation** has been commonly given; of which more will be said hereafter.

The *effects*, or **symptoms**, of irritation differ according to the tissue or organ affected. When a nervous expansion or centre is involved, *pain* is the most familiar result.[1] Functional disorder, of the part innervated, also occurs. Irritation of muscular tissue causes tonic *spasm.*

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[1] Inman and Radcliffe, especially, have insisted that pain is always a sign of *local diminution of vital energy;* it is on the way toward death.

## INFLAMMATION.

Inflammation must be considered briefly, as to its *symptoms*, *minute phenomena*, *products*, *terminations* or *effects*, and *post-mortem* appearances.

Its recognized **symptoms** or signs, in a part open to inspection, are *redness*, *heat*, *swelling*, and *pain*.

In **internal** organs inflammation is detected chiefly by *pain*, *increased by pressure* or *motion*; *obstruction* or *alteration* of the *functional action* of the organ; and *general* (sympathetic) *vascular excitement*. Certain *physical signs* also aid in the diagnosis of inflammation of particular organs (see *Semeiology*).

The **minute phenomena** of inflammation, as seen under the microscope, have been variously construed by different observers. The use of the *term* itself has been, of late years, distorted (Virchow) from its old meaning; and attempts have been made by some (Andral, Eisenmann, Bennett) to do away with it entirely; attempts which fail, because, in proposing other terms, a *part* only is substituted for the *whole*. It is curious, that, of the three terms proposed by three leading pathological writers, **hyperæmia, stasis,** and **exudation,** to take the place of the old word inflammation, *each* expresses a *single* part or element of the process, which *can only be defined by including them all;* while cell-distension and cell-multiplication, made by Virchow so prominent in the process, are only incidental attendants upon it.

The essential minute phenomena of inflammation are, as regards the circulation —

Central stasis;
Concentric hyperæmia;
Exudation.

Other changes affecting the red and white corpuscles, etc., occur, but are of secondary consequence.

The *nature* and *cause* of these phenomena require, for their comprehension, a close consideration of the laws which govern nutrition, the capillary and arterial circulation, and innervation, in their mutual relations, under the influence of *normal stimuli* and of *morbid irritants*.

What are the actual causes of inflammation?

Not section of the nerves; nor division of the arteries (*per se*); nor divisions of the veins; nor ligation of arteries nor of veins; nor (*per se*) of lymphatics. Only such causes as modify the **molecular state** of the tissue, and arrest, for the time, the usual interchange of material between the tissue and the blood, can induce a true inflammation.

Let us, then, revert to our maxims. *Ubi stimulus, ibi affluxus. Stimulation* causes *active hyperæmia. The arteries thus exhibit* **reflex action**; a fact which, in spite of the teachings of Unzer, Hunter, and C. Bell, has been denied or misunderstood by nearly every other physiologist and pathologist down to the present day.[1]

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[1] Much of the accepted pathology of to-day, and some current notions in therapeutics, are founded upon an erroneous view of the physiology of the circulation, especially in regard to the mode of action of the arteries. The error is, the statement

Next, *ubi irritatio, ibi stasis.* Stimulation, carried to *morbid excess*, interrupts, by the molecular disturbance it induces, the *normal life-movement* of the part, and checks the interchange of particles going on between the capillaries and the tissue. Thus *the circulation in the capillaries of the part is arrested;* **stagnation** ensues.

*Both* of these results, active arterial hyperæmia and capillary stasis, follow from the *same* or *similar* causes acting in *different degrees.* They may and do exist *together;* the one (capillary stasis) at the very **point** of irritation, the other (active hyperæmia) in the vessels **surrounding** it.

What follows? Hydraulics may answer this question. A quantity of fluid in (minutely or potentially) porous vessels, being forced upon a centre whose condition allows little or none of it to be transmitted, an **effusion** must result, through the more or less distended coats of the vessels.

This is expressed by our third maxim: *Ubi phlogosis* (inflammation), *ibi effusio.* This phenomenon, the "exudation," has attracted almost all the attention of many pathologists, to the exclusion of other occurrences which precede and accompany it, —an exclusion which has had detrimental results (J. Hughes Bennett) as regards the practical and therapeutical deductions made therefrom. The importance of the part taken by the arterial circulation in inflammation is well illustrated by the control exercised over it in acute cases, as recorded by a number of observers, by the *ligation* or *compression* of the *main artery* of the limb or other part affected.[1]

Virchow has another theory of inflammation, forming a part of his "Cellular Pathology." He identifies (confounds) **stimulation,** which is physiological or normal, with **irritation,** always abnormal or pathological in kind or degree. All irritation, in vascular or non-vascular parts, is, according to him, either *functional*, *nutritive*, or *formative.* Exudation, or transudation of fluid into the substance of an inflamed part, is admitted only of the more vascular, soft, and superficial tissues. In others (parenchymatous inflammation) the essential effect of irritation of a high degree is said to be, the taking, by their own action or attraction, of more fluid into the *cells* of the organ or tissue. Thus they swell and become clouded in aspect under the microscope. Next the *nucleus* divides; and afterwards the cells themselves multiply by division, or *proliferate.* The origination of pus or other cells from entirely liquid lymph, as asserted by Paget,

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(based upon experiments whose results were only *morbid*, not normal) that the *normal, active* contraction of the arteries always *diminishes* the supply of blood through them; as Virchow expresses it "*the more active the vessel, the less the supply of blood.*" Another generation will attain to the correction of this; and, with it, a revolution in the pathology of inflammation must occur. See the author's *Prize Essay on the Arterial Circulation*, Trans. Amer. Med. Association, 1856. More recently (1858) *Lister* asserted reflex action as occurring in the vessels in inflammation; as well as the central arrest of nutrition. A brief summary of the argument is given by the author in Am. Journal of Med. Sciences, July, 1868, p. 288; and again, in the Trans. of the Amer. Med. Association, 1872, p. 181. An admission of the true view, based on the experiments of Legros and Onimus, occurs in the Brit. and Foreign Medico-Chirurg. Review, April, 1871, pp. 291, 303.

[1] See an article on this subject by S. W. Gross, M.D., Philadelphia Medical Times, January 16th, 1871.

Robin, and others,[1] Virchow denies, in accordance with his maxim "omnis cellula e cellulâ." Either the epithelial cells or those of the connective tissue (common germ-stock of all tissues) must give rise, by change, to pus-cells. At a certain stage cell-enlargement and proliferation become destructive of function; the parts then degenerate. But Virchow does not with any distinctness at all state the relation between this **degeneration** and that *nutritive* or *formative* **action** which he considers the one effect of "irritation;" nor does he allow to the condition of the blood-vessels enough importance in what, in any tissue, he calls inflammation.

This eminent pathologist has *added* to previous knowledge that of the changes going on in the cells of an organ, a part of which is inflamed. These are important. But he omits, in his account of the process, much; and makes, on the whole, the least satisfactory theory of it lately held by any authority.

To return to our account of it: an example of the three stages or processes of stimulation, irritation, and inflammation may be well studied in the action of a mustard plaster applied to the skin. Its first effect (the only one if the mustard be diluted) is **stimulant** merely; the skin grows warmer and redder, and its sensibility is moderately heightened. Next (if it be strong and allowed to remain), **irritation** is produced; shown by *pain*, tenderness on pressure, and a deeper or more purple redness. If the irritating matter be now withdrawn, all of these may subside without going further. But if the irritation be continued up to a certain point of duration and intensity, **inflammation** occurs. Then we have redness, heat, pain, and swelling, with effusion of lymph, which, as after a cantharidal plaster, raises the cuticle in a blister.

I express, then, what I hold to be a correct theory of the nature of the inflammatory process, in this definition: *Inflammation is a local lesion of nutrition, with concentric vascular excitement;* resulting in either *exudation* or *cell-distension* and *proliferation;* being *destructive* at the centre of the inflamed part, but often *formative* (*hyperplastic*) *around* and at some distance from it.

The observations of Cohnheim, of Berlin, have, since 1867, attracted great attention. He announced (after Addison, 1841, and Waller,[2] 1846), that, in an inflamed part, some of the colorless corpuscles of the blood (leucocytes) migrate through the walls of the capillaries, and become blood-corpuscles. Without waiting even for the complete establishment by others of this as a fact, some rushed at once to the assumption of a new theory of inflammation, making it to consist *entirely* in this cell-emigration! Rashness in pathological speculation could hardly go further than this. As Stricker[3] has shown, however, Cohnheim's labors have recalled attention to the changes in the circulation during inflammation; while other sources of pus-cells must be admitted. It may be added that, in view of the known fact that

[1] Hérard and Cornil (on Pulmonary Phthisis, 1867), after minute and prolonged investigation, declare that "the theory of proliferation cannot altogether take the place of that of new formation at the expense of pre-existing blastema." Paget appears to be inclined, recently, to give it up.

[2] Philosoph. Magazine, vol. xxix., pp. 271, 398.

[3] Studien aus dem Inst. für experiment. Pathol., Wien, 1869.

pressure increases osmose, this escape of corpuscles through the walls of the capillaries must find its best explanation, partly at least, in the *increased pressure* already alluded to in our description of inflammation.[1]

The **products** of inflammation (by exudation) are (see *Paget's Surgical Pathology*): **1. Serum. 2. Blood. 3. Mucus. 4. Lymph.**

The inflammatory effusion of non-fibrinous **serum** is *rare*. The term is often applied, however, clinically, to a serosity which contains a small proportion of fibrin, as the effusion which follows pleurisy, etc.

**Blood** is exuded *occasionally* only; *e.g.*, in dysentery, in nephritis, and (dissolved) in pneumonia.

**Mucus,** a certain portion of which constantly moistens the surface of mucous membranes in health, is altered both in character and in amount by inflammation. The general statement is, that when a mucous membrane is inflamed (*e.g.*, in bronchitis) its secretion of mucus is *at first arrested*, then *increased*, and lastly *perverted* in character.

*Coagulable* **lymph** is, however, the characteristic ingredient of inflammatory exudations.

Inflammatory lymph is divided by Paget into — **1, fibrinous,** and **2, corpuscular** lymph; with the assertion that, as a general fact, the more fibrin a specimen of lymph contains (provided it be *healthy* fibrin), the greater the probability of its being organized into tissue; while the larger its proportion of *corpuscles*, the greater is the likelihood of suppuration or some other degenerative process, and the more tardy its development into any kind of tissue. (Note an *at least apparent exception to this* in the case of *diphtheritic* exudation.)

**Fibrinous** (coagulable or plastic) lymph is very well seen in the autopsy of any case of acute pleurisy, peritonitis, meningitis, etc.

It is a whitish or yellowish-gray substance, opaque or semi-translucent after coagulation, arranged in fibrous bands, meshes, or layers, and causing adhesions between contiguous portions of the tissues affected.

**Corpuscular** lymph may be studied in the fluid of the vesicles of herpes, or of an ordinary blister, especially if the surface of the latter have been exposed to the air for a short time.

The lymph- or exudation-**corpuscles** which it is found (under the microscope) to contain, are about $\frac{1}{2500}$ of an inch in diameter, "round or oval, pellucid, and appearing, as if through irregularities of surface, dimly nebulous or wrinkled." Examined after a few hours under the action of water, a round and pellucid nucleus is observed within and attached to the cell-wall. It is, however, impossible, in a given instance, to make a *positive* microscopical diagnosis between these corpuscles of inflammatory lymph and the normal lymph or chyle corpuscles, colorless corpuscles of the blood, and pus corpuscles.

The "biography" of the lymph of exudation consists in its **resorption** or its **development** into connective, fibrous, elastic,

[1] Stricker thus states the results observed in experimental inflammation: "traumatic interference, disturbance of circulation, exudation of fluid and morphological constituents, disturbances of nutrition, new formation."

osseous, cartilaginous, or vascular tissue, or into epithelium, etc. (rarely into muscular or nervous tissue), or its **degeneration** into *pus*, or *granule cells*, *exudation granules*, etc.

The rapid **resorption** of a moderate amount of exuded lymph constitutes the **resolution** of an inflammation.

Its **development** is also a form of resolution, but with modification of the condition, dimensions, etc., of the part. This is, in some instances, merely restorative.

The **degeneration** of the exudation results in its being *thrown off*, as pus, or *finally absorbed*, in the form of molecular exudation-granules.

Whether immediate absorption, development, or suppurative or granular degeneration shall occur in any particular case of inflammation will depend—

1. On the state of the **blood**;
2. On the **seat** of the inflammation;
3. On the **degree** of inflammation.

(See Paget's[1] experiments as to the influence of the state of the **blood** on the lymph of vesication.)

As to the **seat** of the attack, *generally*, *serous* and *synovial* tissues (pleural, peritoneal, arachnoid, articular) are most subject to *adhesive* inflammation, *i.e.*, with the exudation of *fibrinous* lymph. *Mucous* tissues seldom exhibit this, being more prone to *suppurative* inflammation. (Exceptions in *croup*, *diphtheria*, etc.) *Parenchymatous* tissues, as those of the lungs, liver, etc., when inflamed, may suppurate, or the lymph exuded may degenerate into exudation granules, and be finally absorbed.

The **degree** of the inflammation exercises an important influence. The greater its intensity or severity (*i.e.*, the more decided and extended the *local lesion of nutrition* and the *concentric hyperæmia*), the further will the lymph exuded be removed, in its primary character, from that transuded in the natural state of the part, and the more will its subsequent changes differ from those of normal nutrition and development.

**Degeneration** may affect both the *fibrinous* and the *corpuscular* portions of inflammatory lymph.

The **fibrinous** part is subject to—

1. Drying into *horny concretions* (as on the valves of the heart, from endocarditis).
2. *Fatty softening.*
3. *Liquefactive* degeneration.

Both of these last contribute, no doubt, to the process of **suppuration.** Calcareous and pigmental degeneration are also described as occurring in it occasionally, but they are less important.

The **corpuscular** portion of lymph may also undergo—

1. *Withering* and *drying* (as in scrofulous inflammation of glands).
2. Conversion into *granule cells* (inflammatory globules of Gluge), by *fatty degeneration.*
3. *Calcareous*, or

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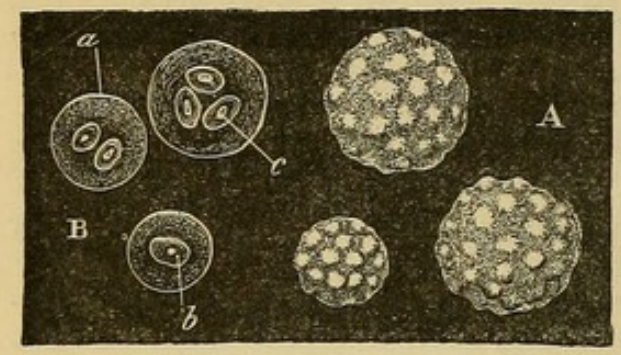
[1] Surgical Pathology, Phil. ed., p. 220.

4. *Pigmental* degeneration.

5. *Most commonly*, degeneration of the lymph-cells into **pus-cells**; the whole of the lymph being transformed into **pus.**

Pus is a greenish-yellow, creamy fluid, consisting, under the microscope, of the *liquor puris* and *pus-cells* or corpuscles. The latter are definite cell forms, larger than blood or lymph corpuscles, somewhat more irregular, and often containing several nuclei. Their characters, however, are *not invariably distinctive;* as might be anticipated, from their being merely *transformed or degenerated* lymph, blood, of epithelial corpuscles; or, in a wound or ulcer, cells of granulation. The assertion of Cohnheim,[1] of Berlin, that pus-corpuscles are white blood-cells which have emigrated through the unbroken walls of the blood-vessels, should not be finally accepted without very full confirmation. Professor Koster, of Utrecht, thinks he has obtained similar results. Professor K. Balogh,[2] of Pesth, after great care, failed to confirm them; and the same is reported by Feltz and Picot. Lebert, Stricker, Caton, Woodward, and others find their observations to accord with them. If the fact of migration (Recklinghausen) of the colorless corpuscles be granted, it does not follow, as Stricker has shown,[3] that *all* pus-cells are of this origin. Some, most probably, are, as before taught by Paget and Virchow, of local origin. Stricker announces his discovery of the *division* of the "nomadic cells or pus-corpuscles." It has, perhaps, also, not yet been proved to be quite impossible, that what Cohnheim believes to be emigrating corpuscles, may be nuclei of the capillary walls, which, as described by Beale[4] "are at definite intervals, often on alternate sides of the tube," and, according to his opinion, "may give origin to the white corpuscles."

FIG. 10.




A. Pus Corpuscles (magnified 350 diameters). B. Same made transparent with acetic acid. *a.* Cell wall. *b.* Nucleus. *c.* Nucleolus. (After Lebert.)

Chemically, pus may be approximatively tested by its solubility in *liquor potassæ.*

**Suppuration** is either **circumscribed** (as in abscess), **diffusive** (in erysipelas), or **superficial** (in leucorrhœa, etc.).

The **effects** of inflammation *upon the part or organ involved* are

| | |
|---|---|
| *Enlargement;* | *Degeneration;* |
| *Induration;* | *Ulceration;* |
| *Softening;* | *Mortification.* |

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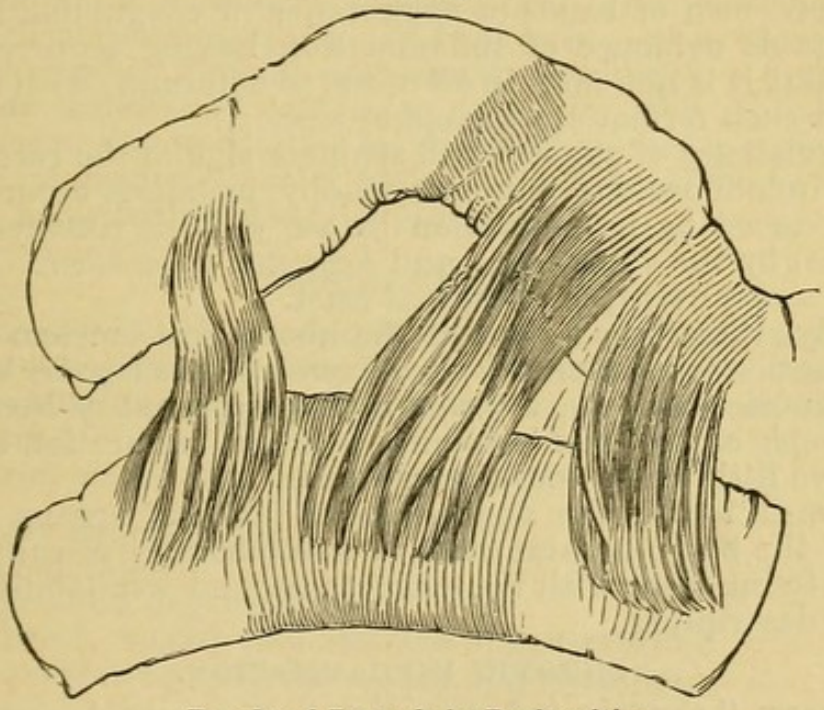
[1] Virchow, Archiv. Band 40, s. 38.
[2] Brown-Séquard's Archives de Physiol., etc., 1869.
[3] Studien aus dem Instit. für experiment. Pathol., 1869. See, also, a paper by Dr. S. H. Chapman; Am. Journal of Medical Sciences, October, 1872.
[4] Microscope in Practical Medicine, 1867, pp. 165, 166.

We thus see that very different or even *opposite* results may follow from different *degrees* or *kinds* of inflammatory action.

**Specific** inflammations require merely to be mentioned here. They are, chiefly, **scrofulous, erysipelatous, rheumatic, gouty, diphtheritic, exanthematous, syphilitic, gonorrhœal.** These are distinguished from ordinary inflammation and from each other in that—1, each exhibits a peculiar *plan* of morbid process; 2, each depends upon a peculiar *cause;* 3, the effects of the said cause are irrespective of its *quantity* mostly; 4, they are especially *diffusible* from one part of the body to another; 5, they sometimes exhibit definite *stages* of the morbid process (*e. g. primary* and *secondary* syphilis); 6, they are *nearly all*, in a more strict sense than other inflammations, *self-limited*; the morbid process *dying out* after a certain time. (This *last* statement applies especially, if not only, to *exanthematous*, *diphtheritic*, *rheumatic*, *gouty*, and *gonorrhœal* inflammations; hardly to the scrofulous, erysipelatous, and syphilitic.) It may be questionable whether erysipelatous inflammation is a truly specific process; as reason has been shown for believing that its peculiar character may be owing to the tissue which it chiefly affects; viz., that of the lymphatic system.

FIG. 11.



Bands of Lymph in Peritonitis.

The **post-mortem appearances** of inflammation are important. They can be *generalized*, so as to avoid, to a great extent, the necessity of their reiteration in connection with the description of particular diseases. It is, at the same time, necessary for the student to *familiarize* himself with them, in their local manifestations, by availing himself of every opportunity for autopsic study.

A part which has been inflamed will exhibit after death some, or perhaps all, of the following signs:

| | |
|---|---|
| Redness; | Coagulable lymph; |
| Enlargement of blood-vessels; | Pus; |
| Tumefaction; | Softening; |
| | Induration. |

The **redness** of inflammation must be distinguished with care from—1st, *hypostatic* injection, or cadaveric settling of blood in the lowest parts, by gravitation; and 2d, *physiological* redness, as of the stomach during digestion, the ovaries during menstruation, etc. Inflammatory redness is usually more *unequal* than either of the above, and is *stellated*, or in *streaks* and *patches*.

**Enlargement** of the **blood-vessels** of a part may occur as the result of a *chronic* affection, different from acute inflammation. This sign, therefore, is to be interpreted with great caution. The same is true of *tumefaction* (general swelling of the part).

**Softening**, if not *cadaveric* (as when the body has been long defunct), may have been produced by *chemical action*, as in poisoning by corrosive sublimate, etc., by *acute and rapid inflammation*, or by *slow*, *non-inflammatory degeneration*.

**Induration** may also follow either acute inflammation, or slow, atrophic degeneration.

**Sclerosis** is the term now commonly applied to it, especially in connection with morbid affections of the cerebro-spinal system.

The presence of bands or membranes of coagulable **lymph** is indisputable evidence of inflammation having occurred in the part. But it is not easy, in *all* cases, to determine with certainty whether such formations are *old* or *new*.

The existence of **pus** is a still stronger sign of the recent existence of inflammation; but, occasionally, instances occur in which pus, produced by inflammation in *one* part, is conveyed (as in phlebitis) by the veins, etc., and *deposited in another*. This, although a rare event, is *possible* at least.

Clearly, therefore, *no one* of the above post-mortem signs of inflammation is sufficient *alone*. *Several of them together* will make the diagnosis certain. *Redness* and *enlargement of blood-vessels*, with *lymph* or *pus*, and softening or slight induration of tissue, will leave little or no doubt in any case.

The variations in the appearance of different organs and portions of the body, in fatal cases of inflammatory disease, are not such as to interfere with the correctness and availability of this general description.

### CHRONIC INFLAMMATION.

The term "**chronic inflammation**," *as commonly* applied, is a *misnomer*. Although the cases so designated exhibit more or less redness, heat, swelling, and pain, yet they are wanting in *exudation;* without which, pathologically, there is *no inflammation*. There is also, in the same cases, only a *partial stasis* or *none;* and the *hyperæmia* is less intense and less strictly concentric than in acute inflammation.

The characteristics of this state, for which a new term is wanted, are—

1. **Enlargement** of the **blood-vessels** of a part (chronic hyperæmia), with the flow of a large amount of blood **through** it.

2. Exaggeration of the **sensibility** of the part (hyperæsthesia) and morbid **irritability.**

3. **Deficient** or irregular *functional* **power.**

4. Unusual **proneness** to acute or subacute *attacks* of **actual inflammation.**

For this familiar combination of pathological elements I propose the name **hyperæmæsthesia.**

It has, with some, been usual to designate it by the term "**irritable,**" in connection with the name of the particular part affected, thus—

Irritable uterus;
Spinal irritation;

to which I would add—

Irritable eye (chronic ophthalmia);
Irritable stomach (chronic gastritis);
Irritable brain, etc.

*Erythromelalgia* is a descriptive name applied to an unusual affection of the extremities (nearly always the feet) observed and reported upon by Graves, Vulpian, Weir Mitchell,[1] Lannois,[2] and others. Its signs are, burning pain, bright red flushing of the feet, turgescence of the blood-vessels, and violent arterial pulsations, with local increase of temperature. It is clearly a condition of *active hyperæmia, with hyperæsthesia.* (According to the erroneous current ideas of vaso-motor physiology, it is called by authors an instance of *vaso-motor paralysis;* which I hold to be precisely opposite to the truth. Consistently with such a view, symmetrical *gangrene* is said[3] to result from "peripheral vascular spasm:" a veritable *reductio ad absurdum.*)

## DEGENERATION.

Degeneration has been already defined as **qualitative atrophy;** *i. e.*, a substitution, under decline of the organic force incessantly active in nutrition and repair, of *abnormal* for *normal* structure and material.

The forms under which this occurs are—

Fatty degeneration;
Calcification;
Pigmental degeneration;
Fibroid, colloid, and amyloid degeneration;
Liquefactive and corpuscular degeneration.

*Amyloid* degeneration has been described by Virchow and others as occurring in the brain, spleen, liver, etc. It consists in the conversion of tissue into a substance which is made reddish-brown by iodine, instead of yellow, as the healthy tissues would be. It is also characteristically stained of a violet color by *methyl-aniline* (methyl green).

*Hyaline* degeneration of the vessels and substance of the lym-

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[1] Am. Journal of Med. Sciences, July, 1878.
[2] Paralysie Vaso-Motrice des Extrémités, ou Érythromélalgie. Paris, 1880.
[3] Am. Journal of Med. Sciences, April, 1881, p. 539.

phatic glands has been described by Wieger (1880). A translucent substance is formed, very slightly colored by iodine, but deeply stained by carmine.

In regard to these alterations it may be stated (see *Paget's Surgical Pathology*) that

1. They are changes such as may be observed **naturally occurring,** in one or more parts of the body, at the **approach** of the natural **termination** of **life.**

2. The new material is of **lower chemical composition** than that normal to the part; *i. e.*, it is less removed from the inorganic state: as fat, gelatin, calcareous matter, etc.

3. In **structure,** it is **less developed;** being crystalline, granular, simply globular, etc.

4. In **function,** it is **less powerful.**

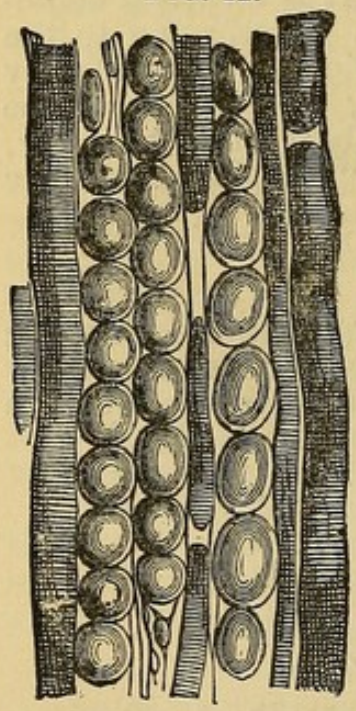
5. In **nutrition,** it is **less active** and capacious.

6. *Generally*, although *not always*, **constitutional** debilitation *precedes*, and (we may infer) institutes the local alteration of structure.

7. *Inflammation* or other *local* **disease** may, by *impairing* the *nutrition* of a part, **cause** it to degenerate.

The form of degenerative disease which has received the most attention from pathologists is **fatty degeneration.** This has been carefully studied, as it occurs in the heart, arteries (atheroma), brain, muscles, bones, liver, kidneys, and morbid products. It must be distinguished carefully from mere fatty *accumulation* or adiposity.

FIG. 12.



Fatty Infiltration of Muscle (magnified).

Our knowledge of the facts concerning degenerative disease, and of the share which it claims in the domain of structural pathology, once almost entirely usurped by inflammation, is among the most important of the acquisitions of the medical science of the last half century.

### MORBID GROWTHS.

**Tumors,** and morbid growths benign and malignant, which may be best classified as forms of structural degeneration or vitiated nutrition, I leave, at present, except to state the following classification (Cornil and Ranvier, Bristowe):—

**Connective-tissue** tumors; viz.,

*Fibroma*, of fibrous tissue.
*Lipoma*, of fatty material.
*Myxoma*, of mucous tissue.

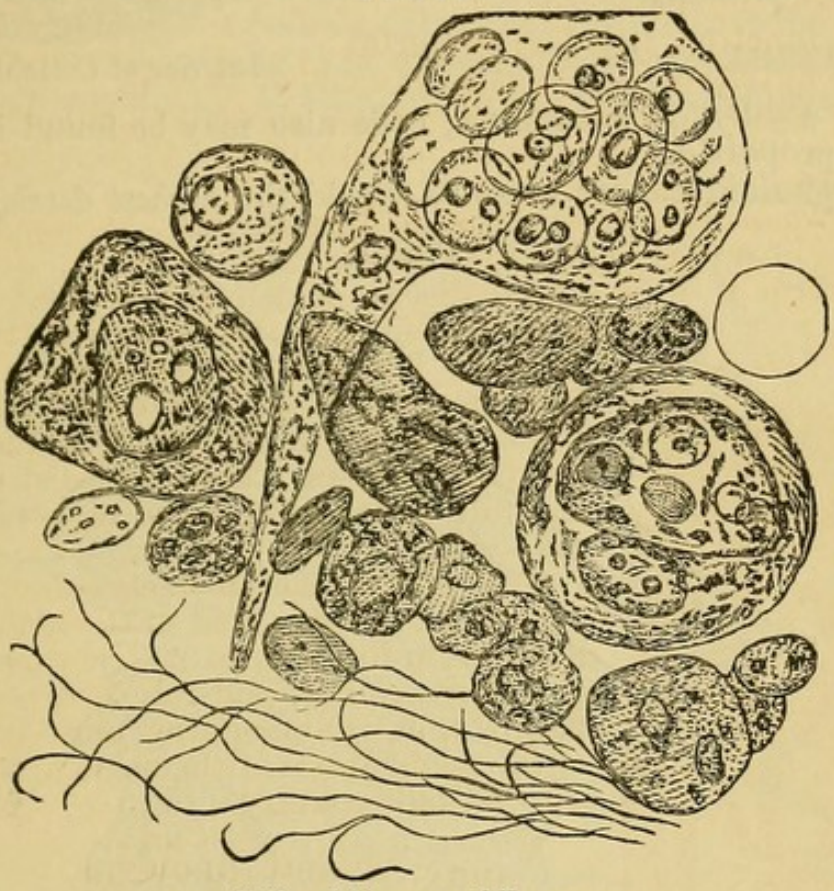
| | |
|---|---|
| **Cartilaginous** tumors, | *Chondromata.* |
| **Osseous** tumors, | *Osteomata.* |
| **Nervous** tumors, | *Neuromata.* |
| **Muscular** tumors, | *Myomata.* |
| **Vascular** tumors, | *Angiomata.* |

| | |
|---|---|
| **Glandular** tumors, | *Adenomata.*[1] |
| **Embryonic tissue** tumors, | *Sarcomata.* |
| **Syphilitic** tumors, | *Gummata.* |
| **Alveolated epithelial** tumors, | *Carcinomata.* |

**Cancer** or *carcinoma* falls under the notice and care of the medical practitioner, when it attacks parts or organs within any of the great cavities of the body.

There is no essential impropriety in classing, pathologically, *all* **malignant** growths[2] together as cancerous; their *subdivisions* being clinical or surgical. (By *malignant*, we mean prone to

FIG. 13.



Cells of Cancer of Tongue.

unlimited increase: disastrous in effect or result; and difficult or impossible of arrest or cure.)

Cancers may, then, be divided simply into

Scirrhus, or hard cancer (fibro-carcinoma);
Colloid, or gelatiniform (alveolar) cancer;
Encephaloid, or brain-like (medullary) cancer.[3]

Each of these contains, as its anatomical elements, **fibres, fluid,** or semi-fluid jelly, and **cells.**

**Scirrhus** is composed mainly of a fibrous or filamentous tissue, with little fluid, and comparatively few cells. It never becomes encephaloid, nor does encephaloid cancer ever become scirrhus.

---

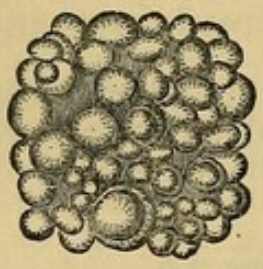
[1] *Lymphomata.*

[2] Tubercle is not a *growth*, but rather an *abortion* of tissue.

[3] Other names are used, as *epithelial, melanoid, osteoid, hæmatoid, myeloid,* and *villous cancer, enchondroma,* round-celled, *spindle-celled* and *giant-celled sarcoma,* etc.

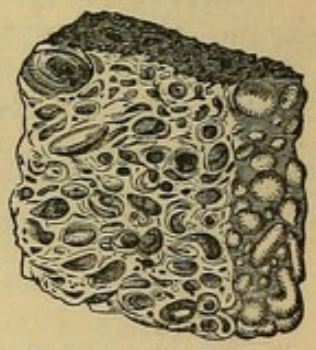
**Colloid** cancer has a variable amount of fibrous tissue, arrayed as a *matrix* (compared often to the structure of an orange), con-

FIG. 14.



Colloid, exterior.

FIG. 15.

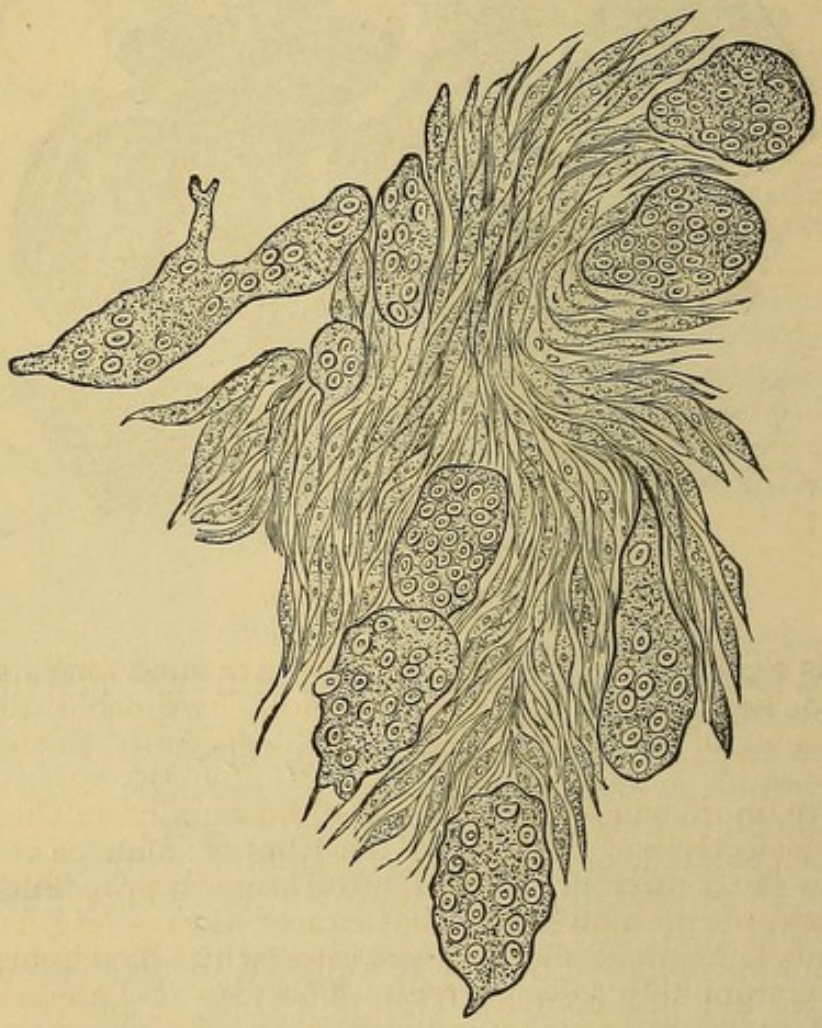


Interior of Colloid.

taining a *jelly-like* substance; cells also may be found in it, but in less proportion.

**Encephaloid** cancer is (so to speak) the *highest development* of

FIG. 16.



Myeloid Sarcoma. (Virchow.)

carcinomatous formation. It consists of a fibrous matrix, containing an abundance of abnormal, multiform cells, and a peculiar fluid.

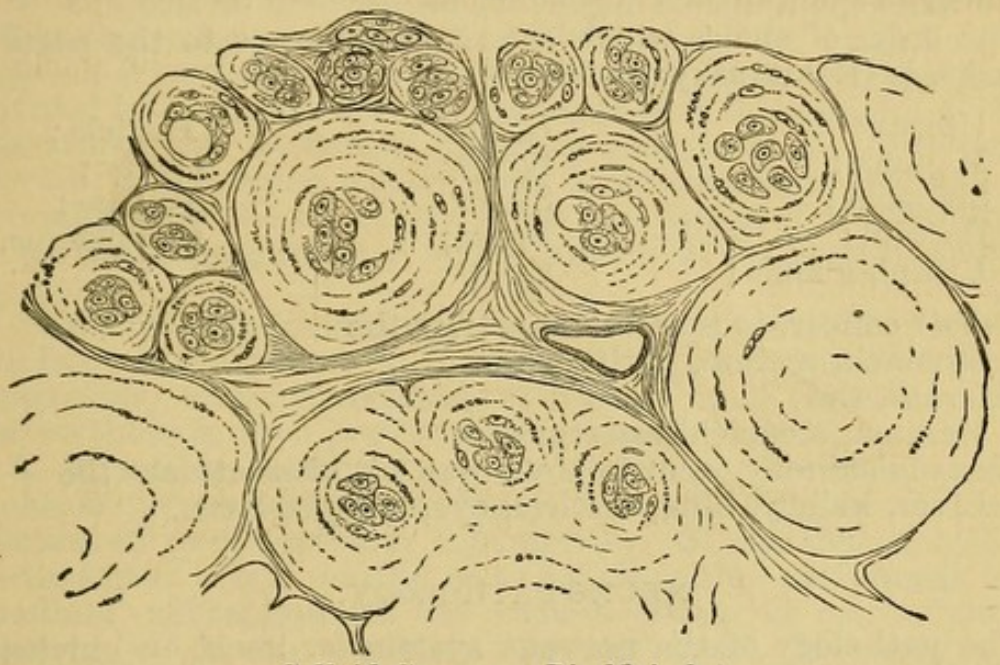
When a cancer, of either type originally, is based upon and includes bony structure, it constitutes *osteo-sarcoma.* If it develop itself upon the skin, or other epithelial tissue, or, wherever occurring, display similar structure, it may be called *epithelioma.* If its location involve especial *vascularity* and hemorrhage, it assumes the form and name of *fungus hæmatodes.* The *pain* of cancer (which is not always present) appears to depend upon the extension of the disease to a tissue well endowed with *nerves.*

The cells, fibres, and fluid[1] of cancer are all *abnormal.*

Cancer-cells are of *various* shapes, resembling gland-cells, but larger, averaging about $\frac{1}{1000}$ of an inch in diameter.

But are these forms *heterologous; i. e.*, different from anything normal or natural to the body? Are they, so to speak, *implantations*, or **distortions?** I believe, fully, that the latter is the correct view. The "cancer-cells" are no longer held by micrologists to be pathognomonically distinctive; they are **homologous** with

FIG. 17.



Colloid Cancer. (Rindfleisch.)

other cells found in the body. Yet, they are such forms as *do not normally belong to the part;* being produced by morbid alteration or perversion of its natural elements; especially the *epithelial* elements.

They are, moreover, *crowded together* abnormally, in the meshes of an imperfectly and irregularly distributed connective tissue; and with a great number of *nuclei*, often large in proportion to the cells. Classen's opinion (1870) that cancer always originates in a morbid development of *migrated leucocytes* (white blood-corpuscles) is extremely unlikely to be correct. The view of Thiersch (1865)

[1] The milky or creamy "cancer-juice," which emulsifies with water, is considered highly characteristic by many observers. The *malignity*, or proneness to increase, and extend destructively, of a tumor, is generally in proportion to its succulence or juiciness. The *lawless manner of growth* of cancer-cells, compared with the regular apposition of those of the same part when healthy, is very important.

and Waldeyer (1867), ascribing cancerous growths to a modification in the cell-multiplication of ordinary epithelium, is more probable. This view is favored also by Rindfleisch; who, however, admits as one mode of growth of epithelial cells, their derivation from wandering formative cells, in contact with existing epithelium.[1]

The most rational theory of cancer is *dynamic*. The disease consists in a morbid **tendency**; a tendency to enormous and unhealthy growth of a formation which is, at the same time, vascular and sensitive, showing subserviency, although under *perversion*, to the physiological laws of the organization.

The origin of cancer in most cases, is **constitutional**; it is frequently *hereditary*. A cancerous *cachexia* is recognized in very many cases; its most obvious sign is a peculiar sallowness of the skin. It follows much more rapidly upon cancers of the *viscera* than upon those of external parts.

Genuine cancer may always be expected to return after removal —although exceptions occur, and it has occasionally been known to undergo spontaneous degeneration.

The order of choice which cancer exhibits, as to the parts it attacks, is (Rokitansky) as follows:—

| | | |
|---|---|---|
| Uterus; | Liver; | Testicle; |
| Mamma; | Bones; | Ovary; |
| Stomach; | Skin; | Tongue; |
| Rectum; | Brain; | Œsophagus. |
| Lymph-glands; | Eye; | |

*Colloid* cancer, in particular, prefers the
Stomach, rectum, peritoneum.
*Scirrhus*, the
Mamma, stomach, intestines.
*Encephaloid* may occur in any organ; it *alone* attacks the
Liver, kidney, lung, testicle, eye, lymph-glands.

## NEURO-PATHOLOGY.

The pathology of the **nervous system** is, itself, an extensive field, of which the merest *coup d'œil* is possible here.

For the purposes of pathological study, we must remember that the *anatomical* elements of the nervous apparatus are—1, gray, vesicular; and 2, white, tubular; and 3, gray, gelatinous nervous substance; the first being arranged in *ganglia*, the latter two in *nerves* and *commissures*.

Physiologically, the functions of the *ganglia* (nerve-**centres**, and, probably, impressible *peripheral* ganglionic *expansions* also) are, to *receive*, *reflect*, *accumulate* (generate?) and *distribute* nerve-force. The sole function of **nerves** and *commissures* is, to *transmit* or *conduct* it.

As a whole, we may state the offices of the nervous apparatus to be as follows:—

---

[1] It is a proposition not yet proven, that "wandering leucocytes" take part in the formation of any *tissue* whatever. I believe it to be extremely doubtful.

| | |
|---|---|
| Excito-motor; | Internuncial, *i. e.*, |
| Excito-secretory; | Sympathetic and |
| Sensory; | Synergic (co-ordinative); |
| Voluntary motor; | Psychical, *i. e.*, mental. |

The forms of disorder to which this apparatus is liable, are

1. **Anæsthesia**; *i. e.*, that condition in which the patient remains without cognizance of impressions made on a surface which is normally sentient. This may result, *a*, from disease of the nervous expansion at the **surface**; *b*, from disease or injury of the **conducting nerve,** somewhere on its track; *c*, from disease of the **cerebral sub-centre** of sensation (sensorium). The *thalami* are believed by physiologists generally to be the *aggregative* centres of sensation; and local lesion (apoplectic clot, tumor, softening, etc.) in or near them is frequently associated with hemiplegia, etc. The paralysis is commonly observed (from *decussation* of the nerve fibres in the medulla oblongata and cord) on the side *opposite* to that on which the lesion has occurred.

2. **Subjective** impressions and sensations; *i. e.*, those which affect the consciousness of the individual *without the action of any external or peripheral cause.* These subjective impressions may be divided into—*a*, those which are **central** in their origin, as when disease of the thalamus causes neuralgia of the fifth pair of nerves; and *b*, those whose origin is **intermediate**; as, when inflammation of the *sheath* of a nerve, or disease of the *spinal axis*, gives rise to pain referred by the patient to the *termination* of the nerve.

Subjective **hyperæsthesia,** or perversion of sensibility or psychical impressibility, may be, in its causation (as regards the nervous apparatus), either **functional**[1] or **organic**; and the difference between these is often practically important.

3. **Muscular Paralysis**; or that condition in which a central volition (or an excitation equivalent to it) fails to produce its normal effect of muscular contraction. Of this defect, also, the pathological origin may be, as to its seat, either **peripheral, intermediate, subcentral** (in the corpora striata or cerebellum), or **central** (in the convolutions of the cerebrum). Muscular as well as sensational paralysis dependent on an affection of the brain, occurs usually (not invariably) on the *opposite side* to that of the encephalic lesion. Scarcely ever is palsy confined *exclusively* to sensation or to voluntary motion—although the *proportion* of impairment of the two functions may vary considerably in particular cases. Both kinds are occasionally *reflex* (Brown-Séquard). Investigation is now being industriously made into the *pathogeny* (morbid origination) of motor as well as of sensory paralysis, by means of—1, minute *anatomical dissection;* 2, *comparison of lesions* found after death with *symptoms* occurring during life; 3, *vivisectory experimentation.* To my judgment it appears, that the "net result" of *experimentation* upon the brain and spinal cord of living animals during the last twenty years, has been to throw

[1] *Functional* nervous disorder results generally (Todd) from an abnormal state of the *blood.* See a valuable lecture on Hyperæsthesia, by Dr. C. Handfield Jones: Brit. Med. Journ., Sept. 30, 1871.

the whole subject into inextricable confusion. While a quite different estimate of it prevails generally in the profession, it is admitted by several excellent authorities that *normal and morbid anatomy*, taken together with the study of the *healthy* and *disordered performance of functions*, afford at present the most reliable information required by the physician for his guidance.[1]

4. Involuntary contraction of voluntary muscles, or **Convulsion.** Only very *local*, and usually *transitory* spasmodic affections are (unless **reflex**) *peripheral* in their origin. Usually, convulsive affections are accounted for by functional excitement of the **motor centres**; the causation of which is made up of three elements, in variable proportion, viz.: *a*, morbid **irritability** of the **spinal** *excito-motor apparatus itself; b*, imperfect *control* over the *subordinate nervous centres* by the **brain**, from an abnormal condition of the latter; *c*, the disturbing influence of a **peripheral irritant**—as, tension of the gums in teething, worms in the bowels, undigested food in the stomach, etc.

The three forms of spasmodic disturbance to which the muscles are liable under a morbid alteration of innervation, viz., the **tonic, choreic,** and **clonic,** are illustrated respectively in **tetanus, chorea,** and **epilepsy.** Modifications of these are seen also in *spastic spinal paralysis*, *locomotor ataxia*, and *paralysis agitans* (shaking palsy). Hughlings-Jackson has shown that chronic *localized* convulsions (affecting a few muscles only), as well as localized paralysis, usually result from localized lesion of the *opposite* hemisphere of the *brain*—most generally a *tumor.*

5. **Excito-secretory** action (Longet, Campbell) becomes morbid under conditions like those which produce convulsion; for example, the diarrhœa of infants, so common at the time of dentition.

A subject of great interest, almost neglected until within the last dozen years, is that of the effects of various agencies, through the **nerve-centres,** upon the **blood-vessels.** But while the *vaso-motor nerves* are now recognized, and their special relation to the *ganglionic* or sympathetic system is beginning to be appreciated, much confusion on this subject still pervades physiological and medical literature.

A further important pathological subdivision exists as to the method of **origination** of those functional disturbances of the nervous system to which we have been alluding.

The source of any of the above forms of nervous disorder, hyperæsthesia, anæsthesia, muscular paralysis, or convulsion, may be (when not purely local) either—

1. Central **organic** disease;
2. Blood-perversion, or defective **nutrition;**
3. Purely **sympathetic** disturbance.

It is far from easy, in many cases, to mark the diagnosis between these different modes of causation of nervous symptoms; but, when the decision has been made in any instance, the *prognosis* is *most* favorable in the *last* case; less so in the *second;* and most unfavorable in the *first*, *i. e.*, when the symptoms have their origin in an actual organic lesion of an important nerve-centre.

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[1] To justify the above expressions, let any one compare the *earlier* and *later* dicta of Dr. Brown-Séquard, one of the most eminent of living experimental physiologists.

6. **Neurasthenia** is a term conveniently applied (Beard) to a general deficiency of tone and strength in the nervous system; producing symptoms variously affecting either the **organic, sensory, muscular,** or **psychical** functions. If the *first* of these be most involved, we have *nervous dyspepsia*, occasionally *diarrhœa*, or *vomiting; amenorrhœa*, *dysmenorrhœa*, or *menorrhagia;* perhaps *retention of urine*, etc. When the *sensory* apparatus exhibits the results of neurasthenia, *neuralgia* is the most common symptom; sometimes, however, *anæsthesia* occurs instead, or functional *paralysis of special sensation; e. g.*, blindness or deafness. In the *muscular* apparatus, the same condition produces a tendency to *convulsions*, general or local. *Psychical* symptoms of neurasthenia are extremely various in both sexes. In females, all of the above disorderly conditions and actions have been commonly grouped together, under the term **hysteria**. But they occur in men and boys also, under circumstances sustaining the view that in either sex the relation to the reproductive system is rather accidental than essential. Special terms have been invented to apply to some of the mental peculiarities of neurasthenic subjects; as *anthropophobia*, dread of society; *agoraphobia*, a fear of crossing large open spaces; *thanatophobia*, an excessive apprehension of death; to which might be added *ergophobia*, or morbid shrinking from active effort of every sort, etc. But these expressions add very little to definiteness of description. Undoubtedly, neurasthenia bears an increasingly large part in the diseased states with which the physician has to deal in the artificial life of modern society, especially in great cities. *Causes* of neurasthenia are chiefly as follows: sexual or sensual excesses or abuses; very large use of tobacco; continued "worry," *i. e.*, fretting and wearing care about business, domestic, political, or other affairs; too laborious brain-work, with insufficiency of sleep; social dissipation, with the same effect of deficiency of rest; unhygienic habits of bodily and mental inertia, typified by the *corset*, the *veil*, the *novel*, and the *sofa*. Predisposition to nervous debility, with some or all of its attendant ailments, is, beyond question, often *hereditary*. It is promoted, sometimes, by inheritance of the *gouty* constitution.

No more interesting question has been latterly discussed in neuro-pathology, than that of the **localization of brain-lesions.** Physiological experiment and pathological anatomy have contributed many facts concerning it; in the former field, through the labors especially of Fritsch, Hitzig, Ferrier, Schiff, Nothnagel, Carville, Duret, Burdon Sanderson, Brown-Séquard, Lussana, Vulpian, Munk, Tamburini, Dupuy, and Lauterbach; in the latter (morbid anatomy), by those of Dax, Bouillaud, Broca, Hughlings-Jackson, Charcot, Bouchard, Pitres, Brun, Lépine, Meynert, Huguenin, Mills, and others.

Space cannot be given here for a full statement upon this subject.[1] My own view upon the physiological inquiry is this: that all that has been proved is, the functional association, in some

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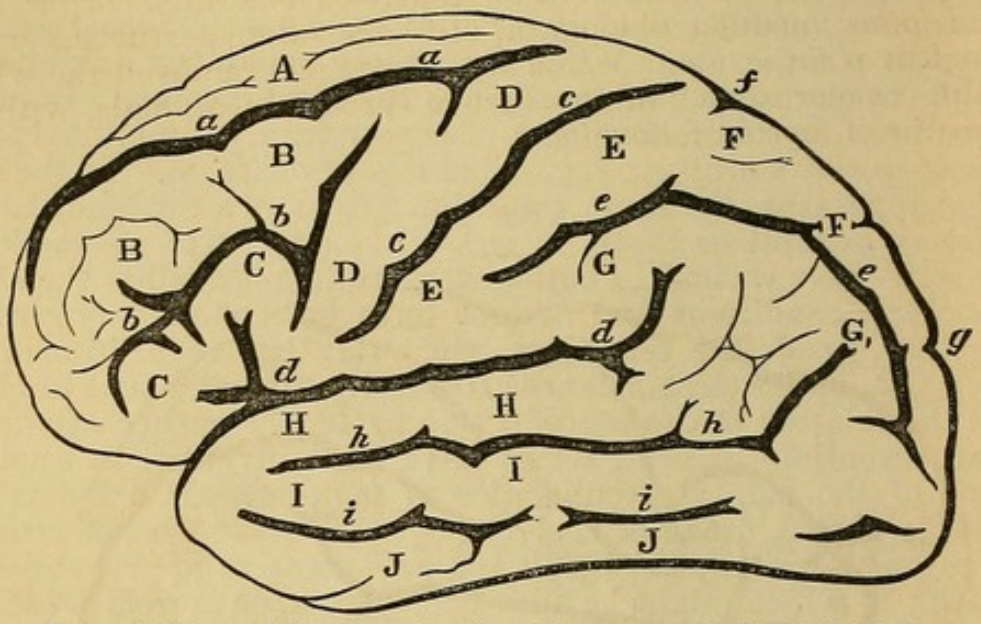
[1] See a summary account of it by the author, in *Reynolds' System of Medicine*, American edition, Vol. I., p. 916 *et seq.*

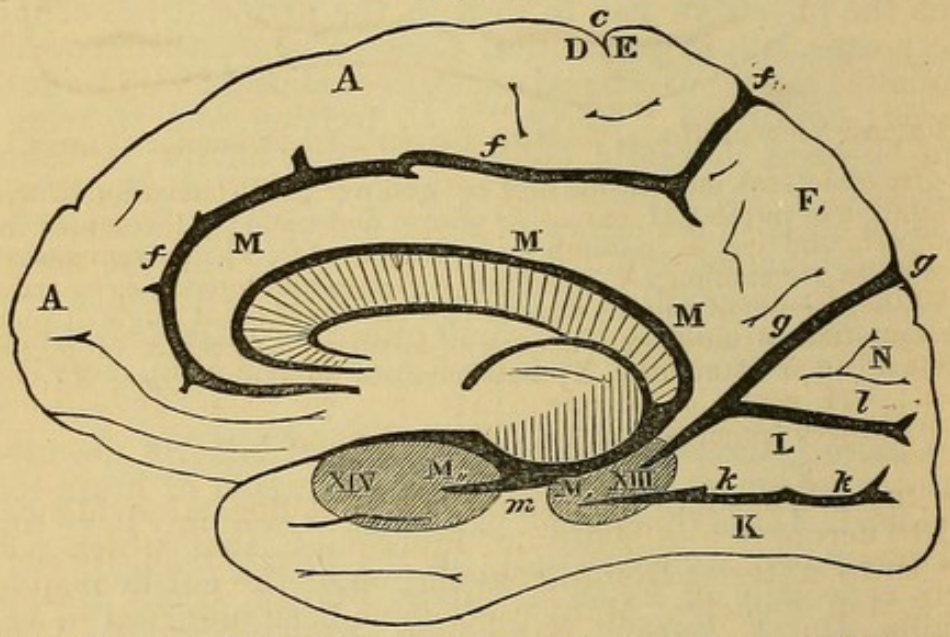
manner, not yet fully determined, of certain regions of the cortex of the cerebral hemispheres with different groups of muscles; that this relation is probably connected particularly with *emo-*

FIG. 18.




Lateral View of Brain, showing Fissures and Convolutions.

FIG. 19.



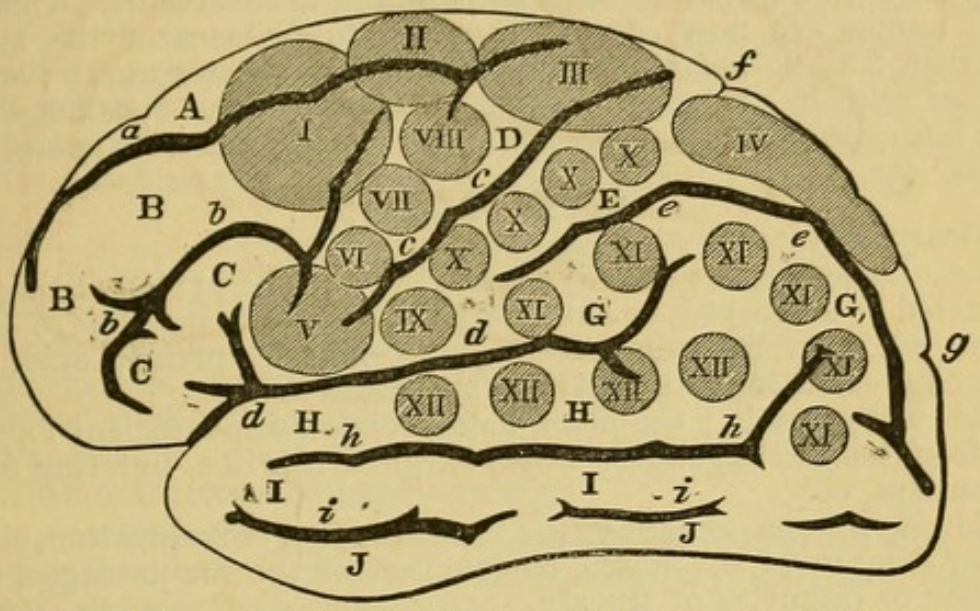

Inner Surface of Hemisphere, showing Convolutions and Fissures.

*a*, superior frontal fissure; *b*, inferior frontal; *c*, fissure of Rolando; *d*, fissure of Silvius; *e*, interparietal; *f*, fronto-parietal; *g*, parieto-occipital; *h*, first temporo-sphenoidal; *i*, second ditto; *j*, inferior ditto; *k*, occipito-temporal; *l*, calcarine; *m*, hippocampi.

A, superior, or first frontal convolution; B, second ditto; C, third ditto; D, ascending frontal; E, ascending parietal; F, superior parietal; $F_1$, prœcuneus; G, supra-marginal; $G_1$, gyrus angularis, or *pli courbe;* H, first temporo-sphenoidal; I, second ditto; J, third ditto; K, fusiform lobule; L, lingual lobule; M, gyrus fornicatus; $M_1$, gyrus hippocampi; $M_2$, uncus gyri fornicati, or subiculum cornu Ammonis; N, cuneus. (From Bristowe.)

*tional expression;* Ferrier's phrase, "*psycho-motor*" centres, being thus most appropriate;[1] while, under organic disease or injury of the same regions, the motor functions which are *directly* controlled by the *lower sensori-motor* centres (thalamus, corpus striatum, pons, medulla oblongata, etc.) are often perturbed or impaired by *reflex action* or *sympathy*. Goltz has removed the whole of the "*motor* zone" of the cortex cerebri in animals, without paralysis of motion following.

FIG. 20.




Lateral View of Brain, showing Ferrier's Psycho-motor Centres.

I, centre of lateral movements of head and eyes, with elevation of eyelids and dilatation of pupils; II, extension of arm and hand; III, complex movements of arm and leg, as in climbing, swinging, etc.; IV, movements of leg and foot as in locomotion; V, movements of lips and tongue, as in articulation; VI, depression of angle of mouth; VII, elevation of angle of mouth; VIII, supination of hand and flexure of forearm; IX, centre of *platysma*, retraction of angle of mouth; X, movements of hand and wrist; XI, centre of vision; XII, centre of hearing; XIII (Fig. 20), centre of touch; XIV (Fig. 20), centre of smell and taste. (From Bristowe.)

The most considerable amount of pathological evidence in regard to cerebral localization of function, is that which points to the third anterior frontal convolution of the left hemisphere, as the seat of *language*. Many cases have been observed in which a lesion of that part of the cortex cerebri has been found to accompany *right hemiplegia* (paralysis confined to the right half of the body) and *aphasia* (see *Aphasia*, later in this volume). But the whole subject, both of the physiology and the pathology of the brain, is rendered more difficult by the *very close interconnection*, in structure and function, existing amongst its different parts; making it often almost or quite impossible to separate from each other the *direct* and *indirect* effects of injury or disease. An

[1] Ferrier, however, claims a more positive *motor* function for these "centres" than appears to me to be warranted by the facts; especially in view of the results of Goltz's, Dupuy's, and Tamburini's experiments.

immense amount of care and labor will still be necessary, before accuracy of diagnosis in affections of the brain can be based upon a complete and exact pathology.

Some further attention will be given to cerebral localization, in connection with the special pathology of the Brain and Nervous System, in Part II. of this book.

Localization of diseases affecting the **spinal marrow** has, of late years, through clinical observation, aided by autopsic study, acquired considerable definiteness. Romberg, Duchenne, Lockhart Clarke, Charcot, Türck, Westphal, Erb, Gowers, Moxon, Seguin, and Hamilton have especially contributed to this result. Anatomical names are now commonly given to diseases of the spinal marrow: as, *posterior spinal sclerosis*, for locomotor ataxy; *lateral spinal sclerosis*, for spastic spinal paralysis; *anterior poliomyelitis*, for infantile paralysis; *disseminated* or *multiple cerebro-spinal sclerosis*,[1] etc.

### MODES OF DEATH.

Death may occur—

1st. By **asthenia**; the dynamic force of the system being exhausted or destroyed, so that the heart ceases to beat; as in death from old age, lightning-stroke, poisoning by prussic acid, etc. **Syncope** (fainting) simulates or threatens this.

2d. By **anæmia**; the blood being rendered insufficient for life; as from hemorrhage after labor, surgical injuries, bursting of an aneurism, etc.

3d. By **apnœa**, or **asphyxia**; that is, arrest of respiration, either from disease of the lungs, obstruction of the air-passages, deficiency or impurity of the air.

4th. By **coma**; the brain (medulla oblongata) being made incapable of sustaining innervation; as in apoplexy, opium poisoning, etc.

**Sudden** death may occur from

Apoplexy;

Valvular heart-disease (especially mitral);

Rupture of the heart (or syncope) in fatty degeneration;

Bursting of an aneurism, or abscess, within the thorax, or of an aneurism within the abdomen;

Suffocation;

Violent shock or alarm, producing fatal syncope.

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## SECTION II.

### *SEMEIOLOGY.*

I. RATIONAL SYMPTOMATOLOGY.
II. PHYSICAL DIAGNOSIS.

**Rational symptoms** and **physical signs** are distinguished (somewhat arbitrarily) thus: a rational symptom is a sign of disease which is obvious to the patient himself or to the practitioner without close inspection. A physical sign is one determined by exam-

[1] See Part II. for the special pathology of these affections.

ination into the properties and material conditions of the organs of the body; as by palpation, auscultation, percussion, etc. Symptoms guide us, generally, by *physiological inference;* physical signs, by *anatomical necessity.*

Symptoms and physical signs together contribute to **diagnosis;** *i. e.*, the knowledge of the character of the morbid process or state in a given case; the answer to the question, "What is the matter?"

**Prognosis** is the anticipation of the *progress* and *results* or *terminations* of disease. The essential elements of prognosis are, a knowledge of the *cause* or causes of disease present; of the *condition of the organs;* and of the *general* vital state, or *degree of vital force* of the system. Prognosis depends, therefore, upon diagnosis; but is governed, in a majority of cases, chiefly by those rational symptoms which indicate the organic energy of the patient, and the kind and rate of change that his system is undergoing.

## SYMPTOMATOLOGY.

**Symptoms, or rational signs,** are—

Local, or constitutional;
Idiopathic (primary), or secondary;
Premonitory (prodromata);
Critical;
Pathognomonic (characteristic).

We examine the symptoms of disease as connected with the digestive, circulatory, respiratory, tegumentary, secretory, motor, sensory, and psychical apparatus.

### SYMPTOMS CONNECTED WITH THE DIGESTIVE SYSTEM.

The **tongue** may be natural, pale, cold, red, furred, brown, black, cracked, or fissured.

It is *pale*, in anæmia.

*Cold*, in *collapse*, as of cholera, etc.

*Red*, in scarlatina, stomatitis, sometimes in gastritis.

*Furred*, in indigestion, gastro-hepatic catarrh, fever, etc.

*Brown* or *black*, *cracked* or *fissured*, in low fevers: as typhus or typhoid.

*Protruded with difficulty*, in low fevers, and in apoplexy; *to one side*, in paralysis.

The *manner of cleaning* of the tongue during convalescence should also be noticed, as affording prognostic indications.

The **teeth** are *covered with sordes* in low febrile states.

They are *loosened* by severe salivation.

Their *rapid decay* shows some impairment of constitution; but this is unfortunately very common.

The **gums** are swollen, soft, and spongy, and prone to bleed, in scurvy.

A *blue line along the gums* is observed in lead poisoning.

A *red* line along their edge is sometimes noticed in phthisis.

Swelling and soreness of the gums, with tenderness of the teeth, and a coppery taste, occur in *salivation.*

*Increased flow of saliva* gives name to this effect of mercury on

the mouth. Jaborandi often produces it, without any action upon the gums. Iodide of potassium occasionally does so.

*Deficiency* and thickness or viscidity of the saliva occur generally during fever; and often also in chronic diseases, especially of the throat and stomach.

The **taste** is morbidly

*Bitter*, in hepatic derangements, dyspepsia, etc.;
*Sour*, in gastric indigestion;
*Saltish*, in phthisis pulmonalis, hæmoptysis, etc.;
*Putrid*, in gangrene of the lungs.

**Appetite** is *generally deficient* (anorexia) in disease, especially of an acute character.

**Excessive appetite** (bulimia) is not often important; sometimes it occurs in nervous affections, in *diabetes*, and in persons having *worms* in the alimentary canal.

**Perverted appetite** is one of the symptoms of chlorosis, hysteria, etc.

**Thirst** is *excessive* in *two opposite* conditions: *high fever* and *low collapse.*

**Difficulty of swallowing** (*dysphagia*) may result from—

*Inflammation* of the fauces, tonsils, or pharynx;
*Spasmodic constriction* of the throat;
*Stricture* of the pharynx or œsophagus;
*Obstruction* by a foreign body, tumor, etc.;
*Retro-pharyngeal abscess;*
*Paralysis*, as after diphtheria;
*General debility*, as in the moribund state.

**Nausea and vomiting** may occur from—

*Indigestion:* egesta,[1] partly digested food, mucus, etc.;
*Colic:* eg. ditto, bile, etc.;
*Sea-sickness:* ditto, ditto;
*Pregnancy:* eg., mucus, food, etc.;
*Gastritis:* eg., abundant and altered mucus, etc.;
*Hysteria:* eg., gastric and biliary secretions, more or less altered;
*Cholera morbus:* eg., gastric and biliary secretions, diluted;
*Cholera maligna:* eg., copious watery fluid (rice-water);
*Bilious fever:* eg., altered mucus, bile, etc.;
*Yellow fever:* eg., (advanced stage) black vomit;
*Ulcer of stomach:* eg., mucus, lymph, blood;
*Cancer of stomach:* eg., ditto, with cancer-cells, fibres, etc.;
*Disease of the brain:* eg., not peculiar in character;
*Bright's disease of kidney:* eg., not peculiar;
*Strangulated hernia:* eg., stercoraceous (fecal);
*Poisoning:* as by tartar emetic, arsenic, etc.

*Sarcinæ*, or microscopic, wool-sack like vegetable parasites are occasionally found in matters vomited, in cases of disease of the stomach. Epithelial cells, starch granules, torulæ (also vegetable), and vibriones, are often discovered by the microscope.

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[1] *Egesta*, matters thrown out.

## SYMPTOMS CONNECTED WITH THE CIRCULATORY SYSTEM.

**Palpitation or disturbed action of the heart** may depend upon—

*Pericarditis* or *endocarditis;*
*Hypertrophy of the heart;*
*Chronic valvular disease;*
*Exophthalmic goitre;*
*Anæmia;*
*Nervous irritability* (nervousness);
*Disorder of the brain;*
*Dyspepsia.*

**The pulse** should be examined when the mind and body of the patient are as tranquil as possible. It is most rapid in the standing posture, less so when sitting, slowest in the recumbent position. Dr. Guy asserts it to be most rapid in the morning. It is increased in force and frequency by exercise, food, and emotional excitement. The pulse of the female is slightly more rapid, as a rule, than that of the male sex. It diminishes in rapidity from infancy to old age; but in very aged people it again becomes somewhat accelerated.

In obscure cases we should examine the pulsation of other arteries beside those at the wrist; and should especially observe the character of the *impulse of the* **heart.** Absence of pulsation in a particular artery is often important as a sign of *embolism.*[1]

In adults, the average number of beats in health is, for the male, 70; for the female, 75.

| | |
|---|---|
| Infancy, 120 to 100. | Middle life, 75 to 65. |
| Childhood, 100 to 90. | Old age, 70 to 60. |
| Youth, 90 to 75. | Decrepit age, 75 to 80. |

We judge by the pulse (inferentially) of the force of the **heart's** action, of the force of the **arterial** impulse, of the **excitability** of the nervous system, of the **fulness** of the blood-vessels, and of the tone and physical **condition** of the arteries.

The pulse in disease may be *natural*, or *strong*, *weak*, *firm*, *yielding*, *full*, *small*, *bounding*, *compressible*, *rapid*, *slow*, *quick*, *jerking*, *hard*, *soft*, *tense*, *gaseous*, *corded*, *wiry*, *thready*, *imperceptible*, *regular*, *irregular*, *intermittent*, *dicrotous.*

Not considering it necessary here to define each of these terms, it may be remarked that an important difference exists between a *rapid* pulse and a *quick* pulse, and between one that is merely *full* and *large* and one that is *strong.*

The pulse of **fever** is characterized by *moderate* **acceleration,** with variable increase of force in the beat. It is most rapid in relapsing fever, scarlet fever, and puerperal fever.

The pulse of **inflammation** (with constitutional excitement) is not only *accelerated*, but **hard** or *tense*, and commonly full. Whatever may be said to the contrary, this character of the pulse is, in acute inflammations, of great consequence as one indication for treatment; although, of course, it must not be depended on *alone.*

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[1] See Embolism, in Part II.

The pulse of **nervous irritation** is usually **quick**, and **variable** in rapidity and force, under excitement or repose.

A *jerking*, abrupt pulse is associated (Stokes, Corrigan) with *deficiency of the aortic valve of the heart.*[1]

The pulse of *extreme* **debility** is nearly always (as in the dying state) very **rapid** and very **small**, or "thready." A pulse of 150 or 160 in an adult is nearly always a fatal sign.

**Slowness** of the pulse is most marked in *compression* of the *brain* (as from fracture of the skull, apoplectic clot, or hydrocephalic effusion) and in *opium poisoning.* Exceptionally, it is met with under other circumstances. In one case, I have known the pulse to be but 20 in the minute (temporarily) from functional disorder of the heart.

**Irregularity** of the pulse is occasionally congenital; sometimes it comes on with old age. It is of the least importance in young children. It may be a transient symptom, accidental, as it were, during the progress of an acute malady; or at the commencement of convalescence, as from remittent fever. It is directly related to the nature of the disease, in certain cases of *disease of the heart*, and in *meningitis* (inflammation of the membranes of the brain) during the stage of effusion. Dr. B. W. Richardson has laid stress upon the frequency with which *mental depression* is a cause of irregularity of the heart's action.

The **dicrotous** or double pulse is observed especially during *continued fevers*, either typhous or typhoid. It is explained in some cases, at least, by a loss of muscular tone in the arteries, so that the arterial impulse is separated from that of the ventricles by a perceptible (though slight) interval.

The state of the **capillary and venous circulation** often affords signs of disease. Torpor of the circulation is marked by slowness in the return of the blood after it has been displaced by pressure; for instance, upon the cheek or back of the hand. The *veins* of the hand or arm may be similarly examined with advantage; as in *cholera*, *pernicious intermittent*, *low continued fever*, etc. The venous circulation is affected not unfrequently in *heart disease: e. g.*, pulsation of the jugular veins, from valvular disease involving the right side of the heart; *cyanosis*, or *blueness*, from imperfect separation of the arterial from the venous blood; etc. A network of enlarged superficial abdominal veins is sometimes seen in *cirrhosis* of the *liver.*

Pulsation of the veins does not *always* depend upon disorder of the heart. The author has seen three cases in which jugular pulsation was evidently the result of *local irritation*, exaggerating the muscular activity resident in the organic muscle-fibres of the vein.

The **blood** itself is perhaps the most important of all subjects of inquiry in connection with disease. Little, however, as yet, is known of its morbid changes. The principal facts are, that—

In *anæmia*, there is deficiency of hæmoglobin and corpuscles;
In *plethora*, an excess of red corpuscles;
In *leucocythæmia*, an excess of the colorless corpuscles;
In *pseudo-leukæmia*, deficiency of red corpuscles;

[1] Galabin has shown (Medico-Chirurgical Transactions, 1876) that occasionally this pulse results from relaxation of arterial tension.

In *inflammation*, and in *chlorosis*, excess of fibrin;
In *anticipation* of *suppuration*, excess of colorless corpuscles;
In *gout*, excess of uric acid;
In *rheumatism* (probably), excess of lactic acid;
In (malarial) *melanæmia*, excess of free pigment;
In *jaundice*, excess of biliary matter;
In advanced *Bright's disease*, excess of urea, etc. (uræmia);
In *diabetes*, excess of sugar;
In *malignant cholera*, deficiency of water and salts;
In *relapsing fever*, spirilla (minute organisms);
In *yellow fever*, granulation of white corpuscles.

These peculiarities require minute inspection, with the aid of the microscope or of chemical reagents. To the eye, differences sometimes exist which may be instructive; *e. g.*, as to the bright red or very dark color of the blood; as to the magnitude, form, and firmness of the clot, the rapidity of coagulation, etc.

**Counting the blood-corpuscles** is important in the diagnosis of *leukæmia* (leucocythæmia) and *pseudo-leukæmia*, *progressive pernicious anæmia*, etc.

The principle employed was first devised by Vierordt; it consists in making a definite dilution of a measured quantity of blood, and counting the corpuscles in a known volume of that dilution. Cramer, Potain, Malassez, Hayem, Nachet, and Gowers have modified Vierordt's process.

Gowers gives the following account of his improvement upon Hayem's *hæmacytometer*.[1] His apparatus consists of "1. A small pipette, holding exactly 995 cubic millimetres. 2. A fine capillary tube, holding 5 cubic millimetres. 3. A small glass jar, in which the dilution is made. 4. A cell, exactly one-fifth of a millimetre deep, the floor of which is ruled in *tenth of a millimetre* squares. Whatever solution is employed, the corpuscles are, more or less, changed by it. One which answers very well is a solution of sulphate of soda of a specific gravity of 1025.

"A pipetteful of the solution is placed in the mixing vessel. Five cubic millimetres of blood are drawn into the capillary tube from a drop in the finger, and then blown into the solution. The two are well mixed by a glass rod; a drop of the dilution is placed in the centre of the cell, the covering glass is applied and secured by springs, and the slide is placed on the stage of the microscope. The lens is then focussed to the squares. In a few minutes the corpuscles have sunk on to the squares. The number in ten squares is then counted." Multiplying the *average* number for a *square*, of these ten micrometric squares, by 10,000, we obtain the number of corpuscles for a cubic millimetre of blood. In healthy blood, Vierordt and Welcker found this number to be 5,000,000; of which from 5,000 to 15,000 are white or colorless corpuscles. In *leukæmia* and *pernicious anæmia* the red and white corpuscles are both diminished in number; but in leukæmia the white corpuscles are notably increased in number beyond the normal proportion. Cases of this last affection not rarely show as many as 1 white corpuscle to 3 of the red. In Hodgkin's disease (pseudo-

[1] Reynolds' System of Medicine, American edition, Vol. III., p. 520.

leukæmia) the alteration of the normal proportion is very seldom, if ever, so great.

In cases of lingering prostration, *clots* may form in the heart or large arteries before death. After very rapid malignant diseases, the blood is sometimes found *uncoagulable.*

**Hemorrhage** from different parts of the body is often important as a symptom, but requires to be interpreted with care. Its consequence varies much with its *quantity*, and the *source* of the blood thrown out.

Thus, in **epistaxis,** or bleeding at the nose, the flow may result from—

*Mechanical injury;*
*Congestion of the Schneiderian membrane;*
*Congestion of the brain;*
*Typhoid fever;*
*Hemorrhagic diathesis;*
*Suppressed menstruation.*

This variety of hemorrhage is, however, *most* frequent during *childhood* and early adolescence.

**In hæmoptysis,** or spitting of blood, the source of the hemorrhage may be the—

*Gums;*
*Posterior nares;*
*Throat* (*e. g.*, ulcerations, etc.);
*Bronchial mucous membrane;*
*Lungs;*
*Stomach.*

In the *last* case, being *vomited* into the mouth, it is properly called **hæmatemesis.** Sometimes it requires care to determine *what is* the source of blood coming from the mouth. We must notice what are the *symptoms preceding* the hemorrhage; and the *manner of its ejection*, whether by *coughing* or *vomiting*, etc., as well as the appearance of the blood, whether mixed with food, gastric fluid, etc.

True **pulmonary hæmoptysis** may arise from—

*Active congestion of the lungs;*
*Passive congestion, from heart disease;*
*Tubercular phthisis;*
*Hemorrhagic diathesis;*
*Vicarious monthly flow*, in the female;
*Mechanical injury*, as fractured rib, etc.;
*Rupture of aortic aneurism.*[1]

**Hæmatemesis,** or vomiting of blood, may be—

*Hysterical;*
*Ulcerative;*
*Cancerous;*
*Vicarious*, etc.

**Uterine hemorrhage,** other than the normal menses, may be—

[1] Dr. Baelz, of Japan, has reported cases of hæmoptysis from the presence in the lungs of a minute gregarinoid *parasite.* Epistaxis has, in like manner, been sometimes caused by a small parasite in the nasal cavities; *pentastoma tænioides.*

*Congestive;*
*Ulcerative;*
*Cancerous;* as well as, in the *pregnant* female, *placental*, technically called "unavoidable hemorrhage;" that of *abortion;* or *after parturition.*

**Hemorrhage from the bowels** may be connected with—

*Hemorrhoids*, or piles;
*Dysentery;*
*Ulceration of the bowels;*
*Intussusception;*
*Cancer of rectum*, etc.;
*Rupture of aneurism;*
*Hemorrhagic diathesis;*
*Typhoid* or *yellow fever;*
*Vicarious menstruation.*

**Hæmaturia**, or bloody urine, may result from—

*Mechanical injury* of the bladder, prostate gland, or urethra;
*Renal inflammation;*
*Calculus;*
*Hemorrhagic diathesis;*
*Passive senile congestion of the kidneys;*
*Scarlatina.*

SYMPTOMS CONNECTED WITH THE RESPIRATORY ORGANS.

The normal, average rate of breathing in the adult, while at rest, is sixteen or eighteen respirations in the minute. In fever it is much accelerated. In *extreme narcotism* it becomes slower than natural. In some cases of *fatty degeneration of the heart* it is sighing and interrupted.

**Dyspnœa**, or difficulty of breathing, when great, is called **orthopnœa**, from the erect posture required by the patient. **Cervical** respiration, *i. e.*, auxiliary action of the muscles of the neck, occurs in cases of great exhaustion, or of obstruction of the respiratory function by disease.

**Dyspnœa** may be caused by—

*Chlorine* or other irrespirable gases in the air;
*Morbid change of the blood*, as in cholera;
*Laryngeal or tracheal obstruction*, as in croup, etc.;
*Bronchial spasmodic constriction*, as in asthma;
*Bronchitis; pneumonia; pleurisy; phthisis;*
*Heart disease; aneurism of thoracic aorta;*
*Cancer within the chest; hydrothorax; ascites.*

**Coughing** may depend upon a variety of causes, the nature of which may often be concluded upon from its character. Thus, usually,

Cough is *dry and hollow*, or *hacking*, when nervous or sympathetic;
*Dry and tight*, in early bronchitis;
*Soft, deep, and loose*, in advanced bronchitis;
*Hacking*, in incipient phthisis pulmonalis;
*Deep and distressing*, in confirmed consumption;
*Short and sharp*, in pneumonia;

*Barking and hoarse*, in early or spasmodic croup;
*Whistling*, in advanced membranous croup;
*Paroxysmal*, and whooping, in pertussis.

**Expectoration** is—
*Mucous*, in catarrh, and early bronchitis;
*Purulent*, in severe and protracted bronchitis;
*Rusty*, in early and middle stages of pneumonia;
*Bloody and muco-purulent*, in phthisis;
*Nummular and heavy*, etc., in advanced phthisis;[1]
*Putrid*, in gangrene of the lung.

The **temperature** *of the breath* is *increased* during the *febrile state*. It is *lowered*, sensibly, only in aggravated prostration; as in the collapse of cholera. Coldness of the breath is an almost certain prognostic of dissolution.

The **odor** of the breath is rarely perfectly agreeable except in the healthy infant or child. It is very heavy at the commencement of fever; sour during indigestion; offensive, often, from decayed teeth; rotten, in gangrene of the lung.

**Hiccough** (singultus) is produced by a spasm of the diaphragm. It may depend upon *indigestion*, *nervous disorder*, or *exhaustion*. It is serious in prognosis only when the last (exhaustion) is present or is anticipated.

**Stertorous** *respiration*, from relaxation of the *velum palati*, results from *cerebral oppression;* the cause of which may be *apoplexy*, *fracture of the skull*, *dead drunkenness*, or *narcotism* by opium, etc.

SYMPTOMS CONNECTED WITH THE TEGUMENTARY APPARATUS.

The skin is **hot** and **dry** during the presence of **fever.**

**Moisture** is almost always a *favorable* sign.

The exceptions are, the profuse *colliquative* sweats of phthisis, etc., and the *cold and clammy* perspiration of extreme prostration. Coldness of the skin, or inequality of temperature, is always more or less unfavorable.

**Emaciation** is often an important sign. It generally occurs in severe chronic diseases, but is sometimes rapidly brought on in acute affections; *e. g.*, diarrhœa or dysentery. The changes which occur in the adipose tissue, and in the plumpness and roundness, or flabbiness and shrunken appearance of the surface of the body, are often *extremely rapid in children.*

The **color** of the skin varies much in disease. Thus, the face is—
*Pale*, in anæmia, syncope, etc.;
*Flushed*, in fever, congestion of brain, etc.;
*Cheeks brightly flushed*, in hectic fever;
*Forehead and eyes flushed*, in early stage of yellow fever;
*Purple or livid*, in low continued fever;
*Yellow*, in jaundice, bilious fever, yellow fever;
*Sallow*, in chlorosis, dyspepsia, cancer;
*Bronzed*, in Addison's disease;

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[1] Microscopic examination discovers portions of disintegrated *lung-tissue* in the expectoration of phthisical patients; arched and anastomosing fibrils of pulmonary and bronchial elastic tissue, with abrupt or square fracture.

*Blue*, in the collapse of cholera, and in cyanosis;
*Black*, almost, in asphyxia, and from large internal use of nitrate of silver.

**Eruptions** upon the skin are characteristic of certain diseases. Their description belongs to Special Pathology. (See Part II.)

### SYMPTOMS CONNECTED WITH THE SECRETIONS.

These must always be considered along with *other* explanatory symptoms; and the **character** of the discharges should never be overlooked. Thus,

**Constipation** may denote—

*Torpor* of the muscular coat of the bowels;
Deficient *secretion* of the liver, or intestinal glands;
Defective *innervation*, from spinal or encephalic disease;
*Stricture of rectum* or *colon; pregnancy; cancer;*
*Intussusception*, *strangulated hernia*, etc.;
*Sympathetic disturbance* from fever, etc.;

**Diarrhœa** and **Dysentery** will be considered in another department. It may be mentioned, however, that in *dysentery* the discharges contain blood, mucus, lymph (in small quantity), and, when ulceration has occurred, pus. In *diarrhœa* they are either fecal, mucous, bilious, or serous—the last being of importance, especially in the diagnosis of *cholera*.

### Symptoms Connected with Urination.

*Dysuria*, or difficult urination (strangury).
*Ischuria*, retention of urine.
*Enuresis*, incontinence.
*Diuresis* (diabetes), excessive discharge of urine.
*Morbid character* of the urine itself.

The average quantity of urine passed by a healthy adult in twenty-four hours, is from thirty to fifty ounces—greatest in the winter.

In reaction to test-paper, the urine is normally *acid;* reddening litmus, or restoring to turmeric its yellow color after it has been made brownish-red by an alkali.

The *color* of healthy urine is that of *amber*.

The average *specific gravity* of human urine (water being 1000) is 1017–24; containing about twenty grains of solid matter to the ounce.

Deviation, to a certain extent, from any or all of the above standards as to quantity, reaction, color, and weight, is quite compatible with ordinary health; but a very decided and persistent deviation is a proof of disease.

**Retention of urine** may be caused by—

*Deficiency* of contractile *power* in the bladder;
*Spasmodic constriction* of the vesico-urethral muscular fibres;
True *stricture of the urethra;*
*Enlargement of the prostate gland;*
*Calculus* in the bladder or urethra;

Percussion and palpation, as well as catheterism, are sometimes necessary to determine the fact of retention of urine.

**Suppression** of urine, from inaction of the kidneys, is a most serious symptom under all circumstances. If long continued, it becomes fatal by *uræmic poisoning*—coma, and often convulsions, preceding death. *Partial* suppression of urine occurs, sometimes transiently, in cholera, scarlet fever, etc.

**Excessive urination** is frequently present in hysterical cases—the water being pellucid, and of low specific gravity (diabetes insipidus). The influence of cold and of diuretic medicines produces a similar watery excess, mostly with little increase in the solids of the urine.

**Diabetes mellitus** is, however, a more important affection; in which the urine is not only excessive in quantity, but *heavy*, and *loaded with sugar*.

For the accurate estimation of the changes occurring in the urine in disease, scientific skill is requisite. To pursue *original investigations* upon the subject, considerable practical knowledge of *analytical chemistry*, and of the use of the *microscope*, is indispensable. But for the *application* of the conclusions of pathological chemists and micrologists to *diagnosis*, a much more moderate amount of skill will suffice. There is wisdom in the remark of Dr. Todd (*Clin. Lect. on Urinary Organs*, etc., p. 73), that, "while it is clearly a duty not to neglect any means of observation and investigation, it is desirable that you should be as little as possible dependent on means which are not always at hand, and which it does not fall to the lot of every eye and hand to use with equal readiness and skill."[1]

I shall state, on this principle, only the *most important* and *available* points in urinary pathology and diagnosis.

Allowance must always be made, or correction obtained, for the *variation* the urine undergoes in the course of the same day. It may be divided conveniently into the *urina* **sanguinis**, *urina* **chyli**, and *urina* **potus**: the first being that after a night's rest, the second that after dinner, the third after a very light meal with fluid, as tea. All of these should in each case be examined and compared.[2]

The questions in regard to any given specimen of urine are, as to its **general appearance, specific gravity, acidity** or alkalinity, the chemical or microscopical character of its **sediments**, and the **effects of reagents** upon the clear fluid.

**General appearance.** If *clear*, after standing a few hours, note the *color*. *Deep-colored* transparent urine, of high specific gravity, indicates excessive metamorphosis of tissue. In *jaundice*, the urine is generally very yellow, and sometimes as dark as porter.

If the urine be *opaque*, it is either *white* or *dark*. *White* opaque urine contains either *mucus*, or *pus*, or undissolved *earthy salts*, or all of these together. Mucus floats more distinctly in a separate cloud than pus; purulent urine is generally opaque throughout,

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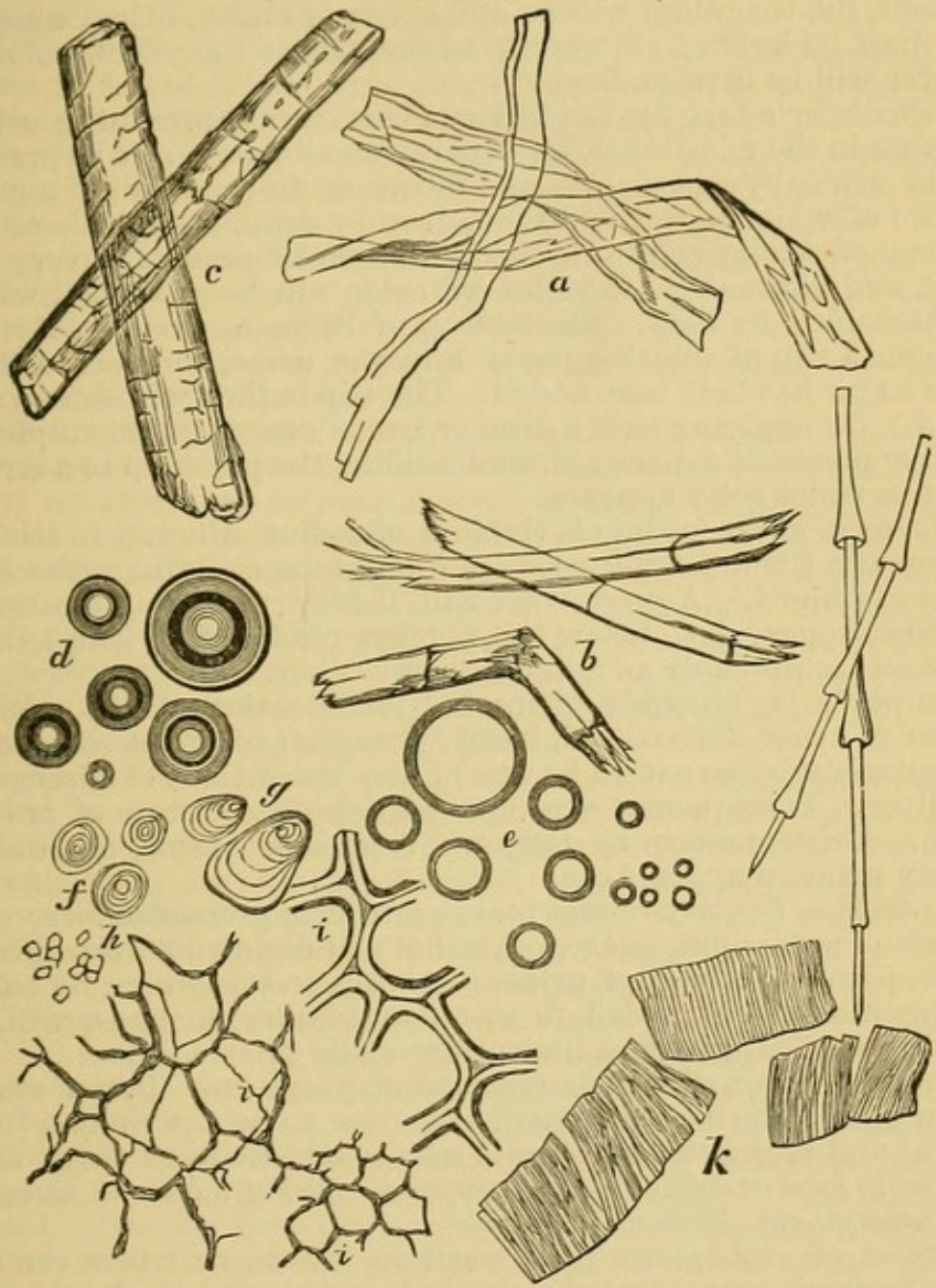
[1] A similar remark has been made by Virchow, in reference to "naked-eye pathology." He asserts that almost always microscopical appearances may be anticipated by a *careful* and *skilful* examination with the unaided sight.

[2] It is well also (in some cases at least) to avoid the complication of *urethral* discharges, by having the first ounce or two passed into a different vessel from that which is to receive the urine to be retained for examination.

and of a creamy yellow color at bottom. Pus can, however, be more readily diffused by agitation than mucus. Purulent urine is oftenest *acid;* mucous urine, generally *alkaline.* Pus contains *albumen*, as shown by testing; mucus does not. Acetic acid coagulates mucus, not pus.

*Dark-colored opaque* urine is most frequently tinged with *blood*,

FIG. 21.




Foreign Bodies in Urine.

*a*. Cotton fibres; *b*. Flax fibres; *c*. Hairs; *d*. Air-bubbles; *e*. Oil globules; *f*. Wheat starch; *g*. Potato starch; *h*. Rice starch; *i, i, i*. Vegetable tissue; *k*. Muscular fibres.

giving it a pinkish or brownish hue. The latter color prevails especially in cases of passive hemorrhage from the kidney—the former in fresh hemorrhage from the bladder, or active renal hem-

orrhage. Urine may also be dark from the presence of *bile* (as in jaundice), or of *purpurin;* also, from carbolic acid poisoning.

For biliary coloring matter (biliphain, cholepyrrhin) a good test is (Gmelin's) the addition of nitric or, better, nitroso-nitric acid, drop by drop, to a little of the urine on a white dish. It will become pale green, violet, pink, and yellow, in succession. Or (Heller's) shake a little solution of albumen (white of egg) with the urine, and then add a slight excess of nitric acid; if bile be present, the coagulum will be dull green or bluish. Or (Cunisset) add half its bulk of chloroform to the urine; the yellow coloring matter will be carried down.

*Pettenkofer's* test for the biliary acids (rarely present in urine) consists in the addition (after separating albumen, if it be present in the urine, by coagulation and filtration) to the fluid, of a grain or two of white sugar, and then, drop by drop, two-thirds of the volume of strong sulphuric acid. If bile be present, a very distinct and characteristic violet-red color will be produced, which is intensified by heat. Strassburg, of Bremen, modifies this by dipping a slip of filtering paper into the urine, to which a little cane sugar has first been added. The slip is then withdrawn and dried. On applying to it a drop or two of concentrated sulphuric acid by means of a glass rod, and holding the paper up to a strong light, a violet color appears.

*Maréchal's* test for bile is tincture of iodine, allowed to trickle, a drop at a time, down the side of a test-tube containing the fluid to be examined. A green color will, if biliary coloring matter be present, appear just below the portion reddened by the iodine. This test is probably as reliable as any other.

*Purpurin* is, probably, a morbid modification of the *coloring matter* of urine, derived, originally, from that of the *blood.* Some pathologists believe it to be one of the indications of disease of the liver. It frequently accompanies deposits of urate of ammonium. Urine containing purpurin is pink or purple, not unlike bloody urine in appearance.

As tests — liquor potassæ makes purpurin *greenish-brown;* carbonate of potassium, *yellow.* Alcohol will dissolve purpurin from an evaporated extract of urine, receiving and retaining its color. Hydrochloric acid added to urine containing purpurin will, if heat be applied, give it a lilac or decidedly purple tinge.

Late authors make little mention of purpurin. Tyson[1] states the normal coloring matters of the urine to be *urohæmatin* (urophain) and *uroxanthin* (indican); abnormal, besides foreign matters from food or drink, the *coloring principles of the blood* (altered) and *uroerythrin* (Heller).

Excess of *urohæmatin* may occur in fevers, or whenever the urine is much concentrated; also in jaundice and in chronic diseases of the liver. Heller's test for urohæmatin is, pouring a fine stream of the urine from a height of four inches into a small quantity of pure colorless sulphuric acid. A deep garnet-red coloration results from the admixture. (Diabetic sugar, however, and also uroerythrin, give the same reaction.)

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[1] Practical Examination of Urine, Philadelphia, 1875, p. 57.

Excess of *uroxanthin* or *indican* has been observed in a number of diseases: cancer of the liver, cancer of the stomach, phthisis, tabes mesenterica, Addison's disease, spinal and renal affections, etc. Heller's test for it is, dropping and stirring ten or twenty drops of the urine into a small quantity of pure hydrochloric acid. A small amount of indican will give a pale, yellowish-red color; a large amount, a violet or blue coloration. This is intensified (Senator) by adding a few drops of a concentrated solution of chloride of calcium.[1]

*Uroerythrin* is present in the "lateritious" sediment of the urine in fevers. It is also precipitated, when in solution in the urine, by acetate of lead, producing a pink deposit.

In the so-called "malarial hæmaturia" of severe Southern fevers, Berenger-Feraud asserts the proof that *choluria* really exists, the urine being colored not by blood, but by bile.

*Alcohol* is present in the urine when an excess of it has been taken into the system. Anstie's test for it is one part of bichromate of potassium with three hundred parts of sulphuric acid, giving a green color, more or less intense, according to the amount of alcohol in solution.

*Black* urine has been sometimes seen as the result of poisonous over-doses of *chlorate of potassium*. Urine is dark also (as already said) or green, when *carbolic acid* is being largely eliminated. For the latter the best test is Sonnenburg's. It depends on the conversion of the sulphates of the urine into soluble sulpho-carbolates. A portion of the urine to be examined is acidulated with strong acetic acid, and then an excess of chloride of barium is added. With normal urine this will produce a copious precipitation of sulphate of barium. When much carbolic acid is present, almost no precipitate falls.

*Salicylic acid* (or sodium salicylate) should be found in the urine during its medicinal administration. If not thus eliminated (as when excretion is prevented by disease of the kidneys), its toxic accumulation may be apprehended. For salicylic acid, tincture of perchloride of iron is a delicate test. When a few drops of it are added to the urine, if salicylic acid be present, a bright violet color (salicyluric acid) will be produced.

The **specific gravity** of urine is easily ascertained by means of the *urinometer*, a small glass instrument so weighted and marked that, when floated in the urine at 60° Fahr., it will show, in thousandths, the excess of its density above that of water.

*Excessive weight* of the urine is caused by its containing an unusual quantity of *salts* or of *urea*, or by *sugar*. The quantity passed in twenty-four hours must always be considered in connection with its specific gravity; so as to judge of the actual quantity of the solids passed, as well as their degree of dilution.

The *heaviest* urine is that of *diabetes mellitus* (glycosuria), sometimes reaching 1060 to 1070. The *lightest* is observed in hysteria and in Bright's disease, running down sometimes even to 1003.

The degree of **acidity** of urine may be approximately estimated by the more or less decided redness given by it to litmus paper.

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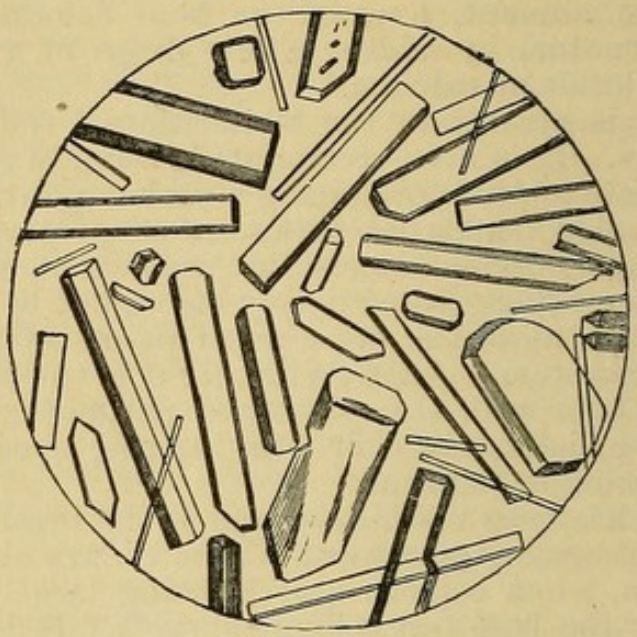
[1] Centralblatt Med. Wiss., No. 20, 1877.

If it be *alkaline*, it will make turmeric brown and restore the blue to litmus reddened by an acid. A highly-animalized diet increases the acidity of the urine. Vegetable food, without any meat, may reduce it even to a neutral condition.

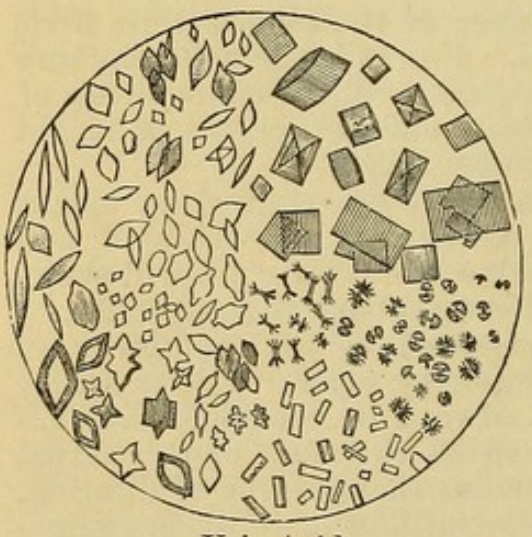
FIG. 22.



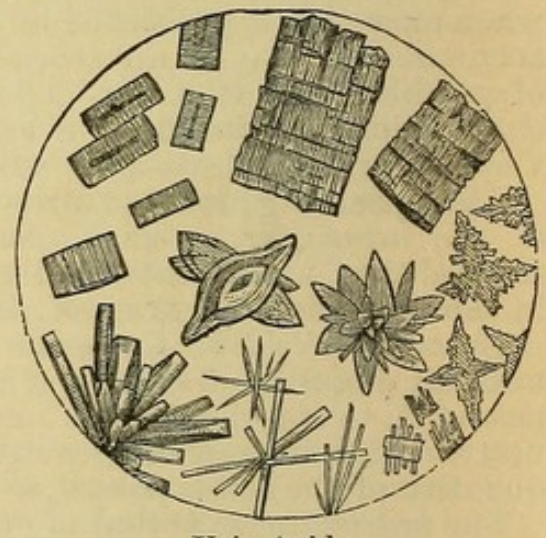
Urea.

**Alkalinity** of the urine is *uncommon*, unless (Bence Jones) immediately after a meal. If it does occur at other times, it depends upon either fixed (potassa, soda) or volatile alkali (ammonia). If the former, it is usually associated with *nervous debility* or general

FIG. 23.



Uric Acid.



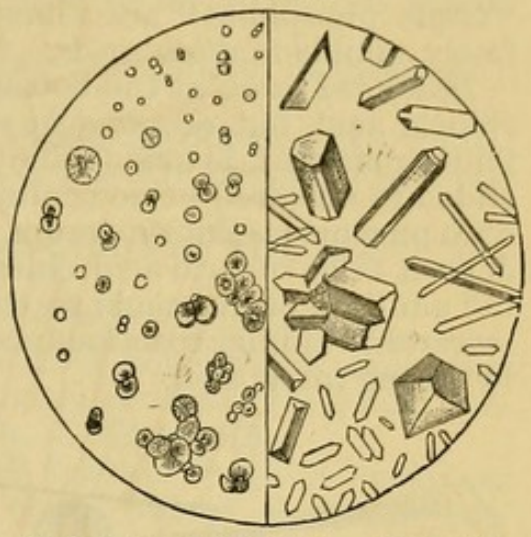
Uric Acid.

depression of vital power, except when accounted for by the medicinal use of potassa, soda, or lithia. Excess of the phosphatic salts, and of oxalate of calcium (oxaluria), often accompanies alkalinity of the urine. The importance of the presence of oxalate of calcium has probably been overrated. Garrod and Parkes have

shown reason for believing that a little oxalic acid exists naturally in the blood, and Leared and Duckworth have caused artificial oxaluria by the free ingestion of lime-water into the stomach.

Carbonate of *ammonium*, when present in the urine, causes it to **effervesce** on the addition of an acid, from the escape of carbonic acid gas. The change of color produced by ammonia in turmeric paper will, also, *disappear when it is heated.*

FIG. 24.



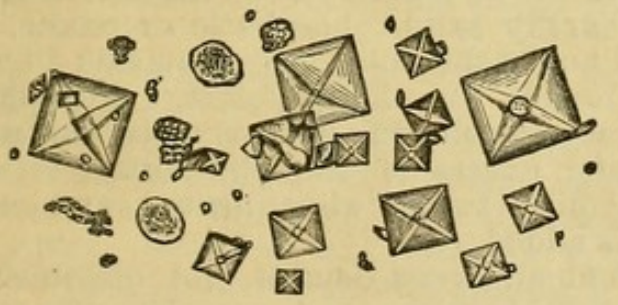
Carbonate of Calcium. Hippuric acid.

Ammoniated urine becomes so by the decomposition of urea, and its conversion into carbonate of ammonium. When the bladder is inflamed and contains unhealthy mucus, this decomposition occurs, either in the bladder or in the urine shortly after it has passed, making it alkaline in reaction, and effervescent when acid is applied. In cases of *much less frequency*, urine will effervesce with acid from the presence of *carbonate of calcium.*

The *odor* of urine is apt to be most intense when tissue-change is going on rapidly, and the quantity of fluid passed is small, its density being then high. Excess of phosphates is sometimes accompanied by a fetid odor. A sweetish smell may be perceived in diabetic urine. Some articles of food, especially asparagus, and certain medicines, as oil of turpentine, cubebs, and copaiba, give their own odor to the urine.

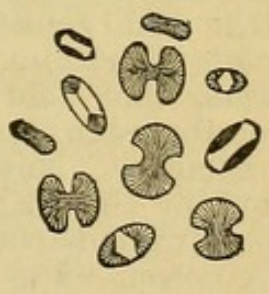
**Sediments** occur in the urine, either when first passed or after standing, from its containing substances (1) insoluble in it, or

FIG. 25.



Octahedral Oxalate of Calcium Crystals. (Bowman.)

FIG. 26.



Dumb-bell-shaped Crystals of Oxalate of Calcium. (Bowman.)

(2) precipitated upon its cooling, or (3) resulting from chemical changes rapidly taking place. Such sediments may be examined both chemically and microscopically.

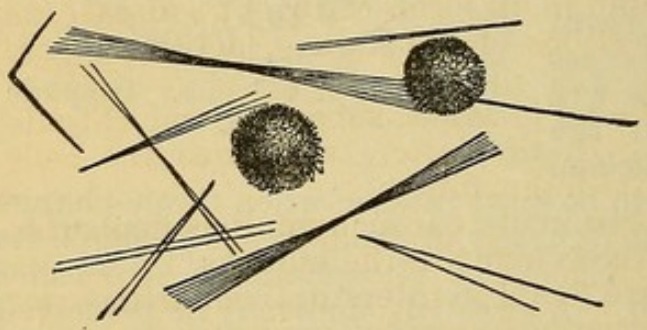
A *fawn-colored* deposit, not crystalline, which is *redissolved when the urine is heated*, consists of **urates** of *ammonium* and sodium.

Urate of ammonium is also immediately dissolved by solution of ammonia or of potassa.

A much more *rare* deposit, of **cystine**, has a similar color, but it is not soluble by heat, and is but slowly dissolved by alkalies. Cystine, under the microscope, shows rosette-like or hexagonal crystals, sometimes like those of chloride of sodium; the latter, however, is much the most soluble in water. The crystals of "triple phosphate" are known from those of cystine by being freely soluble in *dilute acids*.

*Heavy red sand*, at the bottom of the vessel, insoluble in hydrochloric acid, but *dissolved by nitric acid* and also by *alkalies* (as liquor potassæ), is **uric** (lithic) **acid**. When *strong* nitric acid is added to deep-red urine containing urate of ammonium in excess with purpurin, solution occurs, with effervescence, and a brownish deposit falls, of uric acid chiefly. When evaporated to dryness, the addition of ammonia to the deposit will produce the purple *murexide*. Similar reactions occur with uric acid itself, acted upon by strong nitric acid.

FIG. 27.



Crystals of Tyrosin obtained by the evaporation of urine. (Frerichs.)

FIG. 28.

Crystals of Leucin. (Beale.)

**Blood-corpuscles** sometimes fall to the bottom of urine as a colored sediment. They are not soluble in acids or alkalies, and may be distinguished by aid of the microscope.

A *whitish* deposit, *not at all dissolved by heat*, but dissolved by nitric acid, consists of **earthy salts**, phosphatic or oxalic. If *oxalate* of calcium, it will not be dissolved by *acetic* acid; if *phosphates*, that acid will render the liquid clear. Phosphatic deposits occur (even if not excessive in amount) when the urine is alkaline. Nevertheless, excess of the phosphates is indicated by the urine becoming turbid when heated, and clearing up when acetic acid is added.

A *creamy-white* flocculent and *ropy* deposit, not dissolved on agitating the liquid, is probably **mucus**. A greenish-yellow settling, diffused when shaken, and which is dissolved by and forms a *jelly* with liquor potassæ, may be concluded to be **pus**.[1]

The **microscope** may detect, even in urine scarcely opaque, or in its residue after evaporation—

[1] Dr. Day, of Geelong, tests for pus with a fluid prepared by exposing a saturated alcoholic solution of guaiacum to the air until it has absorbed oxygen enough to cause it to become green with iodide of potassium. A drop or two of this will give a clear blue color with a very small amount of pus moistened with water.

*Blood-corpuscles*, disk-like, or jagged and out of shape;
*Mucus-corpuscles*, mingled with epithelial scales or cells;
*Pus-corpuscles*, granular, containing several nuclei;
*Epithelial cells* or scales, from the kidney or bladder;
*Tubular casts* from the kidney (desquamative nephritis);
*Spermatozoa;* thread-like, with one end ovate and expanded;
*Uric acid* crystals, variously shaped, as lozenges and square prisms;
*Triple phosphate* of magnesium and ammonium, in three-sided prisms with beveled ends;
*Phosphate of calcium*, granular, or in long needle-shaped crystals;
*Oxalate of calcium*, in transparent octahedral or dumb-bell crystals;
*Oil-globules* (rare), with dark, smooth, and well-defined outline;
*Chyle-corpuscles*, found in urine of a milky appearance.

Several of these forms will be noticed hereafter in connection with particular diseases. The following summary statement concerning *casts* in the urine is from Dr. J. Tyson:[1]

"1. Hyaline casts are found in all forms of Bright's disease, as well as in temporary congestions of the kidney, active or passive.[2]

"2. Epithelial casts are found in acute, subacute, and chronic parenchymatous nephritis. In the latter two forms the cells are generally degenerated and fragmentary.

"3. Blood casts are found in acute parenchymatous nephritis, and where hemorrhages have occurred in the kidneys.

"4. Pale granular casts are found in interstitial nephritis (contracted kidney) and chronic parenchymatous nephritis.

"5. Dark granular casts are found in parenchymatous nephritis, acute and chronic, and rarely in interstitial nephritis.

"6. Waxy casts are found only in chronic Bright's disease, and attend either of the three principal forms.

"7. Oil casts are found in subacute and chronic forms of Bright's disease, and may attend any of the three principal forms, but are most numerous in chronic parenchymatous nephritis (fatty kidney)."

Urine **free from deposit** should, in suspected cases, be tested for **albumen** and for **sugar.**

The best test for albumen is the *successive* addition to the urine of *heat* and *nitric acid.* If it become and continue turbid under their combined influence, it is albuminous; but neither alone will suffice. Another test (Millon's) is the acid nitrate of mercury; which causes with albuminous urine a pink precipitate. Fibrin and casein have this reaction also, but they will scarcely ever be found in urine, in the absence of albumen. Other mineral salts (ferrocyanide of potassium, bichloride of mercury, etc.) will precipitate albumen; but the first-mentioned test is the most available.

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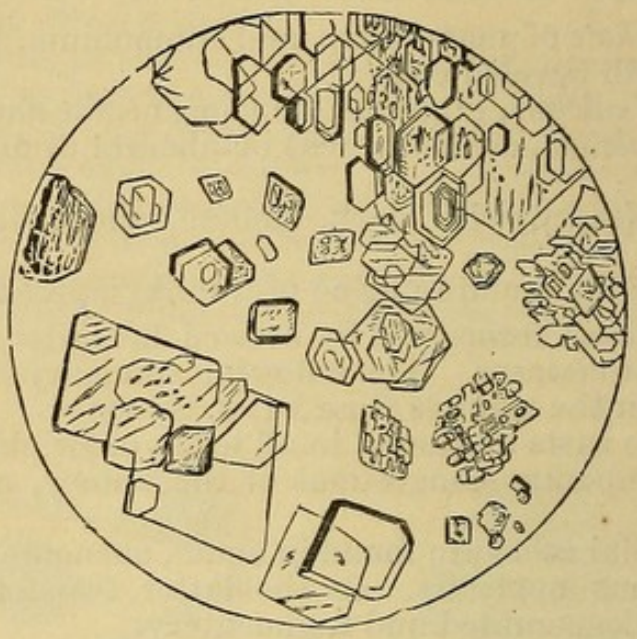
[1] Phila. Med. Times, March 13, 1880, p. 294.

[2] Hyaline casts are (Curschmann, 1880) stained ultra-marine blue by methyl (green methyl aniline). Med. Times and Gazette, April, 1880, from Virchow's Archiv., vol. lxxix.

*Picric acid*[1] has been somewhat used. A drop of the urine to be tested, falling into picric acid, if albumen be present, will make a white streak through it. A dark background will render this more evident. Bowditch has proved this to be a less delicate process for the purpose than that with heat and nitric acid.

FIG. 29.



Nitrate of Urea.

We must remember, however, that **albuminuria** is no longer synonymous with Bright's disease. Albumen occurs, *transiently*, in the urine of many acute affections, as scarlatina, diphtheria, and renal congestion from cold and wet. It is only when *persistent* as a symptom that it becomes pathognomonic of degeneration of the kidneys. In rare instances, moreover, this degeneration has been found (post-mortem) to exist *without* albuminuria.

The principal tests for **diabetic sugar**[2] (glucose) are *Moore's*, *Trommer's*, *Maumené's*, *Böttger's*, and *fermentation*.

*Moore's:* Boil the liquid with half its bulk of liquor potassæ.[3] If saccharine, it will become first yellow and then brown, and ruby red by transmitted light. Addition of a few drops of nitric acid (Heller) will cause the brown color to disappear.

*Trommer's:* Add a few drops of strong solution of sulphate of copper to the urine in a test-tube, and then pour in liquor potassæ to about half the bulk of the urine. On the careful application of heat, a yellowish or reddish-brown precipitate

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[1] Gazette Médicale de Paris, 1873, p. 122.

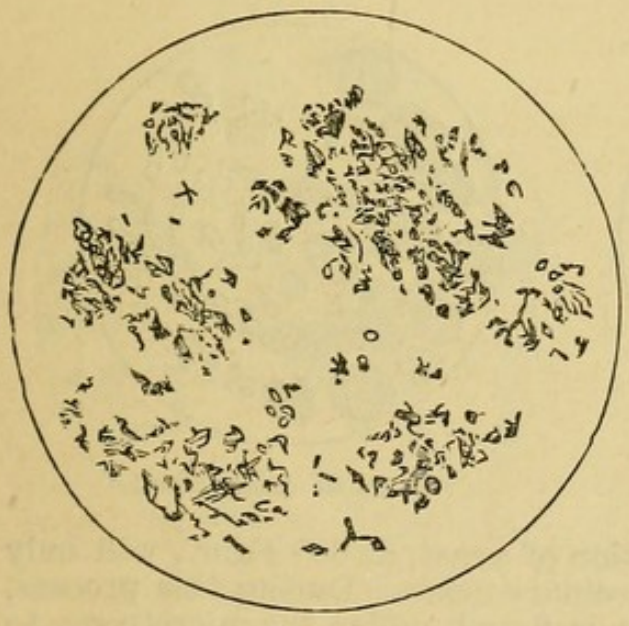
[2] Bence Jones has found a very small quantity of grape sugar in healthy urine.

[3] Dr. M. Tidy (Med. Times and Gazette, June 3, 1871) prefers this test for the approximate determination of the *quantity* of sugar in diabetic urine. A series of solutions is prepared, each containing a different amount of grape sugar (say from one-fourth of a grain up to two grains), but all the same amount of potassa. The difference of the tint is well marked. In testing the urine, a solution of 1 grain of potassa to every 7 grains of water is made; of this 70 grains are added to 70 grains of the urine; boil one minute, dilute with distilled water in a 4 oz. vial (similar to those used for the test solutions), and then compare with the solutions containing known quantities of sugar, until the exact tint is found.

(suboxide of copper) is thrown down. *Fehling's test fluid* is analogous to this. As modified by Lowe, it consists of sulphate of copper, with soda and a little glycerin.[1] Boil the test-solution, and add the suspected urine drop by drop.

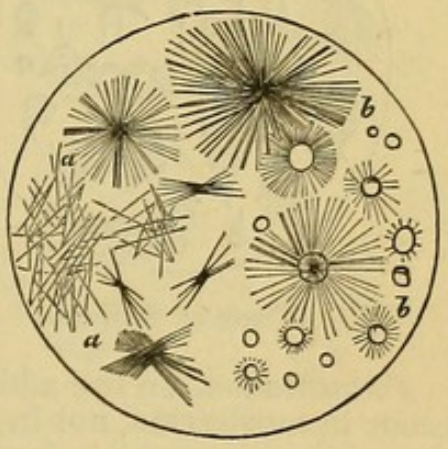
For the detection of small quantities of sugar, Dr. W. Roberts advises that the test be applied in the following way: "Heat in a test-tube two fluidrachms of Fehling's standard solution of copper, and when boiling, add five to ten drops of the urine to be tested; if sugar be abundant, as in a decidedly diabetic urine, a yellowish or brick-red opacity and deposit will be produced. If no such reaction ensue, test for traces of sugar by adding one and a half fluidrachms of the urine to the hot liquid, heat again to ebullition, and set aside for some time. If no milkiness is produced as the mixture cools, the urine is either quite free from sugar, or at any rate contains less than $\frac{1}{40}$ of one per cent. If the quantity of sugar is very small, namely, from $\frac{1}{2}$ to $\frac{1}{40}$ of one per cent., the precipitation of the yellow or red cuprous oxide does not take place immediately, but occurs after some time, as the liquid cools, and the manner of the change is peculiar. First, the mixture loses its transparency, and passes from a clear bluish green to a light greenish opacity, looking just as if some drops of milk had fallen into the tube. This green milky appearance

FIG. 30.



Urates.

FIG. 31.




Urate of Sodium.

is quite characteristic of sugar. In performing this test for the first time, a difficulty may be experienced on account of the phosphates of the urine being precipitated by the alkali of the test solution. These phosphates, however, are thrown down in large flakes, which are seen floating in a clear bluish-green

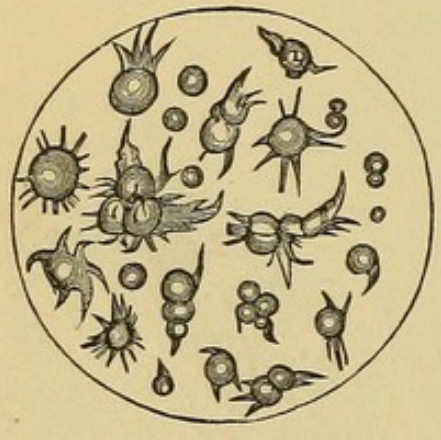
[1] London Lancet, Sept. 24, 1870. *Pavy's* solution consists of 320 grains of sulphate of copper, neutral tartrate of potassium 640 grains, caustic potassa 1286 grains, distilled water 20 fluidounces. This gives an opaque yellow color with diabetic urine. Fehling's liquid, without glycerin, consists of 94.73 grains of sulphate of copper, 378.91 grains neutral tartrate of potassium, solution of caustic soda (spec. grav. 1.12) 3½ fluidounces, and enough water to make in all 6 fluidounces.

medium, by holding the tube between the eye and the light. The presence of sugar does away with all transparency, which gives place to a milky greenish or yellowish opacity. This mode of applying the copper test is based upon the fact that urine which is free from sugar never discharges the color from more than an equal bulk of Fehling's solution. Fehling's solution is apt to deteriorate by keeping, so that without any addition it may cause a precipitation of cuprous oxide upon boiling. Proceeding, however, in the manner described, the test solution is boiled first, and if it remains clear there is a proof that it is in good condition. If, instead, it forms a deposit on boiling, it must be rejected and a fresh supply of it made."

*Maumené's:* Dip into the liquid a strip of flannel (not linen or muslin) saturated with a solution of bichloride of tin in twice its weight of water. The strip, on being heated over a fire or lamp to near 300° Fahr., will at once become brownish-black, like caramel.

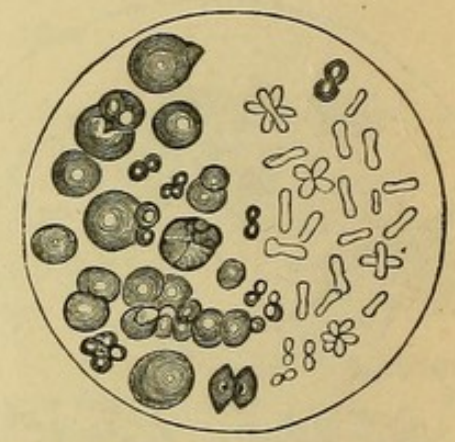
*Böttger's:* Add a few drops of dilute solution of nitrate of bismuth in nitric acid; make the liquid alkaline with carbonate of sodium, and boil for a few minutes. When sugar is present, it becomes dark, and will gradually throw down a grayish-black deposit. If the urine were healthy, a *white* deposit would fall.

FIG. 32.



Urate of Sodium.

FIG. 33.



Urate of Ammonium.

*Fermentation*, on the addition of yeast, at 80° Fahr., will only occur in saccharine, not in ordinary urine. During this process, the white scum which forms is found, under the microscope, to contain the chains of oval vesicles of *torula* (saccharomyces) which characterize vinous fermentation.

*Trommer's* test is the one most generally employed. Occasionally a substance called *alkapton* may be present, which likewise reduces the oxide of copper; but it will not ferment, nor cause a dark deposit with bismuth. Its possible existence does not interfere with the practical value of this test for sugar.

Beale mentions that *chloroform* will, like grape sugar, reduce the suboxide of copper. Dr. J. B. Roberts[1] has observed that

[1] Amer. Journal of Med. Sciences, October, 1877, p. 424.

the copper test will throw down a yellowish deposit in the urine of patients taking *chloral* as a medicine.

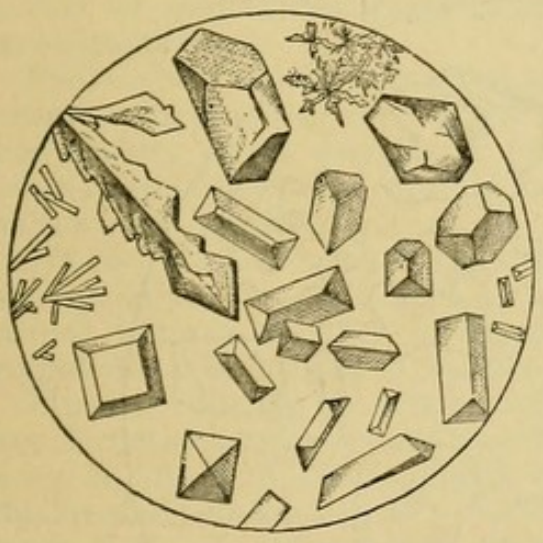
**Coloring matters** taken as medicine or food may sometimes occur in the urine; as rhubarb, senna, logwood, coffee, etc. Santonin gives a light yellow color to the urine. Mineral acids will change the color of rhubarb or senna to a bright yellow. Aqua ammoniæ will turn the orange hue of rhubarb to crimson.

The following passages[1] contain much information in regard to the meaning of urinary changes in disease:

"The quantity of urine is increased in hysteria, neuralgia, the beginning of fevers, diabetes, the beginning of cirrhosis of the liver, and of hypertrophy of the heart; diminished in the hot stage of fevers, more advanced cirrhosis of the liver, and hypertrophy of the heart. An increase in quantity after diminution is favorable, as it shows that the disease has reached its acme.

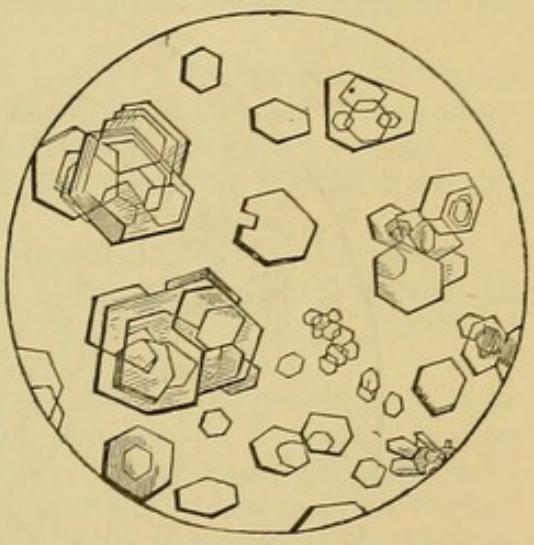
"The density of the urine is reduced in different nervous affections, in granular degeneration of the kidneys, the cold stage of fevers, and in many instances of that period of collapse which ushers in local inflammation. The tendency in all diseases, and especially in inflammations, as they approach termination, is to give rise to an increase of the specific gravity of the urine, except in granular degeneration of the kidney, the influence of which is, from first to last, to lower the specific gravity of that secretion. In phthisis, fluctuations are observed, and we are

FIG. 34.



Triple Phosphate.

FIG. 35.



Cystine.

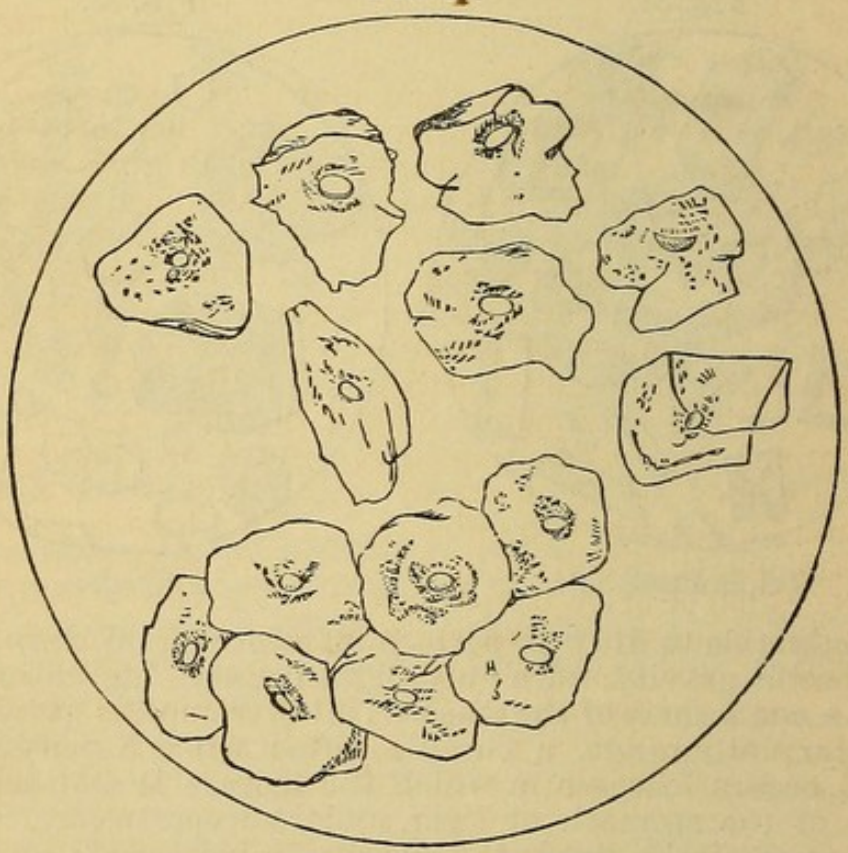
frequently able to draw important inferences from them; thus a high specific gravity, with only slight diurnal fluctuations, indicates an acute form of the disease; a lower specific gravity, with a greater daily range, a chronic form; while a density nearly normal occurs in cases in which the disease is stationary. In cancer of the stomach or liver, and in hypertrophy, cirrhosis, and abscess of the liver, the density is increased; and this is also the case in any disease involving a mechanical obstruction to the flow of bile.

[1] Black, in St. Andrew's Med. Graduates' Association Reports, 1870; condensed by J. H. H., in Am. Journal of Med. Sciences, Jan., 1871.

"The color of the urine is made pale by nervous diseases, by diabetes, by granular degeneration of the kidney, and by the phosphatic diathesis. It is milky whenever it contains pus or chyle. In oxaluria, in active inflammation, in fevers, it is of a yellowish or brownish-red color.

"The occurrence of the urates, as a deposit in the urine, indicates either an excess of food, or of disintegration of the tissues. In an acute disease a deposit of urates is generally indicative of a tendency to recovery, but in wasting diseases, as phthisis, their amount is simply a measure of disintegration. They occur during convalescence from inflammation, and depend probably on the absorption of the exudation, and hence will be deposited for a longer time after inflammation of a serous than of a mucous membrane, because in the former case there is no direct outlet for the exudation as in the latter. If, after the eruptive fevers have attained their height, no urates are observed in the urine, complications or sequelæ are to be feared; or if in acute gout or rheumatism the improvement of a joint is suddenly followed by the disappearance of the sediment from the urine, another joint will soon be involved. The urates will be reddish in color in inflammatory diseases, and in functional disturbances of the digestive organs; pinkish in acute articular rheumatism, but whitish whenever there exists nervous irritation rather than inflammation."

FIG. 36.



Vaginal Epithelium in Urine.

The **quantitative** analysis of urine, to determine the amount and proportion of its different ingredients, requires considerable chemical proficiency.

The following statement of the **normal average** amount of the constituents of healthy urine, passed in twenty-four hours, is from Thudichum:

| | | |
|---|---|---|
| Solids altogether | 850 to 1020 | grains. |
| Urea | 463 to 617 | " |
| Uric acid | 7.5 | " |
| Creatin | 4.5 | " |
| Creatinin | 7.0 | " |
| Hippuric acid | 7.5 | " |
| Chloride of Sodium | 154 to 200 | " |
| Sulphuric acid | 23 to 38 | " |
| Phosphoric acid | 56 | " |
| Earthy phosphates | 19 | " |
| Ammonia | 10 | " |

Besides *sarkin*, *uræmatin*, *uroxanthin*, *potassa*, *soda*, *lime*, *magnesia*, *iron*, *trimethylamine*, *carbonic* acid, *phenylic* acid, and *damaluric* acid in undetermined amounts.[1]

As the specific gravity of the urine varies in health from 1015 to 1025, and in disease from 1005 to 1070, an approximative estimate of the amount of solids may be obtained by *doubling the last two figures of the specific gravity*. Thus, urine having a specific gravity of 1030 will contain *about* 60 grains of solids per ounce.[2]

**Heavy** and **dark-colored** urine (*diabetic* urine is straw or amber colored), with a strong odor, may be inferred to contain an excess of solids from waste of tissue; among which **urea** is the most important.

Prolonged muscular exercise and highly nitrogenous diet both promote increase of urea in the urine. It would therefore seem reasonable, when *uræmia* is feared, as in Bright's disease, to restrict the amount of animal food as far as the strength of the patient will permit.

When excess of urea is present, the addition of a few drops of strong colorless nitric acid to the urine on a watch-glass will throw down a number of crystals of *nitrate of urea* (delicate, rhomboidal, like those of saltpetre). (See Fig. 29.)

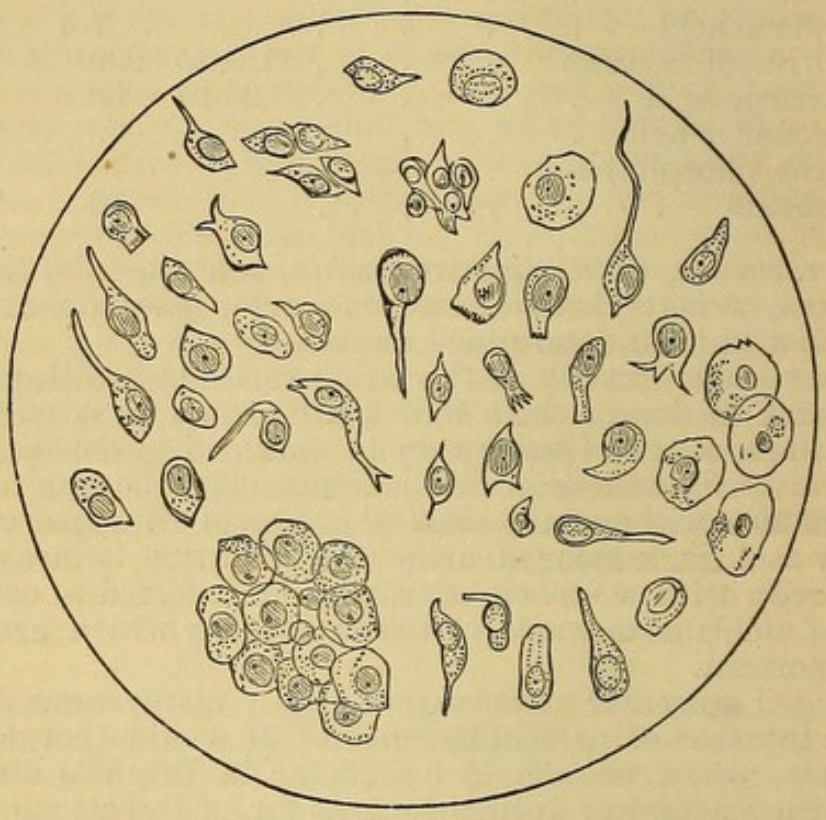
For determining the amount of urea, Bowman gives the following directions: "A measuring-tube, twelve or fourteen inches long, is provided, easily closed by the thumb, and graduated to tenths and hundredths of a cubic inch. This tube is filled rather more than one-third full of mercury, and a measured quantity (50 to 60 grains) of urine poured into it. The tube is then quickly filled to the brim with solution of hypochlorite of soda, closed by the thumb, and inverted under a saturated solution of common salt (which being heavier than the solution in the tube, prevents its escape), contained in a small mortar. The tube is allowed to stand for three or four hours, or until the volume of

[1] Städeler is reported to have shown that carbolic acid (carbol or phenol) is a constant ingredient of the urine, to the extent of about ¼ of a grain daily in health. Salkowski and Briegel have found it to be greatly increased in some cases of disease, especially in peritonitis. See *Med. Times and Gazette*, Oct. 12, 1878, from *Centralblatt f. d. Med. Wiss.*, Nos. 30, 31, 34, 1878.

[2] Prof. A. Flint, Jr., asserts that, between 1010 and 1030, the *last two figures* of the specific gravity indicate, very nearly, the number of *grains of solids* per ounce.

the nitrogen ceases to increase, and the amount of urea is calculated (1.549 cubic inches of nitrogen gas representing 1 gr. of urea). In this process the carbonic acid is retained by the excess of chlorite of soda employed. To prepare this solution of hypochlorite of soda, 500 grains of good chloride of lime (bleaching powder) are stirred with boiling water, filtered, and the residue

FIG. 37.



Epithelial Cells from bladder, ureter, and kidney.

washed once or twice with the boiling water; 1000 grs. of crystallized carbonate of soda are dissolved in a little water, and added to the solution, which is then filtered and made up to 20 oz. with water."

A. Gamgee (1878) prefers sodium *hypobromite* solution for the quantitative estimate of urea. It decomposes urea into carbonic acid and nitrogen; the former is absorbed by the alkaline solution, and the nitrogen can then be measured as in the above-mentioned process.

To estimate the amount of **sugar** in urine, Pavy's solution (see note to p. 85) may be used; 100 minims of it being decolorized by half a grain of sugar.

Excess of **phosphates** *is generally associated* with disintegration of brain and nerve-tissue. Bence Jones and others have found the phosphates deficient in the urine in delirium tremens, and in excess in inflammatory affections of the brain. Dr. Luther H. Wood, however, in an elaborate investigation, disproves the supposition, based on some previous observations, that mental activity causes a general increase of the phosphates. He finds that the *alkaline* phosphates are *slightly* increased by mental exertion,

but the earthy phosphates are *diminished*, and the total amount of phosphoric acid in the urine is not increased to any important extent.[1]

**Chloride of sodium** has been found (Redtenbacher) to *disappear* from the urine in the height of an attack of *pneumonia*, and (Beale) to appear at the same time in excess in the *sputa*. This may be tested by the addition of a few drops of nitric acid, followed by solution of *nitrate of silver*—a white precipitate of chloride of silver indicating the presence of the chloride of sodium.[2]

**Fatty** matter in the urine is detected by the microscope, and by the use of ether, which will dissolve the oily particles from the extract obtained by evaporation.

**Kyestein** is a greasy pellicle found on the surface of the urine (after standing a day or two) of pregnant women, or (Kane) in those whose mammary glands are excited by sympathy with uterine irritation. *Urostealith* is a solid adipose concretion (Roberts), now and then making part of a calculus.

In a **low state of vitality** (Inman) the urine, after being passed, *undergoes decomposition* more rapidly than during health.

For diagnostic chemical analysis of urine by the student or practitioner, simple apparatus will answer. There are needed half a dozen test-tubes, a urinometer, a spirit lamp, litmus and turmeric paper, graduated glasses (6-ounce, 1 fl.-ounce, and 1 fl.-drachm), a stirring rod and drop tube, a glass funnel and filtering paper, a porcelain evaporating dish, and a small amount of each of the following reagents: nitric, nitroso-nitric, hydrochloric, sulphuric, and acetic acids, liquor potassæ, aqua ammoniæ, nitrate of silver solution, sulphate of copper solution (94.73 grains in the ounce), and sometimes alcohol, solution of chloride of barium (to test for sulphuric acid or sulphates), distilled water, and ether. A blowpipe may be added for use with calculi.

Microscopical examinations may be made satisfactorily for ordinary purposes with an instrument of moderate cost; such as Woodward's student's microscope.[3] (Guidance should be sought for in the works of Beale, Carpenter, Hogg, or Richardson, on the microscope.)

### Urinary Calculi.

**Gravel,** formed in the kidneys and passed, sometimes with much pain, along the ureters to the bladder, and thence out through the urethra, consists commonly of *urates* of ammonium and sodium, and uric acid.

**Calculi,** of larger size, are in a majority of cases composed of **uric acid.** Such are smooth, or but slightly rough outside, formed in concentric layers of different thickness. They will dissolve in a dilute solution of potassa; or in strong nitric acid, with effervescence. The microscope will show the uric acid crystals.

Next in frequency is the calculus formed of a mixture of **phosphate of calcium** with **triple phosphate** (of magnesium and

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[1] Silliman Prize Essay, New Haven, 1869; and American Journal of Medical Sciences, April, 1870, p. 506.

[2] Chloride of ammonium will produce the same reaction; but this salt is rare in the urine or sputa.

[3] Made by J. W. Queen, Philadelphia and New York.

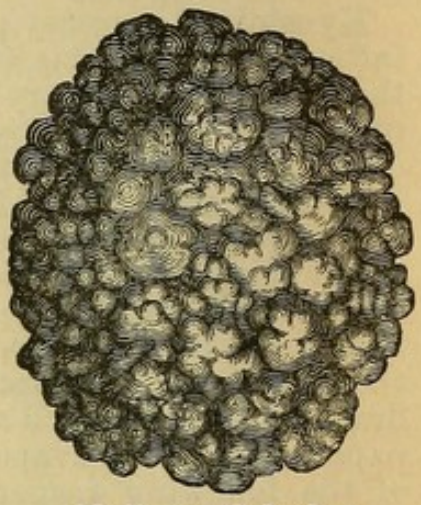
ammonium), called *fusible* calculus; because, before the blowpipe, it melts readily without combustion.

Calculus of *phosphate of calcium* is generally smooth and polished

FIG. 38.

Lithic Acid Calculus (section).

FIG. 39.



Mulberry Calculus.

on the outside; it *chars* before the blowpipe. So does the rather rare calculus of *triple phosphate* alone.

**Oxalate of calcium** forms the so-called *mulberry* calculus; irregular and rugged in structure throughout. It may be tested by burning a small fragment to a white ash under the blowpipe, and then placing this ash upon reddened litmus paper, and moistening it. It will turn it to a decided blue color.

**Cystine** is occasionally found forming the substance of rather soft, brownish, or greenish-yellow calculi.

Urostealith has been already mentioned.

Of 184 stones removed by Sir H. Thompson by lithotrity, 122 were of uric acid and urates, 16 of a mixed character, 40 phosphatic, 1 pure phosphate of calcium, 4 oxalate of calcium, and 1 cystic oxide.

### Gall-Stones.

These concretions of biliary matter are formed in the gall-bladder, and frequently cause great pain in their passage along the cystic and common biliary ducts. They are of various sizes, averaging about that of a pea. **Cholesterin** forms the greater part of their substance, mixed with the biliary resinous and acid constituents (cholic and choleic acids, taurin, etc.) and coloring matter.

From a solution of the gall-stone in boiling alcohol, cholesterin will crystallize, on cooling, in *fine scaly crystals*. Though allied to the fatty bodies, it differs from them in not dissolving in

a solution of potash. The observations of Dr. A. Flint, Jr., make it probable that cholesterin is converted normally into *stercorin*, in which form it is excreted.

### Other Secretions.

The **milk** of a mother may be affected in quality as well as quantity by the physical or even mental state of the individual; so as to become innutritious, or even injurious to her offspring. Violent mental agitation in a mother has been known to produce fatal convulsions in an infant at the breast.

In the **parturient** state, the *sudden* arrest of the formation of milk in the mammary gland, with the cessation of the uterine *lochial* discharge, is alarming—threatening child-bed fever.

**Menstruation** is not a secretion; it is rather a periodical discharge of somewhat altered blood, along with *ovulation*, or the escape of a germ from the ovary. Its occurrence, however, is necessary to the health of the female, from 15 to 45 years, about, and its variations and deviations are important signs of disease.

Abnormality in menstruation is, principally, either **amenorrhœa, dysmenorrhœa,** or **menorrhagia.** The first, amenorrhœa, is either (1) non-appearance, (2) suppression, or (3), retention of the menses. The last of these (retention) is rare.

Suppression or irregularity of menstruation, apart from pregnancy, may result from uterine or ovarian disease, or from *constitutional* conditions affecting the uterus or ovaries functionally. The latter is the more common in general practice. The amenorrhœal woman is generally, though not always, *anæmic.*

**Dysmenorrhœa** (painful menstruation) may be either *obstructive, spasmodic,* or *neurotic.* The *first* may occur from congenital smallness of the orifice of the neck and mouth of the womb; or retroversion, anteversion, or obliquity of that organ; or pressure by a tumor; or occlusion of the os by inflammatory bands or adhesions of lymph. The diagnosis of such affections from *spasmodic* or *neurotic* dysmenorrhœa belongs to *obstetric* surgery or medicine. So does the consideration of *retention* of the menses.[1]

**Perspiration.**—Changes affecting the secretion of the *skin* have been already alluded to, in connection with the signs of disease belonging to the tegument. Strong *odor* of the perspiration indicates vicarious excretion by the sweat-glands, and commonly accompanies insufficient action of the bowels. *Acidity* of the perspiration is sometimes dependent on the presence of an excess of *uric acid;* which, in gout, in the form of urate of sodium, is occasionally concreted palpably upon the surface of the body. *Sudoric* acid is said by Favre to take the place of uric acid, normally. The perspiration contains also chloride of sodium, urea, lactic acid, ammonia, etc. The *odor* of the perspiration is *peculiar* in small-pox, typhus, gout, albuminuria, etc.

## SYMPTOMS CONNECTED WITH THE MOTOR APPARATUS.

The **decubitus,** or mode of lying down, of a patient, should be noticed. *Inability to rise* may depend upon *general debility, paraly-*

[1] See "Unclassified Affections," in Part II.

*sis* of the extremities, rheumatic or gouty *inflammation* of the joints, etc., or *injuries*, such as fractures or dislocations.

*Inability to lie down* is most frequently the result of dyspnœa (orthopnœa)—the respiratory muscles having the freest scope in the erect position.

In *colic*, the patient generally prefers to lie upon the belly.

In *peritonitis*, the characteristic position is upon the back, with the *knees drawn up*, to relax the abdominal muscles.

Lying *upon one side* is often significant in disease. In the early stage of pleurisy, the patient prefers to lie upon the *healthy* side; when effusion has taken place, this is reversed. In irritative disorder of the liver, with enlargement, the patient will often lie most comfortably upon the right side. When the heart is enlarged or violent in its action, the sufferer *generally* cannot lie upon the left side. The exceptions are most frequent in cases of long duration.

In *aneurism of the aorta*, the *prone* or semi-prone position (as leaning forward over a chair or a bed) is sometimes preferred.

**Muscular debility** may be the result of acute disease, as fever, or of actual exhaustion and prostration. *Total want of exercise* will enfeeble the muscles; as, when a limb is long confined in splints on account of a fracture or other injury. Inability to walk steadily without constant guidance by sight, is among the symptoms of *locomotor ataxia.*

**Spasm** is of three kinds: *tonic*, *clonic*, and *choreic.*

*Tonic* spasm is *fixed rigidity;* such as *emprosthotonos* (arching of the body forwards), or *opisthotonos* (arching backwards), in *tetanus.* *Clonic* spasm is ordinary *convulsion; i. e., successive* contractions of the muscles at short intervals *Choreic* spasm is a term suggested to indicate the jerking, irregular movement of the muscles, not controllable by the will, in cases of chorea.

**Tremor** is of two kinds: *incidental* or *volitional* tremor, occurring only when muscular action is attempted; and *habitual* or *constant* tremor, which takes place while the individual is at rest, as well as when in motion. *Multiple cerebro-spinal sclerosis* is, in many cases, attended by the former; *paralysis agitans* exemplifies the latter. Erb, Hammond, and others assert that *volitional* tremor occurs only when some part of the *brain* is involved in disease.

*Rigidity* is different from spasm; although sometimes closely connected, as in *spastic spinal paralysis.* In cases of palsy, we may meet with *early* and *late* rigidity (Todd) from different pathological causes. The first is connected with *irritation* of nerve-centres; the second, with *degeneration.*

*Subsultus tendinum*, or jerking of the tendons at the wrist, is one of the symptoms of low states of continued fever.

**Paralysis** will be alluded to presently.

### SYMPTOMS CONNECTED WITH THE SENSORY APPARATUS.

Of these, the most important is **pain.** Pain may be—

*Acute, sharp, cutting*, as in pleurisy;
*Shooting, darting*, as in neuralgia;
*Lancinating*, in cancer;

*Gnawing*, *tearing*, in rheumatism;
*Dull*, *heavy*, *aching*, in pneumonia;
*Griping*, *twisting*, in dysentery;
*Bearing down*, in second stage of labor;
*Pulsating*, in the formation of an abscess;
*Burning*, *smarting*, in erysipelas;
*Stinging*, *nettling*, in urticaria;
*Constant*, or *intermittent;* fixed or wandering.

**Tenderness** *on pressure* is generally associated with *inflammation;* although some affections designated as neuralgic also present it—possibly from inflammation of the sheaths of the nerves. *Exhausted muscles* also have it, with pain (**myalgia** of Inman).

Sometimes pain is *relieved* by pressure; as in many cases of *colic* and *dysmenorrhœa*. This is a sign, usually, of the *absence* of inflammation.

Pain is *not always at the seat of disease*. Thus, in disease of the hip-joint (morbus coxarius), the pain is felt chiefly at the knee; in calculus of the bladder, at the glans penis; in ovarian disease, sometimes, along the limbs; in disorder of the liver, often, under the scapula; in dyspepsia, frequently, about the sternum; and in irritation of the uterus, at the top of the head.

Total **loss** of sensation, local or general, is called **anæsthesia. Hyperæsthesia** is *excessive* sensibility. **Acinesia** (a term seldom used) is loss of muscular power.

**Paralysis** of one side only, of the body, *e. g.*, the right arm and leg, is *hemiplegia*. Paralysis of both lower extremities, *paraplegia*. These terms are commonly applied either to loss of power, or loss of sensibility, or the more usual combination of both. The cause of paralysis may be *local* (lesion of a *nerve*) or in the *spinal marrow*, or in the *brain*.

In the diagnosis of cases of paralysis, the reaction of the muscles to **electricity** is often important. When hemiplegia (paralysis on one side of the body) or paraplegia (palsy of the limbs on both sides) is produced by disease of the *brain*, or of the spinal cord *above* the insertion of the nerves supplying the affected limbs, the muscles of those limbs will respond to both the "faradic" and the "galvanic" currents. When, however, the paralysis results from disease of the *nerves* supplying the muscles, or that part of the spinal cord with which those nerves are *directly connected*, the paralyzed muscles react with unusual susceptibility to the *galvanic* current, but *not at all to the faradic* current. This (reaction of degeneration, Erb; better called reaction of *local* or *proximate lesion*) is observed often in acute facial paralysis from inflammation of the sheath of the seventh or facial nerve on one side. When disease or injury of the brain causes paralysis of the same muscles (other muscles also being then commonly involved) they will react to *both* the galvanic and the faradic currents; unless, at least, *descending neuritis* modify the case, and produce a true reaction of degeneration.

The **eye** affords many indications of disease. A prominent and turgid condition of both eyes occurs in acute ophthalmia, and in congestion of the brain; also not unfrequently in fevers; especially yellow fever. The eyeballs are notably prominent in

*exophthalmic goitre.* If *one eye* alone becomes prominent, local disease, *e. g.*, a tumor behind the orbit, may be suspected. The eyes are sunken, in phthisis, and in other wasting maladies. Sinking of *one* eye indicates local atrophic disease.

The **movements** of the eye should be noticed, especially in children. Rolling of the eyeballs from side to side (nystagmus) is a common symptom of nervous restlessness or cerebral irritation in infants. *Squinting*, occurring as a symptom in disease, is of unfavorable import. Sometimes, however, *seeing double* occurs transiently, under sympathy of the brain with gastric irritation.

The **color** of the eyes varies in disease. In *conjunctivitis*, the blood-vessels are generally enlarged, and the membrane reddened. In *sclerotitis*, the enlarged vessels are seen *converging toward the margin of the cornea.* In *iritis*, discoloration, *irregularity*, and sometimes fixedness of the pupil occur.[1]

The cornea in old people occasionally exhibits the **arcus senilis**—a sign of fatty degeneration. It is an opacity around the circumference of the cornea.

The *lustre* of the eye is lessened generally in depressing acute diseases, and especially just before death.

The eyes are often remarkably bright during the progress of phthisis. They have a *glare* in some cases of inflammation of the brain and of mania.

The **pupil** is generally *contracted* in—

Inflammation of the retina;
Inflammation of the brain;
Apoplexy of the *pons Varolii;*
Narcotism by opium, chloral,[2] pilocarpin,[3] or the Calabar bean.

It is *dilated*, usually, in—

Apoplexy; Amaurosis;
Hydrocephalus; Cataract;
Narcotism by belladonna, stramonium, duboisia, or prussic acid.

An *immovable* state of the pupil, or a *difference between the two eyes* under the same light, gives rise to suspicion of ophthalmic or cerebral disorder.

**Photophobia** is a dread of or shrinking from the light, such as occurs in ophthalmia, and in meningitis or cerebritis. Other symptoms connected with the eye are—

*Photopsia*, flashes of light passing before the eyes.
*Muscæ volitantes*, moving spots, or spectra.
*Amblyopia*, dimness of vision.
*Diplopia*, double vision.
*Hemiopia*, half-sight; *i. e.*, seeing but one-half of an object at a time.

**Tinnitus aurium**, or ringing in the ears, may attend *congestion*

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[1] *Ophthalmoscopic* examination of the interior of the eye is found to be useful in the diagnosis not only of diseases of the eye, but in those of the brain.

[2] Erlenmayer, McKendrick, Sedgwick, etc. In *dogs*, Feltz and Ritter have found the pupils *dilated* after poisonous doses of chloral.

[3] Laborde and Fitzgerald; Lancet, Nov. 13, 1880.

*of the brain; nervous debility; quininization;* or *disease in the ear.* Sometimes tinnitus results merely from *rhythmical twitching* of the *tensor tympani muscle.* **Deafness** may proceed from *coryza* (a cold in the head); *wax* in the ears; *quininization; typhus* or *typhoid fever; disease of the ear; cerebral* disease.

**Pain in the head** (cephalalgia) may be especially alluded to as depending upon—

Neuralgia;
Rheumatism of the scalp;
Congestion of the brain;
Uræmia;
Toxæmia (*e. g.*, by narcotics, alcohol, etc.);
Fever (remittent, yellow, typhoid, etc.);
Chronic disease of the brain;
Uterine irritation, etc.

The distinction between these different forms of headache is by no means always easily made out. As a general statement, it may be said that *neuralgic* headache is mostly on *one side* (hemicrania), and extends more or less to the *face;* it is usually accompanied, also, by sensitiveness of the scalp, and is *shooting* or *darting* in its character. *Rheumatism* of the head is attended by *stiffness of the muscles* which move the head from side to side. *Congestive, febrile,* and *toxæmic* headaches are accompanied by *heat* of the head, and are *throbbing* or *pulsating.* That of *uterine irritation* is on the *top* of the head. That of *uræmia* is more often *occipital.* The pain of *chronic cerebral disease* (tumors, etc.) is commonly *constant* or *periodic in one spot,* and is attended by some functional disorder of the brain.

### SYMPTOMS CONNECTED WITH THE PSYCHICAL APPARATUS.

The **expression of the countenance** is usually altered by disease, especially of an acute kind. The change from anxiety or distress to serenity is always a favorable prognostic, except where *gangrene* or *paralytic anæsthesia* accounts for it.

*Great anxiety* of expression is seen especially in organic disease of the heart, and in acute disorders of the abdominal viscera. In hypochondriasis, a *sad and desponding* expression prevails.

*Terror* is shown by the countenance in delirium tremens.

*Rage,* in some cases of hydrophobia, and sometimes in acute mania.

*Insanity* and *imbecility,* although not characterized by any *special* cast of countenance, yet modify its expression so as to enable the mental state to be detected by one accustomed to the observation of deranged persons.

The *facies Hippocratica* is the countenance of extreme exhaustion or of the moribund state; so called because of its having been well described by Hippocrates, the father of Medicine.

**Delirium** is described as being either *active* or *passive.* Active delirium is present in cases of acute meningitis; passive or low muttering delirium, in typhus fever, etc.

**Coma** presents itself in practice chiefly in five forms: Alcoholic stupefaction; Opium poisoning; Apoplexy; Typhus; Fracture of the skull with compression of the brain.

Typhous stupor is generally easy of recognition; the others may give some trouble in the diagnosis. Between narcotism by opium and dead-drunkenness we have the distinctions, that in opiate poisoning the pupil is almost always *firmly contracted*, and that the breath smells of alcohol (or aldehyde) in the intoxicated subject.

**Loss of speech,** without affection of the vocal apparatus, constitutes the disorder called *aphasia*. *Aphonia* is loss of voice from a morbid condition of the vocal chords or muscles of the larynx.

**Vertigo,** or dizziness, is mostly symptomatic of disorder of the stomach, or of the liver (cholæmia); sometimes, of general debility; rarely, of disease of the brain.

### GENERAL VITAL CONDITION.

Lyons (Hospital Practice) remarks as follows: "The highest skill in physical diagnosis, and the most profound knowledge of pathological anatomy, will leave you but very imperfect and unsafe practitioners, incapable of clear judgment and self-reliance in difficult cases in which you have to rest on your own responsibility, if you do not from the first endeavor to master and acquire for yourselves that unwritten and indescribable knowledge which constitutes the consummate skill of the experienced medical man. It consists in a faculty of appreciating the vital state of your patient; of forming a rapid but complete and accurate estimate of the nervous and muscular force which he possesses; or, in general terms, of the powers of life which remain to him—his *viability*, so to speak, or the power which his system retains of resisting the morbid or fatal influences of injury or disease."

### PHYSICAL DIAGNOSIS.

The *idea* of physical exploration for the purpose of diagnosis has been well defined by Piorry, in the word "**Organography**:" *i. e.*, the determination of the actual and relative *position*, material *condition*, and functional *action* of the organs contained within the body. The methods in use for this purpose are modern, dating from Auenbrugger, of Vienna, the inventor of diagnostic percussion, in 1761, and Laennec, the great originator of auscultation, about[1] 1818.

The modes of examination of the chest, abdomen, etc., are—

Inspection; Mensuration; Palpation; Succussion; Spirometry; Percussion; Auscultation.

By **inspection,** we estimate, with the eye, the *form*, *size*, and *movements* of the chest, etc.

By **mensuration,** we obtain a more *accurate* knowledge, especially of *deviations* and *alterations* of size and form.

**Palpation** aids in the determination of the character of surfaces and of subjacent parts, and, in the chest, detects changes in the degree or extent of the *movements* of respiration and of the heart, and in the *vibrations* connected with the voice, cough, and breathing.

**Succussion,** or *shaking* the chest suddenly, is of use occasionally, in establishing the presence of *fluid* in the thoracic cavities.

**Spirometry** is the measurement of the capacity of the lungs for air.

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[1] The *idea* of auscultation, however, was known even to Hippocrates.

By **percussion** we learn much of the physical condition of the lungs, heart, and abdominal viscera, through the variations of *resonance* and *resistance* when the walls of the thorax or abdomen are lightly struck.

**Auscultation** is equally important, but somewhat more difficult in its application, on accóunt of the complexity of the signs afforded by it. It consists in directly *listening* to the sounds produced within the cavities of the body, by placing the ear, with or without the stethoscope, upon the surfaces thereof.

The **Regions** of the *Chest*, for the purpose of physical exploration, may be most conveniently divided into the following:—

| *Anterior.* | *Posterior.* |
|---|---|
| Upper and lower sternal; | Interscapular; |
| Right and left clavicular; | Dorsal; |
| Right and left subclavian; | Right and left acromial; |
| Right and left mammary; | Right and left scapular; |
| Right and left infra-mammary. | Right and left infra-scapular. |

*Lateral.*

Right and left axillary;
Right and left lateral;
Right and left lower lateral.

The most important peculiarities of these different regions, in the normal state, are connected with *percussion-resonance.* The clearest and fullest sound on percussion is given over the *subclavian* and *lateral* regions; the dullest and smallest, over the *acromial*, the *right infra-mammary* (hepatic), and the *left mammary* or præcordial region.

### MENSURATION AND PALPATION.

For **mensuration**, various stethometers or chest-measurers have been devised; but, with care and judgment, the common tape-measure will suffice.

The dimensions to be compared are the—

**Circular**: around the chest opposite the base of the ensiform cartilage. This averages thirty-three inches. The *right half* of the thorax is nearly always half an inch to an inch **larger** in circumference than the *left.*

**Transverse**: from the nipple to the middle of the sternum.

**Vertical**: from the clavicle to the lower margin of the ribs.

**Antero-posterior**: from the clavicle anteriorly to a corresponding point in the scapular region.

General expansion and local bulging of the chest, and general retraction and local depression, are the signs most frequently determined by inspection and mensuration.

**General expansion** or **local bulging** of the chest, usually upon one side only, may be caused by—

*Pleuritic effusion;*
*Pneumothorax;*
*Emphysema* of the lung;
*Aneurism*, *cancer*, etc.; or more rarely, by—

Hydrothorax;
Pneumonia;
Incipient tuberculization.[1]

**Retraction** or **local depression** of the thoracic walls may result from—

*Absorption* of pleuretic effusion;
*Tuberculization;*
Pneumonia; cirrhosis of lung;
Pleuro-pneumonia;
Infiltrated cancer of the lung.

By **palpation,** we observe **diminution** of the **expansion** *and* **elevation** *of the* **ribs** *in breathing,* in—

*Pleurisy;*
*Pneumonia;*
*Tuberculization;*
*Pneumothorax;*
Emphysema;
Intercostal rheumatism;
Paralysis;
Hydrothorax.

**Increased** expansion and elevation of the ribs in breathing occurs in—

*Asthma;*
*Croup;*
*Spasm of the glottis;*
Foreign bodies in air-passages.

**Increased vibration** *of the walls of the chest* with the **voice** and **cough** is noticed in—

*Tuberculization;*
*Pneumonia;*
Pulmonary apoplexy;
Dilatation of bronchi.

**Diminished** vocal and tussive vibration occurs in—

*Pleuritic effusion;*
*Pneumothorax;*
*Emphysema;*
Cancer of the lung.

**Rhonchal** vibration, occasionally, in bronchitis.

**Rubbing,** or to-and-fro vibration, in—

*Pleurisy;*
*Pericarditis.*

**Pulsatile** vibration in—

*Aneurism of aorta;*
Cancer of lung or pleura;
Pneumonia.

**Fluctuation** in—

*Large* pleuritic effusion.

**Purring** vibration (frémissement cataire) in—

*Aneurism of aorta;*
*Valvular heart disease;*
*Exophthalmic goitre;*
Anæmia.

### SPIROMETRY.

For **Spirometry,** Hutchinson's, Pereira's, Coxeter's, and Mitchell's[2] spirometers have been used.

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[1] A case is on record in which bulging above the clavicle occurred, from the protrusion of a lung, in consequence of *tight lacing.*

[2] Consisting of a small *gas-meter,* with a mouth-piece.

Hutchinson made elaborate investigations into the comparative breathing-power of individuals, by which he proposed to conclude upon their *vital capacity*. A man 5 feet 8 inches in height, and of 155 pounds weight, was found, on the average, to expire, after a full inspiration, 230 cubic inches.

For every inch of height above this, a definite increase in the quantity breathed was observed. The proportion was *less constant* with *weight* and with *age*. After fifty-five there was a decrease.

In the first stage of *consumption*, the average (for the adult of ordinary height) was found to be 154 cubic inches; second stage, 131; late stage, 108, etc.

In practice, however, spirometry is not extensively used. It is of service in examinations for *life assurance*.

## PERCUSSION.

**Percussion** is either *mediate* or *immediate*. In immediate percussion, we tap with the ends of the fingers at once upon the body; in mediate percussion, a pleximeter (*stroke-measurer*) is used. The latter is almost universal; but a difference exists as to the kind of pleximeter employed. Louis and Walshe have preferred one made of caoutchouc; Piorry and Skoda, one of ivory; Wünderlich, an ivory disk, upon which to strike with a small steel hammer, the head of which is covered with caoutchouc.

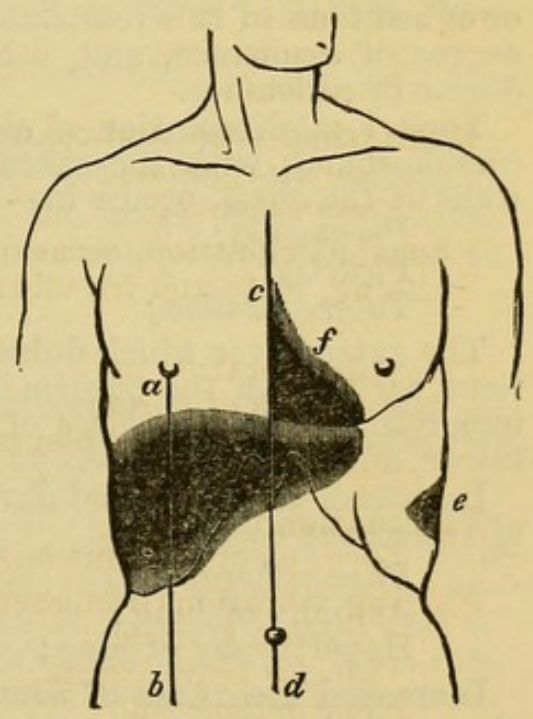
A majority of practitioners, however, are satisfied (with good reason) with the use of the *middle finger of the left hand* as a pleximeter. (Percuss by movement of the hand on the *wrist;* not by a sledge-hammer motion from the *shoulder*.)

In using percussion as a means of physical diagnosis, we note—

1. The **clearness** or **dulness** of the resonance produced.
2. The **duration** of the resonance.
3. Its **special character.**
4. The **degree of resistance** felt.

Certain terms are in common use to describe particular characters of resonance; as, *wooden* sound, *thigh* sound, *stomach* sound, *tympanitic* or drum-like resonance, *amphoric* or pitcher-sound, *bruit de pot félé* or *cracked-pot sound*, etc.

FIG. 40.




Area of Hepatic dulness, viewed anteriorly. *a. b.* Right Mammary line. *c. d.* Median line. *e.* Splenic dulness. *f.* Cardiac dulness. (Murchison.)

It is indispensable, in commencing the study of percussion (or other modes of physical diagnosis), to become familiar with the *normal and natural* sounds

observed in *health*. To be anything more than a *routine* diagnostician, moreover, it is necessary to understand the *principle* of the exploration, and as far as possible, the *reason* of the meaning of every sign.

Two or three very simple facts explain the use of percussion in diagnosis.

When any solid body is struck, the sound elicited varies according to its *material*, *form*, *size*, and, *if hollow*, the *condition of its walls*, and that of its *contents*.

The human thorax (or abdomen) having a certain general form, size, condition of its walls, and proportion of air, blood, and solid structure in its contents, will give forth a certain degree and kind of resonance.

Whatever alters either the *state of the walls* or the *proportion of air, fluid, and solid* contained within them, gives rise to an alteration of percussion-resonance.

Alteration of the state of the *walls* of the thorax seldom occurs in disease in such a way as greatly to modify percussion-resonance. Changes in the proportion of **solid, liquid,** and **air,** in the lungs and pleural cavities, as well as in the similar relations of the heart and pericardium, aorta, etc., are frequent. The *more air*, and the *less liquid or solid* contained within the part of the chest which is percussed, the clearer and fuller the resonance, and, as a general rule, the less the resistance to the finger. Any *increase* in the relative proportion of *liquid* (as in pleuritic effusion), or of *solid* (as in tuberculization), must cause a duller or lesser degree of resonance, and, other things being equal, a greater degree of resistance.

Thus, local **diminution** of **clearness** and **duration** of the percussion-sound, with **increased resistance** of a portion of the walls of the chest, occurs in—

| | |
|---|---|
| *Pneumonia;* | Pulmonary apoplexy; |
| *Pleurisy;* | Hydrothorax; |
| *Tuberculization;* | Cancer, etc. |

The extent over which dulness on percussion is observed *sometimes varies* with the *position of the patient*. This is practically important in the diagnosis of *pleuritic effusion*, *empyema*, *hydrothorax*, and *hydropneumothorax*.

**Increased clearness** and **duration** of resonance, with **decrease** of **resistance** occurs in—

| | |
|---|---|
| *Pneumothorax;* | Emphysema; |
| Atrophy of lung; | Anæmia; |
| Hypertrophy of lung; | *Emaciation.* |

**Increased clearness** of sound with **increase** of **resistance** is observed when there is a *tubercular cavity near the surface of the chest, with its outer wall thin, hard,* and *adherent to the pleura.*

**Tympanitic** resonance of the chest is present in—

*Pneumothorax;*
Emphysema;
Pulmonary atrophy, etc.

**Amphoric** resonance, when there is a large tubercular *cavity*, with *solid* and *tense* walls near the surface of the chest.

The **cracked-pot** sound indicates an *anfractuous* cavity, *i. e.*, one whose walls are broken or incomplete, communicating with the bronchial tubes. It may be imitated by clasping the hands loosely and then striking the back of one of them upon the knee.

*Skoda's* classification of percussion-sounds has the merit of great simplicity. He distinguishes them as—

Full; empty (*large* and *small* resonance);
Clear; dull;
Tympanitic; non-tympanitic;
High; low (pitch).

A sound may be at the same time *full* and *dull*, or *clear* and *empty* (small).

Skoda does not value very highly the information obtained from differences in the *pitch* of percussion-sounds. Other authorities (as Flint) differ from him, however, upon this point; and with good reason.

Dr. Da Costa[1] has investigated, under the designation of **respiratory percussion,** the differences made in percussion resonance by *deep inspiration*. In health, percussion at the time of deep inspiration gives a sound *fuller* and of *higher pitch* than during expiration or in a medium state of chest-expansion.

In bronchitis (without affection of the lung), the same difference is observed as in health. This is true also in *pulmonary emphysema*.

In *acute pneumonia* no difference in resonance attends deep inspiration.

*Pleuritic effusion* also prevents the occurrence of any such difference *over the seat of effusion*.

When, in *phthisis*, the dulness on percussion is no longer modified by forced inspiration, we may infer that the disease is advancing. When *cavities* exist in the lungs, deep inspiration will often *increase* the dulness of percussion-resonance, and at the same time *raise its pitch*.

## AUSCULTATION.

In **auscultation,** as well as in percussion and other modes of physical exploration, a comparison is made not only with the normal standard, but *between the two sides* of the chest.

The *stethoscope* is, in auscultation, generally speaking, a superfluous instrument. If any be used, a simple wooden tube with one end slightly expanded is the best. Camman's *double* stethoscope[2] is approved by Dr. Flint; but it requires a good deal of practice to use it well. Snelling's[3] addition of an India-rubber rim is an improvement to it, as well as to the ordinary stethoscope.

Upon the invention of the *microphone*, by which sounds otherwise inaudible are made perceptible by the human ear, sanguine hopes were entertained that it might be made available in auscultation. Wallich[4] succeeded in so modifying it as to intensify the

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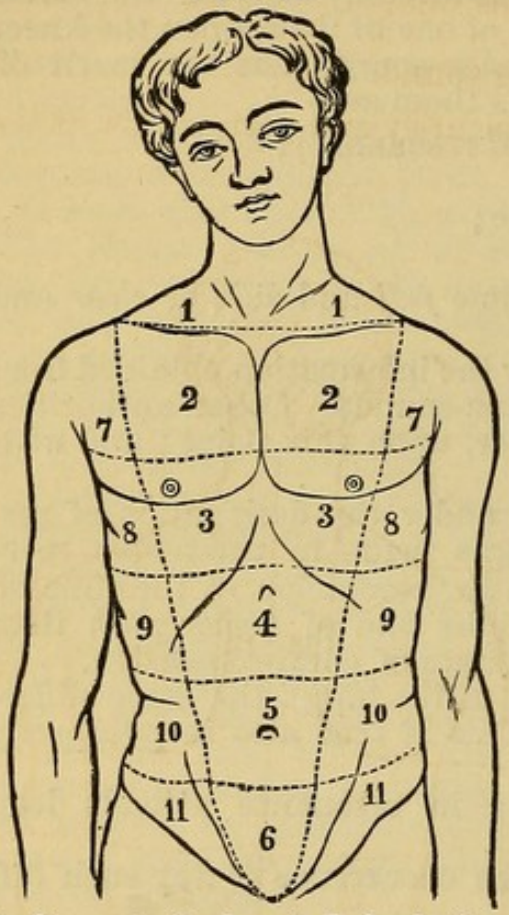
[1] Amer. Journal of Med. Sciences, July, 1875.
[2] First invented by Dr. Leared, of London, 1851.
[3] New York Medical Record, March 15, 1870.
[4] Lancet, Nov. 30, 1878.

heart-sounds, without lessening their distinctness from each other. But, especially on account of the tendency to confusion of various sounds together, when magnified by such an instrument, it appears that we must wait yet awhile longer for successful microphonic auscultation.

FIG. 41.




1. Supraclavicular. 2. Infraclavicular. 3. Mammary. 4. Epigastric. 5. Umbilical. 6. Hypogastric. 7. Axillary. 8. Infra-axillary. 9. Hypochondriac (right and left). 10. Iliac (right and left). 11. Inguinal (right and left). (Paxton.)

The beginner must familiarize himself with the *natural breathing-sound*, 1, as heard when the ear is placed over any part of the *lungs*, and 2, with that heard in the *sternal* and *interscapular* regions. The latter is **bronchial**, the former is the **vesicular murmur**. The tubular, blowing character of the respiration as heard in the bronchi, and its soft, breezy nature when the ear is placed over the lungs, are essential elements in diagnosis by auscultation.

The pulmonary vesicular murmur is always *louder in infants and children, except* when they are asleep or very quiet. **Puerile** respiration is, therefore, the name given to **exaggerated** breathing-sound in the adult.

In a healthy state of the lungs, the *expiratory* murmur is very faintly heard. A *prolongation*, and increase in loudness, of the sound of expiration, is often a sign of disease (tuberculization).

The sounds detected by auscultation of the chest are divided into **respiratory** and **secretory** sounds, **friction**-sounds, and modifications of **vocal resonance**.

### Respiratory Sounds.

Normal vesicular murmur;
Puerile respiration;
Prolonged expiratory sound;
Harsh, tubular, blowing;
Bronchial, and cavernous;
Amphoric respiration.

### Secretory Sounds.

*Dry.*

Sibilant rhonchus (hissing or whistling);
Sonorous rhonchus;
Dry crackle.

*Moist.*

Fine crepitation or crepitant râle;
Coarse crepitant râle (mucous râle);
Humid crackle or gurgling;
Metallic tinkling or dropping sound.

**Friction**-sounds are peculiar to pleurisy and pericarditis, at the stage of adhesion, or, at least, of effusion of plastic lymph.

*Modifications of* **vocal resonance** *are—*

*Bronchophony;*
*Pectoriloquy;*
*Ægophony.*

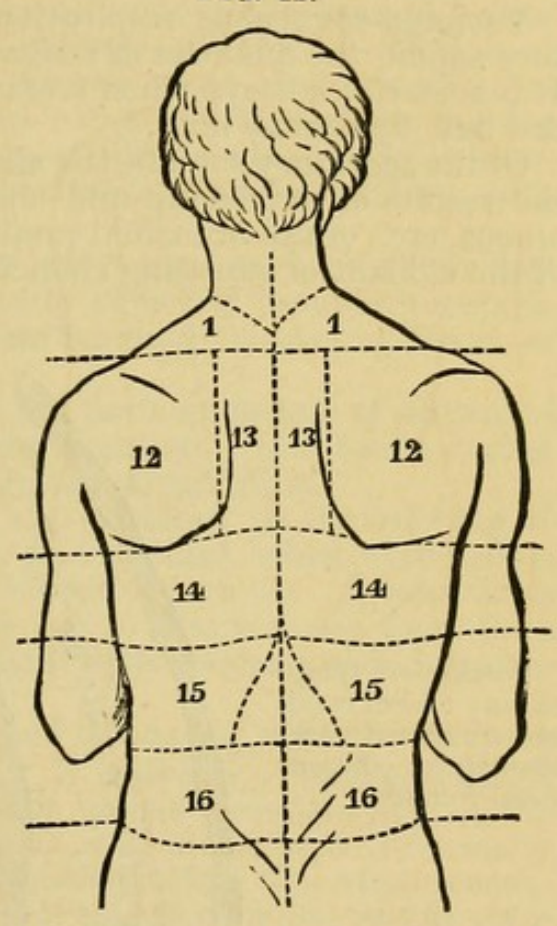
The above is, essentially, the classification commonly adopted by auscultators. That of Skoda is, however, still more simple. He divides *respiratory* sounds into—

Vesicular;
Bronchial;
Amphoric;
Indeterminate.

Skoda denies, also, the validity of the distinction between *pectoriloquy* and *bronchophony;* and shows that *ægophony* cannot have the precision of meaning supposed by Laennec and others to belong to it.

No description of the sounds heard in auscultation can do more than *guide* and *assist* their actual clinical study. For this purpose the simplest and clearest terms are, of course, the best.

FIG. 42.




1. Supraspinous. 12. Scapular or subspinous. 13. Interscapular (right and left). 14. Infra-scapular. 15. Inferior dorsal (right and left). 16. Lumbar (right and left). (Paxton.)

The **normal respiratory murmur**, as heard in the *lungs*, is well illustrated by Skoda as resembling (during inspiration) the sound caused by narrowing the opening of the mouth and then drawing in the air. The *consonant* of this murmur is *f* or *p*. The *expiratory* murmur may be represented as somewhat between *f* and *h*. That of the *larynx*, *trachea*, and *bronchi*, by the guttural *ch*, or between that and *h*. The vesicular murmur is slightly louder (Flint) and lower in pitch, on the left side.

By **bronchial respiration** as a sign of disease in the lung, we mean a breathing-sound heard while listening over the *lung*, like that *normally* heard when auscultating the middle regions of the chest, over the bronchial tube. It occurs when the lung is *solidified* or *condensed*. (The *explanation* of bronchial respiration is by

*conduction* or by *consonance.* The latter theory, that of Skoda, is *preferred.*)

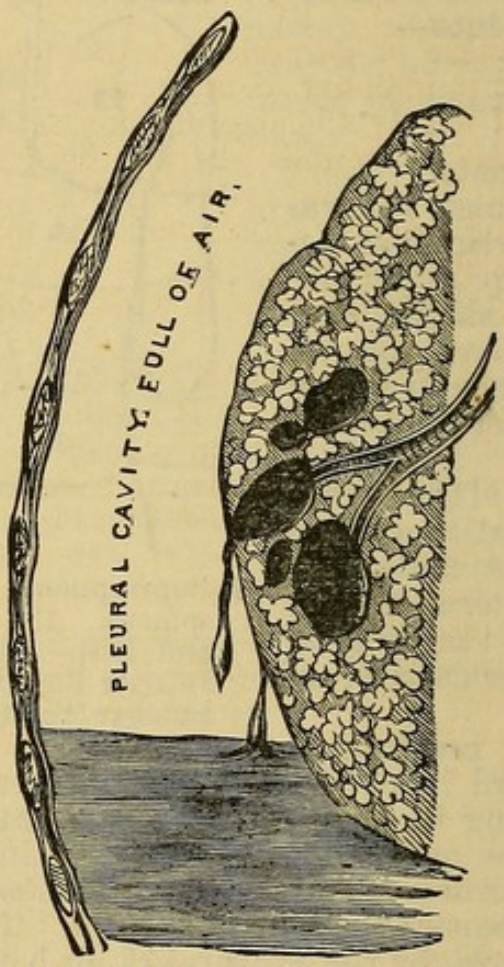
**Cavernous** respiration is that which is inferred to occur during the passage of air into or out of a *cavity* in the lung (as in tubercular disease). Notwithstanding the truth of the statement urged by Skoda, that it is *often* impossible to draw a certain demarcation between *bronchial* and *cavernous* respiration, yet, in a *number of cases* this *can* be done, and the term cavernous, therefore, should be retained.

**Vesiculo-cavernous** respiration (Flint)[1] unites, in the inspiratory sound, the qualities of *vesicular* and of *cavernous* respiration. It is sometimes heard when a cavity is surrounded (not by solidified but) by *healthy* lung.

Of the **secretory** sounds, the **sibilant** and **sonorous rhonchi** are the results of narrowing and obstruction, by congestion, or by mucus, etc., of the bronchial ramules; of the *smallest*, in the case of the sibilant or whistling rhonchus; of those *somewhat larger*, so

FIG. 43.

Percussion tympanitic; absent respiration; absent vocal resonance; absent vocal fremitus.




Splash on being shaken; percussion dulness; metallic tinkling.

Diagram of the Physical Signs in Pneumothorax. (Dobell.)

that the air passes through in irregular and varying bubbles, in the sonorous (snoring or roaring) rhonchus. Both of these sounds are characteristic of bronchitis. The use of the term *dry* sounds,

[1] Manual of Auscultation and Percussion, 2d edition, Philada., 1880.

as applied to them, is not strictly correct; but it is convenient, as designating the impression which they convey to the *ear* as compared with those technically called moist sounds.

The **dry crackle** is associated with *incipient* or infiltrated *tubercle.*

Among the **moist** sounds, the finest or most delicate is the **crepitant râle,** or fine crepitation of pneumonia. It is very well imitated by rubbing a few hairs of one's head between the thumb and finger, near the ear. Its *cause* is, probably (C. J. B. Williams), the penetration of the air into the air-cells of the lung at a time when their walls are rendered slightly *adhesive* by effusion of coagulable lymph. The gentle *forcing apart* of these adherent walls, or of portions of the viscid lymph itself, produces the fine crackling sound, as a modification of the natural vesicular murmur. It is only heard during *inspiration;* and, in children, with difficulty in any case.

**Coarse crepitant** or "mucous" râles are heard whenever any fluid exists in the lungs in quantity sufficient to modify respiration without arresting it, whether the fluid be mucus, blood, or serous effusion.

The **humid crackle** or *gurgling* is pathognomonic of advanced tuberculization or pulmonary disintegration. It is heard during the later stages of nearly all cases of consumption.

**Friction** or *to-and-fro* sounds are produced by the rubbing of two surfaces, as of the pleura or pericardium, when made adherent or slightly roughened by inflammatory lymph. It sometimes requires an acute and practised ear to discriminate these from other sounds. They are heard both with inspiration and expiration.

**Bronchophony,** or bronchial vocal resonance, corresponds in its history with *bronchial respiration.* It is simply a resonance of the voice, to the ear of the auscultator placed over the *lung* of the patient while he speaks, loud, near, and clear, as it is normally when the ear is placed over the *bronchial tube.* The same reasonings will apply to the explanation of this sign by the two theories of *conduction* and *consonance,* which have been urged in regard to bronchial respiration. The *latter* theory, as in that instance, I prefer; but, practically, all agree as to the *circumstances* under which the sign occurs (solidification of the lungs). Normally, the vocal resonance is loudest under the *right* scapula. Modifications of the sound of the *whispered* voice are spoken of by Dr. Flint as exaggerated bronchial, amphoric, and cavernous whisper.

**Pectoriloquy** (chest speaking) is merely a *yet nearer* and *louder* resonance of the voice, heard on auscultation, than that called bronchophony; the sound seeming to be *vocalized* in that part of the lung which is *immediately under the ear.* Skoda objects that this cannot be definitely distinguished from loud bronchophony. But, although this is *generally* true, a certain number of cases occur in which it may be so distinguished, as indicative of a very different pathological state of the lungs, viz., a large cavity.

**Ægophony,** bleating, or goat-like resonance of the voice, has been, since Laennec, supposed to be an almost certain sign of the

existence of *pleuritic effusion* or *hydrothorax*. Skoda's observations, and those of others also, show that it is occasionally heard in pneumonia, in phthisis, and even in the healthy state of the thoracic organs. It is, therefore, not *pathognomonic* of the presence of fluid within the pleura; but it is among the signs which render that diagnosis probable.

**Amphoric resonance** is heard especially in connection with the sound produced by *coughing*. A tense condition of the walls of a large cavity will explain it, as well as the phenomena called *metallic echo* of the voice or cough.

**Metallic tinkling** is usually accounted for by the *dropping of fluid* in a large cavity (as in hydropneumothorax, with collapsed lung) having tense walls.

Resuming the consideration of respiratory sounds, **puerile** *or exaggerated respiration* occurs in the *healthy* lung, or part of the lung, when the *other* lung or portion of the same is *obstructed*, as by a foreign body, or by bronchitis; or *condensed*, as by—

| | |
|---|---|
| Pneumonia; | Pleuritic effusion; |
| Tuberculization; | Tumor. |

A lung, a *portion* of which is permanently expanded by *emphysema* or *hypertrophied*, may also give an exaggerated vesicular murmur; and, transiently, this is observed in a lung *just released* from the paroxysmal obstruction of *asthma*.

**Feeble** respiratory murmur is heard in one or both lungs in cases of—

| | |
|---|---|
| *Croup;* | Collapse of lung; |
| *Foreign bodies* in air-passages; | Pulmonary apoplexy; |
| *Bronchitis;* | Emphysema; |
| *Pneumonia;* | Pneumothorax; |
| *Pleurisy;* | Hydrothorax; |
| *Asthma;* | Intercostal rheumatism; |
| *Infiltrated tubercle;* | Paralysis; |

Cancer; or other tumor.

In cases of pleuritic effusion, the feebleness of the respiratory sound is proportioned not only to the *amount* of fluid present, compressing the lung, but also (Baccelli)[1] to the *nature* of the fluid. Pus (empyema) conducts sound worse than limpid serous effusion. Baccelli states that, while even the whispered voice may be heard at the base of a *serous* effusion, the spoken voice is not heard over a purulent exudation.

**Harsh** respiratory murmur, passing by gradations into **blowing** and **bronchial**, in—

| | |
|---|---|
| Dry bronchitis; | *Pneumonia;* |
| *Incipient tubercle;* | Pulmonary apoplexy; |
| *Pleurisy* (condensing lung); | Bronchial dilatation. |

**Cavernous** respiration, in case of—

| | |
|---|---|
| *Tubercular cavity;* | |
| Excavation from | |
| *Abscess of lung;* | Softening of cancer; |
| Gangrene; | Large bronchial dilatation. |

[1] Med. Times and Gazette, March 18, 1876.

**Amphoric** respiratory sound is particularly associated with the existence of a fistulous opening between the pleural cavity and one of the bronchial tubes; the cause of which fistula may be either tuberculous softening, or abscess, etc.

The **sibilant** and **sonorous rhonchi** occur nearly always in *bronchitis;* occasionally in pulmonary *emphysema*, and when the bronchi are pressed upon by tumors, etc.

**Dry crackling** indicates the existence of hard tubercle in the lungs.

**Humid crackling** or **gurgling**, tubercle in the softened state.

The **crepitant râle** has already been explained as peculiar to pneumonia.

The **coarse** crepitant[1] *râle*, or **mucous** râle, is observed frequently in

| | |
|---|---|
| *Capillary bronchitis;* | Pulmonary *hemorrhage;* |
| *Bronchorrhœa;* | Pulmonary *œdema;* |
| Last stage of *pneumonia;* | Pulmonary *abscess.* |

**Friction**-sounds have been before alluded to as connected with *pleurisy* and *pericarditis.*

**Resonance of the voice** is **feeble** in

Emphysema; Atrophy of the lung; Pneumothorax; lower part of chest in empyema.

**Bronchophony** occurs in cases of

*Tubercle;*
*Hepatization* (pneumonia);
*Pleurisy* (condensing lung); *Cancer;*
*Dilatation of bronchi.*

**Ægophony**, in

*Pleurisy;* Hydrothorax; Pneumonia.

**Pectoriloquy**, in cases of

*Tubercular cavity;*
*Dilatation of bronchi;*
Excavation from
Abscess; Cancer; Gangrene.

**Metallic tinkling** and **echo**, in

*Pneumohydrothorax;*
Large tubercular cavity.

The *sounds of the* **heart** *are heard at an unusual distance from the heart itself*, in some cases of

| | |
|---|---|
| Pneumonia; | Pleurisy; |
| Tubercle; | Cancer, etc. |

(This affords some argument for the *conduction* theory of Laennec.)

**Displacement** of the heart, diaphragm, liver, spleen, stomach, sometimes occurs from pleuritic effusion or empyema, cancer of the lung, etc. In *rare* instances, such a displacement may be

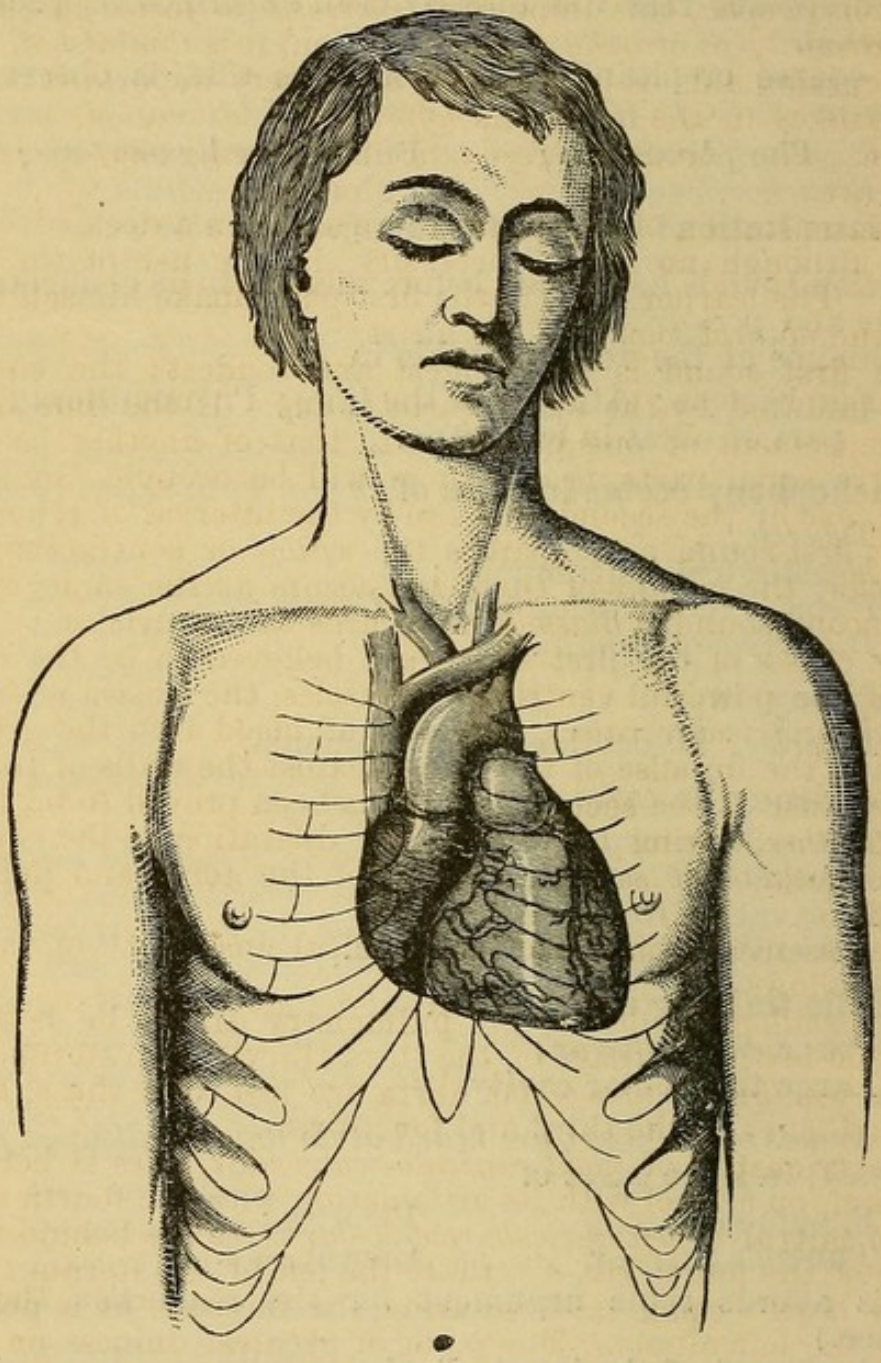
[1] The term *sub*-crepitant râle or rhonchus appears to the author to be very objectionable, as leading to confusion.

*congenital;* as of the heart on the right side. A case has been reported by Leidy, in which the situation of all the viscera was reversed; the liver being upon the left side, the heart and spleen upon the right, the stomach being reversed also, and the ileum terminating on the left side, the colon ending in the rectum on the right side.[1]

*Diseases of the Heart.*

The physical diagnosis of **diseases of the heart** is conducted

FIG. 44.



Normal position of Heart in a healthy Man. (Sibson.)

upon exactly the same principles as that of affections of the lungs and pleura.

[1] Proceedings of Phila. Acad. of Nat. Sciences, 1870, No. 3, p. 134.

By **inspection** we can detect bulging or distortion in the præcordial region, and, in some cases, judge of the extent, force, and character of the heart's *impulse*. By **mensuration**, changes in the thoracic dimensions consequent upon diseases of the heart can be more accurately determined.

By **palpation**, the *impulse* of the heart may always be examined and estimated. This is very important, not only in actual *diseases of the heart*, but also in *fevers*, etc., in the course of which the movements of the heart, as the centre of the circulation, are often seriously affected.

In *hypertrophy*, this impulse is *increased in force;* in *dilatation*, it is *extended;* in *atrophy* and exhaustion, it is *diminished.*

**Percussion** aids us in detecting some very important pathological changes in the heart; as *hypertrophy*, *dilatation*, *pericarditic effusion*. The percussion-resonance is *unusually clear* in *atrophy* of the heart.

In **auscultation** of the heart there is often a decided convenience, although no actual necessity, in the use of the stethoscope. The learner must in the first place make himself familiar with the *natural sounds* of the heart.

The **first** sound is the longest and loudest; the succession being imitated by the syllables *lubb*, *dup*. If the time from the commencement of one pulsation to that of another be divided into five equal parts, *two* of them will be occupied by the first sound, *one* by the second, and *two* by the interval of repose.

The first sound accompanies the *systole* or contraction of the *ventricles;* the *impulse* of the heart occurs at the same moment. The second sound is *diastolic* as regards the ventricles.

The *causes* of the first sound are believed to be the contraction of the powerful ventricular muscles, the *tension of the closed auriculo-ventricular valves*, the rush of blood into the great vessels, and the impulse of the heart against the walls of the chest.

The cause of the **second** sound has been proved to be the *flapping together*, during the diastole or dilatation of the ventricles, of the pocket-like *semilunar valves* of the aorta and pulmonary artery.

The essential points in the "medical anatomy" of the heart are as follows:—

The *semilunar valves of the* **pulmonary artery** lie behind the junction of the cartilage of the third rib with the sternum.

The *semilunar valves of the* **aorta** are just *below* these, between the cartilages of the third and fourth ribs.

The **tricuspid** or *right auriculo-ventricular valve* is behind the sternum, on a level with its articulation with the fourth rib.

The **mitral** or *left auriculo-ventricular valve* lies behind the cartilage of the fourth rib, a little to the left of the sternum.

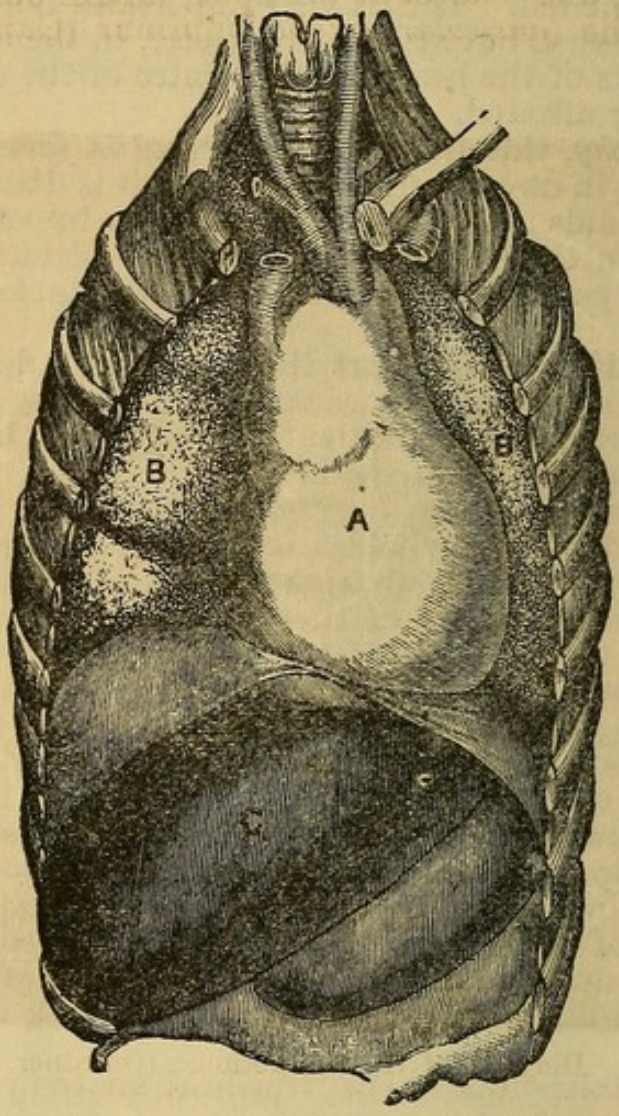
The *heart's* **apex** *strikes*, during the impulse, at a point just below the left nipple. The point of greatest dulness on percussion is slightly within the left nipple. The diameter of the *normal* region of dulness does not exceed two inches.

Using terms of *convenience* merely, the valves of the heart may be said to be of two kinds, *cavity* valves and *vessel* valves. The cavity valves are both nearer to the *middle* and *apex* than to the

base of the heart; the vascular valves (aortic and pulmonary arterial) nearer to its *base*, *i. e.*, as the heart is situated in the chest, its *upper* part.

By auscultation of the heart we may detect **valvular** *murmurs*,

FIG. 45.




Increased dulness on percussion, of pyramidal shape.

Impulse lessened.

Sounds feeble, especially the first.

Position of the Pericardium when distended with fluid.
A. The Heart. B. The Lungs. C. The Liver. (Sibson.)

**anæmic** *murmurs*, and **friction** sounds. Details in regard to these can be best given in connection with the *special pathology* of the heart. A few main points only require mention here.

The valves of the **left** or *systemic* portion of the heart are much more often affected by disease than those of the *right*. Practically, in most cases, those of the right side may be left out of the question of diagnosis.

The following is Harvey's statement of the comparative frequency of the different valvular affections:

1. *Aortic obstructive.*
2. *Mitral Regurgitant.*
3. *Aortic Regurgitant.*
4. Aortic obstructive and mitral regurgitant together.
5. Aortic obstructive and regurgitant together.

If a murmur (not anæmic)[1] is **systolic**, *i. e.*, is heard with the *first sound* of the heart, and is loudest at the **base** of the heart, it may be inferred to be **aortic obstructive.**

If **systolic**, and loudest at the **apex, mitral regurgitant.**

If **diastolic**, *i. e.*, with the *second sound*, and loudest at the **base** of the heart, **aortic regurgitant.**

If **diastolic**, and loudest at the **apex, mitral obstructive.**

A **presystolic** (*auricular-systolic*), murmur (Gairdner), that is,

FIG. 46.

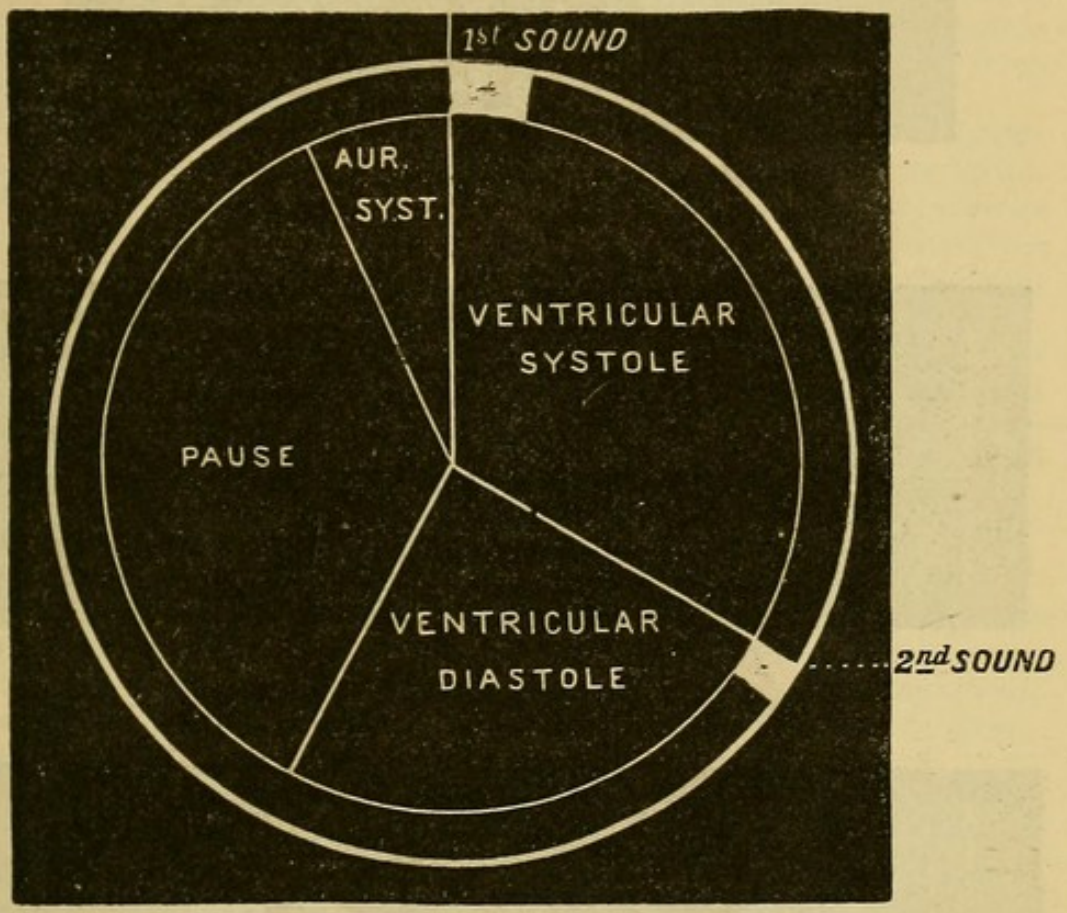



Diagram of Heart's Action. (Gairdner.)

one heard after the second sound, and just before the first, indicates **contraction** of the **mitral** valve.

This opinion, at least, has been accepted by Drs. Gairdner, Peacock, Wilks, and others; although Dr. A. Whyte Barclay[2] asserts reasons for believing that the sound referred to is a *systolic regurgitant* murmur.

**Duplication** of the *second* sound is reasonably ascribed to the closure of the valves of the aorta and of the pulmonary artery not being *synchronous*. The condition with which it is most likely to be associated is *mitral obstruction*.

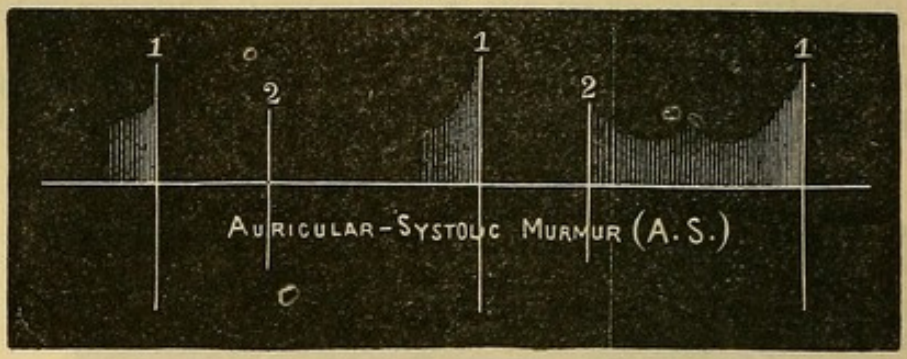
The *rationale* of these inferences is explained by the physiology of the heart's action, in connection with the position of the sev-

[1] Dr. Da Costa has shown, however, that functional murmurs (attended by no organic lesion) are occasionally heard in persons not anæmic. See American Journal of Med. Sciences, July, 1869.

[2] London Lancet, March, 1872.

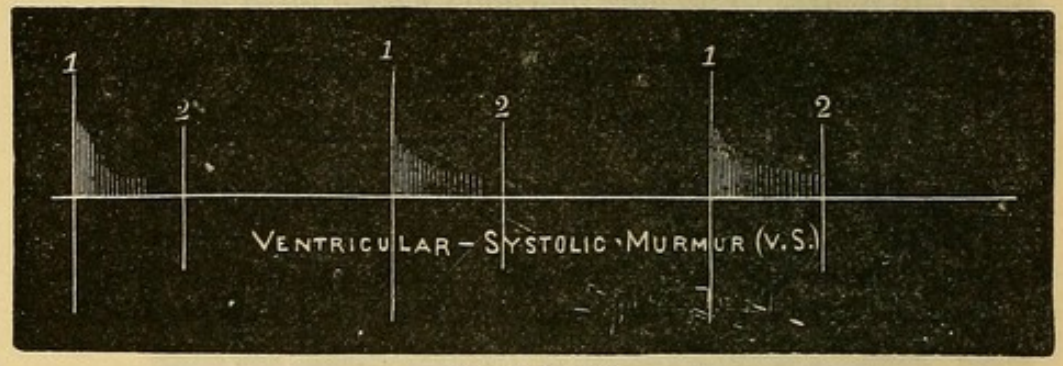
eral valves. The fact that, in rare instances, organic murmurs vary,[1] from time to time, in the same case, is sometimes perplexing.

FIG. 47.



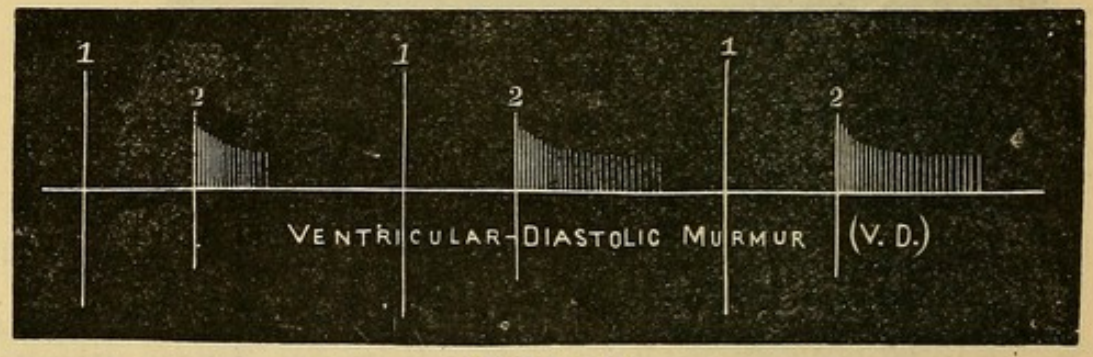

(Gairdner.)

FIG. 48.




(Gairdner.)

FIG. 49.




(Gairdner.)

Murmurs not connected with valvular disease may be quite variable.

Dr. J. H. Hutchinson has emphasized the fact that *anæmic* murmurs are commonly *most intense in the recumbent position.* But this is also true in a certain number of cases in which the murmurs are due to organic disease.

Much complexity attaches necessarily to the *exact* diagnosis of affections of the heart; but we have the excellent authority of Dr. Stokes for the principle, that the *important practical* questions

[1] See, on this subject, a paper by Dr. Sanders, Edin. Medical Journal, Jan., 1869, p. 584.

in each case are—do the abnormal sounds have origin in **organic** disease or lesion, or not? and, how far is the **functional action** and *capacity* of the heart interfered with or impaired?

Upon these, as upon all other questions in diagnosis, it is proper *never* to *confine our attention to physical or immediate signs alone.* To rest either upon symptomatology or physical exploration *exclusively*, would be like hopping constantly on one foot, instead of walking upon two.

**Friction**-*sounds*, in the region of the heart, are connected with *pericarditis.* Their *narrow limits*, and *association*, *in time*, with the *sounds* of the *heart*, serve usually to contrast them with *pleuritic* sounds. It is sometimes difficult to distinguish them from *valvular murmurs.*

*Extra-cardiac* blowing sounds (*souffles*) were mentioned by Laennec, and have been since studied by others, especially Friederich and Potain.[1] They are explicable by the air in the *lung-vesicles* near the heart being forcibly and audibly expelled by the movement of the heart. *Vascular murmurs within the lungs* have been reported by Bartels[2] and A. Stillé.[3] They are very rare.

The signs of **aneurism** *of the thoracic* **aorta** will be alluded to in another place. They are chiefly: 1. A *second impulse* (often with a *thrill*), apart from that of the heart. 2. Dulness on percussion. 3. Bulging. 4. *Symptoms of dyspnœa*, *cough*, and *dysphagia*, from pressure upon the trachea, œsophagus, etc.

### *Abdominal Diseases.*

The physical diagnosis of **abdominal** affections comprises inspection, mensuration, palpation, percussion, and auscultation. The belly is divided, externally, into the *epigastric*, *umbilical*, *hypogastric*, two *hypochondriac*, two *lumbar*, and two *iliac* regions. (See Fig. 42.)

By abdominal **inspection** we can observe the alteration in size and shape caused by *pregnancy*, *hernia*, *tympanites*, *ascites*, or *ovarian dropsy.* By **mensuration**, we can ascertain the *exact changes* which may occur from time to time in dropsical accumulations, etc.

By **palpation** of the abdomen, we may develop the symptom of local *tenderness on pressure;* as in *gastritis*, *hepatitis*, *peritonitis*, *cystitis*, etc. By the same method of examination, more deeply employed, we detect *enlargement* of the *liver* or *spleen*, *ovarian tumor*, *mesenteric disease*, *cancer*, *aneurism*, *distension of bladder*, *fecal accumulation*, etc.; and, with the aid of both hands, prove the presence of *fluid* (ascites, etc.) by the sign of *fluctuation.*

**Percussion** assists materially in the diagnosis of diseases of the abdominal viscera. The ordinary percussion-resonance, in health, is clear, full, and *slightly* tympanitic, all over the abdomen. It becomes more drum-like in distension of the intestines with gas (meteorism), or in tympanitic distension of the peritoneum. *Dulness* of resonance occurs, with limits and peculiar characters, in

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[1] See a paper by R. Lépine, Gazette Médicale de Paris, No. 26, 1872.
[2] Prager Vierteljahrschrift, 1870, Bd. iv.
[3] Philadelphia Med. Times, April 15, 1871.

*enlargement of the liver or spleen*, *ascites*, *ovarian dropsy*, *pregnancy*, *cancer*, *aneurism*, *retention of the urine*, *fecal accumulation*, etc.

**Auscultation** of the abdomen is especially useful in the diagnosis of *pregnancy*, by detecting the sounds of the fœtal heart, and the placental *souffle*.

A localized "bruit" or aortic murmur, heard along the spine, is a probable sign of aneurism of the abdominal aorta.

Morbid sounds are occasionally appreciable in other abdominal affections, as in tapeworm, etc.; but they are subject to so much uncertainty as to be hardly available for practical purposes. *Friction sounds* in *peritonitis* have been studied by Dr. Seidel.

*Recto-abdominal exploration* (Gustav Simon, 1872) is sometimes resorted to, by the introduction of the hand through the anus, into the large intestine; occasionally as far as the arch of the colon. The hand must be first well anointed with lard; the fingers are then placed so as to make a cone, and passed into the rectum with the back of the hand toward the sacrum. Pronation may be effected at the sigmoid flexure. *Aneurism*, *cancer*, or other tumors, etc., may thus be detected and located. This method is not without danger. Once, at least (Dittell), rupture of the rectum has attended it.

### *Diagnosis of Diseases of Women.*

*Rational signs* or symptoms, and the past history of the patient, are never to be overlooked. Among the questions to be answered in the case of suspected uterine or ovarian disease, are these: Has the patient been married; if so, how long? Has she had children; how many? Did she ever miscarry? Is she, now, probably pregnant? If not, is menstruation regular in frequency, amount, and absence of suffering? Is there any vaginal discharge (leucorrhœa)? What are the symptoms of her present complaint, and what have been their duration and progress?

## Physical Examination.

Better than a bed will be a table, covered with one or two blankets or a shawl, and a pillow. If a bed be used, its unevenness may be remedied by placing a board over the mattress and under the bedclothes. In either case, a sheet should be thrown over the patient to prevent unnecessary exposure of the person.

At first, the patient should lie on the back, with the knees drawn up; in a position affording a strong, direct light. For some methods of examination, the prone position, on the hands and knees, has decided advantages.

The modes of diagnosticating abdominal and pelvic affections in the female by physical examinations are as follows:—

1. Vaginal touch.
2. Bimanual palpation.
3. Rectal touch.
4. Vesico-rectal exploration.
5. The speculum.
6. The uterine probe.
7. Dilating tents.

8. The exploring needle.
9. Auscultation and percussion.
10. The microscope.

Space is not allowed in this work to treat of many particulars concerning these methods. The student is referred, in regard to them, and for full information upon all the surgical diseases of women, to the treatises of Thomas, Sims, Simpson, Hewitt, Churchill, Hodge, Meigs, Bedford, Byford, Agnew, Atlee, Barnes, Emmet, and others, on the general subject or on the different departments of Gynæcology.

Besides the *vaginal touch*, *bimanual palpation* and the *speculum* are the most important means available for the detection of uterine affections; *e. g.*, displacements, ulcerations, tumors, etc.

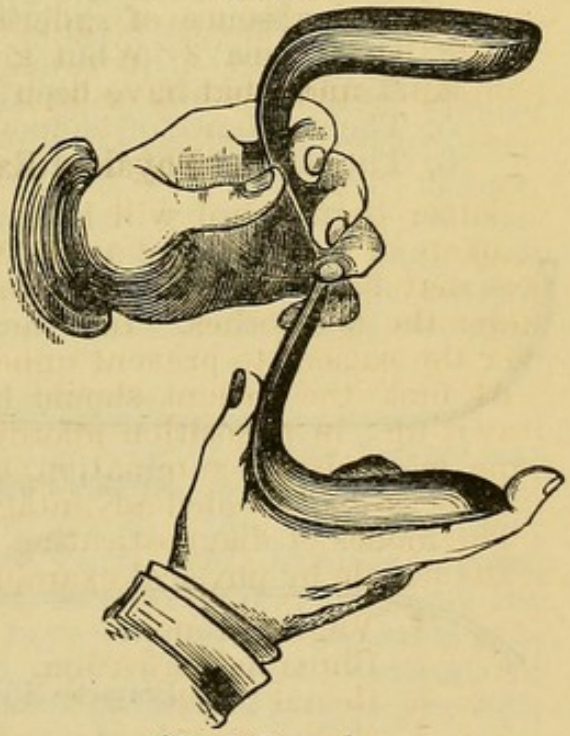
In cases of *abdominal enlargement*, the following is a compact statement (Jovini) of the method of diagnosis "by exclusion:"

"First, exclude pregnancy, uterine and extra-uterine; then consider whether or not there may be an immense deposit of fat on the abdominal walls. You do this by lifting up the skin between your hands. Next think of tympanites. When you have gone thus far, decide by palpation whether the tumor is fluid or solid. If it is solid, it is in all probability either a fibroid of the uterus, an enlarged liver, or enlarged spleen. If it is fluid, it is either ascites, an ovarian cyst or fibro-cystic tumor of the uterus, a distended bladder, hydatids of some of the viscera, pyonephrosis, or abscess. The most common forms of abscess are abscess in the neighborhood of the ileo-cæcal valve, abscess the result of pelvic cellulitis, and abscess from disease of the pelvic bones.

"When you reach the point of diagnosis of a fluid-tumor, you are then justified in aspirating the case and examining the obtained fluid by the microscope."

For exploratory aspiration, in the abdomen or elsewhere, the common *hypodermic syringe* will usually answer very well.

FIG. 50.



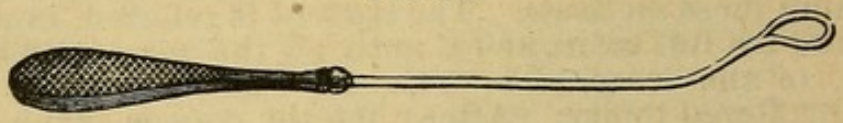
Sims's Speculum.

## The Speculum.

*Cylindrical* (see Fig. 53) and *valvular* forms of the speculum are used. Both have their advantages and inconveniences. Some have two, others three or four valves or movable portions. They are employed not only for inspection of the uterus and vagina, but also for the application of probes, medicaments, etc. Sims's speculum is used with the aid of a depressor. Thomas has modified it so as to fix the depressor in connection with the blade.

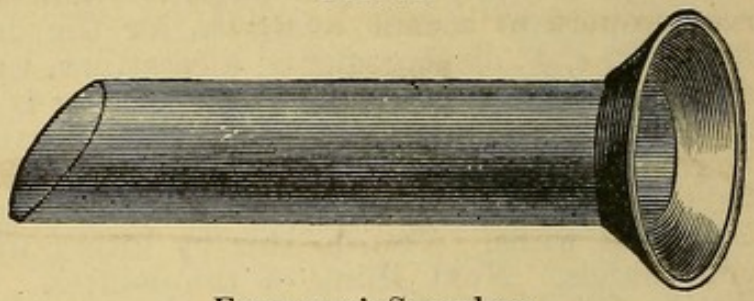
The position of the patient preferred for the introduction of Sims's speculum is *semiprone;* so as to allow the abdominal viscera to gravitate forward.

FIG. 51.



Sims's Depressor.

FIG. 52.



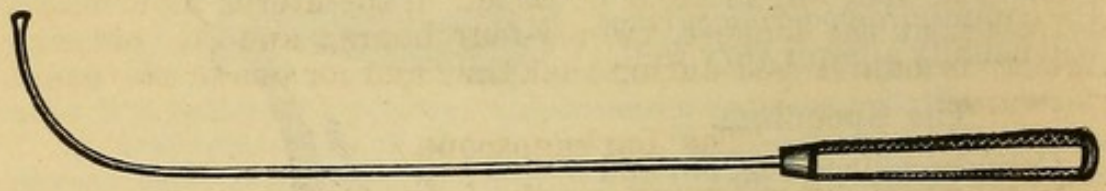
Fergusson's Speculum.

## The Uterine Sound.

This is a firm rod of metal, of such a size and curve as to enter readily the uterine cavity. It requires skill and much care to use it safely. Very serious accidents are endangered by an over-violence with it. As stated by Thomas, the facts which may be determined by it are these :—

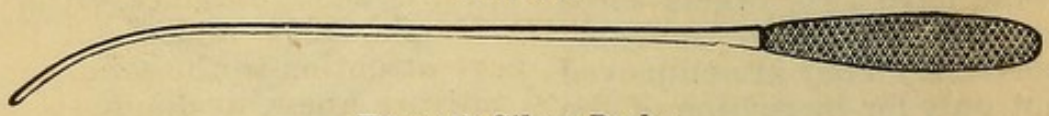
1. The capacity of the uterus.
2. The existence of growths within it.
3. Deviations of its canal.
4. Displacements, as discriminated from tumors.
5. The existence of endometritis.
6. The mobility of the uterus.

FIG. 53.



Sims's Copper Sound.

FIG. 54.



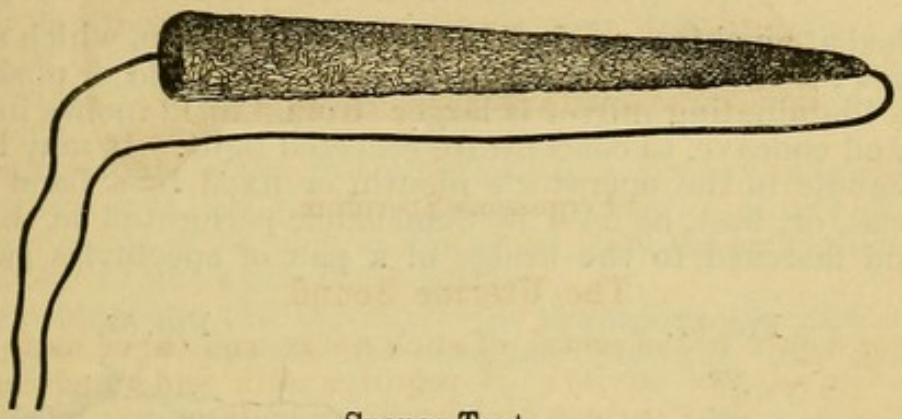
Emmet's Silver Probe.

## Dilating Tents.

These are commonly made either of sponge or of the *sea-tangle* (laminaria digitata). For the former a good clean sponge is cut

into conical pieces from two to three and a half inches in length, and with bases varying from the width of the little finger to that of a walnut or an egg. Each piece may be dipped in a *weak* solution of carbolic acid, salicylic acid, or oil of cloves, in glycerin; then saturated with mucilage of gum Arabic; a wire is next passed through its centre, and it is tightly wrapped from apex to base with strong cord. Then the wire is taken out and the sponge is allowed to dry. After that the cord is removed and another cord is passed through the sponge and sewed fast to its apex. Dr. A. H. Smith prefers a sponge tent with a large point, cylindrical to its end; before introduction, to be covered with moistened soap, coated with salicylic acid.

FIG. 55.



Sponge Tent.

The advantage of the sea-tangle tent is that it affords no animal matter to decompose and produce fetor or irritation. Several small tents are better than one large one.[1]

Some German practitioners (Landau[2]) recommend, instead of sea-tangle, the *tupelo* (root and stem of *nyssa aquatica*) for tents; asserting that they expand more uniformly, and to a greater extent, while almost free from tendency to produce septic infection.

Dilatation of the uterus by tents is not free from danger. Tetanus and peritonitis have sometimes followed their employment. The tent ought never to be left in the uterus more than twelve or, at the longest, twenty-four hours; and the patient ought to remain in bed during that time and for one or two days afterwards.

## The Laryngoscope.

Instrumental aid in examining the interior of the larynx was first thought of by Levret, in 1743. Laryngoscopic mirrors were devised by Dr. Babington, of London, in 1829. Bozzini, 1804; Senn, of Geneva, in 1827; Selligues, Paris, 1832; Baumès, Lyons, 1838; Liston, 1840; Avery, 1844; Garcia, 1854, and about the same time Jacobi, of New York, gave attention to the same subject. Türck, of Vienna, applied mirrors anew to diagnosis in 1857; but shortly afterwards Czermak pursued laryngoscopy with so much acuteness and energy as to have associated his name with it pre-eminently.

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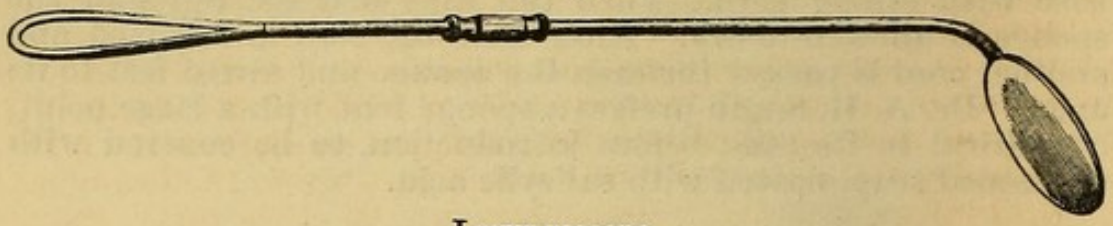
[1] Surgical-instrument makers prepare sea-tangle tents for the use of practitioners.
[2] Sammlung Klin. Vorträge, No. 187, 1881.

The apparatus required is a laryngeal mirror, an illuminating mirror, and a tongue depressor. Glass or polished metal may do for the mirrors.

The laryngeal mirror may be round or square, preferably the former, and about an inch or less in diameter. It should be

FIG. 56.

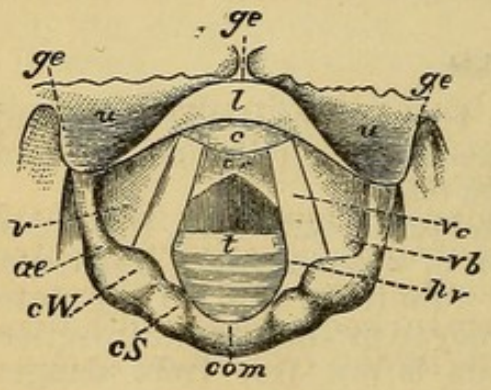


Laryngoscope.

attached at an obtuse angle (120° to 125°) to a stem, which may be fastened into a slender handle so as to be drawn out or pushed in.

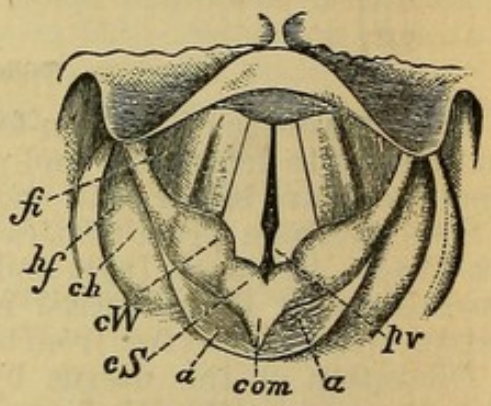
The illuminating mirror is larger (from 3 to 12 inches in diameter) and concave, to concentrate reflected light. It may be held by a handle in the operator's mouth, or fixed by a band to his forehead, or, best, as used by Semeleder, perforated in the middle and fastened to the bridge of a pair of spectacles (with or

FIG. 57.




Laryngoscopic drawing, showing the Vocal Cords drawn widely apart, and the position of the various parts above and below the Glottis during quiet inspiration. *g. e.* Glosso-epiglottidean Folds. *u.* Upper surface of Epiglottis. *l.* Lip of Epiglottis. *c.* Cushion of Epiglottis. *v.* Ventricle of Larynx. *a. e.* Ary-epiglottidean Fold. *c. W.* Cartilage of Wrisberg. *c. S.* Capitulum Santorini. *com.* Arytenoid Commissure. *v. c.* Vocal Cord. *v. b.* Ventricular Band. *p. v.* Processus Vocalis. *cr.* Cricoid Cartilage. *t.* Rings of Trachea. (Mackenzie.)

FIG. 58.




Laryngoscopic drawing, showing the approximation of the Vocal Cords and the position of the various parts in the act of vocalization. *f. i.* Fossa Innominata. *h. f.* Hyoid Fossa. *c. h.* Cornu of Hyoid Bone. *c. W.* Cartilage of Wrisberg. *c. S.* Capitulum Santorini. *a. a.* Arytenoid Cartilages. *com.* Arytenoid Commissure. *p. v.* Processus Vocalis. (Mackenzie.)

without the glasses) so as to rest before one of the eyes and be looked *through*.

The laryngeal mirror is introduced (after being warmed to pre-

vent condensation of moisture) so that its back pushes the uvula upwards and backwards, its lower edge presses upon the posterior wall of the pharynx, and its stem rests in the angle of the mouth.

Sunlight, horizontal (morning or evening), is the best for laryngoscopy, but artificial light, as of a good lamp, may suffice.

The *difficulty* of the operation is produced by the *irritability* of the fauces and larynx. Few can allow of a successful examination on the first attempt; practice makes tolerance. To hasten this, bromide of potassium has sometimes been given. The frequent insertion and retention for a while of the finger of the patient or of an instrument in the fauces accustoms the parts to pressure. Holding ice to the throat just before the examination also lulls sensibility. Momentary use of ether spray has been resorted to for the same purpose.

By laryngoscopy, tumors, ulcerations, inflammatory changes, etc., in the larynx may be inspected, topical applications made, and surgical operations performed, with a precision not otherwise possible.

**Rhinoscopy** is the examination, in a similar manner, of the *posterior nares*. It requires merely a *smaller* mirror (less than three-fourths of an inch in diameter) than for laryngoscopy, and at about a right angle to its handle.

The **otoscope** (for the ear), and **endoscope** (for the urethra), etc., are instruments for surgical diagnosis, not demanding description here.

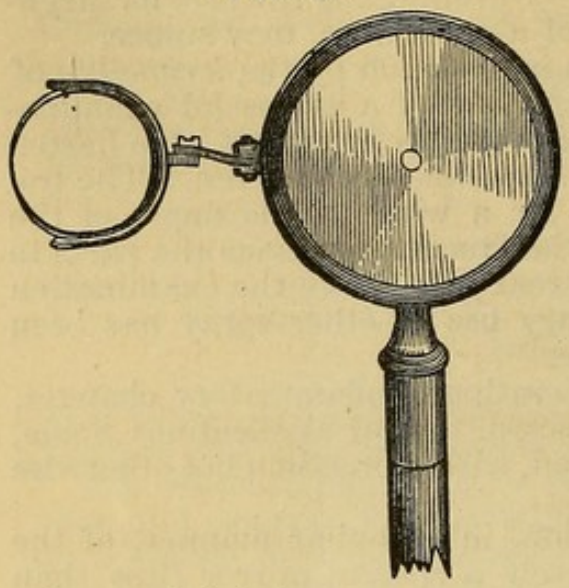
## The Ophthalmoscope.

Not only for ascertaining the state of the *eye* in various disorders of vision, but also to aid in diagnosticating affections of the *brain*, this instrument has acquired importance in recent times. Essentially perfected by Helmholtz (1851), it was brought forward especially by Gräfe (1860), and has had minor improvements made in its use by Liebreich, Anagnostaki, Zander, and others. It consists of a concave circular mirror about two inches in diameter, perforated by a small hole at the centre, with which is used also a biconvex lens of two or three inches focal length. The following account of the mode of its employment is from Zander:

"In order to effect a satisfactory examination of the eye with the ophthalmoscope it is essential to have a good light. Artificial light, as that from an oil or gas lamp, is practically the best. In preparing the patient for an examination the pupil should be dilated by atropia, a small quantity of a solution containing one-twentieth of a grain of the alkaloid to the ounce of water having been applied to the eye several hours before. The room being darkened and the patient seated, the lamp should be placed near the head of the patient, on the same side as the eye to be examined, so far back as to leave the cornea in shadow. It is also important that the flame, the eye of the patient, and the eye of the observer should be all at the same level. The observer now takes the concave mirror in the hand that is on the side towards the lamp, places its edge against the superior margin of his orbit, and looks through the perforation at the eye to be examined; he then causes the mirror to turn a little on its vertical axis, until

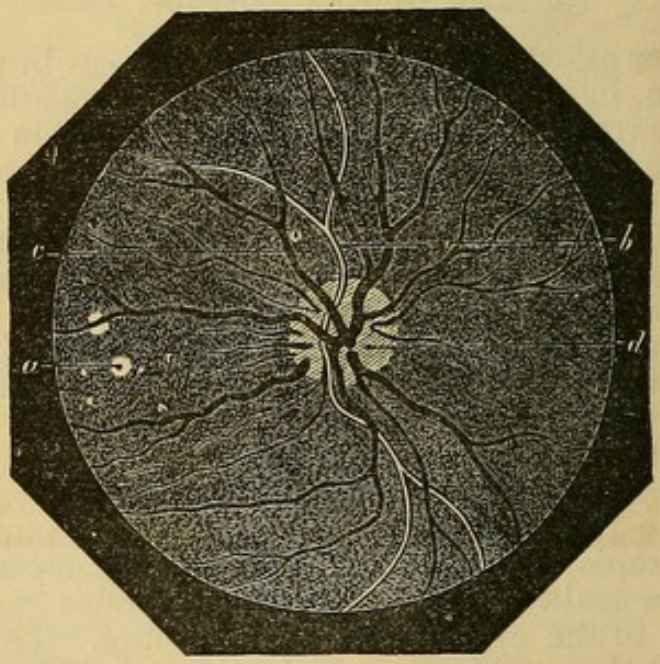
the inverted image of the flame is cast upon the eye under examination, the pupil of which will then return a more or less intense reddish or whitish glow. For a general inspection of the refracting media, it will be sufficient to look at the eye from different directions, and cause it to make slight movements upwards, downwards, and to either side. If no diseased conditions be apparent, the observer proceeds to examine the inverted image of the fundus. For this purpose he takes a biconvex lens of 2″ or 3″ focal length, in the thumb and index of his free hand, rests his little finger upon the forehead of the patient, and brings the lens in front of the examined eye, so that the light from the mirror, passing through the lens, will be concentrated upon the pupil. The actual inverted image of the fundus will now be formed betwixt

Fig. 59.



Ophthalmoscope.

Fig. 60.



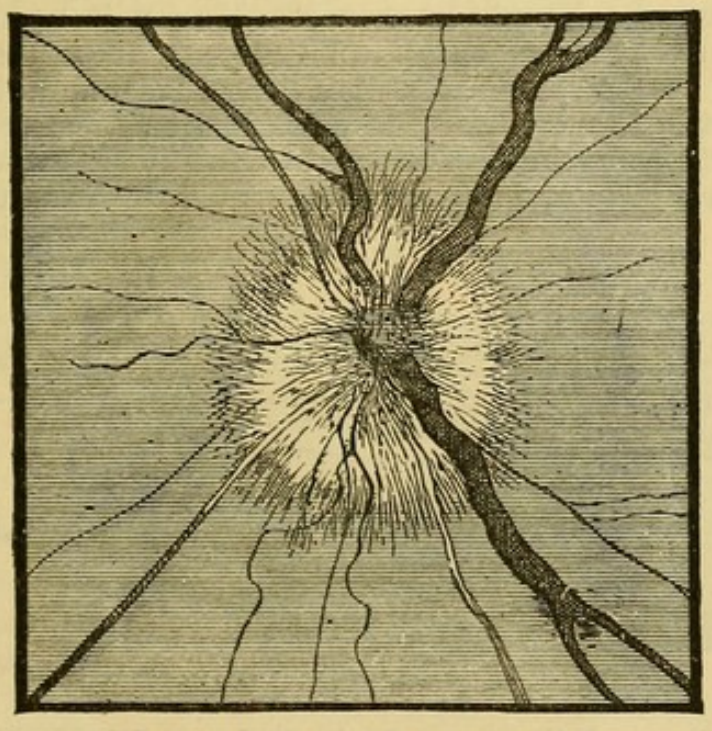

Representation of the appearances seen with the Ophthalmoscope in a case of Tubercle of the Choroid. *a*. Tubercle in the Choroid. *b*. Artery of the Retina. *c*. Veins of the Retina. *d*. Optic Disk. (Bouchut.)

the lens and the eye, and in the focus of the former; and to render it visible, the observer must usually move his head somewhat further back. The first object to be sought within the eye is the entrance of the optic nerve. Sometimes before its white surface becomes visible, darker streaks may be seen traversing a bright

red ground. These will be the vessels that proceed from the entrance itself, and by following one of them, in the direction of its increasing thickness, towards the inner and inferior parts of the eye, by movements of the observer and mirror in the opposite directions, the white surface of the optic disk will presently be perceived. After inspection of the nerve surface, attention should next be directed to the vessels, to observe whether they present a normal condition at their place of entrance, to note their course over the white disk, and their conduct at and after passing to the red background. After the vessels, should be observed the transparency of the retina, its relations to the choroid; and then the observer should return to a more careful and accurate study of the entrance of the nerve. Lastly follows the inspection of the refractory media, the vitreous body, the crystalline lens, the cornea, and then that of the iris."

Türck first called attention to retinal signs of brain disease, in 1858. Von Graefe, in 1860, pointed out the existence, in different cases, of two conditions: that of engorgement of the intraocular end of the optic nerve (*stasis papillæ*) or **choked disk**, and

FIG. 61.



Choked Disk. (After Liebreich.)

that of inflammation of the optic nerve, descending from meningeal inflammation (*descending* **optic neuritis**). In ninety-five per cent. of brain tumors (Bouchut, Ogle, Earnest Hart, Allbutt, Hughlings-Jackson, Annuske, Reich, Longstreth, Norris,[1] Shakespeare) one or other of these appearances exists. Yet, as some marked cases of brain tumor have been shown (Becker, Schweigger) to be entirely without ophthalmoscopic signs, the most certain value of their frequent coincidence appears to be *negative.*

[1] Phila. Med. Times, Aug. 30, 1879.

That is, *when tumor of the brain is suspected but not proven, the total absence of ophthalmoscopic changes lessens greatly the probability of its existence.*

Among the abnormal appearances shown by the ophthalmoscope, involving the eye itself, one of the most interesting is the *cupped depression* of the optic nerve-disk, in connection with the morbid *tension* of the eye-ball in acute *glaucoma*. Accompanying this sign, we have evidence of undue tension on palpation of the ball, with marked redness from increased vascularity, severe pain, and rather sudden loss or impairment of vision.

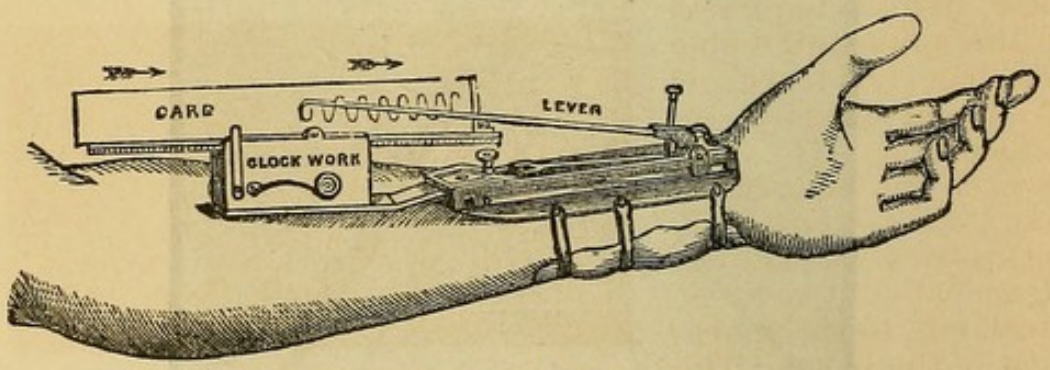
*Atrophic degeneration* of the optic nerve may be ophthalmoscopically shown in many cases of *locomotor ataxy*, *multiple cerebro-spinal sclerosis*, *chronic alcoholism*, and *nicotism* (tobacco poisoning). In some instances such a degeneration is the occasion of hereditary loss of sight.

## The Sphygmograph.

Hérisson, about 1833, supported by Magendie, attracted much attention at Paris by his *sphygmometer*;[1] this was a mercurial tube, ending in an excavated hemisphere of ivory or steel, with a subjacent membranous portion made to rest upon an artery. Next came, for the visual study of the pulse, the *kymographion* of Ludwig; afterwards, King's improvement upon it by the use of a lever; then the sphygmograph of Vierordt, and afterwards, that of Marey. The instrument of the latter is, undoubtedly, at the same time the simplest and the most accurate.

It consists essentially of a very delicately adjusted lever, one end of which rests upon an upright, which, by a rounded surface,

FIG. 62.




Sphygmograph applied to the Arm.

presses on the radial artery at the wrist; while its free end sustains a pen, whose point is placed in contact with a strip of paper, kept in steady motion by clockwork.[2] Each beat of the pulse, therefore, magnified by the lever, is registered in a waving line upon the paper. Some observers prefer a smooth point acting upon smoked glass for the registration.

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[1] I have before me a copy of a translation of Hérisson's memoir presented to the French Institute, published in Philadelphia in 1835, by Dr. J. G. Nancrede.

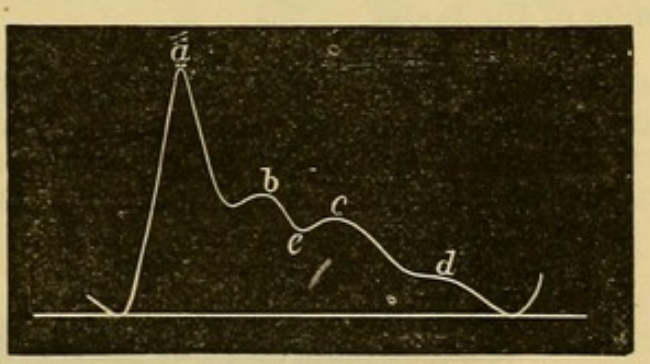
[2] Few of our instrument makers yet construct the sphygmograph. One may be imported from Paris for about $40. Otto & Reynders, of New York, manufacture the improved instrument of Dr. E. Holden. Pond's sphygmograph, also, is now made in this country.

Much physiological as well as pathological interest attaches to this mode of demonstration of arterial action. It has been carefully studied by a number of able observers, especially Wolff, Naumann, Onimus and Viry, Burdon Sanderson, Anstie, B. W. Foster, and E. Holden.[1] Our present concern with it is in regard to its diagnostic use.

The marking of the normal or healthy pulse presents in regular succession the following parts: 1. An ascending line or summit wave; 2. A slight depression, or notch, rising very soon into a secondary wave; 3. A deep impression, or great notch; 4. A second great ascension; 5. A descending line. All authorities are not quite agreed as to the explanation of each of these portions of the curve; which admit, moreover, of some variations compatible with health. The following is probably the correct view.

1. The first ascension or summit-wave follows immediately upon the full commencement of the ventricular systole, as a "pressure-wave" (Weber), or vibratile impulse communicated to the column of blood in the vessels. 2. The secondary wave coincides with the closure of the auriculo-ventricular valves, and the forward impetus of the blood under the total pressure of the systole. 3. The "great notch" (Wolff) is due (Naumann, B. Sanderson) to the rebound of blood under the arterial contraction; the reflux which closes the aortic valves. It is sometimes called the aortic notch. 4. The second main ascension follows the closure of the semilunar valves of the aorta, the *arterial systole* then taking its full effect. 5. A descending line attends the subsidence and intermission of the pulse.[2]

FIG. 63.




Pulse Tracing.
*a* Primary Wave; *b* Tidal Wave; *c* Dicrotic Wave; *d* Fourth Wave; *e* Aortic Notch. (Finlayson.)

By variations from these usual characters of the sphygmographic marking, evidence is given in regard to changes in — 1. The force of the heart's action. 2. The tension of the arteries. 3. The existence of obstructions, anywhere, to the movement of the blood. The permanent record obtainable by means of the instrument gives great advantage for the comparative study of different cases. Hence, hospital men, especially, should value the sphygmograph.

In *old age*, the pulse-mark has generally a nearly vertical but sometimes broken ascent, a rounded or flattened summit, defi-

[1] Prize Essay on the Sphygmograph, 1873. Room yet exists for further investigation of the same subject in other modes. See a paper by the author, Am. Journal of Med. Sciences, July, 1868, p. 288.

[2] Galabin has asserted a *complicating* effect in the sphygmographic pulse-record to be due to the oscillation of the *instrument;* but this view is not well sustained.

ciency in the *dicrotism* or second (arterial) ascent; often a sudden fall after the primary cardiac wave.

In *aneurism* of either of the great vessels, the sphygmograph affords much assistance in diagnosis. It shows a loss of force in

FIG. 64.

FIG. 65.

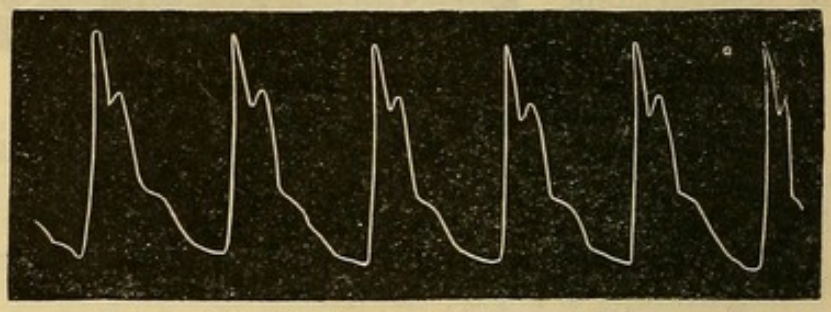
FIG. 66.

Fig. 64. Pulse-tracing of Radial Artery, somewhat deficient in *tone*.
Fig. 65. Firm and long Pulse of Vigorous Health.
Fig. 66. Pulse-tracing of Radial Artery, with Double Apex.

the pulse on the side of the aneurism, with lessening of dicrotism; and, particularly, a *difference in the radial pulse-mark of the two sides* of the body.

*Aortic regurgitation* is attended by a *vertical* ascent of the first wave, ending in a *point*. This alone, however, is not, as Marey and others for a time supposed, decisive; since functional disturbance of the heart may produce the same effect. There is, in aortic regurgitation, a notable *suddeness* in the fall that fol-

FIG. 67.



Pulse of Aortic Regurgitation. (Finlayson.)

lows the pointed ascent; a collapse of the artery, without the dicrotic vascular rebound or second ascending wave. An *oblique* line of the first ascent generally occurs in *obstruction* of the *aortic* valves.

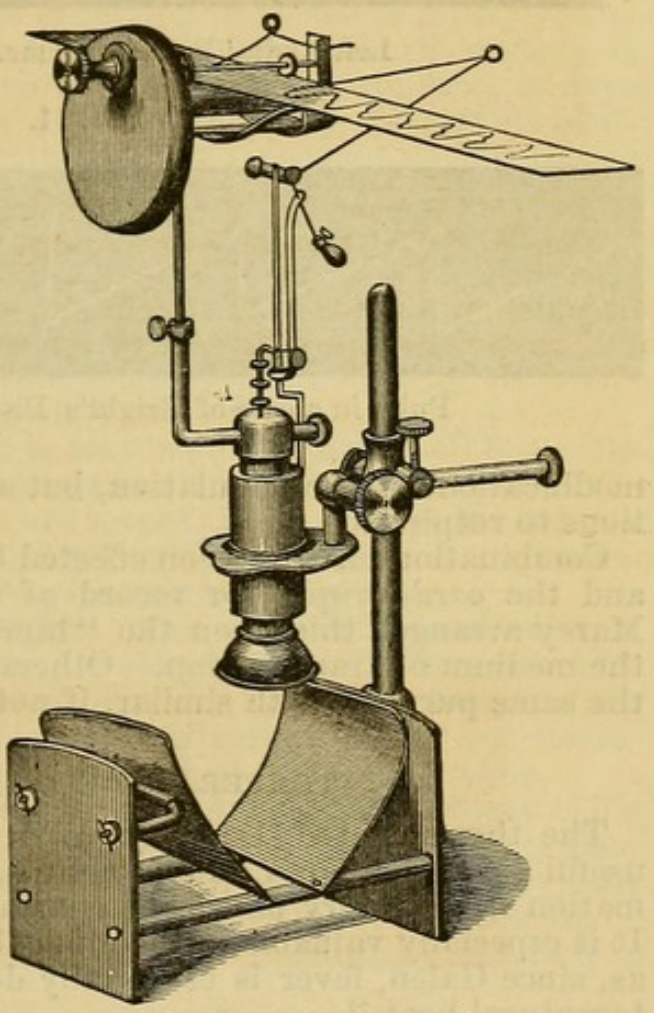
*Mitral* regurgitation gives indication of a small, irregular,

usually dicrotic pulse; easily modified by compression of the artery.

Variations in the fulness and pressure of the arterial system, under different causes, will produce corresponding changes in the sphygmographic markings. This is very quickly shown when the pulse is registered while under the influence of inhaled vapors; *e. g.*, nitrite of amyl. In acute diseases accompanied by fever, Wolff and others have described some characteristic sphygmographic alterations; which, however, require further analysis. It is stated that, in fever, instead of the three-pointed (tricrotous) pulse, a tendency to dicrotism exists; sometimes to a single wave or monocrotism. When the aortic notch is deepened moderately, so as not to reach the line of the base of the pulse-curve, it is said to be *hypodicrotous*. If it reach that line in its descent, *perfectly dicrotous*. When it goes below it, it is *hyperdicrotous*. Changes of temperature are asserted to accompany these variations; the highest degree, above 104°, being found usually with the last.

Anstie has recorded, also, the effects of *alcohol* on the pulse as shown by the sphygmograph. He determined that, when it acts as a helpful stimulant, in typhoid states, the pulse is made slower, and excessive dicrotism is reduced. When alcohol acts as a narcotic, it accelerates the pulse and increases dicrotism.

FIG. 68.



Pond's Sphygmograph.

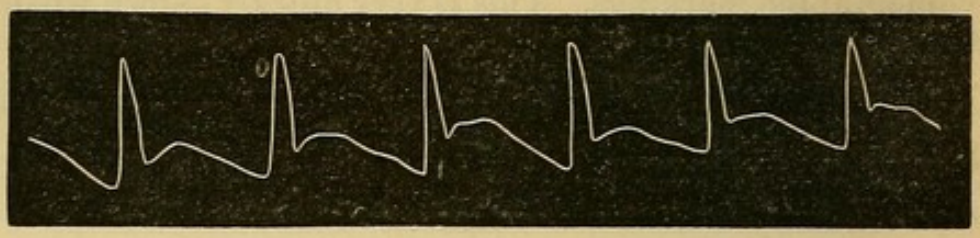
Always, a want of uniformity and regularity in the pulse-marks, or sudden or great changes in their character, will be significant of morbid states, which may often be of serious importance. Still it would, in the case of the sphygmograph, as in that of other instruments, be a great mistake to allow it to *supersede* the use of the more simple and constantly available modes of diagnosis. The *tactus eruditus* must keep its place, as indispensable to every skilful physician.

Other sphygmograpic instruments besides Marey's have been invented and used (Mahomed, Holden). Pond's[1] sphygmograph, especially, has met with considerable favor.

[1] London Practitioner, April, 1879, p. 298.

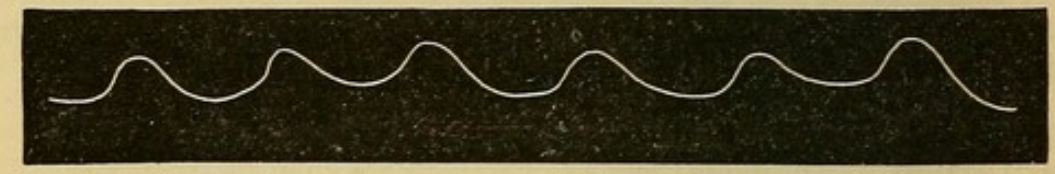
Dr. Hawksley[1] has devised a "stetho-sphygmograph," by which may be observed and recorded not only peculiarities or

FIG. 69.



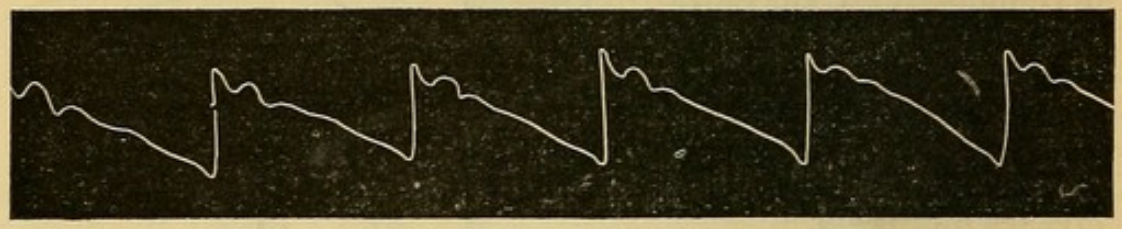
Right Radial Pulse in a case of Thoracic Aneurism. (Finlayson.)

FIG. 70.



Left Radial Pulse, in same. (Finlayson.)

FIG. 71.



Pulse in a case of Bright's Disease. (Finlayson.)

modifications of the circulation, but at the same time their relations to respiration.

Combination has also been effected between the sphygmograph and the *cardiograph* (for record of movements of the heart). Marey arranged this upon the "tambour" method, with air as the medium of transmission. Others[2] have employed water for the same purpose, with similar, if not greater, success.

### TEMPERATURE IN DISEASE.

The thermometer (De Haen, 1754, Wunderlich, J. Davy) is a useful aid in diagnosis and prognosis, making exact that information which every physician constantly obtains by the touch. It is especially valuable in the clinical study of febrile disorders, as, since Galen, fever is essentially defined by the words "preternatural heat."

The **axilla** is the best part for examination of temperature. Some, however (Finlayson), prefer the rectum. In children, this is probably better. The instrument should be kept there

[1] Lancet, December, 18, 1869.
[2] Keyt, New York Medical Record, Oct. 30, 1880, p. 479.

from three to five minutes at a time. Normally, in the armpit, the temperature averages 98.5° Fahr.,[1] with a range in health (Davy) from 99° to 97.92.° It is about 1° higher in tropical than in temperate climates. In the temperate, it is *highest* on waking in the early morning; lowest at midnight. In tropical regions, it is *lowest* in the early morning, and highest during the day.[2] It is one or two degrees higher in children than in adults; but in children during health, according to Finlayson, it is less in the evening than in the morning.

A rise of temperature, in disease, of 1° Fahr. corresponds, as a rule, with an increase of the pulse of eight to ten beats per minute. The thermometer in the axilla may, in some febrile cases, mark 106°, 108°, even 112°. It has been found highest in scarlet fever, yellow fever (Dowler), and tetanus. Dr. H. C. Wood, found it 109° in the axilla of a man dying with heat-stroke, and 110¾° in his abdomen after death. Wunderlich records the temperature of 112.55° in tetanus at death, and 113.56° after death.

The most extraordinary excess of bodily temperature has been reported by J. W. Teale,[3] as occurring in a case of injury of the spine by a fall. As tested by eight different thermometers, it ranged for seven weeks above 108°, and during a number of days fluctuated between 116° and 122°. But for the concurrent testimony of several medical witnesses, this account would appear incredible. Dr. Donkin has recorded cases of fever, pneumonia, inflamed stump of limb, and pyonephrosis, in which temperatures occurred as high as 112°, 113°, 115°, and 117°. All these patients recovered.

In intermittent fever, during the paroxysm, even when the patient shivers and feels cold to himself, his heat by the thermometer is usually above the natural degree.

"When[4] the temperature is increased beyond 98.5° it merely shows that the individual is ill; when it is raised as high as 101°–106°, the febrile phenomena are severe; if above 105°, the patient is in imminent danger; with 108° or 109° a fatal issue may without doubt be expected in a comparatively short time.

"A person, yesterday healthy, who exhibits this morning a temperature above 104° Fahr., is almost certainly the subject of an attack of ephemeral fever or of ague; should the temperature rise to or beyond 106.3°, the case will certainly turn out one of some form of malarious fever. It cannot be typhoid fever.

"A patient whose temperature rises during the first day of illness up to 105° or 106° Fahr., certainly does not suffer from typhus or typhoid fever. In a patient who exhibits the general typical signs of pneumonia, but whose temperature never reaches 101.7° Fahr., it may be concluded that no soft infiltrating exudation is present in the lung.

"If a patient suffer from measles, and retain a high tempera-

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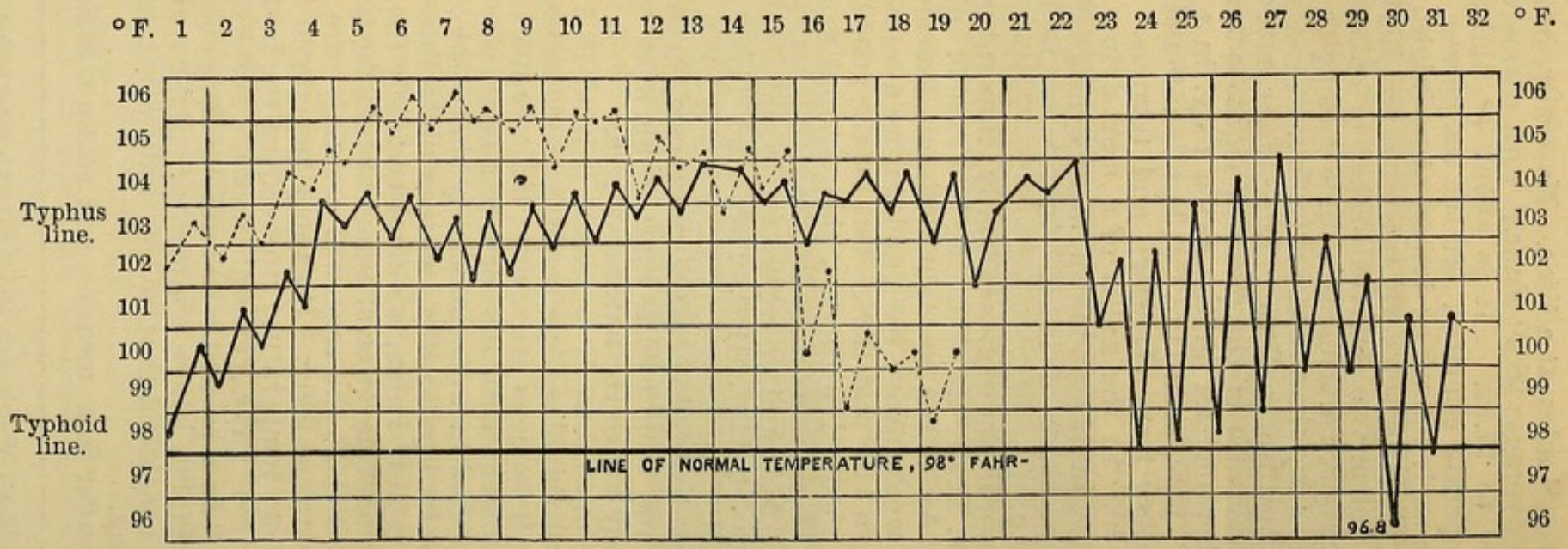
[1] Aitken states it as 98.4°; Wunderlich, 98.6°; my own observation gives it 98.5°. F. Finlayson asserts the existence of greater variability of temperature in children.

[2] See Aitken's Science and Practice of Medicine, 4th ed., vol. i., p. 39.

[3] London Lancet, March 6, 1875.

[4] Aitken, op. citat., vol. i., p. 44.

FIG. 72.




Typical ranges of Temperature in course of Typhus and Typhoid Fever. The dotted line indicates the Typhus range; the continuous dark line that of Typhoid; the two dots under each day indicate the morning and evening Temperature. (Wunderlich and Traube.)—From Aitken's *Practice of Medicine.*

ture after the eruption has faded, it may be concluded that some complicating disturbance is present.

"In typhoid fever, a temperature which does not exceed any evening 103.5° indicates a probably mild course of the fever. 105° in the evening, or 104° in the morning, shows danger, in the third week. In pneumonia, a temperature of 104° and upwards indicates a severe attack. In acute rheumatism, a temperature of 104° is always an alarming symptom, foreboding danger, or some complication such as pericardial inflammation. In jaundice, otherwise mild, a rise of temperature indicates a pernicious turn. In a puerperal female, an increase of temperature shows approaching pelvic inflammation. In tuberculosis, an increase of temperature shows that the disease is advancing, or that untoward complications are setting in.[1]

"A fever temperature of 104° to 105° Fahr., in any disease, indicates that its progress is not checked, and complications may still occur."

Certain diseases have been found to have **typical** ranges or daily fluctuations of temperature throughout their course; so that their "differential diagnosis" may be thus assisted materially. This has now been determined, especially in malarious fever, relapsing fever, typhus, typhoid, smallpox, scarlatina, measles, rheumatism, pyæmia, pneumonia, and acute tuberculosis. Dr. Da Costa has observed that, in some cases at least, cancer is attended by a lowering of temperature.

The same assertion has been made by others in regard to diabetes mellitus. Dr. B. W. Richardson found that the narcotism produced by hydrate of chloral is always accompanied by reduction of temperature. Alcohol produces a moderate effect of the same kind. Dr. Bourneville has shown that a considerable fall occurs in uræmia.[2] Dr. Ogle reports the decided lowering of the temperature in cases of phthisis, under fifteen and twenty-grain doses of sulphate of quinine.[3] Many observations make it appear that large doses of quinine greatly lower the temperature. Salicylic acid and oil of eucalyptus also have a similar effect. Belladonna and coffee increase the temperature. Dr. Nieden observed the temperature to be reduced after an injury of the spinal cord.

During the collapse of malignant cholera, in moribund cases, the temperature of the breath has been found to be as low as 80°, or even 70°. Recovery has seldom been known from any disease when the temperature in the axilla has fallen below 90° Fahr., except in alcoholic poisoning; in which Bathurst Woodman has several times seen recovery after that degree had been reached.[4] Uræmic coma, also, is attended by low temperature. Dr. I. Alvarado, of Mexico, has made a study of the *relations between the*

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[1] The statement (S. Ringer) that rise of temperature *always* attends the deposition of tubercle is not exact. Wunderlich, Roger, Hérard, Cornil, Jenner, and others, have shown many exceptions to it. In Brit. Med. Journ., April 5, 1873, a case is reported as occurring under the care of Sir W. Jenner, in which fatal acute tuberculosis occurred *without any pyrexia.*

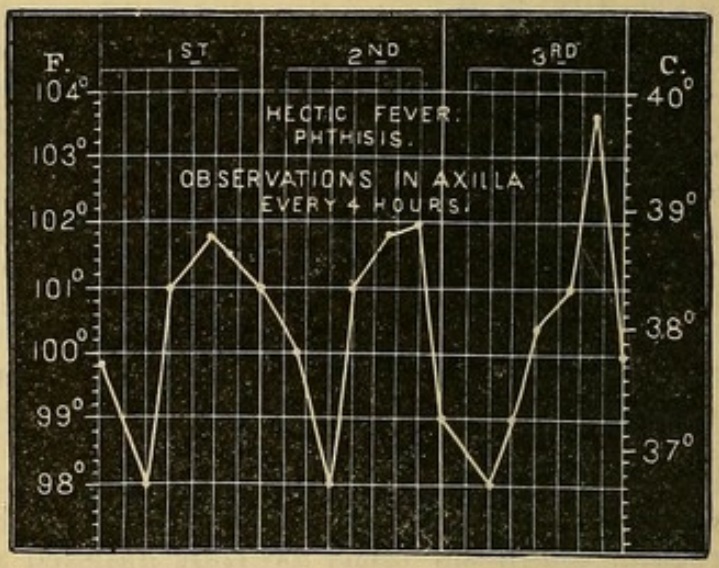
[2] See Hanot, Lancet, Jan. 4, 1873.

[3] London Lancet, July 6, 1872.

[4] Dr. Mendelson found a temperature of 90° F. in the rectum of a half-starved insane patient in the N. Y. Hospital, in April, 1881; he recovered under stimulation with nutriment.

*temperature and the pulse*, in health and disease, which may, when completed, be of value in diagnosis and prognosis.[1]

FIG. 73.




Diurnal range of Temperature in Hectic Fever. (Finlayson.)

In relapsing fever,[2] the heat rises quickly in the first stage, reaching 104° or 105° on the second day; fluctuating then until the day before the defervescence, when it attains its highest point; sometimes 107° or 108°. Then it sinks rapidly, as the other symptoms subside, down to 98°, or even less. When the relapse occurs, about the fourteenth day, the heat again increases to 104°, 105°, or more; to descend as rapidly as before, when convalescence begins.

In continued fevers, the temperature is generally less high in the morning than in the evening. In typhus, however, not unfrequently it falls a little towards night.[3] Stability of temperature from morning to evening is a good sign; on the other hand, if a high temperature remains stable from evening till the morning, it is a sign that the patient is getting or will get worse.

When the temperature begins to fall from the evening to the morning, it is a sure sign of improvement; but a rise of temperature from the evening till the morning is generally a sign of getting worse. *Inequality* of temperature in *different parts* of the body is sometimes quite important; especially in chronic diseases of the nervous system. By means of very delicate instruments, varying temperatures of different portions of the *head* (Broca, 1877, Lombard, Bert, Amidon, L. C. Gray, Mills) have been noted in some cases.[4] A difference has been observed also (Péter) in regard to temperature, between *peritonitis* with effusion and *ascites* of non-inflammatory origin; and in pleurisy, when the effusion is actively increasing, and when it is undergoing absorption; also (Broca) between cerebral embolism (with *lessening* of

[1] Phila. Med. Times, May 22, 1880, p. 435.
[2] Observations on Relapsing Fever, by Dr. J. S. Parry, Am. Journ. of Medical Sciences, October, 1870.
[3] J. W. Miller, Brit. and Foreign Medico-Chirurg. Review, October, 1868.
[4] Phila. Med. Times, March 13, 1880, p. 308.

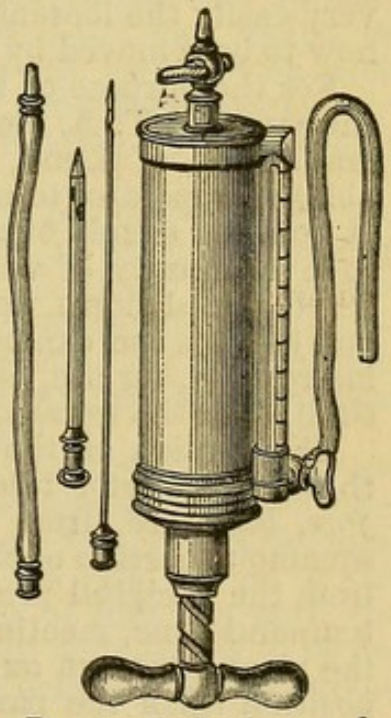
warmth in the temporal regions) and acute cerebral or meningeal inflammation.

Convalescence from disease does not begin until the normal temperature of the body returns, and maintains itself unchanged through all periods of the day and night.

## PNEUMATIC ASPIRATION.

Dr. Bowditch, many years ago, commenced the use of a fine "capillary" trocar and canula, which, as well as the grooved needle of Trousseau, have now long been in common use for the careful exploration of any of the cavities of the body, supposed to contain fluids. Dr. H. F. Walker,[1] of New York, proposed the employment of the hypodermic syringe for the same purpose in diagnosis. M. G. Palletan, in 1831, devised an instrument for the same object. But the attention of the profession has been especially given, since 1859, to the "pneumatic aspirator" of Dr. Georges Dieulafoy, of Paris. By this, it is claimed, the greatest possible safety and convenience are obtained for exploration (and also withdrawal of fluid) in pleuritic and pericardial effusions, cysts in various regions, abscesses of the liver, hydrarthrosis, retention of urine, strangulated hernia, etc. Dr. W. Pepper (1874) has employed it for the local treatment of cavities in the lungs in phthisis; and Dr. Howe, of New York, for transfusion of blood. The special claim of Dr. Dieulafoy, besides that of the fineness of his hollow needles, consists in the use of the "previous vacuum," *i. e.*, a chamber in his instrument exhausted of air *before* the introduction of the hollow needle into the part to be explored or drained.

FIG. 74.



Pneumatic Aspirator of Dieulafoy.

The application of the instrument is thus described :[2]—

"The aspirator being ready, that is to say, the previous vacuum being made, the needle is introduced sharply at the spot pointed out. Before the needle has penetrated a centimetre into the tissue, that is, as soon as its opening is no longer in contact with the external air, the stopcock connected with the needle is opened, and the vacuum is thus formed in the needle itself. This needle, carrying the vacuum with it, is slowly, very slowly, pushed in the direction of the bladder, until the urine flowing over the glass index shows that the bladder is pierced. Owing to this proceeding, and having the previous vacuum at our command, we know the precise moment the fluid is reached."

While this apparatus and method appear to involve a real

[1] See T. Gaillard Thomas, on Diseases of Women. Phila. ed., 1872, p. 663.

[2] Treatise on Pneumatic Aspiration, etc., by Dr. G. Dieulafoy. Philada. ed., 1873. The instrument has been improved upon by Potain, Steurer, and others.

improvement, capable of great utility in many cases, it must not be supposed that their employment is absolutely without danger. A few instances of fatal result, following even the introduction of the hollow needle into an articulation,[1] have enforced the necessity of caution with it. Local anæsthesia, by Richardson's spray-producer, with ether or rhigolene, has sometimes been employed to obviate the pain caused by the operation. It is not certain whether this will lessen or increase the danger of subsequent irritation.

### INSPECTION OF THE BODY AFTER DEATH.

In conducting post-mortem examinations, with a view either to pathological study or medico-legal investigation, *order* and *method* are of great importance.

The three great cavities—the **head**, the **chest**, and the **abdomen**—should always be examined, whether suspicion of disease in them exists or not. First, however (the autopsy being made from twelve to thirty-six hours after death), we should note the **external appearance** of the body; *its size*, *weight*, *conformation*, *color of the skin*, etc. (In cases of suspected violence, even abrasions should be minutely described.)

To examine the **Head**, an incision should be made through the scalp, across the top of the head, from ear to ear—the two flaps thus formed should be reflected, the one over the forehead, the other over the occiput. The nature of the attachment of the occipito-frontalis muscle to the bone beneath is such as to allow very easily the loosening of the scalp. The cranium (calvaria) is now to be removed by means of a small saw.

For the purpose of holding the head firmly during the use of the saw, Dr. T. A. Demmè has furnished, as a substitute for the craniotome of Lund, of London, a *cranium-holder*, which enables the operator to make a section of the skull in any direction. It consists simply of a bar of iron, curved like the letter U, at each extremity of which two drill screws are placed, which, when forced down upon the bone, holds the bar firmly *in situ*, and enables the examiner to control the head. The legs of the instrument, for use, are placed upon the lateral portions of the skull, over the squamous portions of the temporal bones.

The section of the cranium with the saw should be made through its outer table, completely around the head—from *before*, *backward*, from below the frontal protuberances to the squamous portion of the temporal bone, and from *behind forward*, from the occipital protuberance to the squamous portion of the temporal bone, meeting the line just described. The shape of the piece thus cut out enables it to be maintained in its proper position when the parts are readjusted. It is removed by the aid of an elevator, or chisel and hammer, fracturing the inner table of the skull by strokes so applied as not to pierce the brain.

The dura mater is next to be cut through, on each side of the superior longitudinal sinus; after which, dividing the *falx cerebri*,

[1] See Irish Hospital Gazette, Jan. 15, 1873.

the brain may be raised carefully with the hand placed under its anterior portion. The internal carotid artery, and cranial nerves, etc., are now to be severed by the knife, and finally, the vertebral arteries and spinal cord. The brain itself may then be taken out and inspected, by slicing it from the upper part downward, in successive horizontal layers. Both before and after its removal, the amount of *liquid* present should be carefully noted; measuring it, if excessive, by the aid of a pipette or small syringe and graduated glass. Instead of horizontal, many pathologists prefer *oblique* (vertico-transverse) or longitudinal vertical sections through the hemispheres, on each side of the great longitudinal fissure. Modern neurologists insist much on the examination of the "psycho-motor" and "psycho-sensory" zones. (See Part I., Neuropathology), as well as the *thalami*, *corpora striata*, and *internal* and *external capsules*. There seems to be pathological importance in distinguishing, in what was formerly described *en masse* as the *corpus striatum*, two parts; the anterior, intraventricular portion, the *nucleus caudatus;* and posteriorly, the extra-ventricular portion, *nucleus lenticulatus*. Between the caudate nucleus and thalamus above, and the lenticular nucleus below and without, is the *internal capsule*, of white fibrous nervous matter; a portion of the *crus cerebri*. Outside of the lenticular nucleus is the white fibrous *external capsule*.[1]

To examine the **Spinal Column**, an incision should be made from the occipital protuberance to the extremity of the os coccygis. The deep muscles of the back should then be loosened from their attachments, so as to expose the laminæ and spinous processes of all the vertebræ. With the chisel and mallet, or saw, we must cut through the arches of the vertebræ on each side, close to their articular processes.[2] After thus opening the spinal canal, the cord is to be exposed by dividing the dura mater through its whole length.

To examine the **Neck**, an incision should be made through the skin, extending from above the hyoid bone to the upper part of the sternum. Avoiding penetration of the large veins of the neck, the parts to be examined may be carefully dissected, and if desirable, removed from the body. The thyroid gland, larynx, and its appendages, tongue, pharynx, œsophagus, blood-vessels, and nerves of the neck, may be thus viewed.

To examine the **Chest**, two incisions are desirable; the one from the root of the neck, in front, to the extremity of the ensiform cartilage; the other at right angles to this, across the middle of the thorax. The cartilages of the ribs are to be cut through, with a strong knife, at the lines of junction with the ribs. The ensiform cartilage, being drawn outward, is to be detached from the soft parts, the knife being held *close to the sternum.*

---

[1] An interesting subject for minute investigation is the question whether the fibres of the internal capsule constitute a *direct continuous connection between the cortex of the cerebrum and the spinal cord*,—or communicate only by means of the *ganglionic masses* at the base of the brain. Pathological evidence favors the former answer to this question; but physiological analogy is against it, and I am not aware that it has yet (1881) been positively settled by anatomical demonstration.

[2] Dr. Satterthwaite's modification of Brunett's chisel has great convenience for exposing the spinal canal. See N. Y. Med. Record, May 8, 1880, p. 520.

The sterno-clavicular articulation may now be opened, and the sternum with the costal cartilages raised from its position—a cautious use of the knife being made to remove the adherent soft parts.

The thoracic viscera are now exposed, and may be drawn out with care, and inspected in detail.

The *heart* should be removed first, after opening the pericardium by a vertical incision, and ascertaining the presence or absence of adhesions, effused fluid, etc. The apex is then to be raised, and the great vessels at the "root" of the heart divided at a short distance from its base. Laying the heart upon a board, as nearly as possible in the position it occupies in a recumbent body, the auricles and ventricles may be carefully laid open.

The *right auricle* may be opened by cutting through its middle portion, betwen the entrances of the *venæ cavæ*. The *left auricle* may be entered by an incision commencing near the left superior pulmonary vein.

The *right ventricle* should be laid open by a deep incision from the base to the apex, beginning near the *septum* at the base. The *left ventricle* is to be opened by a similar deep incision from the base to a point not far from the apex.

Especial care is needed in dividing the parts near the orifices of the *aorta* and *pulmonary artery*, so as to examine the condition of their valves. Scissors are convenient for this part of the inspection. In examining the *mitral* and *tricuspid* valves, care must be taken not to confuse appearances by a promiscuous division of the membranous *cusps*, as well as of the *columnæ carneæ* and *chordæ tendineæ*.

The *lungs* may be placed first in water to determine whether they will float or not (the lungs of a still-born infant, which has *never breathed*, will, unless from some extraordinary cause, *sink* in water). The same may be done with portions of the lungs after they have been cut for examination. Incisions for this purpose should be made, vertically and transversely, through each pulmonary lobe. The bronchial tubes may be best divided with long-bladed scissors, cutting towards the lungs.

To examine the **Abdomen**, make a crucial incision; the one branch extending from the sternum to the pubes, passing to the left of the umbilicus; the other transversely across the middle of the abdomen. Care must be taken, in making these incisions, not to injure the subjacent viscera.

Before removing the stomach or any portion of the intestines, ligatures should be placed above and below the part that is to be separated.

When—as is always desirable, if possible—both of the large cavities of the trunk are to be opened, a single incision, extending from the top of the sternum to the symphysis pubis, may be made.

The *weight* of organs, altered by disease, is sometimes an important point. The following are *normal* weights of the principal organs in healthy adult subjects:

| | Male. | Female. |
|---|---|---|
| Brain | 49½ oz. | 44 oz. |
| Spinal cord | 1 oz. 4 dr. | 1 oz. 4 dr. |
| Lungs | { right, 24 oz. / left, 21 " | 17 oz. / 15 " |
| Heart | 11 oz. | 9 " |
| Liver | 53 " | 45 " |
| Spleen | 6 " | 5 " |
| Kidney | 5½ " | 5 " |
| Ovary | | 1 to 1½ dr. |

In every case incision through the skin should be made, as far as practicable, only in those parts which are usually covered by the clothes of the deceased. It is generally advisable, when the abdomen or thorax has been opened, to fill the cavities with bran or sawdust. After the examination has been completed, the edges of the divided integument should be brought together, and retained in apposition by the common continued suture.[1]

## MEDICO-LEGAL EXAMINATIONS.

In cases of suspected *poisoning*, the following practical directions are given by Professor Reese, of the University of Pennsylvania, to be observed by those who have charge of *post-mortem* examinations:

1. Ascertain whether the individual has labored under any previous illness, and how long a time had elapsed between the first suspicious symptoms and his death; also the time that had elapsed after death before the inspection is made.

2. Note all the circumstances leading to a suspicion of murder or suicide, such as the position and general appearance of the body, and the presence of bottles or papers containing poison about his person or in the room.

3. Collect any vomited matters, especially those *first* ejected, and preserve them in a clean glass jar, carefully stoppered and labelled. The vessel in which the vomited matters have been contained should be carefully inspected for any *solid* (mineral) matters which may have sunk to the bottom or adhered to the sides. If no vomited matters be procurable, and vomiting has taken place on the dress, bedclothes, furniture, etc., then portions of these must be carefully preserved for future examination.

4. Before removing the stomach, apply *two* ligatures beyond

[1] The examiner should wash his hands with the utmost thoroughness after an autopsy, for his own sake as well as that of others, especially patients to be visited. If the subject examined died of a disease capable of contagion or infection (in which category erysipelas, puerperal fever, and diphtheria must be included) some disinfectant should be used. I prefer Labarraque's solution of chlorinated soda for this purpose. A fluidounce of it may be poured slowly over the hands above a basin of warm (or hot) water, in which they should then be washed. If this is followed by a vigorous scouring with castile soap and water, very little danger of conveying disease will remain. An *abrasion* upon any part of the hand should forbid its being used in an autopsy, or, at least, being brought in contact with the internal cavities of organs. If a puncture or incision of the examiner's hand occur during the operation, the proper thing (however disagreeable) is to *wash* and *suck* it immediately, and then keep it out of all contact with the body. Not a few lives have been sacrificed by neglect of these precautions.

each extremity, dividing between each pair, so as to prevent the loss of any of the contents.

5. If the stomach be opened for inspection, this should be performed in a perfectly clean dish, and the contents collected carefully in a graduated vessel, so as to properly estimate their quantity. [Note here, also, the presence of blood, mucus, bile, or undigested food.] These contents should be preserved in a perfectly clean glass jar, securely stoppered, covered over with bladder, and sealed. The contents of the *duodenum* should be collected and preserved separately.

6. Carefully inspect the state of the *throat*, *œsophagus*, and *windpipe* for the presence of foreign substances, and for marks of inflammation or corrosion.

7. Observe the condition of the *large intestine*, especially the *rectum:* the presence of hardened feces would indicate that purging had not very recently taken place.

8. Note any morbid changes in the *lungs*, as congestion, inflammation, or effusion; in the *heart*, as contraction, flaccidity, presence of a clot; and the condition of the contained blood.

9. Examine the state of the *brain* and *spinal marrow*, and, in the female, the condition of the uterus, ovaries, and genital organs. [Poisons have sometimes been introduced into the vagina.]

10. Along with the contents of the stomach and duodenum, the viscera that are to be reserved for chemical analysis are the stomach and duodenum (to be kept separate from the others), the liver and gall-bladder, spleen, kidney, rectum, and urinary bladder with its contents. Sometimes, also, a portion of the *blood* may be required for the examination.

11. As the legal authorities will rigorously insist upon proof of the *identity* of the matters alleged to be poisonous, it is of the greatest importance to preserve such matters from all possible contamination by incautious contact with a surface or vessel *which is not absolutely clean*. Avoid the use of colored calico or paper for wrapping up the specimens. When once the suspected articles are deposited in the hands of a medical man, he must preserve them strictly under lock and key, and confide them only to a trusty agent for transportation. Many cases are on record where the chemical evidence failed simply from a want of power clearly to establish the *identity* of the matters analyzed.

Actual testing for poisons in cases of suspected criminality ought to be undertaken only by those whose chemical knowledge and skill are considerable.

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## SECTION III.

### *GENERAL THERAPEUTICS.*

REMEDIES have been classified, for the study of *Materia Medica*, in a manner which is sufficiently well adapted to the present state of that science.

I propose the following classification, from the standpoint of

the *practitioner*, *i. e.*, according to the **indications** of **treatment**, or *objects proposed*.

Thus regarded, remedies may be studied as—

**Anodyne** and **calmative**; *e. g.*, opium; ether; chloroform; aconite; hydrocyanic acid; hydrate of chloral.

**Protective**; *e. g.*, demulcents; surgical dressings.

**Balancive**; *e. g.*, cold to an over-vascular part; pediluvia; bloodletting.

**Economic**; rest; astringents; retarders of tissue-metamorphosis.

**Eliminative**; *e. g.*, purgatives; iodide of potassium, etc.

**Antidotive**; *e. g.*, hydr. ox. of iron for arsenical poisoning; antacids; cinchonization in intermittent.

**Alterative**; *e. g.*, nitrate of silver in scarlatinal sore throat; arsenic in skin diseases; electricity in cancer, etc.

**Recuperative**; stimulants; tonics; chalybeates; oleum morrhuæ; travelling.

An elaborate work might, of course, be written upon the topics just enumerated. It is appropriate to our purpose, only to state them; dwelling, presently, upon another yet more brief classification, of the modes of treatment *most frequently called for*, in the management especially of acute and subacute affections.

First, a few words upon **balancive** measures. These constitute a very large part of therapeutics; one of the most constant elements of disease, and especially of acute diseases, being a disturbance of the *proportion* of circulation, nutrition, innervation, and action in different parts.

For example: when one "takes cold," what has occurred? Chilling the surface, as by damp air, has *checked* perspiration, *contracted* the superficial blood-vessels, causing *congestion* of interior organs, and partial contamination of the blood, from *retained excretory matter*. What, then, is the "indication" or pointing of nature?

Clearly, it is to **restore** the lost balance; by *warmth* to bring on perspiration (unless *fever* occurring demand another method); purgatives and diuretics, with plenty of water, to *relieve* the blood of its morbid excess of excreta.

Again, in flatulent colic, unequal distension and spasmodic contraction of a bowel occur, from gaseous accumulation or the presence of irritating ingesta. Aromatics, such as ginger; stimulants, as hot water or whisky; or anodynes, as camphor or opium, by a diffusive action on the whole surface of the affected intestine, and upon its innervation when they are absorbed and reach the ganglia, will renew a **proportionate** contraction (peristaltic) of the muscular coat, and remove the pain. Very often, gentle friction, pressure or *kneading* the abdomen, or external warmth all over it, will have a similar balancive effect.

Laxatives for deficient movement of the bowels, astringents for excess of the same; cold to a too hot head, and mustard and hot water to cold feet, are all balancive means. So is the familiar and always safe use of a *mustard-plaster* to the skin, over any part of body which suffers pain. Pain denotes a morbid innervation from some cause. Apply something which, like mustard, causes a strong impression in a different place, not too remote, and the

"error loci" of nerve-tension (or *debilitation*,[1] as the case may be), is done away with—the balance is restored.

Notice may be here taken, briefly, of a "method" in therapeutics, extending the balancive principle systematically—called the "neuropathy" (*gangliotherapy*) of Dr. John Chapman.

The origin of this is really to be credited to the vivisections of Bernard and Brown-Séquard,[2] and conclusions based upon them, especially by the latter. The experiment of most importance in this connection has been the section of the sympathetic nerve in the neck of a rabbit; which was found to be followed by dilatation of the blood-vessels of its ear. It was concluded from this and other facts similarly obtained (all **traumatic** or **pathological**, as, indeed, are *all* facts of vivisection), that to *increase* the amount of blood and sensibility in any part of the body, you must *paralyze*, partially or temporarily, its sympathetic ganglion. To *diminish* its vascularity and sensibility—you should *excite* its vasomotor nerve-centre.

Dr. John Chapman systematized the use of these principles, by the application of elastic bags, containing ice, or hot water, along the spine; so as to act upon the ganglia located thereupon, and, through them, to affect the viscera, both palliatively and curatively, in disease. "He considers that ice applied along the spine increases the general circulation, stops the cramp of voluntary and involuntary muscles, proves an effective remedy in epilepsy and other convulsive affections, cures sea-sickness, restrains the sickness of pregnancy, arrests diarrhœa, recovers patients from the cold stage of cholera, and, finally, promotes menstruation. On the other hand, heat along the spine lessens the general circulation, overcomes congestion in all parts of the body, lessens fever, restrains hemorrhage, and lessens or arrests the menstrual flow."

If the *physiological theory* of Brown-Séquard, above mentioned, were true, the *therapeutical process* of Chapman, deduced from it, might be justified. I deny the truth of the one, and, *a priori*, have no belief in the validity of the other. Clinical experience, however, must decide the claims of the practice.

It must be remembered, that a *practice* may prove beneficial, whether the *theory* which suggested it be correct or not. Hot and cold applications to the spine must make (especially when *alternated*, as Brown-Séquard proposed for bed-sores) a strong impression on the whole system; this *may* prove a **rapidly alterative** impression in certain cases of disease. *Should* this prove so, the use of such means should be adopted, just as, and *so far* as, experience shows it to be useful. No such utility of applications whose explanation may be reached in many different ways, can make the *theory* above cited seem, to the present writer, other than erroneous.

The *modes of treatment most frequently called for*, in ordinary medical practice, may be designated as—

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[1] Radcliffe "On Epilepsy, Pain, and Paralysis;" Inman, op. citat.

[2] See his Lectures on the Nervous System, p. 205, etc. See, also, a discussion of the experiment mentioned, in the author's Prize Essay on the Arterial Circulation.

The **antiphlogistic**; The **supporting**;
The **febrifuge**; The **antidotive**;
The **alterative** treatment.

Under the first head, the **antiphlogistic**[1] (*i. e.* the treatment of *inflammation*), we place—

| | | |
|---|---|---|
| Rest; position; | Tartar emetic; | Digitalis; |
| Cold applications; | Nitrate of potassium; | Ergot; |
| Venesection; | Ipecacuanha; | Mercury; |
| Local depletion; | Veratrum viride; | Opium; |
| Purgation; Diet; | Aconite; | Counter-irritation. |

The necessity of **rest** during *active inflammation* of any organ is a rule without exception.

A choice of **position** is often dictated by the sensations of the patient. When one of the *extremities* is inflamed its *elevation* is advised, in order to allow the blood to return from the overloaded vessels.

**Cold applications** are very important in the treatment not only of *inflammation*, but of *active hyperæmia* or congestion (*e. g.*, "determination of blood" to the head). The two precautions most necessary in their use are, that the cold be sustained, but not *excessive*, and that it be not *ill-timed*, so as to arrest desirable *perspiration*. The employment of cold applications has been very boldly extended by some practitioners, even to such affections as pneumonia, pericarditis, etc. In such cases, it must require great care and judgment not to do harm instead of good. I am afraid of such experiments.[2]

For continued local refrigeration, Knowsley Thornton's "ice-cap" is very convenient. It is a coil of small India-rubber tubing, through which ice-water is made to flow constantly.

Kibbee's "fever-cot" may be used for either partial or general cooling of the body. It consists of a folding cot (such as is commonly made use of as a temporary bed) with strong elastic cotton netting stretched across it instead of canvas. Under this, to the whole length and breadth of the bed, hangs a piece of India-rubber cloth. A blanket being laid upon the cotton netting, the patient is placed thereupon, and covered with a sheet or another blanket. When water is poured over the body, it runs through the netting and is carried off by the gutter formed by the India-rubber cloth below. If refrigeration of the abdomen only is wanted (as after ovariotomy), the upper part of the body is protected from the irrigation, and bottles of warm water are placed in contact with the feet. Dr. Noeggerath prefers a *water-bed* of India-rubber (covered with a blanket) upon which the patient lies; water at the desired temperature, cold or warm according to the case, being injected at will.

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[1] Some writers pronounce the whole idea of antiphlogistic treatment to be *obsolete*. Its judicious use is likely, nevertheless, to survive the generation in which this opinion has been formed and expressed.

[2] I have, however, known two patients with acute pneumonia (one of them a lady over eighty years of age) to crave *cold air to breathe;* begging to have the windows wide open, although the temperature was below freezing. Both recovered; showing that no harm was done by this indulgence, their bodies being well protected from exposure to the cold. Dr. J. T. Everett has cured cases by *continuous inhalation of cold air.*

**Bloodletting,** by *venesection*, *leeching*, and *cupping*, is one of the oldest, and has been one of the most universal of remedies for inflammation. Although "*αἱμοφωβοι*," or "blood-fearers," have appeared in all ages and nations, yet the aggregate testimony of the profession, from Hippocrates down almost to the present time, has been in favor of the use of the lancet and of local bloodletting in the treatment of violent inflammations and congestions.

*Now*, however, it must be admitted that bloodletting has more opponents and fewer defenders than at any previous period in medical history. Why is this? By reason of—

1. *Reaction* from previously existing *abuse* of the remedy.
2. A *change in average human constitution*, occurring under the artificial habits of *civilized life.*
3. *False construction and misapplication of recent science.*
4. *Leadership* and *fashion.*

I must briefly remark, that the *reaction* alluded to has proceeded *too far*, going from one *extreme* to another.

The *change* occurring *especially in large cities*, in the average human constitution, affords good reason for *limiting* the use of the lancet to a smaller number of cases than was once thought necessary; and for using especial caution as to the *amount of blood abstracted;* but not for abandoning the remedy altogether.

The improved condition of the sciences of *semeiology* and *pathology* gives us the power to discriminate more narrowly in our use of bloodletting, as well as of other remedies. But we should not, for this, throw aside as useless all the experience of our predecessors; as if every new fact was necessarily the heir of some dead old one. *All* facts, old and new, should be retained.

In the *physiological* and *pathological* science which bears upon the question, I hold that false construction and misapplication of observed facts have been operative. An important threefold error has been committed, viz.:—

1. In physiology, the denial or depreciation of the *active* part taken by the *arteries* in the circulation; and of the great fact, without recognition of which no theory of inflammation can stand, that the arteries are subject to *reflex* excitement—the most normal form of which constitutes active hyperæmia, the most abnormal and exceptional, tonic constriction of the vessels.
2. The error of Prof. J. H. Bennett, of giving attention, in regard to the pathology of the inflammatory process, to the *exudation* alone.
3. That of Prof. Virchow, in considering that no important difference in *kind* exists between morbid lesions of nutrition in vascular and in non-vascular tissues; and that *stimulation*, *irritation*, and *inflammation* are *essentially* and *practically*, as well as chronologically, only degrees of the same vital impression.

The theory of inflammation which has been already laid down,[1] as entirely consistent with the *observations* (whatever may have been the reasonings) of the most accurate pathologists (*e. g.*, Rokitansky, Paget, Wharton Jones), inculcates, that the determination of blood towards an inflamed part *conspires with* the

[1] See *General Pathology*, Part I., Section III.

central stasis in *causing* the exudation; and that a constant *proportion* exists between the *degree* of this active turgescence and the *amount* of the exudation, and the *character of the changes* which it subsequently undergoes.

Now, of the cardinal elements of the inflammatory process, the local *arrest of nutrition* and *capillary stasis* cannot be *directly* affected by treatment. Nor, *when the exudation has occurred*, can any but palliative or expectant measures be applied to the management of its changes. But, the active concentric determination of blood—the *arterial excitement*—cannot *this* be essentially *modified* by *treatment?* Yes.

By abstraction of blood, we lessen (for a time at least)—

1. The **fulness** of the vessels;
2. The number of **red corpuscles;**
3. The force of the **heart's** impulse;
4. The force of the **arterial** impulse;
5. The excitement of **nerve-centres.**

And by each and all of these influences, we diminish the vascular excitement connected with an inflammation; and thus (I repeat) *lessen the amount* of the resultant exudation, and (Paget) render its "biography" more normal, its changes less degenerative and destructive.[1] Reference has been made, on a previous page, to the facts reported, by Drs. Onderdonk, Rogers, H. F. Campbell, Maunder, Moore, Vanzetti, Blackman, S. W. Gross, H. H. Mudd,[2] and others, showing the important effect of cutting off the arterial supply of an inflamed part, in subduing inflammation.

If this be true, it is altogether an erroneous assumption of Prof. Bennett that inflammation is a "self-limited process which cannot be cut short nor interfered with to advantage." If there be anything positive in medical experience, I believe the contrary of this to have been established.

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[1] It may be hoped that the time has gone by when any question in therapeutics can be decided by *leadership.* But the "bloodletting controversy" has shown, that the medical mind is not yet *absolutely* free from its influence. As to authorities, old and new, it may interest the student to remember, that of ancient opponents to the lancet, Chrysippus and Erasistratus were the most noted; of the modern European schools, Van Helmont, Dietl, and Skoda, in Germany; Huss, in Sweden; Bennett and Todd, in Great Britain. Exemplification of Sangrado's practice, on the contrary, has been especially accredited to Cullen, in England; Rasori, in Italy; Chomel and Bouillaud, in France; and Rush (the father of American medicine), in this country. We should place in the class of *moderate* bleeders of antiquity, Hippocrates, Asclepiades, Celsus, Galen, Avicenna, and "οι παλλοι;" of earlier English and French teachers, Sydenham, Huxham, Gregory, Laennec, etc.; of the present date, the late Professor Alison, with Watson, Christison, Copeland, Lawrence, Chambers, Parkes, C. West, Gairdner, Symonds, F. Winslow, Aitken, Markham, Handfield Jones, Dyce of Aberdeen, Sutton, Geo. Johnson, B. W. Richardson, and others, in Great Britain; Wunderlich, Oppolzer, Graefe, and Niemeyer, in Germany; Jaccoud, Hérard, and Cornil, in France; and, in this country, G. B. Wood, S. D. Gross, Austin Flint, H. J. Bowditch, J. F. Meigs, A. Clark, Fordyce Barker, W. Pepper, and others. As *statistics* have been especially appealed to by the opponents of bloodletting, it may be proper to quote here, the conclusion of an able analysis of much of the evidence of this kind made public (Brit. and For. Medico-Chirurg. Rev., July, 1858). It is as follows:—

"While the non-bleeding plan (in pneumonia) has a demonstrable advantage over that of indiscriminate and repeated bleedings, we maintain that the discriminating practice of moderate and early bleeding, general or local, in cases of more or less sthenic inflammation, and of refraining from it altogether in asthenic cases, whether as regards the character of the disease or the constitution of the patient, is *pressed upon us both by experience and science.*"

[2] St. Louis Courier of Medicine, April, 1881.

*Thus* much, perhaps, may be allowed to the influence of recent ratiocinations and experimentations in medical practice without the lancet: that *local* bloodletting may be admitted, in many instances, to have all the advantages which can be claimed for venesection, except *convenience;* and that, in doubtful cases, the smaller quantity abstracted ought always to be an argument in favor of local rather than general depletion. This admission may be made without surrendering, in the least degree, the principle of therapeutics upon which bloodletting is scientifically justified, and according to which, if we are to interfere at all with disease, it is often one of the mildest, most beneficent, and least hazardous of remedies. Dr. J. H. Bennett admitted that *relief* of pain, dyspnœa, etc., sometimes follows bleeding; and this concession carries a good deal with it. Dr. Markham and others have pointed out the importance, in certain cases, of relieving an *overloaded heart* (right auricle and ventricle) by venesection.

How, then, it is proper to ask, do we *define* or *classify* the remedial action of bloodletting?

It is **balancive.** What do we mean by *reducing treatment?* The answer to this question is important.

*I do not know of a single case of any kind of disease, in which the indication or object of medical treatment is to reduce the strength, or lower the vital power of the patient's system.*

What we aim to **reduce** is, *disproportionate vascular* **excitement,** *or* **congestion;** to restore the **balance** of the circulation. It is a mere *imagination* that abstraction of a small quantity of blood *must always* lower the patient's strength. Under some circumstances, it actually increases it. At the same time, there are many persons who *will never bear* bleeding, from an actual deficiency or defective quality of blood.

Taking these propositions as established, we may draw blood, locally or generally, for

1. High, **sthenic** inflammation;
2. Active **congestion, threatening** inflammation or hemorrhage;
3. General **plethora,** ditto;
4. Sthenic *spasm;*
5. Sudden passive congestion (not toxæmic) in robust persons.

It must be remembered that, at the present time, *no one* thinks of bleeding *for fever, as such.*

*Repeated* venesections are seldom now resorted to; the time for the lancet, if at all, is always in the **early** stage of a phlegmasia.

It would be instructive, if compatible with our plan, to allude further, especially, to the use of bloodletting in **certain cases** of **pregnancy,**[1] and of convulsions; and to the **caution** necessary in its application to the treatment of **senile** apoplexy. Old persons rarely bear bleeding well.

We might also, if space allowed, illustrate the principles above laid down, by examples; as, of 1, erysipelas; 2, pneumonia; and

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[1] See a valuable paper on this subject by Fordyce Barker, M.D., in the New York Medical Journal, January, 1871.

3, meningitis. Why is bleeding seldom called for in the first, more frequently in the second, and quite often in the last?

Our answer is—that it depends chiefly upon the **anatomical relations** of the tissue involved. The skin is unlimited in its opportunity of hyperæmic expansion, and escape of exudation. The lungs are partially confined and limited, by the pleura and walls of the chest. The brain and its membranes are shut entirely within the closed skull. Therefore the influence of **vascular pressure** (which is most affected by bloodletting) is most marked and important in congestion or inflammation of the brain, next so in that of the lungs, and least of all in that of the skin, as in erysipelas.

In **uræmia**, when the patient will bear it, moderate venesection may do good, by taking out excretory material, with a portion of the blood, and favoring secretion by general relaxation.

Too little consideration has been given to the probable effect of venesection in removing *effete corpuscles* and *altered blood-plasma*, so as to promote a *renewal of more healthy blood*. This may explain, in part at least, the often reported improvement following bleeding (in the days when it was used) in cases of zymotic or enthetic diseases; as scarlet fever, remittent fever, yellow fever, etc.

As to the quantity of blood taken by venesection, twelve fluid-ounces may be stated as a *full*, though not very large, bleeding for an adult man; ten fluidounces for a woman. For infants and children, one ounce under one year, two ounces under three years, three ounces under five years, four ounces under ten years, would be a full average. Bleeding from the jugular vein has been sometimes preferred in young children. The practitioner should judge for himself of the *effect* upon the pulse, etc. It is remarkable how small an amount will sometimes do a great deal of good.[1]

**Cut cups** and **leeches** act alike as to the abstraction of blood, but the former have a more revulsive or counter-irritant effect.

Leeching, being somewhat less violent, is more applicable than cupping to parts which are very *tender;* as, the side in acute pleurisy; the abdomen in peritonitis; a much inflamed joint, etc.

Leeches are usually, for the same reason, applied as near as possible to the part inflamed; cups, sometimes, at a short distance from it. In some cases the *mechanical* leech of Dr. Andrew H. Smith, of New York (anticipated by Heurteloup), has decided convenience and advantage.[2]

In *bronchitis*, it is ordinarily best to apply leeches or cups to the upper *sternal* region.

In *pneumonia*, they may be preferably applied *between the shoul-*

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[1] See the Chicago Med. Journal, September, 1875, for an instance of periodical bloodletting, to the amount of eight ounces every three weeks, kept up for forty years; the subject being eighty years old when the report was made. I was, myself, bled thirteen times from the arm before coming of age; and afterwards was bled and leeched at the beginning of an attack of typhus fever, before the diagnosis was made out; yet I continue to live, and, on the basis of this and much other experience, to believe in the *occasional use of the lancet.*

[2] See N. Y. Medical Record, Nov. 1, 1869, and Feb. 1, 1873.

*ders*, as a general rule, thus leaving room for counter-irritation in front.

In pleurisy, it is desirable to use *leeches* immediately over the inflamed part.

**Purgation**, especially by *saline* cathartics, is a frequently useful part of antiphlogistic treatment.

Cathartics are to be **avoided** in **enteritis** and **peritonitis**; for obvious reasons. Yet laxative *enemata* may be called for in those affections, to prevent the evils resulting from constipation.

**Diet**, in cases of **sthenic** inflammation, should be *non-stimulant;* but it may be sufficiently *nourishing* (vegetable, farinaceous) at the same time. *Starving* patients is not now thought of, unless they are fearfully *plethoric*. In the **later** *stages* of inflammatory disorders—in fact, *as soon as the exudation has all been thrown out*, **generous** diet is usually required. Some patients will never bear a purely vegetable diet under any circumstances; and *some* cases, even of inflammation, require stimulation from the first.

The idea of the association, always, of *low diet* with *inflammation*, has been too absolute in common practice. When, in acute disease, the stomach refuses to digest food, it is vain to force it upon it. But, it will often digest **liquid** food when it cannot solids. And, as some degree of debility is constant in disease, alimentation being necessary, *concentrated* liquid food, *e. g.*, beef-tea, will frequently be appropriated, when no solid substance at all can be taken.

I believe the *principal* requisites of diet in illness to be, liquidity, and facility of digestion and assimilation. In an irritable, febrile state of the system, the presence of a solid body, as meat or bread, in the stomach, when no digestive fluid is secreted to act upon it, has the effect of a foreign substance—namely, irritation; sympathy with which may disturb or increase existing disturbance of the whole economy.

Practically, I have seen, in a person not robust, suffering from catarrhal fever, the drinking of a wineglassful of beef-tea followed by a copious perspiration and cooling of the skin. Still, a young and previously healthy patient will often do best in the early stage of inflammatory disease upon small or moderate amounts of what are called articles of sick diet; as oat-meal gruel, toast-water, panada, arrowroot, etc. In disorders not affecting the bowels, fruits, especially white grapes and oranges, need seldom be withheld. They are often refrigerant and useful; and such is very frequently the effect of lemonade, which acts as a good diuretic and diaphoretic.

The most powerful of antiphlogistic (arterial sedative) **medicines** is **tartar emetic.**

The "contro-stimulant" plan, of giving *very large* doses of this drug in pneumonia, pleurisy, etc., has been abandoned as excessive and injurious. We need never give more than $\frac{1}{6}$ of a grain of tartar emetic at a dose to an adult—oftener $\frac{1}{8}$, $\frac{1}{16}$, etc. *Children* require *especial* caution in its use, on account of the sensitiveness of the alimentary canal in them. I have known severe vomiting to be induced in an infant by $\frac{1}{64}$ of a grain. No other

medicine as yet discovered, however, is so useful in the most violent inflammations of the lungs, bronchial tubes, etc.

Tartar emetic (of course) must **never** be given in **gastritis** or **enteritis.**

**Nitrate of potassium** is a valuable adjunct to, or in some cases substitute for, the antimonial tartrate. It is often given in *too small* doses. Ten grains may be a minimum for an adult, if the stomach is in an ordinary state.

**Ipecacuanha** is especially valuable in *bronchial*, *tracheal*, and *laryngeal* inflammation and in *dysentery*.

**Veratrum viride** (Osgood, Norwood, J. Lewis Smith) has assumed a somewhat important place as a cardiac and arterial sedative, and promoter of the secretions. It is a very certain reducer of the pulse, but requires *caution* in its use.

**Aconite** is, likewise, a favorite medicine with some practitioners (A. Fleming, S. Ringer, C. D. Phillips,[1] C. West) in the management of pleurisy, pneumonia, etc. It must be given in small doses and with great caution. Ringer's method is to give it very early in acute inflammatory diseases; half a drop or a drop of the tincture of aconite in a teaspoonful of water every ten or fifteen minutes for two hours, and afterwards every hour; reducing the dose, however, if prostration ensue.

The power **digitalis** has to reduce the *rate* of action of the heart,[2] has induced the expectation (Schönlein) that it would prove a reliable antiphlogistic remedy; but this expectation has been generally disappointed. It is, however, occasionally useful in bronchitis, etc.

**Ergot** has been employed with a similar view, rather as directly acting upon the *smaller arteries*. It is possible that its powers have not as yet been sufficiently appreciated; although it has been increasingly used of late years, especially in subacute and chronic inflammatory affections of the *nervous centres*.

The place of **mercury** appeared some years ago to be settled. Early in this century, nothing was more common than intentional mercurial *salivation* in the treatment of almost all serious acute and even chronic diseases. In the management of inflammation, in addition to its powerful *alterative* influence, tending to displace, by its own impression, morbid actions and conditions, it was *believed* to exert a peculiar control over the *blood*, *lessening the tendency to the effusion of coagulable lymph*.

In recent times, the "salivating" practice has been entirely abandoned, as disproportionately violent, as well as uncertain. A reaction, somewhat similar to that occurring in the case of bloodletting, has shaken the confidence of many practitioners in the value of mercury as an antiphlogistic.

My own opinion is this. Experience fully warrants the inference that mercury is a *general stimulant to all those functions of organic life which are performed under innervation from the ganglia of the* (so-called) *sympathetic* system. It is probable that its action is directly upon these ganglia. Thus, mercury tends to *diffuse* and

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[1] The Practitioner, April, 1871.

[2] Facts have been accumulated which lend force to the opinion that digitalis is primarily, rather a *tonic* than a sedative to the heart.

*equalize* secretion,[1] and the circulation of the blood, aiding, in this way, to break up local congestions and inflammations. Moreover, it promotes the disintegration of albuminoid material, such as that exuded under the inflammatory process. Its *anti-syphilitic* power makes it important in specific inflammations; as of the iris, etc.

I believe that calomel and blue mass, etc., *have been shown* to be useful in the treatment of several acute disorders. I do not think that a due regard for the principles of evidence in *therapeutical science* can allow us to put aside the proof of this, deduced from actual experience. Dr. O. H. Smith, of Brooklyn,[2] reports three cases of *uræmic* poisoning, in which large doses of calomel did great good; two in pregnancy with convulsions, and one in dropsy after scarlet fever. This suggests the probable action of mercury on the kidneys. Dr. Cyon, of St. Petersburg, performed experiments seeming to render it probable that urea is *formed* in the *liver;* as blood passed through the liver was found to contain much more urea than ordinary arterial blood. Gréhaut's experiments also appear to show that the kidneys are not *secretory*, but only *excretory* of urea.[3]

*Moderate doses*, at the same time, are capable of doing all that we can *safely* aim to effect with the use of mercurials. I do not know of any variety or form of disease in which I should, at the present moment, feel justified in *intentionally* causing *full salivation* as a means of medical treatment.

Mercury is especially *contraindicated* in the presence of the *tubercular diathesis.*

**Opium**, always the most reliable and potent of *anodyne* medicines, has, in latter times, assumed a more important position as a *remedy* in the treatment of inflammatory diseases.

Experience has warranted this, while certain theoretical considerations also have been urged in regard to it.

1. The influence of the *nervous centres* upon *inflammation* (as upon normal nutrition, circulation, etc.), and the intimate *interconnection* of the two portions, organic and sensori-motor, of the nervous apparatus, are now more fully recognized than formerly.

2. Opium is believed by some to act *directly*, *not only* upon the cerebro-spinal, but also upon the *ganglionic* nerve-*cells* as a peculiar stimulant, thus affecting the circulation, nutrition, etc., otherwise than by mere sympathy.

Yet, in estimating the adaptation of preparations of opium or morphia to the treatment of inflammations of important organs, in different stages, we must remember that—

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[1] Very few points in practice are, for instance, so well sustained by experience, as the familiar use (after Abernethy) of small doses of *blue pill*, in the treatment of indigestion with torpidity of the liver, and bowels, etc. Supposing that the conclusion based (by Bennett and others) upon experiments on animals be sustained, that mercury does not increase the flow of bile from the liver; this would merely involve a change in the *explanation* of its therapeutic action, not in the admission of the *often-observed* fact. Dr. Douglass, of Boston (New England), first introduced the use of mercury as an antiphlogistic. Dr. R. Hamilton, of England, generally has the credit of it. Falconer, Jas. Hamilton, Habershon, and Williams of Boston, especially, have of late years written against it. See, in support of its cholagogue action, T. R. Fraser, Edin. Med. Journal, April, 1871; also, Christison, Murchison, and others.

[2] New York Medical Record, Nov. 15, 1870.

[3] Ibid., Dec. 1, 1870.

Opium is an *arterial stimulant*, and is, therefore (as a *general rule*), inappropriate in the *early stage* of an active sthenic phlegmasia.

Opium *first excites*, and then *oppresses* the *brain;* in a word, it promotes determination of blood to the head; and is, therefore, contraindicated by an already existing tendency to *cerebral congestion.*

Opium also *constipates the bowels*—a fact of less importance than either of the two preceding, as the constipating tendency can be counteracted, if desirable, by other medicines; while, in certain cases, it aids in the treatment (as in dysentery).

In *peritonitis*, where the extent and visceral connections of the tissue affected induce more rapid *prostration* and more serious *nervous irritation* than in any other phlegmasia, *opium has become the* **main dependence** with very many practitioners, even from the *beginning* of the attack. The same reasoning will apply, to a somewhat less extent, to its use in *severe* cases of *pleurisy* and *pericarditis.*

**Counter-irritation** is a measure of treatment often of great service, especially in the *later* stages of inflammation (after local or general depletion, etc.), or in cases unattended with much vascular excitement. In the very *incipiency*, or rather *incubation*, of an inflammatory attack, *i. e.*, in the stage of mere *irritation* or *congestion*, counter-irritation (*e. g.*, by a *sinapism*) may *prevent* the further progress of the inflammatory process. But, if the stasis and concentric hyperæmia be already developed, all *powerful* counter-irritants should be avoided (lest they prove co-irritants) until the vascular disturbance has subsided. Schüller[1] ascertained by experiments upon animals that, by sinapisms, blisters, etc., it is possible to diminish the blood-contents of the cerebrum. A measure whose usefulness I have seen amply demonstrated, is the application of a blister to the whole shaven scalp in severe cases of inflammation of the brain. Early use of *large warm* mush and mustard *poultices* (one part mustard mixed with four parts mush) is a *very useful* measure in *pneumonia* and *pleurisy.*

In *subacute* cases, or those of moderate irritation or inflammation, as in *chronic bronchitis*, etc., a good means of counter-irritation is, painting the skin thickly with *tincture of iodine.* More powerful derivative effect is obtained by the application of a *few drops* of *croton oil* (diluted with three or four times as much olive or lard oil) over the part; producing a sore papular eruption. With children, or women having a very delicate skin, friction with *oil of turpentine* will cause considerable derivation to the skin, over or near an inflamed part.

Counter-irritation is, usually, the *most important* part of the treatment of **hyperæmæthesia**, or "chronic inflammation."

Under the head of counter-irritation we may place the powerful impression made by the *actual cautery.* Brown-Séquard has made much use of this, especially for chronic affections of the nervous system. It is reported to relieve or greatly mitigate the suffering produced by neuralgia, as well as the lancinating pains

[1] Berliner Klinische Wochenschrift, Nov. 25, 1874.

of locomotor ataxy; and to assist much in the treatment of obstinate cases of chorea, hysteria, epilepsy, catalepsy, and general paralysis. No special instrument is needed; a small poker will do. Best, is a steel or platinum bulb, shaped like an olive but smaller. White heat gives less pain than a lower temperature. Quick, light touches should be made, burning the skin only in points and lines. The seat of application should be, generally, not far from the location of the disease for which it is used. Most patients will require to be placed under the influence of an anæsthetic for this operation. The cauterized spots may be, with advantage, touched with *pure carbolic acid* (to reduce sensibility), and then dressed with simple cerate, or wet lint (water dressing) until healed.

To recapitulate the **order** of time, in which long-recognized experience has prescribed the use of the different means now included under the term "antiphlogistic" treatment:—

Supposing all[1] of the main remedies of this class to be called for in a given case, we would resort *first* to *venesection;* or, if this be undesirable, to *cupping* or *leeching;* next, to *saline purgation;* then to tartar emetic, nitrate of potassium, ipecacuanha, veratrum viride or aconite; mercury, if given, at the same time, or immediately following these sedatives; opium, sometimes with it or them—oftener, a little later; counter-irritation by blisters,[2] etc., last. The *subsequent debility*, especially in cases of *suppurative* inflammation, may call for *tonics* or even stimulants, with generous diet, etc.; while certain *asthenic* cases will even require such treatment from the *first.*

The treatment of *subacute* or *chronic* inflammation, in *external* or accessible parts, by *astringents* or *stimulants* (*e. g., nitrate of silver*), does not require, in this place, extended discussion; as it usually comes under the domain of Surgery. One example, however, of its *medical* utility may be named—viz., the administration of nitrate of silver (gr. $\frac{1}{4}$–$\frac{3}{4}$ *ter die*) in *chronic gastritis.* The chemical change which it undergoes in the intestines, when given by the mouth, explains the fact that the same medicine fails to exhibit a similar beneficial influence in chronic *enteritis.* In prolonged *dysentery*, however, *enemata* containing this or some analogous mineral salt, as sulphate of zinc, sulphate of copper, or acetate of lead, are often very valuable remedies.

We cannot leave the subject of the management of inflammatory disease without reminding the student of the important practical difference between **sthenic** and **asthenic** inflammations.[3]

The difference is constituted—

1. By the *state* of **system** of the patient affected;
2. By the nature of the producing **cause.**

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[1] Of course, this supposition, of the successive use of all of the remedies named in this paragraph, does not, in very many cases, need to be realized.

[2] Dr. Inman, of Liverpool, suggests that the so-called counter-irritants really act, by absorption, as direct *stimulants*, to parts enfeebled by disease. It is quite probable that, in some cases, this may be true. Sinapisms, friction with liniments, etc., for superficial stimulation and counter-irritation, may be used in the earliest stages of an internal inflammation.

[3] Granting that *all* disease is *debilitating* (Inman), the distinction is still valid and important, as to the different kinds and *degrees* of depression produced by its different forms or types.

One whose constitution has been prostrated by previous disease or recent excess, will have, when exposed to the ordinary causes of inflammation, an *asthenic* attack; *i. e.*, one in which, with all the local symptoms of phlogosis, *the general organic functions are sympathetically affected rather with* **depression** *than with excitement.*

Again, certain **morbid poisons** induce, with toxæmia, local inflammation; and blood-disease (dyscrasia), arising from various causes, may have local inflammation as a *secondary effect.* In these cases, the type of the inflammation is generally *asthenic*, and the *treatment* must be modified accordingly—depletion being avoided, or used with the greatest caution, and strong diet and even stimulation being not unfrequently called for.

As examples of inflammations which may be either sthenic or asthenic, we may mention *erysipelas*, *dysentery*, *peritonitis*, *pneumonia*, *gout.*

The first three[1] of these are at times epidemic; and *then* it is that the greatest number of asthenic cases is observed. The following maxim may be considered as fully established:—

*Whenever any local affection, as dysentery, peritonitis, catarrh, or pneumonia occurs sometimes* **sporadically** (*i. e.*, in altogether separate or independent cases) *and sometimes endemically or* **epidemically** (*i. e.*, a number of cases at the same place and time, under a common, local, or temporary cause), *the* **latter** *cases exhibit, as a rule, the greatest tendency to* **depression** *in their symptoms, the largest mortality, the least tolerance of depletory treatment, and the most frequent need of stimulation or support.*

By **febrifuge** treatment I mean, that which is proper during the existence of the febrile state. It comprises no violent measures of any kind.

Remembering that the essential phenomena of fever are, increased *heat*, especially of the exterior of the body, *dryness* of its surfaces, *scantiness* of *fluid* in all the discharges, with actual *increase* in their *solids*, from accelerated tissue-metamorphosis—our therapeutics must be adapted to these conditions. Apart from the necessity of removing or antagonizing, if possible, the *cause* of the febrile disturbance, the indications are to **allay** the **heat** and **dryness** of the surfaces of the body, tegumentary and mucous, and to favor the **removal** of **excreta,** accumulated in unusual amount in the blood and organs.

For these purposes, we may use

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| Moderate laxatives; | Cold drinks; |
| Saline diaphoretics; | Cool ablutions. |

Of these measures, I have no doubt of the propriety of the designation of **water** as the *heroic* remedy, to which the others are merely adjuvants. Diaphoretics will scarcely act at all without free imbibition of water, and the operation of laxatives is much promoted by it. Water *alone* is diaphoretic, diuretic, and laxative; but it may be *aided*, to an important degree, in alleviating the symptoms of fever, by the addition to it of citrate of potas-

[1] Pneumonia also is sometimes endemic or epidemic, in the form of *typhoid* pneumonia.

sium, acetate of ammonium, etc. Dr. J. F. Meigs found, by measurement, that the daily amount of water taken voluntarily by each of three patients with continued fever, having a temperature of 103° or 104° Fahr., was from 110 to 120 ounces. Thirst is the natural and proper criterion for its use. Yet the temperature of *ice-water* is too low for such copious imbibition. Ordinary spring or well water (50° to 60° Fahr.) is quite cold enough. Manassein, of St. Petersburg, asserts good effects from the use in hot fever of *cool* or *cold enemata* for refrigeration.[1]

Within a few years the revival has occurred of a practice similar to that of Dr. Currie,[2] of Liverpool, using the *cold bath* as a remedy for *hyperpyrexia* in typhoid and other fevers. This revival appears to have been chiefly due to Ernst Brand, 1861. Besides, Niemeyer, Ziemssen, Liebermeister, and Traube have especially employed the method referred to, in Germany; as have also Béhier in France, and Wilson Fox in England. Brand applied cold douches to the upper part of the body of the fever patient, the lower portion being placed in a cold bath. Liebermeister, at Basle, immersed the patient in water at 68° Fahr. for ten minutes at a time; sometimes repeatedly during the same day. These measures appear violent; and they are certainly not always successful, or even safe.

Ziemssen's method is manifestly the best. He introduced (at Erlangen) the *graduated full bath* for fever. The patient is placed in water at 95° Fahr., and its temperature is then gradually lowered, while he is in it, down to 86°, 80°, or, when the effects have been shown to be good, on repetition, to 70° or 68°. In this way all the danger (which has been shown to be real) as well as the discomfort of the sudden shock of a low temperature, is avoided; while the full benefit of the abstraction of heat is obtained. Wünderlich has expressed preference for this method. Extensive trial of this cold-immersion treatment of typhoid fever, in this country as well as in Europe, has led to the conclusion (Flammarion, Grimshaw, Peters, Pepper, Flint) that it does not, on the whole, diminish the mortality of typhoid fever; and that, in a certain number of cases, it may even do serious harm. Cold *sponging*, and *inunction*, with lard or olive oil, are much safer, and often very beneficial measures for reduction of excessive temperature.

I have already laid emphasis upon the statement, that no one now thinks of *bleeding* for fever, as such. In a much more strict sense, pathologically speaking, than inflammation, the febrile *nisus* is *self-limited*, although variable in its duration according to the cause inducing it. The object of the physician is *not* to *cut it short* (*jugulare*), but to **conduct** it safely to a critical termination. In an equally important practical manner, this principle applies, not only to the management of a brief or ephemeral exacerbation or

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[1] Med. Times and Gazette, July 19, 1879. Several other Russian physicians have made large use of cold enemata in fevers. See Practitioner, January, 1880.

[2] Currie wrote in 1797; his first experiments with cold affusion were made in 1787. Hancock, Wright, Brandreth, Lind, Willis, and Robert Jackson preceded him; and so had Cirillo of Naples, De Hahn (Breslau, 1737), Samoilowitz (Moscow, 1771), and others. Indeed, in tetanus, and sometimes in fevers, even Hippocrates, Galen, and Avicenna used cold affusion or the cold bath. What is there new under the sun?

paroxysm of irritative or reactive fever, but also to those of longer duration, under toxæmic (zymotic) causation; as *exanthematous* (rubeolar, scarlatinal, variolous) or *continued* (typhus, typhoid) fevers. An exception is believed by many to exist, in the case of autumnal, malarial, periodical fevers, *i. e.*, *intermittent*, *remittent*, and *pernicious* (congestive); in which, interference by the *antidotal* remedy, cinchona or its alkaloids, is considered *safe at all times*, and sometimes necessary before the subsidence of fever. But I believe this exception to be only partial, since careful recorded experience has given rise to the conclusion[1] that quinine is seldom *necessary* during the *height* of the exacerbation of either type of malarial fever, and that in large doses at that period it *may do harm*. It is, I consider, the best practice generally, in the treatment of autumnal remittent fever, to wait *until the febrile stage has passed its climax*, and its symptoms have *begun* to decline—the urgency of the case, and all its circumstances, then, guiding the practitioner as to *how soon*, as well as how largely, the special remedy must be introduced.

It is needful, however, in this connection, to refer to the approval by Sir Thomas Watson of the use of opium in the hot stage of intermittent fever; as well as the employment, with reported success (Squire), of quinine in the pyrexia of scarlet fever, and of the same remedy in full doses in pyæmia, by Dr. Fordyce Barker and others. In Germany, quinine is often much given during fever, to *reduce the temperature*.

*Antipyretic treatment*, of a very positive and *active* kind, is much in vogue at the present day. Its chief weapon, besides immersion in cold baths, consists in the administration of fifteen or twenty-grain doses of quinine; or, of corresponding amounts of salicylic acid or resorcin. Without recent personal observation of this last practice, I am convinced, by the results of a careful trial of quinine in typhoid fever in the Pennsylvania Hospital (Dundas's treatment) many years ago, and by the reports of the comparative mortality where antipyretic measures have been vigorously pushed, that it is an uncertain, if not a hazardous method of medication. Such an impression of quinine upon the nervous centres as is necessary to abate the high temperature of (non-malarial) fevers, is too powerful to be likely, on the whole, to benefit the progress of those maladies. Exception does not seem yet to be proved to the rule, that typhoid and typhus fevers *cannot be* "*jugulated*," being typically self-limited diseases; but must be carefully conducted, with very little interference, to their close. Sir William Jenner,[2] in an admirable summary of the results of experience in the treatment of typhoid fever, has given the weight of his authority to the non-acceptance of this heroic and abortive "antipyretic" practice.

Moreover, it is extremely important that the indication for **elimination** of **excreta** in all acute febrile maladies (*e. g.*, scarlet

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[1] See Medical Statistics of United States Army, 1839–54.

[2] Address before Birmingham Medical Institute; Lancet, November, 1879, p. 715. See, for testimony against the cold-bath treatment (Biermer, Lindworm, Lichtenstein, Wünderlich, Grimshaw, Pepper, Peters) a paper by F. Allport, M. D., N. Y. Med. Record, November, 1879, p. 414. Bristowe, also, has pronounced against it.

fever, measles, small-pox, etc.) should not be neglected. Early opening of the *bowels*, and free action of the *skin* and *kidneys* are of the greatest consequence in such affections. When diarrhœa is present, it should be merely held in check (not, usually, *suppressed*) with much caution. I have more than once known death to result from premature *locking up of the secretions*, by opium, etc., in acute febrile disorders, which, probably, otherwise might have done well.

Of medicines which, without undue depression, tend to *refrigerate* the system in fever, *acids*, vegetable and mineral, as well as their salts, have long been commended by experience. Citric and acetic acids, even when combined (as in solutions of citrate of potassium or acetate of ammonium) are the general favorites for this purpose. In continued fevers (typhus and typhoid) hydrochloric, nitric, and nitro-muriatic acids are often of great service. In connection with this clinical experience may be mentioned the suggestive fact, that physiological experimentation (Gaskell, Lancet, Sept. 18, 1880) has shown the direct influence of *acids* to be *depressive* of the action of both the heart and the arteries, while *alkalies* have the reverse, or a tonic effect.

It is a matter of general remark, that patients scarcely ever die during the *hot stage* of any kind of fever. In the most intense form of malarial poisoning, called *pernicious fever*, the danger exists in the extreme depression of the *cold stage;* if fever comes on, the patient is comparatively safe for the time.

The **supporting** treatment is that adapted to states of *prostration* or *debility*.

General weakness of the body (when not a *congenital* defect) occurs under three forms—

**Exhaustion;**
**Depression;**
**Oppression.**

We are familiar with the first, **exhaustion,** as the effect of overexertion, loss of sleep, deficiency of food, excessive discharges, etc., and as *following* acute, or constituting a *part* of chronic disease.

The second, **depression,** is to be discriminated from exhaustion, as resulting, not from expenditure or waste of the material or forces of the body, but from *interference* with their normal activity by some disturbing cause. To use a mechanical illustration, *exhaustion* is the *running down* of the clock; *depression* the *arrest* of the *impelling movement* of the weights or spring, by which its wheels are kept in motion.

**Oppression,** then, may be compared to the *obstruction* of the *machinery* by some foreign body, or by some mechanical disarrangement among the wheels, which clogs their action until it is removed or corrected.

*Exhaustion* and *depression* have their chief seat in the nerve-central sources of dynamic force; *oppression*, in the circulation of the blood, or in some subordinate organs or functions.

This distinction, however recondite in *theory* it may seem to be, is of high **practical** importance. This will be seen on consideration of the remedies used and required in the different forms of debility.

Supporting measures may be classified as—

1. **Stimulant;**
2. **Analeptic** (recuperative, restorative).

Under the first head we rank the preparations of *ammonia* and *alcohol*, etc., as usually employed.

Under the second are included *generous diet*, *tonics*, *chalybeates*, *cod-liver oil*, *change of air*, etc.

Now the *first* of these (**stimulants**) are adapted especially to *acute prostration* or *depression;* the second class (**analeptics**), to *chronic prostration* or *exhaustion*. *Oppression* or *counterfeit* debility generally requires *neither*, being benefited by very different treatment. A *mingling* or *blending* of these states is of course possible; and then a union of measures is right, to meet the conjoined indications.

**Oppression** (simulating depression) is every day illustrated by the condition of a patient in the early stage of any of even the mildest acute disorders; as catarrh or bronchitis, indigestion, tonsillitis, measles, etc. In all of these cases, especially where *fever* is developing, the patient is very *weak;* not only as to his muscular apparatus, but in the performance of all the animal and organic functions. But *stimulation*, for such a condition, in persons of ordinary constitutional vigor and soundness, would be generally *inappropriate*, often injurious, sometimes dangerous.

A more serious degree of oppression occurs in some cases of visceral congestion, particularly of the lungs or brain; and in violent spasmodic affections of the alimentary canal, with constipation of the bowels. *Uræmia*, from inaction of the kidneys, presents another case of oppression, in which even a fatal result may occur.

Counterfeit debility or oppression, then, to recapitulate, may occur in—

The *first stage* of all acute diseases;
The *febrile state;*
*Indigestion* or *dyspepsia;*
*Congestion of the brain*, *lungs*, etc.;
*Obstruction of the bowels;*
*Uræmia.*

The *first* of these instances is to be treated usually by measures which promote reaction in the mildest manner. More doubt exists, however, if the *cold stage* itself be intense or profound—as in pernicious intermittent—constituting a *depression* under **toxæmic** *influence*. Of this, a word or two presently.

The *febrile* oppression is to be managed simply by those palliative measures mentioned already under the head of *febrifuge treatment*.

That of *indigestion* is usually *temporary* or *occasional* only; and gives way under the use of antacids, carminatives, blue pill, etc.

Violent *congestion* of the *brain* or *lungs* occurring in a person of previously good constitutional strength (although it may produce the most absolute debility, which, especially in the case of *pulmonary* congestion, masks the cause of the disorder), calls, if the diagnosis be clear, for counter-irritation and the local or general

abstraction of blood. In doubtful cases a **tentative** plan may be pursued; abstracting but a minimum quantity at first, being encouraged to repeat and enlarge the depletion only if the result be favorable.

*Constipation*, producing oppressive debility, is of course to be met by agents calculated to unload the bowels; antispasmodics, anodynes, etc., being also indicated if colic exist, and be not relieved by laxatives alone. In absolute (mechanical) *obstruction* of the bowels, as intussusception or internal strangulation, the treatment now generally adopted is, to depend[1] upon *opium* and *rest*, *avoiding* purgatives.

*Uræmia* demands all the means within our power to restore the action of the kidneys; and to aid them in their eliminating duty by favoring the *cutaneous* transpiration and secretion.

I have already said that **mixed** cases of oppression and depression occur, in which the indications of treatment are, to a certain extent, obscure and doubtful. Such are, the cold stage of pernicious (congestive) intermittent, the incipiency of the algid or collapsed state of epidemic cholera, etc.

It is clear that **reaction** is here to be brought about, if possible; and that *external* stimulation, by powerful rubefacients, frictions, etc., is altogether appropriate; but, however authoritatively rules may have been laid down, it is not so certain, in every case, whether *alcoholic stimulation* or *venesection* would afford the better result, or whether some cases might not be benefited by *both combined*. The *incompatibility supposed* to exist between bloodletting and stimulation is in fact *not intrinsic* but *circumstantial*. Holding distinctly in our minds the principle that the object of bloodletting is to **balance** the quantity, consistency, and distribution of the blood, and *not* to reduce the strength of the patient, it is far from impossible that the balancive action, especially of **local** bloodletting, may be called for in a case in which the forces require to be sustained at the same time by "**supporting** treatment." To borrow an illustration (Billing), the one is like taking part of the load from the cart, the other, whipping the tired horse up the hill.

Personal experience and judgment, however, are indispensable to the application of these, or of any analogous principles, to cases in regard to the management of which the profession has been, but we may hope will not be always, divided. The recent tendency of medical practice has been quite too much in the direction of *over-stimulation*.

**Depression** is exemplified in the state produced by—

*Severe injuries; e. g.*, railroad accidents, extensive burns, etc.

*Mental shocks; e. g.*, terror or great grief.

*Withdrawal of accustomed stimulation; e. g.*, delirium cum tremore.[2]

*Intense toxæmia; e. g.*, pernicious intermittent, etc. (see above).

*Gouty spasm*, of the heart or stomach, etc.

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[1] Unless clear indication exists for a surgical operation to relieve the obstruction.

[2] It is not intended, of course, to indicate that *all* cases of delirium tremens are referable to this cause.

Stimulation by alcohol, ammonia, ether, opium, camphor, turpentine, capsicum, etc., is needed, with greater or less urgency, and in larger or smaller doses, in all of these conditions; always bearing in mind the probability of *reaction* and avoiding, as far as possible, the exaggeration of this reaction into fever.

Dr. Lidell[1] remarks that "the physician's success in saving or prolonging life in cases of pulmonary tuberculosis, chronic bronchitis, chronic pneumonia, chronic pleurisy, chronic abscess, vertebral caries, chlorosis, leukæmia, scrofulous adenitis,[2] ague cachexia, syphilitic cachexia, infantile marasmus, and many other debilitating diseases, will largely depend upon his ability to prevent the occurrence of thrombosis[3] in some part of the venous system." Ammonia is urged as meeting this indication, as well as that of pure stimulation.

The prostration of *typhus fever*, in a *majority* of cases (*not in all*), and that of *typhoid fever*, in a *minority* of cases, requires especially after the height of the fever has passed, alcoholic stimulation, as well as support by concentrated liquid nutriment (beef-tea, milk), at short intervals.

The instances of these fevers afford a sort of intermediate gradation between what I have called **acute** and **chronic** debility.

In regard to the *latter* (the debility of convalescence, chronic disease, etc.), certain principles are agreed upon by all physicians, on the ground of experience, confirmed by the deductions of physiological science. We shall first briefly consider some of these, and then one or two debatable points akin to those already alluded to.

The two most important and familiar results of clinical experience in the treatment of debility, are, the superiority of the pure vegetable **bitters** in **stomachic** and *digestive* weakness, and of **iron** in **anæmia** (spanæmia). The influence of **quinia** and cinchonia in **nervous** debility is equally assured. The confidence of many physicians is strong in the utility of the **mineral** tonics (zinc, copper, arsenic, and silver salts)[4] in debility with **nervous symptoms**; *e. g.*, chorea, hysteria, etc. I believe this confidence to be deserved, to a considerable extent; but some of the diseases in which these medicines are given (*e. g.*, epilepsy) will in many instances baffle all treatment. The use of **strychnia** in certain cases of **paralysis** is also well established; although requiring much care and *discrimination*. Some practitioners (Coupland, Gulstonian Lectures, 1881) make considerable use of *arsenic* in obstinate anæmia.

**Cod-liver oil** holds, at the present time, a very high place in the list of analeptics. All medical observers are not of one opinion in regard to its value; but most of them believe it (on the basis of experience in practice) to be the best and most reliable, where it is tolerated, of all recuperative medicines, not only in consumption, but in other wasting diseases.

The theory of the *mode of action* of cod-liver oil as an analeptic

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[1] Am. Journal of Med. Sciences, July, 1874.

[2] Glandular inflammation.

[3] Coagulation of blood in a vein.

[4] Salts of *manganese* (phosphate and sulphate) are valued by some physicians as very useful in anæmia and debility.

is an interesting subject. Dr. Bennett's view of phthisis was that the error of hæmatosis, from which tubercle results, consists in an *excess* of **albumen** in the blood, with a *deficiency* of **oil**; so that, in the process of cell-formation, the first step of which is believed (Ascherson) to be the investment of *oil globules with albuminous envelopes*, an imperfection exists fatal to the subsequent development of the cell, and obliging it to abort. But the debilitation of the *digestive and assimilative* functions in phthisis renders it impossible by ordinary food to supply the desiderated oleaginous matter to the blood. *Cod-liver oil* is fatty matter which, by the assimilating action of the liver, following the process of digestion, is **prepared** *for immediate absorption* and **appropriation** by the blood, for purposes of nutrition. This rationale of its influence is, although not demonstrable, much more probably correct than that which refers it to the presence of *iodine*, *phosphorus*, or any other special ingredients which it may contain. Allusion to the more lately introduced *dugong* oil (Holt), shark oil, etc., would be more proper in connection with the subject of *materia medica* than here.

The **phosphates and hypophosphites** have attracted a great deal of attention. I do not consider the question settled as yet, as to their comparative value. My impression, however, is, that the phosphate of *iron* is the best of them all, and that they will be found secondary and inferior to cod-liver oil. Still, a combination of hypophosphites often proves useful in improving appetite and digestion.

Within a few years renewed attention has been given (Gubler, Hammond, Baumetz, S. R. Percy,[1] Routh) to the effects of *phosphorus* (not in the state of phosphoric acid) in exhaustion of the brain and nervous system; as, *e. g.*, from over brain-work or worry, or from venereal excesses. Chemical analysis shows a diminished amount of phosphorus in the brains of aged people, and still more in those of idiots. There is reason to believe that it is also lessened especially in cases of *softening* of nerve centres. Phosphorus is safe in doses of $\frac{1}{50}$ grain, in oil or in powder with some farinaceous substance.[2] *Amorphous* phosphorus is the least irritating, and therefore most safe. *Phosphide of zinc* is often given, in pill, in gr. $\frac{1}{20}$ to gr. $\frac{1}{4}$ doses.

What is the proper place of **alcoholic** beverages or preparations in the treatment of **chronic** debility, such as that of phthisis, etc.?

This important question opens a discussion, only the main elements of which can be noticed in this work.

In the first place, the theory of the action of agents called stimulants was formerly almost always misstated in authoritative treatises. It has been commonly laid down that "one of the laws of all stimulation, whatever may be its degree, is, that it is followed by a depression proportionate, at least approximately, to the previous exaltation of the function or functions excited."

The true law is this: that all stimulation which is **excessive**

[1] Prize Essay on Phosphorus, etc., Trans. Am. Med. Assoc., 1872.
[2] See Routh on Overwork and Premature Decay, etc., 1873.

is followed by a depression *corresponding to the excess;* while all that merely excites any function *up to par* (to use a familiar expression), *i. e.*, to or toward its **normal** activity, does, so far, only good, with no *resulting* debilitation, however it may fail, from want of other conditions, to sustain the organ or system at the point desired. To deny this would be to ignore some of the most obvious physiological facts. Heat is a stimulant to life force; oxygen to all the active functions; blood is an excitant as well as food to all the tissues it reaches; and all those impressions upon the exterior of the body which give rise to instinctive or automatic actions are stimulants, without any necessary ulterior depression. Nor do I see how the use of stimulants in any supposable case of disease could be rationally justified, if we *practically* admitted the force of the law as above stated; since, if, after every dose of an excitant, the patient should sink as far *below* the condition for which he was treated, as the intended remedy raised him for the moment *above* it, of course a mere *oscillation*, and no advantage, must be the result.[1]

This, however, is theory, which has not largely governed practice on this subject. Another interesting physiological question—"does alcohol contribute to the **material** or to the **force** of the economy, or only excite some of its organs to exhaustive **action?**"—has been the topic of able and learned disquisitions. I venture the opinion that it may do *either* of the three, or *neither*, according to the **circumstances** and the **quantity** of its administration. When there is *scarcity of food*, or *difficulty of digestion*, alcohol may contribute to the needed material; its carbon, hydrogen, and oxygen going to repair the *adipose* tissue at least, and to economize albuminous substances.[2] When there is *excessive exertion*, alcohol may sustain the flagging forces of the system. When given in *mere excess*, as with the intemperate, it excites to exhaustive action, organic if not motor; even when the bloated body shows increase in *quantity* of material, its *quality* being more or less degenerate.

Parkes, Richardson, and others have shown that alcohol, given during health, produces a wasteful consumption of force, by accelerating the heart's action.

In a word, then, the phrase "**accessory** food" is a happy one. When *unnecessary*, as in full health, alcohol is **injurious** precisely in proportion to the quantity used; and the same is true in disease, when the quantity given is **disproportionate.**

This is the important practical precept. Alcoholic stimulus should never be taken in quantities which produce circulatory or cerebro-nervous *disturbance* or *super*-excitation. If this rule be observed, not only will it be a valuable *supporting* agent in phthisis and other complaints, but no *dipsomania* (methomania) or morbid thirst for it will arrive, *that* terrible disease always growing out of **excess.** Upon this principle, in the use of alco-

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[1] Some recent writers have abjured the term "stimulation," and the idea commonly attached to it, altogether; particularly as applied to the effects of alcohol. Although made excusable by an error in the now prevailing vaso-motor physiology, this innovation in the use of language tends only to confuse the judgment and paralyze practice.

[2] Dr. Wilks, of Guy's Hospital, London, has given carefully-obtained evidence that alcohol, under some circumstances, acts as food. See Lancet, Jan. 27, 1872.

holic beverages in cases of ordinary debility, the common table doses are, medicinally speaking, *too large.*

Alcohol, in advanced or advancing consumption, in low fever, and in other analogous cases, when used in due proportion, is useful—

1. By its **direct** excitant supporting power.
2. By aiding the enfeebled **stomach** to digest a larger supply of food.
3. By tending to **retard tissue-metamorphosis.**

This last action is one which alcohol has been shown (Böcker, Hammond) to have, under some circumstances, at least, in common with other agents, used as medicines or luxuries; coffee, tea, morphia, quinia,[1] etc. I have alluded to it in our classification of remedies, under the head of "economic medicines."

It is not supposable, however, that the retardation of the change of tissue in the body is always beneficial. It may, especially in febrile disease, when accumulation of effete matter in the blood and organs is a present evil, be injurious.

It is probable, however, that in low fevers, when oxidation is going on excessively, alcohol *yields carbon and hydrogen* as *fuel* for the "combustion" which takes place under the depression[2] of life-force; thus economizing the materials of the blood and tissues. This may explain the entire absence of "toxic" effects of alcohol when given in typhus, in regulated, but often considerable quantities. *When more is given than can be consumed by oxidation*, then symptoms of **alcoholism** occur.

The lowering of temperature under the use of small or moderate doses of alcohol in low fevers, may be accounted for in two ways: 1, by its combustion generating less heat than that of other materials in the blood and tissues whose place, in oxidation, it may take; 2, by its *energizing* influence upon the ganglia, through which the vital control over excessive waste and combustion may be restored or promoted.

Admitting, then, the frequent utility of alcohol, we are prepared, most of all from clinical observation, to condemn without hesitation or qualification the practice introduced by the late Dr. Todd, of London (foreshadowed by that of the famous Dr. Brown of the last century), of giving alcohol as the remedy or proper medicine "for all acute diseases." Enough for our present purpose to cite some impartial testimonies as to the *results* of that practice.

1. The physician whom Dr. Todd intrusted with the task of analyzing his own records of hospital practice[3] asserts, that the mortality from fever in the hospital attended by Dr. Todd was in a marked degree greater than that of any other fever hospital in Great Britain.

2. Statistics of the London Hospital[4] more recently published,

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[1] Kerner, Ranke, and Strassburg have shown that quininization diminishes by one-half the excretion of urea and uric acid.

[2] Lowering of *vital* energy being attended by increased activity of *ordinary chemical* change.

[3] British and Foreign Medico-Chirurg. Review, October, 1860, p. 331.

[4] British Med. Journal, Dec. 9, 1865.

show a large increase, since 1858, in the use of stimulants in that hospital, and, with it, a closely coincident ratio of increase in mortality.

3. Drs. Gairdner[1] and Russell have shown, in the Glasgow Fever Hospital, that even typhus may be treated, *with excellent results, almost entirely without alcohol.*

**Stimulism,** as we may call the theory and practice of Dr. Todd, since followed by many others, confounds three distinct propositions: 1. That all disease is debility; 2. That all debility should be treated by the use of stimulants; 3. That alcohol is always the best stimulant. Granting, with some qualification, the first of these, we emphatically deny the truth of the second and third. It is a practice which, like many other *specialisms*, will *have its day.* It is already subsiding in most places. Says Dr. J. Matthews Duncan,[2] "This practice was derived from London, and I hope London will have the honor of putting an end to it." Sir W. Jenner's rule in treatment of typhoid fever[3] may well have a wider extension: "to abstain from giving alcohol if, in the case before me, I *doubt* the wisdom of giving it; and when there is a question of a larger or smaller dose, I, as a rule, prescribe the smaller." In a large "Temperance Hospital" in London, alcohol is, practically, omitted in the treatment of all cases of disease. This is an extreme which my own experience agrees with that of the profession generally in not believing to be a safe example in therapeutics, nor one demanded by the interests of temperance. When used with proper judgment and caution, alcohol may be administered with as little danger of subsequent habits of excess as any other powerful medicine. But such caution is of great consequence.

The following classification of the "genuine effects of stimulation," when properly used as to time and *dosage* (remembering the *often opposite* effects of *small* and *large* doses), is from Anstie.[4]

"I. Relief of pain. II. Removal of muscular spasm, tremor, or convulsion. III. Reduction of undue frequency of the circulation. IV. Reduction of excessive secretion. V. Removal of general debility, or of special fatigue of muscles, brain, or digestive organs. VI. Removal of delirium or maniacal excitement, and production of healthy sleep. VII. Support of the organism in the absence of ordinary food. VIII. Local increase of nutrition where this is deficient."

From the same writer comes also the following terse summary of the stimulating agencies most available therapeutically.

"1. Quickly digested and nutritious *food.* 2. *Opium* in doses of one or two grains; or *morphia* (sulphate, etc.) a quarter to half a grain. 3. *Carbonate* and *chloride* of *ammonium* in doses of five and ten grains respectively. 4. *Alcohol*, in doses just too *small* to produce flushing of the face or sweating of the brow.[5] 5. Chloroform, inhaled (in the proportion of about two per cent. to the bulk of atmospheric air) for a short time; or taken inter-

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[1] British Med. Journal, Aug. 22, 1868. [2] Lancet, Oct. 30, 1880.
[3] Ibid., Nov. 15, 1879. [4] On Stimulants and Narcotics, pp. 112, 113.
[5] It is singular that Headland (On the Action of Medicines, last edition) does not include alcohol in his list of stimulants. It is, with him, an "inebriant narcotic."

nally, in doses of a few drops. 6. Certain fetid gum resins. 7. Many aromatic volatile oils. 8. The bitters, pure and aromatic. 9. Counter-irritation, as it is called; stimulation, as it should be termed, through the skin."

*Hypodermic injection* of powerful stimulants is sometimes used in cases of threatening collapse. *Ether*[1] has been so employed, 15 drops being thrown in under the skin at a time. *Ammonia* has been similarly administered, in so strong a solution as equal parts of aqua ammoniæ and water; a fluidrachm being injected at once[2] into a *vein*. Whisky or brandy may be resorted to under like circumstances; when (for example, from exhausting hemorrhage) life is endangered by prostration not reached by stimulants administered by the mouth or rectum.

Under the now accepted opinion that *digitalis* is a "heart tonic," it (or digitalin) is sometimes used by hypodermic injection, in cases of "flagging heart;" and *atropia* as a stimulant to the respiratory function.

Dr. Karel, of St. Petersburg, within a few years, obtained the attention of the profession to the treatment of dyspepsia, chronic nervous affections, etc., by an *exclusive diet of skimmed milk*. Dr. Donkin followed him, giving in Bright's disease and other chronic diseases six or seven pints of skimmed milk daily, for weeks together, without any other food. Dr. S. Weir Mitchell[3] reports favorably of the alterative influence of this treatment in obstinate disorders of the stomach. He begins with one or two tablespoonfuls of the milk on rising, and every two hours through the day. Increasing the quantity in a few days, the maximum amount of two quarts daily is mostly attained without great inconvenience, although some long constantly for other food. I cannot see anything in this practice but a purely empirical *dernier ressort* in troublesome cases of chronic disease. As such, however, it is now on trial by many physicians. My experience convinces me that, in ninety-nine cases in a hundred, *unskimmed* is better than skimmed milk, for the sick or well. In *diabetes mellitus*, however, skimmed milk may be preferred.

*Desiccated* blood (Le Bon,[4] 1875) is said to be capable of skilful preparation so as to preserve its hœmoglobin, and to answer a good purpose as a recuperant. Dr. Andrew Smith, of New York, and others report favorably of its action in anæmic cases.

The subject of the treatment of debility, acute and chronic, must not be dismissed without one further remark, upon the importance of *rest* in cases of exhaustion from over-exertion. The popular truism, that *exercise is beneficial to health*, has been often *abused* by applying it *universally* to invalids or valetudinarians.

*The one remedy for the immediate effects of* **over-exertion** *is absolute and prolonged* **repose.**

The time required for recuperation, after *cerebral* over-fatigue, may be counted rather by *months* than by weeks or days; and it is quite possible for *irreparable* mischief to be done to the brain or

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[1] Verneuil, Journal de Méd. et de Chirurg. Pratiques, March, 1877.
[2] Griswold, N. Y. Med. Record June 7, 1879.
[3] Phila. Medical Times, Oct. 15, 1870, *et seq.*
[4] Comptes Rendus, 1875. See Journal de Thérapeutique, Nov. 25, 1880.

spinal marrow by neglecting too long the demand of nature for rest. With many others, the author must acknowledge indebtedness to the late Prof. Jackson, of the University of Pennsylvania, for the judicious emphasis of his teaching upon this point.

It is an important hygienic and therapeutic law, that exercise, to be beneficial, must be proportionate to the strength of the individual; and must never be carried to the extent of great fatigue or temporary exhaustion.

**Calmative** treatment has always been regarded as of importance in affections of the nervous system; not only for the relief of suffering, but to arrest the waste of irritation. *Opium*, *camphor*, *valerian*, and *assafœtida* are the oldest and most commonly appreciated medicines of this class. *Warm* and *tepid baths* and *ablutions*, simple or medicated (especially with salt or alcohol), have always been favorite adjuvants.

*Bromide of potassium* has come largely into use within a few years (Locock, 1852), as a *sedative to reflex excitability* of all the surfaces, or rather of the centres, of the body. In *sleeplessness*, *epilepsy*, *hysteria*, and *spermatorrhœa*, it has seemed to be particularly valuable. I have always found it to act mildly and safely in twenty-grain doses. Thirty or forty grains at a single dose may be safe in an adult generally. Dr. Da Costa has pointed out that the bromide adds to the beneficial effects of opiates, given with or after it. Bromide of *sodium* is very similar in its effects, and agrees better with some feeble patients. Bromide of *calcium* does not generally set so well upon the stomach. The sedative action of the bromides when *locally applied*, in solution, is sometimes valuable. *Bromo-camphor* (Schwartz) is said to act as a useful calmative in 2 to 5 grain doses. It must be remembered, however, that the *continuance* of any of the bromides in *large* doses may cause *bromism;* a condition of general debility, with abdominal pain, fetid breath, salivation, nausea, vomiting, or purging, an eruption like acne, anæsthesia of the skin, dilated pupils, dimness of sight, unsteadiness in walking, drowsiness and lowness of spirits. Organic disease of the kidneys is considered to contraindicate the use of the bromides.

*Hydrate of chloral* has, since its introduction by Liebreich, of Berlin, taken a leading place among hypnotic or sleep-producing medicines. It appears to be nearly as certain in its action as opium, with less unpleasant after effects; but to be not so powerful in the relief of pain. As an *antispasmodic*, under various circumstances, it has proved efficacious.[1] Some tendency to *depression of vital energy* is observable under the influence of considerable doses of chloral hydrate. This is especially asserted as of importance in contra-indicating its employment when the *respiratory* function is impaired. What I have seen of

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[1] Hydrate of chloral is soluble in water, alcohol, ether, chloroform, and fatty substances. Dose, 15 to 30 grains. Much larger doses are given, but are not unattended by danger. Death has, in a number of instances, followed excess in its use. Chloral hydrate, being pungent and acrid, should be considerably diluted when taken; but the solution should always be freshly prepared, as it does not keep well. Alkalies are incompatible with it. Dr. Kidd has reported its acting well *by enema* when, given by the mouth, it disturbs the feeble stomach.

its use, however, gives me the impression that (as regards *small doses*, at least) the danger of this has been rather over-rated.[1] Probably the chief danger attends its depressing influence upon the *heart* and general *circulation*. Persons habituated to its use for a considerable time have sometimes died suddenly after taking not more than 60 or 70 grains at once; as if the vascular (or vaso-motor) system had been previously enfeebled by it.[2]

Dr. Edward Hartshorne has found *chloride of ammonium*, in 15 or 20 grain doses, to exert a tranquillizing influence not unlike that of the bromides.

Under the head of *antispasmodic* calmatives may be named *nitrite of amyl;* the inhalation of which is now often resorted to for the arrest or prevention of paroxysms of epilepsy, angina pectoris, etc. It must be used with care; inhaling at first only a few drops at a time. The sign of its action is *flushing of the face.* It may be carried about the person in well stopped small vials; each vial containing not much more than a single dose, as what is left after breathing is nearly inert. Some practitioners, to avoid spilling, have the vial first filled with cotton, which is then saturated with the nitrite. The dose of it may be gradually increased, when it is inhaled repeatedly.

*Jamaica dogwood* (piscidia erythrina) is one of the later narcotics, from whose action upon animals a useful *rôle* as an anodyne is hoped for, but not yet (1881) safely ascertained.

*Erythroxylon coca*, of South America, has been long known as a popularly used nerve-stimulant in its native country. Although getting latterly under trial, its precise uses in practical medicine are not yet well defined. Its action is more like that of *coffee* and *tea* than that of opium. (Dose of fluid extract, ʒss to fʒij.)

**Antidotal** treatment is a topic of great interest. Its *idea* is probably the oldest in medicine. *Specifics* have always been looked upon as the *magna bona* of therapeutical science. Unfortunately, however, their number, instead of increasing, has *diminished* under the inexorable scrutiny of modern investigation. Yet, there is room for hope that they may again *positively* increase, with the diligent application of enlarged means of observation and discovery.

In the widest extension of the term, antidotive remedies may be classified thus:—

**Positive** antidotes;
- *Chemical palliatives;*
  - Antacids;
  - Antilithics.
- *Chemical antidotes;*
  - Antitoxics;
  - Parasiticides.

**Constructive** antidotes;
- *Antiperiodics;*
- *Antisyphilitics;*
- *Antiscorbutics.*

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[1] Ordylowski (Gazette des Hôpitaux, Aug. 28, 1880) asserts that in a considerable number of cases of phthisis, doses of 15 to 30 grains of chloral at bedtime promoted rest and strength, without any bad symptoms in any of the cases.

[2] A prominent symptom of chloral poisoning, however, is stupor (coma). See an article by Dr. H. H. Kane, in N. Y. Medical Record, Dec., 1880.

**Tentative** antidotal remedies;

*Antiarthritics;* *Antiseptics;*
*Antirheumatics;* *Antizymotics.*

The familiar use of **antacids** as palliatives in dyspepsia, etc., needs no remark.

Nor have we occasion to dwell, here, upon **antilithics**; *i. e.*, solvents for urinary solids, prescribed on chemical principles; as alkalies for excess of uric acid or the urates, mineral acids for excess of phosphates or oxalates.

The subject of **chemical** *antidotes* for poisons belong to *Toxicology.* (See Part. II.)

**Anthelmintics** are best treated of in the department of *Practice of Medicine.* (Part II.)

**Antipsorics,** or specific remedies for scabies (itch), are represented generally by sulphur; which, although not at all the *only* agent capable of destroying the morbific *acarus* (sarcoptes), is the most convenient. Other cutaneous parasites (nosophyta) are also destroyed, but with less certainty, by preparations of mercury, etc., called **parasiticides.**

Of "**constructive** antidotes," the most important are the alkaloids of **cinchona,** applied to the treatment of **malarious** affections (antiperiodics). Medical men are divided upon the question whether quinia arrests intermittent fever, etc., by antagonizing (chemically) the organic poison itself in the system,[1] or (physiologically) by causing such an opposite impression upon the nervous centres as is capable of subverting the condition on which the periodical or paroxysmal affection depends. The last is the prevailing view. But, in either aspect, the cure of autumnal fevers and allied affections occurring under malarial influence (neuralgias, etc.), by *cinchonization*, is properly called **specific** treatment; as—

1. No other remedies (yet discovered) have the same power.
2. These remedies have no such control over any *other* diseases (*e. g.*, typhus and typhoid fever, yellow fever).

The second proposition is asserted with positiveness, notwithstanding the now common, but still experimental, use of quinine in full doses in typhus and typhoid fever, and its frequent administration in yellow fever.

Dr. E. B. Baxter, of London (*Practitioner*, Nov., 1873), reports a series of experiments showing the *antiseptic* power of quinia, quinoidine, cinchonidine, and cinchonia; the comparative action of these alkaloids in this respect (and their control over the migratory movements of the colorless blood-corpuscles), being relatively proportionate to their antiperiodic and curative power. The power of quinine to destroy minute fungoid vegetative organisms has been asserted by several observers. So has that of the active principle of eucalyptus globulus. This accords especially with the "fungous" or "disease germ" theory of malarious causation.

In stating that no other medicines, yet discovered, have the

[1] Bence Jones found in human blood a fluorescent material, in small amount, not improbably supposed to be identical with quinia; Drs. E. Rhoads and W. Pepper also ascertained a deficiency of this "animal quinoidine" to exist in patients suffering under malarial disease.—See Penna. Hospital Reports, 1868, p. 269.

*same* power, I mean, to a degree or with a certainty at all comparable to that of the cinchonic alkaloids. The nearest approach to this is afforded by *arsenic* and the *sulphites*.

It is, however, a remarkable and important fact, that, when the recurrence of the paroxysms of intermittent fever has been allowed for a long period (**chronic** intermittent), and the system of the patient has become debilitated and **anæmic**, quinine will only **interrupt**, but *will not cure* the disease. **Iron** is, then, *the remedy*.

Opinion is divided as to the value or necessity of **mercury** as an **antisyphilitic**. In the primary disease I am a full believer in its importance; against which its frequent *abuse* furnishes no argument. In secondary syphilitic affections, especially syphilitic **rheumatism, iodide of potassium** also exhibits decidedly specific powers.

**Antiscorbutics** are most valuable as *preventives* of scurvy; but will promptly relieve it, also, when it has occurred. All **fresh vegetables** belong prominently to this class; certain plants not so used, as the cactus opuntia, are included in it; the juice of **lemons**, limes, etc., is of service for the same end, and the neutral salts of potassium have been largely employed, with variable results.

**Tentative** antidotal treatment—for diseases in which there is evidently (as a *part*, at least, if not the primary part of the malady) *humoral* disorder, such as gout, rheumatism, the exanthemata, etc.—affords a large field for study and ratiocination. The positive *facts*, so far, are few; the *hypotheses*, legion.

In **gout, colchicum** has long held, deservedly, a high place, as either an *eliminative* or an *antidotal* remedy. Most observers have given it the first title;[1] Dr. Garrod's experiments induced him to prefer the *idea*, if not the phrase of the latter. **Alkaline salts** *of organic acids*, as bicarbonate of potassium, sodium, or lithium (Garrod), or tartrate of potassium and sodium, and the *alkaline earth*, *magnesia*, have also a large share of confidence in the treatment of gout. Experience satisfies me that this confidence is well founded. After all, however, so incomplete is any curative plan as yet devised, that a large margin is left for patience and opium.

The same is true of **rheumatism**; especially in its distinctive form, of *acute articular rheumatism*, or **rheumatic fever.** Colchicum has been here also much given; but *in the absence of the gouty diathesis*,[2] hereditary or acquired, it will often, if not *generally*, *disappoint*. **Alkaline salts** are, with many, the favorite tentative anti-rheumatics. Lemon-juice also has been freely employed.

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[1] Colchicum has been shown, by Krahmer and Hammond (Proceedings of Biological Department of Acad. of Nat. Sciences of Philadelphia, Nov. 1st, 1857), to *increase the amount of the solids* of the urine more decidedly than any other vegetable diuretic.

[2] Garrod insists on the diagnostic importance of the *uric acid test* for gout. It is easily applied, as follows: Take about f℥ss of the serum from a blister, or from the blood drawn by venesection or cupping, and place it on a flat dish or watch-glass. Add to this fifteen drops of acetic acid, and place in it two or three threads of cotton. Allow the glass to stand in a warm room for one or two days, to evaporate. If the cotton fibres be then removed and examined microscopically with an inch object-glass, they will be found, if the serum contained uric acid, to be covered with its crystals, arranged somewhat as the crystals of sugar-candy form on a string.

Phosphate of ammonium was for a brief time in vogue. Certain enfeebled cases, with free perspiration, will recover speedily under *quininization*. But in all these modes of treatment there is no *specific* **certainty**. Of *propylamin*, as a remedy for rheumatism, I have had some experience, and have found no basis for a favorable opinion. First employed by Awenarius, of St. Petersburg, Drs. Gaston, Dujardin Beaumetz, and Besnier have reported favorably of this remedy. Dr. Da Costa[1] has obtained good results with *bromide of ammonium*. Stricker, in 1876, asserted rapid cures with *salicylic acid*. Since then, Traube, Sée, Broadbent, Maclagan and many others have obtained, by their published results, the general confidence of the profession in its value. (See *Rheumatism*, Part II.) As it is capable of causing death when used in excess, moderation in dosage is necessary with it.

*Chronic* rheumatism is not satisfactorily shown to be a *humoral* disease. Except in its *syphilitic* form, when iodide of potassium will always relieve it, there is no specific for what is commonly known as chronic rheumatism. Of all medicines, I have found *oil of cajuput* (in 5 to 10 drop doses) do the most in mitigation of its pains. Oil of turpentine is a more generally used remedy for the same purpose, and one often serviceable. The explanation of the action of these oils in such cases is very obscure and doubtful. Iodide of potassium, also, is largely given for chronic rheumatism. In *syphilitic* rheumatism, it is absolutely a *specific* remedy.

In the management of the **zymotic** affections, the only great triumph of medical art has been one of **prevention. Vaccination** affords an instance of control over one of the most destructive and loathsome of pestilences, by the interference of the physician. As to the **treatment**, even of small-pox[2] itself, when it has occurred, and of scarlet fever, measles, chicken-pox, hooping-cough, and mumps, we are forced to confess our powerlessness, except to conduct the case, by the aid of **palliative** measures, to its natural and spontaneous termination.

This is equally true of **yellow fever**. There is **no specific** yet known for this terrible disease. It is to be **palliated**, as it *cannot be cut short*.

Nor have we any specific for epidemic **cholera**. Antispasmodics, at very short intervals of administration, and ice, with free external stimulation, will conduct many cases to a successful close; but this is not **antidotal** treatment.

In the medication of zymotic affections having, as a local symptom, inflammation of the mucous membranes, with unusual tendency to (septic) decomposition or **disorganization**—*e. g.*, *scarlatina*, *diphtheria*, and *pyæmia*—**chlorate of potassium** and other preparations of chlorine, as tincture of **chloride of iron**, have achieved a very widespread reputation. *Benzoate* of *sodium* has, of late, with some, claimed a share of the same confidence.

The tincture of the chloride of iron appears also to have an

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[1] Pennsylvania Hospital Reports, 1869.

[2] *Sarracenia* has proved valueless upon fair trial.

excellent effect (although we can hardly call it antidotal) in *asthenic* **erysipelas.**

*Antidiphtheritic* power has been strongly asserted of *lime-water*, locally applied, and of *lactic acid.*

Professor Polli, of Milan, in 1864 (following Chaussier and Bielt of Paris), proposed the internal use of the *sulphites* of sodium, calcium, and magnesium, in toxæmic diseases, as antizymotics or antiseptics. The chemical rationale of their action is very plausible. Success has been asserted[1] for them in pyæmia, scarlet fever, diphtheria, intermittent fever, cattle-plague, etc., and in glanders in the horse. As a tentative practice these remedies have seemed worthy of careful trial; although, especially in the United States army during the late war, the amount of positive evidence in their favor has not been very large.

Science should *suggest* remedies for experience to *prove;* empiricism may thus be made rational, and rationalism in medicine may become practical. Even if disappointment attend a certain set of experiments, such a trial is fully justifiable in principle.

The sulphites appear in the urine about twenty minutes after they are taken; also in the sputa and saliva; but they are gradually changed in the system into sulphates. M. Carey Lea, of Philadelphia, in a paper published in 1865,[2] reported a series of careful experiments, in which he found evidence that when a small quantity of sulphite or bisulphite of sodium is taken, less than a hundred grains, it disappears by oxidation in the system; but if large amounts be ingested, a considerable portion passes unchanged in the urine, and sulphurous acid may even be detected in the breath.

Dr. Polli recommends especially the sulphite of magnesium as the most active and having the least taste. The dose is fifteen to thirty grains, in powder, dissolved in water or an aromatic vehicle, or in troches. He advises *saturating* the system with the medicine; four or five drachms daily for an adult as a minimum. Five to seven drachms of the sulphite of sodium are borne well. Its long-continued use may bring on œdema and diseases of debility; otherwise, it shows no special influence on the system.

*Externally*, solutions of the sulphites, especially when mixed with a portion of glycerin, are recommended as applications to suppurating surfaces, to sloughing and ulcerated parts, and in erysipelas. Sulphites of calcium and magnesium are somewhat caustic. In septæmia from wounds, etc., Polli administers thirty grains of the sulphite of magnesium, every two hours, internally.

*Carbolic* acid has also come under extensive trial, as an antizymotic, both externally and internally used. Dr. Shoemaker, of Ohio, amongst others, reports excellent success with it, given internally in small doses, in *scarlet fever.* Dr. Ernest Sansom[3] uses in scarlet fever and other allied diseases, the *sulpho-carbolates* of sodium, potassium, and other bases; especially sulpho-carbolate of sodium, five or ten grains every four hours.

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[1] See Amer. Journal of Med. Sciences, Oct., 1863; and later numbers of the same Journal.

[2] Am. Journ. Med. Sciences, Jan., 1865, p. 84.

[3] Lancet, Jan. 15, 1870.

*Silicate of sodium* is asserted by Dubreuil[1] and Champouillon[2] to have powerful antiseptic properties, especially available locally, in ozœna, catarrhal bronchitis (by atomization of its solution), and cytitis with accumulation of decomposing secretion. *Salicylic acid*, *iodoform*, and *benzoate of sodium* are now under abundant trial, in the treatment of many disorders. Their antiseptic properties are only a part of those contributing to their value, not yet wholly determined in therapeutics. Of benzoate of sodium (recommended by Letzerich in diphtheria, and by several practitioners in scarlet fever) the minimum dose for an adult is five grains; some physicians (Klebs, Schüler) give it or the benzoate of magnesium to the amount of ℥j in a day. Klebs and Krocsak advise inhalation of its solution (from 2 to 5 per cent. in water) two or three times daily. Its administration in phthisis will be referred to hereafter in another place.

One of the latest introduced (1880) of anti-zymotics is *resorcin;* whose effects have not yet been thoroughly investigated.[3]

*En résumé*, we may say that all endemic, epidemic, infectious, and contagious diseases are naturally **self-limited**; and that, so far, we have only reached a certainly *curative* treatment for one class — viz., intermittent, remittent, and pernicious (classed together as **malarial**) fevers; and a **preventive** treatment for another, small-pox.

While, therefore, for yellow fever, scarlatina, pertussis, etc., we are without the possession of any *specific* or *antidotal* treatment, the **palliative** plan is the one for us to pursue. All attempts, by violent measures, to cut short either of these diseases, while they fail to attain that object, will endanger the patient by lowering his forces and thus promoting the victory of the depressive toxæmic cause.

Yet, I repeat, we are not to abandon or reject the hope that observation and cautious experiment, guided by the lights of advancing science, may enable us hereafter to discover remedies as potent in the management and control of scarlet fever, yellow fever, and cholera, as quinine is in that of ague, or vaccination in the prevention or salutary modification of small-pox.

**Alterative** treatment is distinguished, in our classification, it may seem arbitrarily, from the *antidotive*. All antidotes may be said to be alterative, but all alterative medicines are not antidotal; as the latter expression implies at least the *probable*, if not the known existence of a **material cause**, against which the antidote is to act. Yet the distinction is not one upon which we can *insist*, although it appears convenient.

The term *alterative* is by no means a mere apology for ignorance; it involves an important therapeutical principle, viz., the **supplanting** or displacing of a morbid impression, condition, or process in the body, by the **safer** impression and **counteraction** of a medicinal agent. The influence of the latter, physiologically

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[1] Gaz. Médicale de Paris, No. 49, 1872.
[2] Gaz. Hebdomadaire, No. 8, 1873.
[3] Loltmann and Rotenhöfer, of Breslau, have used it with advantage in cholera infantum. Lyon Méd., Feb. 20, 1881.

speaking, may be, *per se*, abnormal; yet, having a sanative purpose, it is therapeutic.

This principle may be sufficiently illustrated by allusion to two or three examples. In the peculiar and often violent inflammation of the throat in scarlatina, the free application of a *strong solution of nitrate of silver* to the part will almost invariably arrest (if used *early*) the morbid local process; converting it, at all events, from a *specific* and *dangerous* into a *simple* and *mild* phlogosis.

So may the early and powerful impression of the solid nitrate of silver, or other caustic, upon the surface of the penis affected with *chancre*, *supplant* the *venereal* process, and leave in its place a benignant ulcer.

When erysipelatous inflammation is spreading like a conflagration from part to part, a blister, or tincture of iodine, etc., will sometimes succeed in forming a *cordon sanitaire*, by inducing its own milder irritation in advance of the disease.

The most essential part of the treatment of chronic *diseases of the skin*, is either **alterative** or **antidotal.** *Parasitic* affections, as scabies, favus, mentagra, etc., require the destruction of the epizoon or epiphyte by an antidote. Others, as eczema, lichen, impetigo, lepra, etc., when at all obstinate, are all generally treated in the *same manner* essentially, to whichever class the disease may belong. Why? Because the **principle** is the same in all—the *alterative* principle. The abnormal, perverted nutrition of the cutaneous tissue, whether it be deeply or superficially affected, is (apart from antiphlogistic or sedative treatment, called for in certain cases) to be *subverted*, by a decisive change in all its conditions; and, speaking boldly, it is little matter *what* change, so it be considerable. Any means which will hurry the removal of the old diseased skin, and favor the immediate construction of a new layer, will be *curative*, whether it be only soap, water and frictions, mercurial ointment, chrysophanic acid, vesication, or the actual cautery.[1] And the same principle explains and justifies the *internal* use of arsenic and mercury in the management of so many very *diverse* forms of cutaneous disease—the indications for alterative medication being the same in all.

The administration, for **long periods,** of minute doses of powerful alterative medicines, in the treatment of chronic affections which resist other management, is less common now than formerly, on account of the explosion of some old hypotheses connected with it. It is very possible that in this, as in some other medical reforms, we may have gone too far.

Agents which tend with any degree of constancy to **increase** the rate of metamorphosis of tissue in the body, are few. Mercury appears to have this effect; and its alterative power may to a considerable extent be due to this. It is well known that most of the diuretics given for the removal of dropsical accumulations (a treatment often carried to an irrational excess), increase only the

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[1] Dr. Hughes Bennett, in the treatment of cutaneous diseases, relied mainly (London Practitioner, Vol. I.) on the beneficial influences of *water* and *oil;* in affections with moist secretions, water; in those which are dry, scurfy, or scaly, oil. Of course, however, Prof. Bennett assigned *some* value to other applications, as adjuvants.

**fluid** secretion of the kidneys, affecting little or not at all their *solid* excreta. But there is good reason to believe that potassa and soda, and some of their compounds, as well as iodine and mercury, do hasten the disintegration of tissue. Iodide of potassium has been shown by Melsens to be in this way *eliminative* of lead, laid up in some organ (probably the liver), removing it in the shape of iodide of lead.

If any possible measures, beyond attention to hygiene and repose can benefit cases of organic **degeneration**, we may hope for advantage from the combination of tonics or analeptics with alteratives. Dr. Chambers (on *Digestion and its Derangements*) remarks thus:—

"In Bright's disease, I know of no treatment so advantageous as that which unites **alteratives** (that is, liquefacients of tissue) with those **restorers** of blood *par excellence*, iron and animal food."

**Iodide of iron** or iodide of potassium at the same time with **cod-liver oil**, may afford an example of this sort of medication in its simplest form. Its object is to favor the rapid removal of old tissue, and the formation of good new structure in its place.

Whatever produces a powerful impression, not immediately destructive upon the system, may act alteratively, and sometimes beneficially, in chronic disease. Change of air, scene and circumstance often exemplifies this.

**Electricity**, perseveringly used as an alterative, in certain cases of paralysis and other neuroses, does more good than anything else. The ancient Romans used the shock produced by the *torpedo* (electrical fish) for the cure of paralysis and gout; and the natives of Western Africa apply the *silurus* in a similar way, in baths, for the treatment of sick children. Pivati, of Venice, 1740, and after him De Haën, Winkler, Manduyt, and Nollet, employed statical electricity as a remedy. Galvani (1790) and Volta introduced new means, which have since been extensively used. Faraday discovered the induced currents in 1831.

At present, while it is clear that electricity must be capable of powerfully influencing the human system, our knowledge of its uses is far from complete. Rash experimentation with it may do harm; but all its appliances may be so graduated as to admit of the mildest and most cautious tentative practice.

Three agencies are included under the term electricity: 1. **Static** or frictional electricity, of the machine of glass and rubber. 2. **Galvanic** or **Voltaic**[1] electricity, the current of the battery, of metals with acid solutions, etc. 3. **Faradization**, by induced and interrupted currents, electro-magnetic or magneto-electric.

*Frictional* electricity is least in use. It is best employed by placing the patient on an insulated stool (with glass legs or feet) and charging him from either a plate or a cylinder machine; then withdrawing the electricity by a *pointed* metallic conductor, if a mild and general effect is wanted, or by a *round* one of some

[1] In strict justice, this ought to be called *Voltaic* electricity. Galvani was the earlier discoverer in the field of *animal* electrical phenomena; but Volta first discovered and demonstrated the origination of electrical currents from chemical action.

size to produce sparks and a locally stimulant effect. Dr. Arthius, of Paris, has written a work (1873) upon the therapeutic uses of statical electricity.

*Voltaic* or *galvanic* electricity is developed by chemical action. A battery consists of a series of plates of two materials (copper, zinc, silver, carbon, etc.), in alternation, and a liquid in contact with both which acts more upon one than on the other. Daniell's and Smee's batteries are especially recommended. Althaus prefers a modification of Daniell's, in which, with copper and zinc plates, a solution of sulphate of copper is used as the liquid. This will run for six months without cleaning; with cleaning, for a much longer time. The *size* of the cups determines the *quantity* of the current of electricity; the *number* of cups, its *intensity*. Quantity is especially powerful for chemical action; intensity, for overcoming the resistance of a slowly conducting medium. The *direction of the current*, through the wire or wires connecting them outside of the liquid, is, in ordinary batteries, from the copper (or platinum, silver, or carbon) to the zinc; the former being the positive and the latter the negative pole. Dr. Hammond[1] prefers the direct to the induced current. His apparatus consists of a series of plates of perforated zinc and copper or copper gauze, soldered in pairs, with flannel between the elements. They are moistened by pouring strong vinegar upon the top, so that it runs through the perforations.

*Faradic* or induced electrical currents are usually obtained in either of two modes: 1. By galvanic electricity (from chemical change) acting upon iron; making it magnetic during the closure of the circuit, which is interrupted momentarily by a vibrating spring. A current is thus induced, in one direction at the moment of *closing*, and in the opposite at the *opening* of the connection. 2. By causing a magnet or its keeper of iron to revolve so as alternately to approach and recede from contact. A *helix* or coil of wire, wound around the magnet, will then have an induced current at the moment of approach and at that of separation. This (magneto-electric) is more convenient than any other apparatus; but some authorities claim greater power for electro-magnetism in therapeutics. It has been shown also that the *constant* galvanic current (as of Daniell's, Grove's, Bunsen's, or Smee's batteries)[2] has a more extended or general stimulant or alterative effect; while the *interrupted* (faradic) current is more powerful locally. Proof of the difference between the two may be obtained by applying them in succession to the face. The continued current produces a flash of light by its influence upon the retina. The interrupted causes the muscles to contract in proportion to its force. The action of a voltaic or galvanic battery may be readily *interrupted*, by alternately lifting and replacing one rheophore,[3] while the other is retained in contact

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[1] Quarterly Journal of Psychol. Medicine, etc., July, 1867, p. 62.

[2] The Leclanché cell is now a favorite with many practitioners.

[3] *Rheophore*, "current bringer;" *i. e.*, the metallic disk, moistened sponge, brush of fine wire, or other arrangement (provided with handle) used to apply electricity to any part at the will of the operator. Rheophores are constructed for introduction into the rectum, bladder, etc. For such use, all but the *end* of the conductor should be insulated by being surrounded by gutta-percha or india-rubber.

with the surface of the body. Remak has expressed the greatest confidence in the continuous current; especially that which is constant in strength. He uses from 15 to 30 of Daniell's cells (modified), weighing 8 pounds each. He asserts that the down-running current acts most upon the sensory nerves, and the up current upon those of motion; and that while interrupted currents take effect almost alone upon the muscles, constant currents act upon the nerve-centres themselves. Hiffelsheim and Onimus have extended Remak's investigations. It has been shown (E. Weber, Matteucci, Erb)[1] that a constant current may be made to take effect upon the brain and spinal marrow. Kühne and others have also found, by the aid of the microscope, distinct action of the constant current upon organic cells and protoplasm; a change of form of the *cell* sometimes resulting, which has been called *cell-tetanus*.

Duchenne, of Bologne, asserts, as the conclusions derived from his experience, the following:

"In man, whatever may be the direction of the currents, or the degree of vitality of the nerves they traverse, the same results are always produced when the conductors are applied to any part over the course of the nerves,—namely, muscular contractions and sensations.

"Various changes in the current-direction produce no appreciable influence over the sensibility, or capability of voluntary muscular contraction, in man."

On the basis, however, mainly of Dubois Reymond's experiments, other electricians insist that a current *towards* the centres of the body stimulates the sensory nerves, while it lessens the excitability of the motor nerves; and that a current *from* the centres out to the periphery stimulates motor, and acts as a sedative to sensory nerves. Pereira says, "In paralysis of sensation only, the current should be direct or centrifugal. In paralysis of motion, it should be inverse or centripetal. In paralysis of both sensation and motion, the vibrating current (faradization) is peculiarly appropriate; for by this the sensitive and motor nerves are alternately excited, while the one current promotes the restoration of the excitability, which may have been lessened by the preceding current."

Hitzig, Brenner, Chauveau, De Watteville, Benedict, and Russell Reynolds,[2] all sustain the above quoted judgment of Duchenne, as to the absence of specific differences, practically available, according to the *direction* of the current applied; while the *locality of the application* is of the greatest importance. It does not appear to be proved that either *pole*, as such, has peculiar "anodyne or stimulant" powers, as some have supposed.

As a general rule, it may be said, that the *continuous* voltaic (galvanic) current tends to produce a tranquillizing effect upon spasmodic *over-action;* while the interrupted *faradic* current is

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[1] Budge and Waller have reported remarkable observations upon the "centrum ciliospinale," in relation to the action of the iris. See M. Meyer, Medical Electricity, transl. by Hammond, p. 77.

[2] Cited by Dr. L. Carter Gray, N. Y. Med. Rec., August, 1879.

especially stimulant to *enfeebled* and *atrophied* muscles, and to a sluggish circulation.

For the use of *frictional* (machine) electricity, whose effects are most like those of the faradic current, Dr. Bartholow recommends the Toepler-Holtz machine as most efficient and reliable.

Dr. Moritz Mayer[1] lays down the following as the best established facts. 1. *Electricity is a stimulus.* 2. It increases the supply of blood to the irritated part. 3. It augments also its temperature, and tends to increase its volume. 4. It enhances the contractile energy of the vascular walls. 5. It counteracts the secondary changes occurring in inactive nerves and muscles. 6. It is capable of aiding in the restoration to nerves and muscles of their lost functional power. 7. It is capable of developing a supplementary function in muscular fibres not yet paralyzed.

Dr. G. M. Beard recommends the use, in many chronic affections, of "central galvanization;" the negative pole being placed at the pit of the stomach, and the positive pole applied successively to the head, over the sympathetic and pneumogastric in the neck, and to the spine; the whole of the central nervous system being thus brought under the influence of the current.

The *precautions* needful in employing electricity as a remedial application are—

1. Always to begin with it very gently, watching carefully its effects; continuing it therefore at first but for a few minutes at once. The *hand of the operator* is the gentlest and best electrode for sensitive or irritable parts. To use it, of course the electricity must pass through the operator's body. This mode, however, is not commonly resorted to.

2. To be especially careful in its use at or near the great nerve centres, as the brain and spinal marrow.

3. Avoid using it, even locally, during the existence of an inflammation or acute irritation of the spinal marrow or brain.

The idea which Dr. Radcliffe has especially advocated, of using galvanism, *e.g.*, in neuralgia, or convulsions, with such force as to partially or temporarily *paralyze* a disordered nerve-centre, is, I am sure, unsound in theory and very unsafe in practice. I would not think of resorting to such a measure in any conceivable case.

The affections in which electricity, in various modes of application, has been found most positively and frequently serviceable are *paralysis* (especially *hysterical*, *reflex*,[2] *infantile*) and *lead* palsy, *aphonia* and *diphtheritic paralysis* of the throat; *neuralgia*, *chronic rheumatism*, *exophthalmic goitre*, *angina pectoris*, *amenorrhœa*, *suppression of lactation*, *obstruction of the bowels*, *lead colic*, *cancerous or other tumors*, *eczema*, *herpes*, *prurigo*.[3] In *surgery*, *galvano-puncture* is resorted to for aneurisms, etc. In treatment of *asphyxia*, *narcotic coma*, etc., its powerful stimulation is some-

[1] Medical Electricity, p. 372.

[2] See Mitchell, Morehouse, and Keen upon Wounds of Nerves, etc.

[3] In one case I have known it to appear to retard the progress of *pulmonary phthisis* for a considerable period.

times an important means of saving life. Applied to *aneurism of the thoracic aorta*, the object is to produce coagulation of blood in the tumor. The best mode of operating is as follows: two sharp platinum needles coated with gutta-percha are successively plunged into the tumor, over which the skin has first been benumbed with ice or spray of ether or rhigolene. The needles having been connected with a voltaic battery, the current is gradually increased to its full strength and continued so for several minutes, after which the needles are withdrawn.

Crussell, Spencer Wells, and Hammond report great success in causing the healing of *indolent ulcers* and *bed-sores* by mild, constant currents. Dr. Hammond's method is the following:

"A thin silver plate, no thicker than a sheet of paper, is cut to the exact size and shape of the bed-sore; a zinc plate of about the same size is connected with the silver plate by a fine silver or copper wire six or eight inches in length. The silver plate is then placed in immediate contact with the bed-sore, and the zinc plate on some part of the skin above, a piece of chamois-skin soaked in vinegar intervening. This must be kept moist, or there is little or no action of the battery. Within a few hours the effect is perceptible, and in a day or two the cure is complete in the great majority of cases. In a few instances a longer time is required."

The use of electricity in *diagnosis* will be alluded to in another part of this book.

**Hydropathy** (hydrotherapy) is an example of a most valuable agent misapplied by **exclusivism**, which is always quackery,—that is, it is quackery to deny the virtues of other remedies, no matter how long or well established, in extolling those of one made the sole *panacea* of practice. Bathing (local and general), douches, and even packing in the wet sheet, are, if used with judgment, potent alterative and often sanative means. Almost hopeless chronic cases of nervous disorders, dyspepsia, chronic rheumatism, etc., may sometimes have their languid vitality aroused by the revolutionizing action of such processes. The danger is of unprofessional and ill-judging *abuse* of an agency of such power.

**Hot-air baths** have of late years attracted attention.

M. Fillet (1764), Fordyce, Blagden (1775), and others, proved, as Chabert the "Fire King" also illustrated, that a *dry-air* heat above that of boiling water can be borne by the human body with safety. Within a few years the use of the hot-air bath, similar to that of the *calidarium* of the ancient Romans, has been introduced for remedial purposes. It is misnamed the "Turkish Bath," as the latter includes a *vapor* bath at a temperature below 100°.

Erasmus Wilson, the dermatologist, Urquhart, and others, have, upon personal experience, lauded the virtues of the hot-air bath. The requisites are a heated metallic surface (a common stove will do) to warm the air of the apartment, and an adjoining convenient water bath, with warm or cool water, to plunge into after or alternately with the air bath.

Urquhart thus speaks of its use in health: "When I come back to it after its absence and the use of other baths, even the best, it is like getting on the back of a thorough-bred after having to ride a cart-horse. It is of service at every moment, and at all temperatures. You come in from a journey, say before dinner; you go in not heated, when it may stand at 120°; you dress at that charming temperature, with streams of hot or cold water, or the tank to revel in. So, also, you may dress in the morning. My regular practice, when not requiring it for health's sake, is to go in on getting up and on going to bed, dressing and undressing there; five to ten minutes suffice to bring on the flow of perspiration. After that a plunge in the cold water, and you come out fresh, glowing with a sense of cleanliness, health, and strength, which no other operation can convey to the body. You are then indifferent to the heat of summer and the cold of winter."

Copious perspiration and the thorough removal of the effete cuticle, as well as of all foreign impurity, from the surface of the body are the obvious and direct effects of the hot-air bath. *Depuration* and functional balance of the excretory processes are thus promoted, while the stimulant influence of heat, so often useful in cases of depressed vitality, is obtained. Renewal of the nutrition of the skin must also be more rapid under such a process. The temperature is made to vary between 120° and 200°; 130° to 140° is a good standard.

The *diseases* in which the hot-air bath has been tried with favorable results, in cure or palliation, are, especially, acute and chronic rheumatism, lumbago, sciatica, neuralgia, gout, dropsy, catarrh, influenza, throat affections, diarrhœa, dysentery, sluggishness of circulation, disorders of the liver, scrofula, incipient phthisis, Bright's disease, ague, obstinate skin diseases, chorea, mania; also, it is said, even cholera and hydrophobia.

**Hot sand-baths** have been used in London by Dr. Conradi[1] and others to promote perspiration and relieve congestion of the internal organs.

**Mustard Bathing.**—Dr. S. Newington, of England, ascertained by experience in his own person that the extensive and continued application of mustard to the body is a powerful tranquilizer of nervous excitement and means of restoration of the balance of a disturbed circulation. Use of the same remedy with a number of patients has confirmed its value. One mode of its application is as follows: Two handfuls of powdered mustard are tied in a cloth and placed in hot water, then squeezed in the hand until the strength of the mustard has been extracted. A thick towel long enough to reach around the loins is then wrung out of this infusion, wrapped round the body, and covered with a large piece of oiled silk or gum-elastic cloth. Another plan is that of the mustard bath,—that is, an ordinary warm bath into which have been thrown five or six handfuls of mustard.

In *maniacal excitement*, particularly, these applications have been found usefully sedative. *Sleeplessness*, from any cause, may be so treated, as well as hysteria, etc. It may be expected that

[1] Med. Times and Gaz., October 19, 1872, p. 150.

such a process will be useful also in promoting reaction in cases of internal congestion; perhaps in the chill of pernicious fever, in "spotted fever," and in the incipient collapse of cholera.

**Movement-cure** (*kinesipathy*) is the name for a kind of practice (Taylor) founded upon the teachings of Ling, of Sweden, consisting of *passive exercise* of the muscles, for the purpose of improving the circulation, innervation, and reparative nutrition of diseased and enfeebled organs.

Although an elaborate system of particular movements upon a *quasi*-physiological rationale has been devised and adapted to each kind of chronic local or general disorder, careful examination of the treatise of an authority upon the subject convinces me that this is all *surplusage*. What remains to be true is that where active exercise is not practicable, systematic frictions and passive movements of all parts of the body are very useful in its stead. What is added to this by the *specialist* is, faith on the part of the patient and perseverance in the attendant,—two things which, without extraordinary processes, explain much and account for many cures.

**Massage** is the term applied to systematic rubbing and kneading the muscles and other accessible parts of the body. It is an ancient practice, common even among some savage nations. The *lomi-lomi* of the Sandwich Islands[1] is of this character. It is familiar to the Brahmins in India, and is traced as far back as to the Egyptian priests, before Hippocrates. It is now used especially in cases of general and nervous debility, in which muscular exercise is not to a sufficient extent obtainable.

Dr. S. Weir Mitchell[2] thus describes this procedure:

"An hour is chosen midway between two meals, and the patient lying in bed, the manipulator starts at the feet and gently but firmly pinches up the skin, rolling it lightly between his fingers and going carefully over the whole foot; then the toes are bent and moved about in every direction, and next, with the thumbs and fingers, the little muscles of the foot are kneaded and pinched more largely, and the inter-osseous groups worked at with the finger-tips between the bones. At last the ankles are dealt with in like fashion, all the crevices between the articulating bones being sought out and kneaded, while the joint is put in every possible position. The leg is next treated, first by surface-pinching and then by deeper grasping of the areolar tissue, and last by industrious and deeper pinching of the large muscular masses, which for this purpose are put in a position of the utmost relaxation. The grasp of the muscles is momentary, and for the large muscles of the calf and thigh both hands act, the one contracting as the other loosens the grip. In treating the firm muscles in front of the leg, the fingers are made to roll the muscles under the cushions of the finger-tips. At brief intervals the manipulator seizes the limb in both hands, and lightly runs the grasp upwards, so as to favor the flow of venous blood-currents, and then returns to the kneading of the muscles.

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[1] Nordhoff: Northern California, Oregon, and the Sandwich Islands, 1874.
[2] Fat and Blood, and How to Make Them, p. 52.

The same process is carried on in every part of the body, and especial care is given to the muscles of the loin and spine, while usually the face is not touched."

At first this is continued for but half an hour at once; gradually it is increased to an hour daily or every other day. After each rubbing the patient should have at least an hour's absolute repose.

Dr. Mitchell advises the use of cocoa oil or vaseline to lubricate the parts rubbed. My belief is that more stress might be placed upon this **inunction**, as itself an important portion of the treatment. The ancients resorted largely to anointing for sanitary and remedial (as well as religious) purposes. Their wisdom in this has been too much neglected. *Cod-liver oil* inunction in *scrofulosis* of children, and in some obstinate forms of skin disease, has decided therapeutic value. Although but little oil may be absorbed through the skin, it has been proved that the tendency to emaciation may be arrested or abated by inunction.

One of the drawbacks in the use of *massage* is that so much depends on the judgment, dexterity, and *tact* of the rubber (masseur or masseuse). Dr. Mitchell's advice to disregard such symptoms as increased nervousness and even loss of sleep, following the daily massage, is, as I know from observation, not safe. Average professional rubbers sometimes do harm instead of good. The constant oversight of the medical adviser is necessary; and there are some cases of neurasthenia in which this method does not prove advantageous. It is likely to do good particularly in *paralysis*, *chronic rheumatism*, and *sprains* of the *joints*. *Electro-massage* is sometimes practised, by the use of a metallic brush of fine wire, connected with a battery.

Under any treatment, however, we must not encourage sanguine hopes in instances of **organic degeneration**, the origin of which is so generally to be found in a failure of systemic vital power. The physician will do much for his patient if he can persuade and instruct him to adapt his living to the actual condition of his physical resources, so that, whether his malady be Bright's disease of the kidney, diabetes mellitus, cirrhosis of the liver, locomotor ataxy, or fatty or other organic disease of the heart, he may *economize* both the material and the force of his system by such a regimen of diet, exercise, and excitement as his state requires.

With such management, it often happens that valetudinarians live longer than those who, with sound constitutions, are less watchful against causes of disease, and less prompt in taking warning from the slightest symptoms or approaches of ill health.

Nor need we look upon the failure of medicine to arrest the process of organic degeneration as a subject of very humiliating discouragement. As death is the natural result of life, in the human organism as in every other material form, this partial death occurs, also, under **physiological laws**; and, if it be relatively premature in certain instances, we may believe that this, too, may be traced to a near or remote causation in perfect harmony with the highest interests, moral and physical, of man.

## INHALATION AND ATOMIZATION.

Although the ancient Egyptians had some knowledge of the effects of drugs whose vapors were inhaled, and Hippocrates, Galen, and other Roman physicians, as well as, later, the Arabians, so employed them, they were afterwards long lost sight of. Bennet, of London, in the seventeenth century, seems to have been the first in modern times to use inhalations systematically. The earliest proper instrumental inhaler was probably that of Dr. John Mudge, an English physician, invented and applied in 1799. St. John Long, the charlatan, used large inhalers, from which a number could breathe at once. Boerhaave and Von Swieten, in the early part, and Beddoes at the end, of the eighteenth century, employed medicated inhalations. Scudamore, in 1830, issued a work upon the subject which had a wide circulation.

Since that time, an immense amount of experimentation has been made, to ascertain what local effects upon the lungs and air-tubes, and what action upon the system at large, might be obtained by vapors brought in contact with the highly absorbent respiratory membrane. Most important of all, of course, was the discovery of gaseous anæsthesia by Sir Humphrey Davy, and the subsequent practical application of it by Wells and Morton. Ether, chloroform, nitrous oxide, and bichloride of methylene now take their places not only as alleviators of pain during operations and in parturition, but, also, as occasionally valuable aids to the physician in medical cases. Extreme neuralgic pain is sometimes relieved by the inhalation of ether or one of the other anæsthetics. Convulsions are not unfrequently so treated; and, in those at least of a hysterical or merely irritative character, with good success. Angina pectoris is often relieved by breathing a few drops of nitrite of amyl.

For medical as well as surgical use, chloroform is the most prompt, quiet, and *effectual* anæsthetic. In cases of disease, it does not need to be so given as to produce the total relaxation of *profound* anæsthesia. Can its use be justified, in view of the fact that a considerable number of deaths have been traced to it?

Without space to discuss this point, I may say that observation of the use of chloroform in a method employed by some of the surgeons of the United States army during the civil war, has modified my previous apprehension of it. The great necessity is, as Dr. Sansom[1] has shown very fully, the *dilution* of the chloroform with abundance of air, and its gradual introduction. Most methods exclude air too much. That which I have alluded to above is, letting the chloroform fall, *drop by drop*, upon a handkerchief spread singly over the face of the patient. An instrument is used for dropping, which will allow only one drop to pass at once. I believe that, with this or any other mode of abundant dilution and slow inhalation of it, watching momentarily its effects, chloroform is safe, in an immense majority of cases. Anæsthesia from chloroform cannot with safety be produced in less than five or six minutes.

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[1] On Chloroform; its Action and Administration.

Ether excites some persons too much to be generally relied upon in medical cases. Two or three parts of ether with one of chloroform make a mixture often used with advantage. Dr. Sansom prefers one part of chloroform to one or two of absolute alcohol. Dr. B. W. Richardson combines ether with bichloride of methylene. Nitrous oxide, although experimented upon by Davy and used by Wells before ether, has only of late come to be highly appreciated for practical use. Its applications by inhalation in disease remain to be tried and studied. The same is true of bromide of ethyl. Compressed air (Waldenburg) and oxygen gas are now considerably employed for inhalation in consumption. Some practitioners believe the chief benefit to result from mechanical *expansion of the air-cells of the lung.*

Apart from the "anæsthetics," it cannot be said that great success has ever been obtained in the *cure* of diseases by inhalation. *Palliation* of pulmonary and bronchial or laryngeal irritation, or diminution of excessive expectoration, as by simple vapor of water, tar-vapor, or that of infusion of hops, opium, etc., has been often realized. With other aims and agents, disappointment has generally predominated.

For ordinary inhalation, very simple apparatus will suffice. For instance, a wide-mouthed jar or bottle, with a cork in it; the cork pierced by two glass tubes, one straight, and reaching to near the bottom of the bottle; the other short, and bent outside of the cork. The bottle is to be not quite filled with the liquid (more or less heated according to its volatility); the bent tube not reaching its surface, the other conveying air into it from beyond the cork. Even this is not necessary, at least in the case of liquids used with water. We may employ these by pouring boiling water into a convenient vessel of any kind, the medicament being added to it, and then covering the vessel with a towel, holding the mouth and nostrils under the edge of the latter. Hops in infusion, stramonium leaves, laudanum, etc., may thus be used. Of laudanum, *e. g.*, twenty or thirty drops may be put into a pint of water, for a very worrying cough. *Smoking* is a primitive method of inhalation. Tobacco, so employed, sometimes relieves in asthma; but cigars of stramonium leaves, or of paper saturated with nitrate of potassium, are more effectual in the paroxysms of the same disorder. *Continuous* inhalation is sometimes desirable. For this, Dr. W. Roberts's small and light metallic box may be used. It is perforated in front and behind, and filled loosely with tow, into which the desired liquid is poured for inhalation. It may then be fixed by elastic bands over the ears, and worn for some time without inconvenience. Curschmann has devised a similar respirator made of vulcanite, with a rim of soft India-rubber. A simple glass or metal tube will answer for a shorter period. Dr. Pepper employs a tube enlarged near its lower end, in which pumice-stone is placed to receive the material for inhalation.

Dr. Andrew H. Smith's *insufflator* is sometimes convenient to introduce powders into the larynx. It consists of a small wide-mouthed bottle, through whose cork are passed two tubes, each bent at right angles. To one is attached a rubber hand-ball;

the other is placed near the orifice of the glottis. When the medicated powder has been put into the bottle, the compression of the hand-ball will blow the powder out through the other tube into the throat.

Extremely minute division or *atomization* of liquids, introduced into the air-passages, has been latterly often substituted for inhalation. It was first devised by Sales-Girons. Under the natural fascination of novelty, and the imposing appearance presented by instrumental appliances, it is quite probable that a degree of enthusiasm has existed about it, more than will be permanent. Still it is an important addition to our means of treatment of affections of the throat, and, perhaps, of some of those of the lungs. Referring the reader to special works[1] upon it for details, I must give only the briefest account of atomization or nebulization.

The essential idea of it is, the forcing of a fine jet of liquid against a solid body or a strong current of air, so as to convert it at once into diffused spray. Bergson, for instance, employed the tubes used for *odorators*, that is, to spread perfumed liquids in the air. Two glass tubes with minute orifices are fixed at right angles to each other, so that the end of the upright tube is near and opposite to the centre of the orifice of the horizontal tube. The upright tube being immersed in the liquid to be nebulized, air is forcibly blown through the horizontal one. The current of air, passing over the outlet of the tube communicating with the liquid, rarefies the air in the latter, causing a rise of the liquid in the tube, and its very minute subdivision (atomization, nebulization, pulverization), as it escapes. Silver tubes may be used instead of glass, but they are harder to keep clean. Glass ones may be cleaned with hydrochloric acid solution, aided by a bristle to remove obstructions. The form of the tubes may be varied, so as to allow of their application to any part of the body.

Richardson's spray-producer (designed for local refrigeration) is constructed upon a similar principle. It consists of a graduated bottle, through whose cork passes a double tube; that is, a tube within a tube. The inner one reaches to near the bottom of the bottle, below, and above near to the extremity of the outer tube. The latter has entering it, above the cork, another tube connected with "hand bellows"—*i. e.*, two elastic bags, the one nearest the bottle (protected by silk network) acting as an air-chamber, and the furthest one being compressed by the hand, to produce a jet of air into the bottle and tube.

Siegle contrived an apparatus for the application of steam-power to atomization. The tubes being arranged upon Bergson's principle, a small boiler is connected with the horizontal one, and in the boiler steam is generated by the heat of a spirit lamp. The jet of steam from the horizontal tube nebulizes the liquid drawn up from the vertical tube immersed in a vessel containing it. Various modifications of this have been made.[2] Though the

[1] See Da Costa on Inhalation.

[2] Gemrig, of Philada., Dr. W. Reed, of Boston, and Codman and Shurtleff, of Boston, furnish improved forms of apparatus for atomization.

steadiness of action of the steam apparatus must be a great advantage, for many purposes the hand-ball atomizer is more available.

For full effectiveness of any method of inhalation in chronic or subacute cases, the patient must have the instrument at his own house, learn its management, and use it with regularity for a sufficient time. This of course limits very much the employment of such medication.

The first inhalations should always be short, and with warm water only, to inure the patient to their use. The distance of the mouth from the tubes may vary from six inches to two feet. When prepared for it, one may inhale "medicated spray" for ten minutes at a time; breathing deeply if we wish the liquid to reach the remoter air-passages. It should never be done after a hearty meal; and the patient should remain in-doors for a while after the operation.

Proof has been obtained that atomized liquids inhaled do, sometimes at least, pass down into the trachea; constantly, into the larynx. It is probable, indeed almost certain, that a certain portion may even reach the lungs. As to their application, trial has been and is now being made of this process, especially in croup, diphtheria, œdema of the glottis, catarrh, chronic laryngitis, hooping-cough, asthma, pulmonary hemorrhage, and phthisis.

False membrane has been asserted by Küchenmeister, Biermer, Geiger, and others, to be dissolved, or at least removed from the throat, by inhalation of hot lime-water. Dr. Geiger's method is to make the patient breathe the vapor arising from hot water poured on unslaked lime. Lactic acid is said (A. Weber) to have the same power.

From Dr. Da Costa's monograph upon inhalation I cite the following conclusions as indicating the results of experience upon the subject:—[1]

"That in most acute diseases of the larynx, and still more so in acute disorders of the lungs, the value of inhalations of atomized fluids, save in so far as those of water may tend to relieve the sense of distress, etc., and aid expectoration, is very doubtful; though in some acute affections, as in œdema of the glottis and in croup, medicated inhalations have strong claims to consideration.

"That in certain chronic morbid states of the larynx, particularly those of a catarrhal kind, and in chronic bronchitis, they have proved themselves of great value.

"That in the earlier stages of phthisis, too, they may be of decided advantage, and that at any stage they may be a valuable aid in treating the symptoms of this malady.

"That their influence on such affections as hooping-cough and asthma is not satisfactorily proven.

"That they furnish a decided and unexpected augmentation of our resources in the treatment of pulmonary hemorrhage.

"That they require care in their employ; and that in acute

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[2] Op. citat., p. 40.

affections we should consider whether, as they have to be used frequently to be of service, the patient's strength justifies the disturbance or the annoyance their frequent use may be."

DOSES FOR INHALATION.[1]

| | |
|---|---|
| Alum | 10 to 20 grains. |
| Tannin | 1 to 20 " |
| Perchloride of iron | ⅛ to 2 " |
| Nitrate of silver | 1 to 10 " |
| Sulphate of zinc | 1 to 6 " |
| Chloride of sodium | 5 to 20 " |
| Chlorinated soda | ½ to 1 drachm. |
| Chlorate of potassium | 10 to 20 grains. |
| Chlorate of ammonium | 10 to 20 " |
| Watery extract of opium | ¼ to ½ " |
| Fluid extract of conium | 3 to 8 minims. |
| " " hyoscyamus | 3 to 10 " |
| Tincture of cannabis indica | 5 to 10 " |
| Lugol's solution of iodine | 2 to 15 " |
| Fowler's solution of arsenic | 1 to 20 " |
| Tar-water | 1 to 2 drachms. |
| Oil of turpentine | 1 to 2 minims. |

To these may be added, carbolic acid (Marcet) 1 or 2 grains, or creasote, 1 or 2 drops, in phthisis; and lactic acid (15 to 20 drops in half an ounce of water), in croup. Also, *nitrite of amyl*, 2 to 5 drops; in puerperal convulsions, angina pectoris, etc.

## HYPODERMIC MEDICATION.

Apparently upon a suggestion contained in Valleix's work on Neuralgia, Dr. Alexander Wood, of Edinburgh, in 1843, experimented successfully with the injection of anodynes under the skin of parts affected with neuralgic pain.[2] Dr. Kursak, of Vienna, disputes priority with him. Mr. Rynd, of Dublin, followed him after about a year. Local effects, only, seem to have been clearly recognized by these gentlemen. C. Hunter, in 1858, proved that general effects upon the whole system are produced, in whatever part of the body the injections are made. Since 1855, however, many medical men have studied the subject; especially Béhier, Lorent, Eulenberg, and Nussbaum, abroad, and Ruppaner and Bartholow in this country. The practice has now become common.

It has been amply proved that hypodermic injection of medicinal substances is ordinarily entirely safe; more rapid, certain, and exact in its effects, in proportion to the amount, than medication by the mouth; that it requires one-third or one-half of the quantity necessary when given by the stomach, and produces less complicated and generally less inconvenient results.

The medicines principally used in this way are narcotics, sedatives, nervine tonics, and stimulants. It is in diseases or symptoms affecting the nervous system that the greatest number of

[1] From Da Costa.

[2] In 1839, Drs. I. Taylor and Washington, of New York, made subcutaneous injections with an Anel's syringe, after first incising the skin.

successful cases has been reported. Pain, most of all, is speedily conquerable by it. Hunter lays down the indications for it thus:—

"When the immediate and decided effect of the medicine is required.

"Where medicines administered by the usual methods fail to do good.

"Where the effect of a medicine is required, and the patient refuses to swallow.

"Where, from irritability of the stomach, or other cause (such as idiosyncrasy, etc.), the patient cannot take the medicine by the stomach."

The following Table is slightly modified from Hunter's :—

- The injection of medicines into the cellular tissue beneath the skin may be made.
  - Locally with...
    - 1. Caustics for nævi, aneurisms, etc.
    - 2. Anodynes, for local neuralgia.
  - Generally
    - In Cerebral.....
      - Insomnia.
      - Melancholia.
      - Mania.
      - Delirium tremens.
      - Hysteria.
      - Chorea.
      - Central neuralgia.
    - Spinal.....
      - Rheumatism.
      - Tetanus.
      - Hydrophobia.
      - Retention of urine.
      - Convulsions.
      - Epilepsy.
    - and
      - Peritonitis.
      - Pericarditis.
      - Dysentery.
      - Ophthalmic surgery.
    - Sympathetic nerve-cases, inflammatory affections, etc.
      - Malarial fever.
      - Gangrene.
      - Dysmenorrhœa.
      - Colic.
      - Cholera.
      - Sea-sickness.
      - Cancer.
      - Ulcer of stomach.
      - Intussusception.
    - As antidote.....
      - For opium, belladonna, etc.
    - Anæsthetic.....
      - With or after chloroform or ether in operations.

The instrument most approved is a small glass syringe, holding about half a fluidrachm, and graduated for drops or minims, with a tube for puncture, of tempered steel, or of silver with a gold point. The end of the tube must be small and sharp, and kept very clean.[1] Graduation of the cylinder is not necessary, as it is

[1] Dr. E. Cutter, of Woburn, Mass., has had made a syringe (of aluminium alloy) so compact as to be carried easily in a pocket case. This is furnished by Shepard & Dudley, William Street, New York. Celluloid syringes also are made.

easy to measure the amount to be taken up by it. Not much pain is usually produced; but sometimes it is quite severe. If the dose of the medicinal agent be not too large, the only danger (unless in an erysipelatous patient) is of a circumscribed inflammation. Repeated injections should not be made at exactly the same spot. Apart from special local indications, the best places for injection are the arms, the back, the abdomen, the thighs, and the calves of the legs. In operating, draw the skin tense with the forefinger and thumb of the left hand, and pass the point of the tube (first well oiled) quickly and steadily through it. Then push in, not rapidly, the desired amount of the fluid; and withdraw it without rotating it. Avoid subcutaneous veins; the puncture of one of them may give an excessive action of the medicine. *Intravenous injection*, however, is sometimes purposely employed, with proportionate doses.

The agents most used are salts of morphia, atropia, strychnia, and quinia. For anodyne purposes, Dr. Ruppaner prefers *liquor opii compositus*, of which one hundred drops are equal to a grain of sulphate of morphia. Many use the ordinary solution of morphia (gr. j of morph. sulph. in f℥j) or Magendie's (gr. xvj in f℥j). Doses (for adults) are as follows:—

| | |
|---|---|
| Sulphate of morphia | gr. $\frac{1}{8}$—$\frac{1}{2}$ |
| Acetate " " | gr. $\frac{1}{8}$—$\frac{1}{2}$ |
| Sulphate of atropia | gr. $\frac{1}{100}$—$\frac{1}{50}$ |
| Sulphate of strychnia | gr. $\frac{1}{50}$—$\frac{1}{12}$ |
| Sulphate of quinia | gr. i—iv |
| Hydrochlorate of quinia | gr. $\frac{3}{4}$—iii |
| Jaborandi, fluid extract | f℥ss—f℥j |
| Pilocarpin | gr. $\frac{1}{8}$—$\frac{1}{4}$ |
| Ergotin | gr. i—v |
| Tinct. digitalis | gtt. v—x |
| Aconitia | gr. $\frac{1}{200}$—$\frac{1}{100}$ |
| Apomorphia | gr. $\frac{1}{16}$—$\frac{1}{4}$ |

Practitioners find it best to make always a *fresh* solution of sulphate or acetate of morphia[1] for hypodermic use. Possibly from decomposition and the growth of fungi in the liquid, old preparations are more likely to be followed by abscess. Strongly acid and strongly alkaline liquids are alike unsuitable.

Quinine is frequently dissolved in glycerin for subcutaneous injection. It is apt to give considerable pain, however. Köbner advises using the *hydrochlorate* (muriate) of quinia for this purpose, its dose being smaller than that of the sulphate, as it contains more quinia in the same bulk.

Among the diseases in which palliation or relief of suffering is often important by means of this method of treatment, are espe-

[1] Anstie and some other British practitioners have preferred the *acetate* of morphia, freshly prepared. Five grains of the acetate are dissolved, with a *minim* of acetic acid, in a fluidrachm of hot distilled water. Two minims of this will be a dose to begin with. Vachell and White have proposed the following: Acetate of morphia, 20 grains; distilled water, 140 minims; acetic acid, 5 minims. T. & H. Smith advise meconic acid instead. Drasche, Rosenthal, and Constantin Paul recommend *glycerin*, instead of water, for hypodermic injections. Adrian prefers distilled water with twenty per cent. of glycerin. *Pellets* for hypodermic use are now made. They keep well, but are less easy to graduate in dose than solutions.

cially neuralgia, hysteria, palpitation of the heart, cancer, and ulcer of the stomach. A case of the latter affection is recorded in which for weeks or months the patient was only able to retain food upon the stomach after the disposition to vomit had been allayed by a hypodermic injection of morphia.

*Curative* effect from anodynes so employed has been asserted in cases of delirium tremens, mania, and tetanus; from quinine (two to four grain doses) in intermittent fever.

*Tentative* use of the same mode of practice is justifiable in cholera, hydrophobia (woorara), poisoning (as the injection of morphia for belladonna poisoning, and the converse), croup (apomorphia), violent hooping-cough (atropia), pernicious fever, spotted fever, etc.

That the operation is always without inconvenience to the patient is not true. Not only pain, but local inflammation and even suppuration may sometimes be induced. Odevaine, in India, reports three cases of tetanus following the hypodermic injection of quinine. (*Indian Med. Gazette*, April, 1871.)[1] But many patients, suffering painful complaints, have had a hundred or more injections made in different parts of the body, without any disadvantage, and with great relief.

A *habit* of hypodermic injection of morphia has often been formed; exhibiting the same power over the will of the individual as that experienced by the opium-eater.

*Hydrate of chloral* is sometimes used by hypodermic and also (Bucquoy) *intravenous* injection, especially in tetanus. It should be diluted considerably (ten grains to the ounce) to prevent local irritation. Intravenous injection of *aqua ammoniæ* (half a fluidrachm with the same or twice the amount of water) has been resorted to for *stimulation* in cases of exhaustion; also, to antagonize the poisoning of snake bites (Halford). Ether (15 drops at once) has been given for the same purpose by hypodermic injection. *Whisky* and *brandy* may be introduced hypodermically in cases of collapse, in half drachm doses. Strong *coffee* has also been so used, and in opium poisoning, 20 or 30 drops at a time. *Woorara* (curara) has been injected, with asserted success, in two or three cases of hydrophobia. This powerful agent has also been hypodermically applied in the treatment of epilepsy. *Acetic acid* injected into cancerous tumors is said to have some power to cause them to shrink and cease growing. I propose the use of *alcohol* upon the same indication. I am not aware of its having been thus employed; but Politser[2] has so treated polypi of the ear with success. *Creasote* may do good in like cases.

*Apomorphia* (grs. $\frac{1}{10}$ to $\frac{1}{20}$) when injected under the skin, produces a powerful emetic effect. It has been used with advantage in membranous croup. It is so depressing as to require caution.

*Camphor* (2 or 3 grains, dissolved in ten times its weight of

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[1] Other cases of tetanus following hypodermic injections are mentioned in the London *Lancet*, Dec. 16, 1876, and July 6, 1867; and *Brit. Med. Journal*, Nov. 1, 1879. It would seem that a peculiar state of system must be present, predisposing to tetanus in such cases.

[2] Wiener Med. Wochenschrift, Nov. 31, 1880.

almond oil) has been found, when subcutaneously injected, beneficial in calming excitement and promoting sleep in lunatics and hysterical patients.

*Ergot* (or its extract, called ergotin) has been much used of late years, hypodermically, to *produce contraction* of blood-vessels and other involuntary muscular tissues; as in the treatment of *hemorrhages*, *fibroid tumors of the uterus*, *enlargement of the spleen*, etc. Of ergotin (which, as commonly prepared, is not the pure alkaloid, but a watery extract) Bartholow[1] says, from one to five grains may be injected at once; best, freshly dissolved in distilled water, and then passed through a filter. Of the fluid extract of ergot, from five to ten minims may be injected at a time; for serious hemorrhages, yet larger doses. It may be thus employed in epistaxis, hæmoptysis, uterine hemorrhage, aneurism of the aorta, etc. (It should not be pushed so far as to cause spasmodic closure of the *sphincter* of the bladder and retention of urine.)

*Pilocarpin*, hypodermically injected, is the most powerful of sudorifics, increasing also largely the secretion of saliva, and promoting the action of the kidneys.

*Hypodermic alimentation* has been tried in a few cases. Dr. J. T. Whittaker,[2] of Cincinnati, succeeded in keeping a patient suffering with gastric ulcer alive for several days at a time by subcutaneous injections of beef extract, milk, and cod-liver oil. Menzel, Percs, Stricker, and others had before experimented similarly upon animals, and Krueg successfully with olive oil upon an insane patient.[3]

*Atropia* is sometimes hypodermically injected in states of great prostration, as a "respiratory stimulant;" and *digitalis* (or digitalin) to "support a flagging heart."

## TRANSFUSION OF BLOOD.

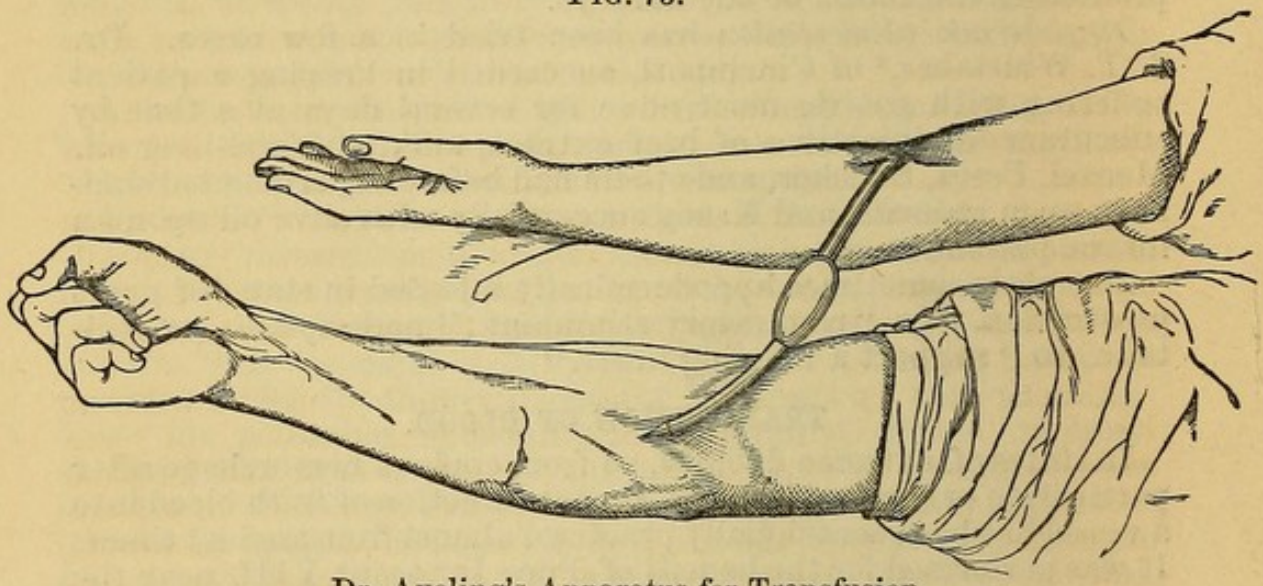
In states of extreme debility, as from copious hemorrhage after parturition or surgical injuries, the introduction of fresh blood into a vessel has been occasionally practised almost from ancient times. It was performed for the benefit of Pope Innocent VIII. near the end of the fifteenth century. Sir Christopher Wren wrote a paper upon its practicability, for the Royal Society, in 1657. Not much later, Lower in England, and Denys in France, experimented with it; the latter with two successful cases in human subjects. Harwood, Blundell, Waller, Martin, and others afterwards called attention to the same practice.[4] Several methods have been employed; the oldest, the transfusion of blood from an *artery*, directly into a vein of the arm of the patient. In 1872, Prof. Esmarch performed arterial transfusion twice. Kolomnin, of Russia, after ten trials, prefers injecting defibrinated blood into the *peripheral end of the radial artery*.[5] *Mediate* transfusion of

[1] Materia Medica and Therapeutics, p. 277. Squibb's preparation is probably the best.
[2] The Clinic, Jan. 22, 1876.
[3] Revue des Sciences Médicales, Jan., 1876, p. 106.
[4] In 1861, Dr. Martin published a statement of forty-five successful instances of transfusion, out of fifty-seven cases of its performance. See *N. Y. Med. Record*, April 1, 1874. In all, 126 successful cases had been reported down to July, 1874, and probably as many or more have occurred since that time, successful so far as the *immediate* result of the operation is concerned.
[5] Transactions of the Society of Russian Physicians, 1879–1880.

*venous* blood has been most often used; the blood being received into an instrument, from which it is again injected into a vein or (Albanese, Auter, Kolomnin, Aschè) into an *artery* (radial or posterior tibial). On theoretical grounds, *defibrinated* blood has been much favored, especially in order to prevent interference with the operation by coagulation. It would appear, however, to be a defensible opinion that unwhipped natural blood, *promptly* (though not too rapidly) transfused, will better afford favorable conditions for recuperation. Introduction of air during the operation has been regarded as its chief danger; speedy death has been ascribed to this accident in several cases. Robin and Feltz have explained this by capillary embolism. But Oré found, experimentally, that a *small amount* of air may be injected into the femoral vein of a dog without injury. While precautions are necessary to exclude air, this risk need not stand in the way of transfusion.

Altogether, it is probable that Aveling's method of *immediate*

FIG. 75.



Dr. Aveling's Apparatus for Transfusion.

*transfusion from vein to vein* is the best. The instrument for this consists of a small india-rubber tube, about a foot long, with a bulb at the centre; the ends being furnished with canulas for introduction into the veins. The *movement* of the blood is facilitated by pressure upon the bulb. The quantity of blood transferred has varied from four to twelve or more ounces; probably from four to six or eight ounces will always suffice. It may be sufficiently well estimated in direct transfusion, by the *time* occupied. Three or four minutes will do when blood flows from vein to vein; half a minute to a minute, if from artery to artery. Béhier[1] saved the life of a woman with twenty drachms; using Moncocq's apparatus, by which, at each turn of the rack, five grammes of blood are introduced. Dr. J. W. Howe (*N. Y. Med. Record*, April 1, 1874) has found Dieulafoy's aspirator, modified for the purpose, to serve in transfusion with great convenience.

[1] *Revue Scientifique*, March 7, 1871.

Dr. B. E. Fryer, U. S. A., has added a second bulb to Aveling's apparatus, for more convenient manipulation of the blood, which requires some force of pressure to secure its transmission (*N. Y. Med. Record*, April 15, 1874). Dr. T. G. Morton (*Am. Journal of Med. Sciences*, July, 1874) reports success in four cases with the use of defibrinated blood. He has a vessel in which the blood can be kept warm, by being surrounded by hot water, while awaiting use.

Some practitioners prefer to *omit* the *bulb* of Aveling's apparatus. Others (McDonnel) recommend the employment of a *funnel* into which defibrinated blood is poured, to be conducted to the vein through a rubber tube ending in a canula. On the question of choice between the use of unmodified and that of defibrinated blood, B. W. Richardson is among those who urge the latter; Barnes and A. Flint, Jr., as well as Howe and Moncocq, the prompt use of unaltered blood. During the operation it is advisable (MacEwen[1]) to have the patient's arm *elevated*, to lessen the probability of air entering the vein when it is opened and when the blood is introduced. For the same reason, when a syringe is used, a small portion of blood may be forced out after it has been filled, the nozzle being slightly inclined upwards.

The purpose of the operation is of course to sustain life until the emergency which threatened exhaustion is overpassed, and normal sanguification in the patient is renewed.

Transfusion of blood has been so far chiefly employed in cases of hemorrhage from any cause, and, in a few cases, for the collapse of cholera. Hasse, Proegler, and others, however, have resorted to it, with at least apparent temporary advantage, in advanced phthisis.[2]

Experiments of the same kind, with lamb's blood, made at Dresden, by Drs. Oehme, Stetzner, Hirschfeld, and Bischoff, have not sustained the expectation that much benefit can be thus effected in phthisis. Immediately after the operation, in several instances, shivering, vomiting, and even convulsions followed; a day or two later, hæmaturia. All these symptoms soon disappeared; but the patient was left with his malady about as before. Landois, Ponfick, Panum, and Kuster have strengthened the evidence against the employment of any kind of blood except that of man; that of other animals being apparently dangerous in proportion to the *quantity* introduced.

Dr. Hodder, of Toronto, in 1850, used intravenous injection of strained *milk* in three cases of cholera, in collapse. Two of these patients recovered. Dr. J. W. Howe, of New York, in 1874, injected f℥vi of goat's milk fresh from the animal into the cephalic vein of a patient having phthisis. During the following year Dr. T. Gaillard Thomas[3] injected f℥viijs of cow's milk, freshly drawn, into the median basilic vein of a woman exhausted after the removal of a large abdominal tumor. She rapidly

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[1] London Lancet, 1880.

[2] *Phila. Med. Times*, May, 1874. See, also, *Die Lamm-blut Transfusion beim Menschen*, by Dr. Oscar Hasse, Nordhausen: *Die Transfusion des Blutes*, by Dr. Franz Gesellius; and an article by Dr. H. M. Madge, *Brit. Med. Journal*, Jan. 10, 1874.

[3] Amer. Journal of Med. Sciences, Jan., 1876, p. 61.

recovered. Drs. Howe and Dupuy proved by experiments upon dogs that milk *an hour or more removed from the cow* has fatal effects; it must be *fresh* and *alkaline* to be successful. For certainty of its alkalinity, a small amount of carbonate of sodium or ammonium may be added. Not more than eight fluidounces of milk should be injected at once; four or five ounces may suffice. The funnel and canulated rubber tube are preferred for its introduction. By April, 1878,[1] Dr. Thomas had operated in this way seven times upon human subjects; with no bad effects in any instance, and in several cases with prolongation of life. Meldon,[2] of Dublin, has injected milk in ten cases; four of these are reported as thus *cured* of pernicious anæmia. Drs. J. H. Brinton and C. T. Hunter of Philadelphia have also had successful cases; in all to October, 1879, twenty-two cases were recorded.[3]

Wulfsberg,[4] Demetre-Culcer[5] and Schäfer[6] object to the transfusion of milk, on the basis of results obtained in experimenting on animals. Theoretically, also, they point out as important the absence of *hæmoglobin* from milk, the difference of *milk corpuscles* from those of blood, the danger of capillary embolism, and of bacteria or other "septic organisms" being introduced with milk. Against these objections stands the success of the operators above mentioned, in so considerable a number of cases; giving encouragement to the hope of Dr. T. G. Thomas, of a useful future for intravenous lacteal injection.

Ponfick,[7] Bizzozero and Golgi[8] have obtained promising results with the transfusion of defibrinated blood into the *peritoneal cavity*. After experimenting with animals, Ponfick resorted to this practice with three hospital patients. Slight feverishness and abdominal tenderness occurred, but soon passed away. The apparatus used was an india-rubber tube, to one end of which a glass tube was attached, and to the other a pen-pointed canula, which could be closed with a tap. First filling the whole tube with defibrinated blood, the canula was pushed through the abdominal wall, the tap opened, and the blood poured into the peritoneal cavity. From 220 to 350 grammes (7 to nearly 9 ounces) were injected at one operation, without pain or great discomfort. Immediate increase of the red blood corpuscles in the blood of the subject of transfusion was ascertained, and this lasted more than a week. Absence of danger to the brain, lungs, or heart is urged on behalf of this procedure. Of course there is a possibility of peritoneal inflammation; and the value belonging to the operation will have to be finally determined by more extended experience.

The inconvenience attending *all* modes of transfusion is likely to cause them to be reserved very much for extreme emergencies.

(On *Pneumatic Aspiration*, see p. 112.)

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[1] N. Y. Med. Record, April, 1878.
[2] Lancet, April, 3, 1880.
[3] Medical Press and Circular, October, 1879.
[4] Lancet, Dec. 7, 1878.
[5] Thèse de Paris, 3 Mai, 1879.
[6] Transac. of Obstet. Society of London, 1879.
[7] Medicinisch Rundschau, 1879, p. 876.
[8] Centralblatt f. Medicin. Wissenschaft, Dec. 20, 1879.

## GENERAL CONCLUSIONS.

The following may, in recapitulation, be stated to be the *most general* desiderata in the management of all diseases:—

**Rest** { *a*, in all *acute* diseases;
*b*, in all cases of *exhaustion.*

**Balance** { *a*, of the *fluids* and solids;
*b*, of the activity of *functions.*

**Normal blood-change** { *a*, due removal of *excretions;*
*b*, absence of morbid *poisons.*

**Support** { *a*, in all *asthenic* cases;
*b*, in *later stages* of sthenic cases.

## THERAPEUTIC MAXIMS.

1. All **pathology** is but the **physiology** of organic **perturbations.**
2. Never **interfere** actively in disease without a distinct **object.**
3. **Act** only upon scientific **reason,** or *well-defined* **experience.**
4. Treat the **cause** of disease whenever it is **possible.**
5. **Watch** *always*, and treat, when **requisite,** the **condition** of the *patient.*
6. **Avoid,** especially, **routine** treatment according to the *names* of diseases.
7. Use no **violence** with **self-limited** diseases.

I believe that a sound "theory of medicine" may be approximated in a single paragraph, thus:—

Physiological **optimism** characterizes the aggregate tendency of all the forces of the living organism, under the influence of *life-force.* But, the *best possible* result in a given case may, from its *conditions and circumstances*, fall far **short** of *health.* Medicine, then, is to *favor or supply those* **conditions** *which, under natural laws, allow* or *promote* the **best result.**

In aiming to fulfil this duty, the art of healing must *always* depend, *in part*, upon empirical **observation** (which every branch of knowledge requires) and *in part* upon **deductive science.** But in both alike, the physician is, or should be, "*naturæ minister et interpres.*"

# SECTION IV.

## *NOSOLOGY.*

Diseases were by Cullen classified as **locales, pyroses, cachexiæ,** and **neuroses** (local diseases, fevers, cachectic diseases, and nervous affections).

The advances made in pathology since Cullen's time require some *modification* of this arrangement, while retaining its principle. I propose, therefore, that diseases be sub-divided as—

**Phlegmasiæ**: inflammations.
**Zymoses**: zymotic diseases.
**Cachexiæ**: cachectic affections.
**Neuroses**: nervous disorders.
**Ataxiæ**: unclassifiable diseases.

The following list is intended to present only the *most important* diseases of each class:—

**Phlegmasiæ:**

Laryngitis;
Tracheitis;
Bronchitis;
Pneumonia;
Pleurisy;
Endocarditis;
Pericarditis;
Stomatitis;
Pharyngitis;
Gastritis;
Enteritis;
Dysentery;
Peritonitis;
Hepatitis;
Nephritis;
Meningitis;
Cerebritis;
Myelitis.

**Zymoses** (diseases produced by a *morbid poison;* enthetic):

Only produced by contact or inoculation—

1. Primary Syphilis;
2. Gonorrhœa;
3. Hydrophobia;
4. Vaccinia.

Eruptive—contagious—

1. Variola;
2. Varioloid;
3. Varicella;
4. Morbilli (measles);
5. Rötheln;
6. Scarlatina.

Contagious—not eruptive—

1. Parotitis Contagiosa (mumps);
2. Pertussis (hooping-cough).

Generally epidemic or endemic—

1. Typhoid Fever;
2. Typhus;
3. Cerebro-spinal Fever;
4. Puerperal Fever;
5. Erysipelas;
6. Plague;
7. Cholera;
8. Endemic Dysentery;
9. Influenza;
10. Diphtheria.

Endemic, occasionally epidemic—
1. Yellow Fever;
2. Relapsing Fever;
3. Dengue.

"Malarial;" endemic—
4. Intermittent;
Remittent;
Pernicious Fever.

**Cachexiæ:**

1. **Diatheses** (general cachexiæ):

Always chronic—
*a.* Spanæmia (anæmia);
*b.* Chlorosis;
*c.* Leucocythæmia;
*d.* Pseudo-leukæmia;
*e.* Pernicious Anæmia;
*f.* Melanæmia;
*g.* General Dropsy;
*h.* Hemorrhagic Diathesis;
*i.* Tuberculosis;
*j.* Diabetes;
*k.* Lithiasis;
*l.* Secondary Syphilis;
*m.* Addison's Disease;
*n.* Exophthalmic Goitre.

Acute or subacute—
*a.* Scurvy;
*b.* Gout;
*c.* Rheumatism;
*d.* Septæmia;
*e.* Pyæmia;
*f.* Mucous Disease.

2. **Local** cachexiæ (degenerations):

Cancer;
Various Tumors, Cysts, etc.;
Goitre;
Cirrhosis (of the liver, etc.);
Bright's Disease (of the Kidney);
Fatty Degeneration of the Heart;
Other organic Degenerations.

Skin diseases, viz.:
Exanthemata (urticaria, roseola);
Papulæ (lichen, etc.);
Vesiculæ (herpes, etc.);
Bullæ (pemphigus, etc.);
Pustulæ (impetigo, etc.);
Squamæ (psoriasis, etc.);
Maculæ (fuscedo, etc.);
Hypertrophiæ (elephantiasis, etc.);
Tubercula (molluscum, etc.);
Hemorrhagiæ (purpura);
Neuroses (prurigo);
Parasiticæ (scabies, etc.);
Syphilida.

**Neuroses:**

Apoplexy;
Paralysis;
Epilepsy;
Catalepsy;
Hysteria;
Chorea;
Tetanus;
Asthma;
Angina Pectoris;
Locomotor Ataxy;
Cerebro-spinal Sclerosis;
Laryngismus Stridulus;
Convulsions;
Neuralgia;
Delirium Tremens;
Insanity; viz.:
Mania;
Monomania;
Melancholia;
Dementia.

**Ataxiæ** (unclassifiable Diseases):

Hemorrhages;
Local dropsies (ascites, etc.);
Jaundice;
Dyspepsia;
Cholera Morbus;
Colic;
Diarrhœa;
Worms, etc.

# PART II.

# SPECIAL PATHOLOGY AND PRACTICE OF MEDICINE.[1]

HAVING endeavored, on our previous pages, to state, with brevity, what may be regarded as the essential *principles* of the science of medicine, we proceed to apply these to an account of the diseases to be dealt with in *practice*. Our purpose will be to give a brief and clear description of each disease, with its causation, diagnosis, pathology, and treatment.

The classification of diseases followed in the succeeding pages is chiefly clinical; though based upon the pathological nosology already stated (Part I., Sect. IV.). Such an arrangement finds sufficient justification in its convenience.

## AFFECTIONS OF THE RESPIRATORY ORGANS.

### PNEUMONIA.

**Definition.**—Inflammation of the substance of the lung.

**Varieties.**—According to its *seat;* single, double, lobular. According to *causation;* idiopathic, from cold and wet; traumatic, from injury; caseous or tuberculous, in phthisis; and typhoid pneumonia. Except in phthisis, we seldom meet with chronic pneumonia; what is commonly called so being mostly induration *following* acute pneumonia as an effect, not a continuation of it.

**Symptoms and Course.**—A chill or stage of depression, followed soon by fever, with oppression in breathing, dull pain (not always present) in the chest, and sometimes short cough. Delirium is common. In children, vomiting frequently occurs. Temperature of the body is high, especially on the fourth or fifth day; sometimes, in the evening, reaching 104° or 105° Fahr. in the axilla. Secretions scanty, as in other febrile states. Urine containing an excess of urea, but deficient especially in the chlorides, in the middle period of the attack. Expectoration commences about the third day usually, the sputa being composed of mucus, lymph, and blood mixed together, making the *rusty* sputum of pneumonia. In this an excess of chloride of sodium will be found by testing with nitrate of silver.

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[1] NOTE TO PART II.—The letter F, followed by a *number*, in parenthesis, indicates a reference to a formula of that number, in the latter part of the book. See, also, Index of Formulæ, at the end of the book.

The height of the attack is generally reached between the fifth and the seventh day; after which the temperature declines, and, in favorable cases, all the symptoms subside. In others, oppression in breathing, and prostration increase; cough deepens, and expectoration becomes more abundant, at last purulent. Death seldom occurs before the sixth, and may be as late as the twentieth day.

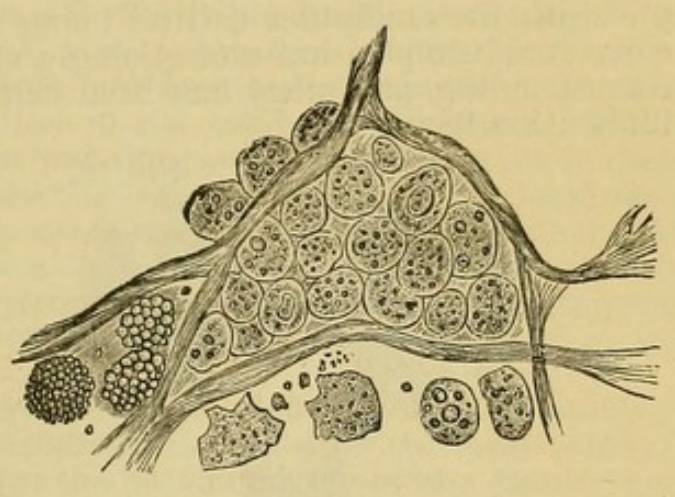
**Stages.**—1st, that of congestion or engorgement, and the commencement of exudation; 2d, that of exudation and red hepatization; 3d, that of gray hepatization, softening, or purulent infiltration.

**Physical Signs.**—These differ in the three stages. In the first they are, moderate dulness of resonance on percussion over the affected lung, and, on auscultation, after the first day or two, the *fine crepitant* râle.

In the second stage, decided dulness on percussion, no râle, but instead, *bronchial* respiration and bronchophony; with increased vocal fremitus. In the stage of softening or suppurative infiltration (gray hepatization), dulness on percussion, and coarse crepitant or mucous râle.

When *resolution* follows the second stage, as in cases of recovery, the bronchial respiration gives way to returning fine crepitation (crepitus redux); and, then, the dulness of resonance on percussion also gradually disappears.

FIG. 76.



Red Hepatization (magnified).

**Terminations.**—Resolution; death in the second stage from asphyxia; death from exhaustion in the third stage; recovery after the third stage (uncommon); abscess; gangrene of the lung.

**Complications.**—Pleurisy (pleuro-pneumonia); capillary bronchitis; tubercle; inflammation of the liver; endemic malarial fever.

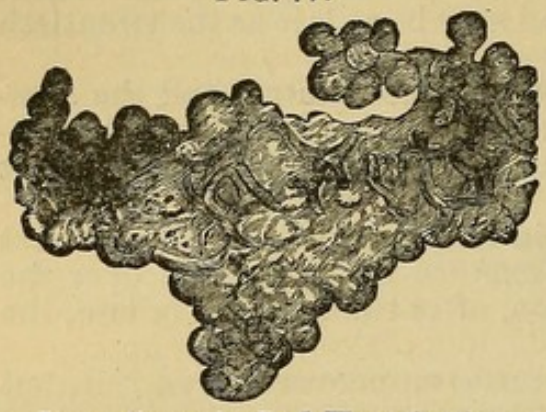
**Sequelæ.**—The most frequent is that persistent consolidation of the lung called by some chronic pneumonia. Tubercular deposit, sometimes even acute phthisis, may follow pneumonia, in persons predisposed to it.

**Morbid Anatomy.**—The *lower* or *middle* lobe is almost always the seat of the disease. Should death take place (as it rarely does) in the first stage, the lung would be found somewhat swollen, dark-red, inelastic (splenization), and filled with blood or bloody serum. It would still float in water, though heavier than healthy lung. It is easily torn.

In the second stage, of hepatization, the lung is no longer spongy, but presents considerable resemblance to the liver;

although a finger may be easily thrust through it. When entirely hepatized, it will not float in water, the air being displaced from the cells by the exudation of coagulable lymph.

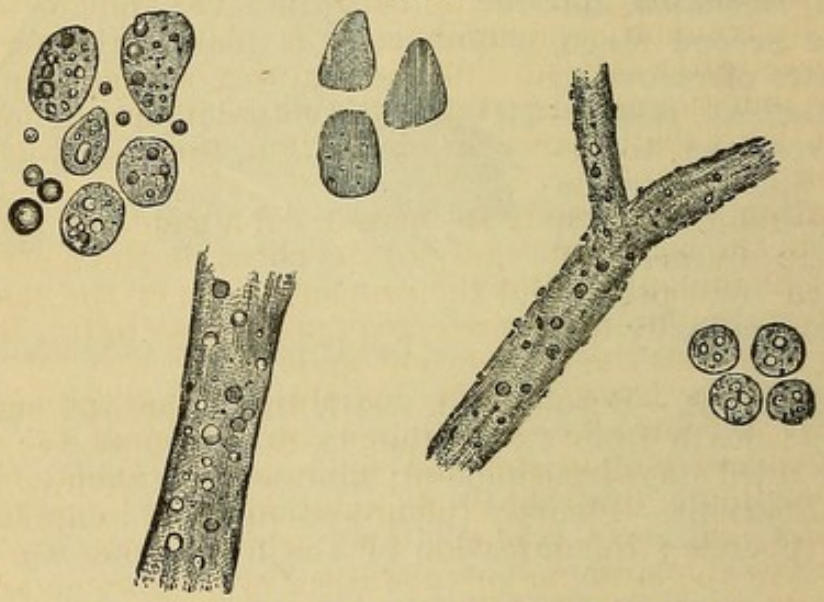
FIG. 77.



Lung-tissue in Red Hepatization.

The third stage consists in the degeneration (in the absence of more favorable *resolution* by absorption) of the exudation. This occurs by *granulation*, *softening*, and *suppuration*. Mostly the latter is infiltrated; occasionally an abscess forms. In gray hepatization, the lung is solid, impermeable to air, with a granite-like appearance of red and white points on section. It sinks in water, but is more easily torn, or crushed into a pulp, than in the second stage. *Caseous* pneumonia is now regarded by many as a frequent beginning of phthisis; the exudation neither being absorbed (resolution) nor converted into pus, but undergoing a slow cheesy degeneration; corresponding with what has been hitherto called "tuberculous infiltration."

FIG. 78.



Elements of Gray Hepatization. (Da Costa.)

*Chronic* pneumonia, of authors, is rather a *sequela* of the inflammatory affection; consisting in induration or consolidation of the affected portion of lung, the exudation not undergoing, for a considerable time, either absorption or degeneration. It is not frequent, in the absence of tubercular deposition. This was, at least, the opinion of Laennec, sustained also by Grisolle, Chomel, Stokes, Niemeyer, and other authorities. Wilson Fox, however,[1] identifies *cirrhosis* of the lung with chronic pneumonia. Walshe,

[1] See Cirrhosis of the Lung, p. 200 of this book; also, article on Chronic Pneumonia, in Reynolds' System of Medicine, Amer. Edition, Vol. II.

Corrigan, Bastian, Wilks, and others, regard pulmonary cirrhosis as a distinct affection.

**Diagnosis.**—The only affections with which pneumonia is likely to be confounded are pleurisy, bronchitis, and phthisis. In children, collapse of the lung has been mistaken for lobular pneumonia.

From pleurisy, pneumonia is known by the absence of the sharp pain belonging to the former, and by the crepitant râle and rusty sputa. From bronchitis, by the dulness on percussion, crepitant râle, bronchial respiration, and bronchophony. From phthisis, by its sudden onset, fine crepitation, and sputa, as well as by the acute violence of the attack. *Latent* pneumonia sometimes complicates fevers, etc.

**Prognosis.**—Simple pneumonia, of one lung, in a young and previously healthy person, ought, under favorable circumstances and judicious treatment, always to be recovered from. In the aged, it is dangerous; and double pneumonia is so at all periods of life, though good recoveries do occur. It is double in about one case in eight.

**Pathology and Nature.**—Ordinary pneumonia is a phlegmasia; with the usual elements of general pyrexia or fever, local hyperæmia, and local exudation. As in other phlegmasiæ, the relation of these to each other is not easily determinable. Is the local affection always the first thing, *causing* the fever, or is there a blood disease first, producing both the fever and the local affection? In traumatic pneumonia, it is plainly the former. In other cases, after exposure to cold and wet, we may suppose it to be both; but the primary step of the actual inflammation is probably the local disturbance in circulation, functional action, and nutrition.

**Causation.**—As already intimated, cold, suddenly or partially applied to the body, especially to the chest, is the most common cause of pneumonia. But the previous state of the health, and especially, also, latent tubercle, may predispose to it. So, in certain regions, does the influence of malaria.

Some writers have latterly maintained that pneumonia is, ordinarily, a "fever" or self-limited constitutional disease (not a true *phlegmasia* or idiopathic local inflammatory affection). While there is no doubt at all that inflammation of the lungs frequently *complicates* malarial,[1] typhoid, and other fevers, my belief is decided that the large majority of cases of pneumonia are simply inflammatory, as truly as pleurisy or other *phlegmasiæ*. The "pneumonic fever" theory seems to me to have influenced treatment disadvantageously.

**Treatment.**—This remains to be a *quæstio vexata*. Having considered already (General Therapeutics) the principles involved, my conclusions may be briefly stated. I am convinced by experience that prompt and moderate "antiphlogistic" treatment may greatly lessen the danger of pneumonia, if not shorten its duration.

Probably nine cases in ten would recover without the abstrac-

[1] See La Roche on Pneumonia and Malaria.

tion of blood; the tenth might die for want of it. I believe that the mortality of pneumonia has increased in Philadelphia and elsewhere since bloodletting has been so generally abandoned.[1] But bleeding from the arm, if resorted to, should be done but *once;* not later than the *third* or *fourth* day; and it may be moderate in amount. Old persons and those of feeble system will neither bear nor require it.

Cupping between the shoulders may, in many cases, take the place of venesection; in some, it may follow this. The early administration of a vigorous purgative, as Epsom salts, or citrate of magnesium, is proper in the absence of any special contraindication.

Tartar emetic [F. 1][2] in the dose of one-eighth to one-quarter of a grain for an adult, every two or three hours, may be continued during the height of the febrile stage. For this, as for bleeding, the indications are to be found not in the physical signs of pneumonia, but in the general condition of the system; not in the crepitant râle, but in the hot skin, hard or else oppressed pulse, pain and dyspnœa, and more or less darkly flushed face. After the height of the attack, small doses of ipecacuanha [F. 5] may be substituted for the antimonial; or nitrate of potassium [F. 4], gr. x, every two hours. Some practitioners (as J. Lewis Smith)[3] give, in place of antimony, tincture of veratrum viride, in small doses, watching its effects, and withdrawing it when the pulse has been sufficiently reduced. Murchison sometimes uses tincture of aconite, with liquor ammonii acetatis. Dr. Gehrung, of Colorado (*St. Louis Med. and Surg. Journ.*, November, 1873), urges the importance of *rest* to the inflamed lung; which he endeavors to secure by passing a broad bandage around the chest, over a layer of cotton batting. Where but one lung is affected, the idea seems reasonable. A broad piece of *adhesive plaster*, unilaterally applied (Roberts), will answer as well for the same purpose.

Asthenic pneumonia requires a different treatment; and the same will apply to the third or suppurative stage of all cases. Support may be required, in a few cases, even from the first; by beef-tea, wine or spirits (best with nourishment, as in milk punch), quinine [F. 2], or ammonia [F. 3]. In hospital, I have known more than one case to recover under this plan *alone;* but they are the exceptions.[4] Some cases in which bleeding or cupping will be proper in the first stage before the fourth day, may require beef-

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[1] The late Dr. L. P. Gebhard, of Philadelphia, informed me, that in a large practice, of more than half a century, he had never lost a case of *simple* pneumonia; his treatment being (according to cases) "moderately antiphlogistic," as above described. Those who object to venesection in *all* cases of pneumonia, do so, almost invariably, on theoretical grounds, *without having tried it.* Its occasional use is justified with almost equal unanimity, by those who have had experience with it. This was well brought out in a discussion of the subject at Richmond, Va., 1881; the "net result" of which was thus expressed by Dr. Martin, of Boston: "I trust that it may go out to the world that the American Medical Association sanctions the occasional use of the lancet, at least."

[2] F., with a number, in brackets, refers to a formula in the collection at the end of the book.

[3] On the Diseases of Infancy and Childhood: Philadelphia, 1870

[4] Dr. A. Patton, of Indiana, reports the treatment, by himself and others, of three hundred and nine cases of pneumonia, of all grades, with carbonate of ammonium; 5 to 10 grains every two hours, night and day; little other treatment being used. The number of deaths was eight, or one in thirty-eight cases.—*Am. Journ. of Med. Sciences*, October, 1870, p. 374.

tea in the second stage, and moderate stimulation later. A large blister over the affected part is often useful about the fifth, sixth, or seventh day of the attack.

Dr. A. Flint[1] considers that twenty-grain doses of quinine, given early, may *abort* some attacks of pneumonia. He believes also that, in any case, "if it does no good it does no harm;" and advises resorting to the use of quinine in all cases of pneumonia. Supposing this to be allowable in many cases treated in *hospitals*, I am by no means convinced that it will answer well in all cases met with in private practice. Dr. Everett (N. Y. Med. Record, Sept. 10, 1881) has treated cases successfully with *continuous inhalation of cold air*, brought through a tube from out of doors in winter.

**Varieties of Pneumonia.**—When complicated with pleurisy or bronchitis, no important modification of treatment is called for. *Tuberculous* pneumonia requires careful husbanding of the resources of the economy. Loss of blood is then rarely proper; if at all, it must be local only, and in minimum quantity. The necessity for the analeptic treatment of the tubercular diathesis is paramount. Dry cups, blisters, and counter-irritant plasters, or tincture of iodine, croton oil or tartar emetic ointment externally applied, are then suitable. Warm poultices, as of Indian or flax-seed meal, with or without the addition of mustard; or carded wool, covered by India-rubber or oiled silk, kept on the chest day and night for a time, are often very useful, especially in children.

**Traumatic** pneumonia, following an injury, is not common, except in army practice. It calls for no particular difference of treatment.

**Typhoid** pneumonia is a term not always uniformly applied. It means, with some authors, inflammation of the lungs complicating typhoid fever; others include under it all cases of asthenic pneumonia. More generally, however, it designates that form of the disease in which epidemic or endemic influence has impressed a peculiar character. Malarial regions especially exhibit this, in the "winter fever" or typhoid pneumonia of our Southern States. Early and great debility, out of proportion to the local symptoms, with a tendency to low delirium, and to remittence, mark this disorder. In treatment, it bears little or no depletion, hardly even the reduction of excitement by tartar emetic or veratrum viride. Diaphoretics first, as [F. 6] ipecac, ½ grain, with, perhaps, the same amount of calomel and five or ten grains of nitrate of potassium, every three hours; or liquor ammonii acetatis [F. 7], or solution of acetate of potassium [F. 8]; then quinine, when the need of a tonic is apparent, which may be very early; with strong liquid nourishment, in a few cases stimulants, and moderate counter-irritation: these are the measures usually proper in typhoid pneumonia.

After recovery from an attack of inflammation, the lung will be for some time more than usually susceptible to conditional changes. Exposure should, then, be carefully avoided; and flannel ought to be worn next the skin. In winter a mild warming

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[1] Philadelphia Medical Times, June 3, 1880, p. 158.

plaster, as of hemlock or Burgundy pitch, over the chest, will give good protection.

## CIRRHOSIS OF THE LUNG.

**Definition.**—A slow, chronic affection, with cough and muco-purulent expectoration, not unfrequently hemorrhages, but with little or no wasting of the body; in which, as ascertained after death, the lung involved is shrunken (sometimes to but one-fourth of its normal size), with obliteration of its air-vesicles, by conversion of the parenchyma into a fibroid material; the bronchial tubes also being dilated, and the lung on the other side much enlarged. As **physical signs,** may be noticed *high-pitched* percussion resonance; sometimes amphoric resonance over a much dilated bronchial ramification; occasionally, bronchophony; on auscultation, feeble or absent respiratory sound at the apex of the affected lung; tubular respiration in various degrees elsewhere on the affected side. Mucous râles are not uncommon. After several months, *shrinking of the side of the chest affected* occurs. The *position of the heart* is altered by the gradual shrinking of the lung; the heart being, so to speak, moved toward that side.

**Synonyms.**—*Chronic pneumonia; interstitial pneumonia; sclerosis of the lung; fibroid phthisis.*

**Pathology.**—Different opinions have been the following: 1. That of Laennec, that the consolidation of the lung results from chronic catarrh, with accumulation of mucus and pressure of dilated bronchial tubes. 2. C. J. B. Williams' view, that it is a *sequela* of pleuro-pneumonia. 3. Charcot's and W. Fox's opinion, that it is identical with, or the result of, chronic pneumonia. 4. The judgment of J. Hughes Bennett, that it is a phase of tubercular disease, advancing towards recovery. 5. Corrigan's and Bastian's, that it is analogous to cirrhosis of the liver;—the characteristic change being the interstitial growth or deposit of a fibroid tissue; a fibroid substitution or degeneration, whether preceded or not by acute or chronic inflammation.[1]

Practically, the most important question in regard to cirrhosis of the lung is, as to its independence of tubercular deposit, and the tubercular diathesis. I believe that the occurrence of a true fibroid degeneration of the lung, independent of tuberculosis, has been proved; but such cases are not frequent.

Indications for the **treatment** of pulmonary cirrhosis are those of relief of the symptoms as they present themselves, along with hygienic management and general support of the energies of the system. For the cough, remedies applicable to chronic bronchitis will be in place; including the inhalation of tar vapor, creasote, or (Niemeyer) spirits of turpentine. Iodide of potassium, and the external application of tincture of iodine, are advised with a view towards the dissipation by absorption of the deposited fibroid material. Of this, however, we cannot be sanguine in any case; although retardation of the degenerative process is not improbable.

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[1] See Bastian's article on Cirrhosis of the Lung, in Reynolds' System of Medicine, Amer. edition, Vol. II.

## PLEURISY.

**Definition.**—Inflammation of the pleura.

**Varieties.**—Single or unilateral, and bilateral or double; upon the same side, unilocular, bilocular, or multilocular, idiopathic, traumatic, and secondary, *e. g.*, tuberculous, or cancerous. Chronic pleurisy, so called, is merely the consequence of an acute attack.

**Symptoms and Course.**—Generally, after a chill or cold stage, sharp pain in the side, impeded and accelerated respiration, short, sharp cough, and fever. The pain centres in the infra-mammary or lower axillary region; it is often intense, and is increased by a long breath, by coughing, pressure, or lying on the affected side. Dr. Peacock asserts[1] that in many cases the patient suffers only discomfort, with little pain and no fever. I have met with but one or two such instances, in which it may be a question whether the term *pleuritis* or that of *hydrothorax* should be applied. The pain and fever lessen after effusion has occurred; but the dyspnœa may then be increased. It is, after that period, most comfortable to lie on the diseased side, so as to allow of free breathing by the other lung. Acute pleurisy is often recovered from without any considerable effusion. When the latter does occur, absorption mostly follows. If not, life is endangered by interference with respiration. At first serous, constituting one form of **hydrothorax**, the fluid may become purulent; this is pyothorax or **empyema.** The term *false* empyema is given to a collection of pus in the pleural cavity from the rupture of an abscess in the lung. **Pneumothorax** is the accumulation of air in the cavity of the pleura; **hydro-pneumothorax,** of water and air together. Both of these are most common in tuberculous pleurisy, *i. e.*, occurring in the course of a case of pulmonary phthisis.

**Stages.**—In severe pleuritis there may be, 1, the adhesive; 2, the effusive; 3, the suppurative stage. In favorable cases the third stage is that of absorption.

**Physical Signs.**—Of the first stage, deficient elevation of the ribs in breathing, feeble respiratory murmur on the affected side, and *friction*-sound. Second stage, dulness of resonance on percussion, bronchial respiration, bronchophony, sometimes *ægophony*. When the effusion becomes very copious, *bulging* of the side occurs, with suppression of respiratory sound and of vocal resonance and vibration, and exaggerated or puerile respiration on the sound side. Displacement of the heart may take place if the effusion be on the left side; of the liver if on the right. There is no physical sign by which empyema can be certainly distinguished from serous effusion; but irritative fever usually accompanies empyema.

Baccelli, of Rome, has pointed out[2] that the thickness and heterogeneous character of the fluid in empyema (presence of pus corpuscles, etc.) must produce greater interruption of the conduction of sound than when serous fluid only is present. This is observed in auscultation of vocal sounds; which, as well as bronchial breathing, are (if Baccelli is right) not to be heard at

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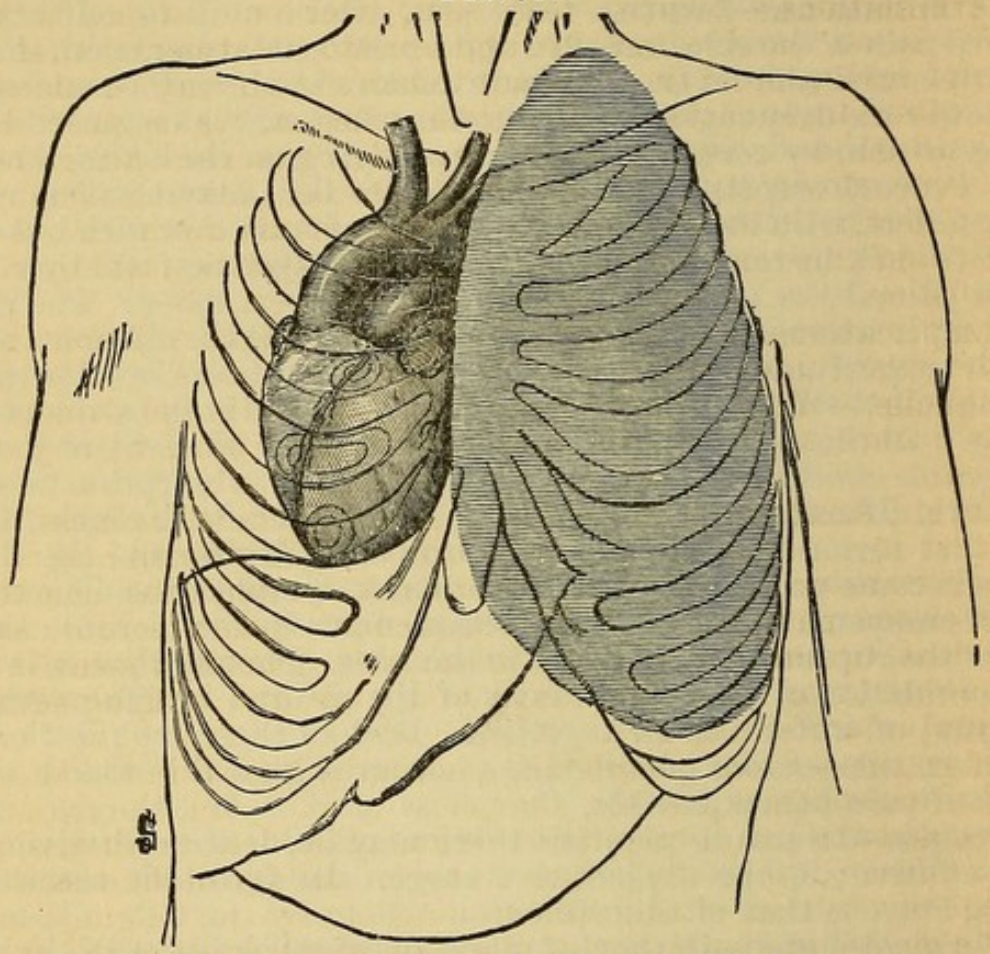
[1] British Medical Journal, July 20, 1872.
[2] London Med. Record, Aug. 15, 1876.

the base of a *purulent* effusion. There are, however, not a few cases in which vocal resonance may be heard (notwithstanding the presence of effusion) all over the chest; but it is then *muffled* over the effusion. *Above* the seat of effusion, where the lung is condensed, it is apt to be louder than usual.

FIG. 79.



Displacement of Heart by Pleuritic Effusion.

When the amount of fluid effused is not very great, there may be observed an *in* and *out* movement at the intercostal spaces,[1] synchronous with the respirations. In some such cases, also, of a chronic character, even before retraction from absorption has begun, the measurement of the healthy side of the chest may be as large as, or occasionally even larger than, that of the side of the effusion; yet the *rounded shape* of that side, with the other physical signs, will distinguish it upon inspection.

Absorption following extensive effusion induces *retraction* and *depression* of the chest on that side, from the slow or imperfect expansion of the lung. Then return, first, bronchial respiration and voice, or ægophony; afterwards, gradually, the normal respiratory murmur. Sometimes, from adhesions of false membrane over the lung, permanent depression of the thorax on that side is left.

During effusion, its fluid character as well as extent may be shown by percussion in different positions. Sitting up, it falls

[1] Edinburgh Med. Journal, October, 1880.

forward, and rises to a higher line in front; lying on the back, the dulness, from gravitation, may fall much lower in the anterior region. Sometimes adhesions prevent this. *Succussion*, or sudden shaking of the chest of the patient, may produce an audible splashing, if the ear be upon or near the affected side. By ocular inspection and *measurement*, the changes in the amount of the effusion may be estimated from time to time.

**Terminations.**—Pleurisy may sometimes be "nipped in the bud" at an early stage by appropriate treatment; that is, prompt resolution of the incipient inflammation may be effected. The other terminations are, serous effusion, which may vary from an ounce or two to quarts, gradually absorbed altogether; the same, slowly and incompletely absorbed, leaving collapsed lung; death, in double pleurisy, by asphyxia from excess of fluid; and empyema, often, but not nearly always, fatal by slow exhaustion.

**Complications.**—Pneumonia, tubercular deposit, inflammation of the liver (bilious pleurisy).

**Sequelæ.**—What authors call *chronic pleurisy* is the sequela of acute pleuritis. Its results and terminations have been above named.

**Morbid Anatomy.**—In the early period, general redness and vascular injection of the pleura, with bands of whitish and more or less translucent or opaque coagulable lymph, causing adhesions of the pulmonary and costal pleura. Later, serous, sanguinolent, or purulent effusion, in variable quantity; sometimes displacement of the heart, lungs, and liver, and bulging of the ribs and intercostal spaces.

**Diagnosis.**—From pneumonia, pleurisy is known in the height of the acute attack, by the sharpness of the pain, the friction-sound, and absence of crepitant râle and of dulness on percussion. After effusion, especially by the change of the line of dulness with change of position, sitting and recumbent; by the bulging; and by the degree of diminution of vibration of the walls of the chest when speaking.

From intercostal neuralgia, pleurisy is distinguished by the absence of fever and friction-sounds in the former, and the non-increase of the neuralgic pain upon inspiration. Congestion, in some rare cases, attends neuralgia; the diagnosis is then more difficult. In intercostal muscular rheumatism, there is slight increase of pain in breathing deeply, but also as much in moving the arms; the pain is much less acute, and the attack is generally without fever.

**Prognosis.**—Pleurisy is rarely fatal; though death may occur, from very abundant effusion in bilateral pleuritis, or with empyema in the unilateral, through gradual exhaustion.

**Causation.**—Exposure to cold and damp is the ordinary exciting cause of "idiopathic" pleurisy. Fracture of the rib, punctured wounds, etc., may cause traumatic pleurisy. In the course of phthisis, it not uncommonly occurs by extension of disease from the lung. Cancer of the chest may produce it in an analogous manner.

**Treatment.**—In young and vigorous persons still more confi-

dence may be placed in *early* antiphlogistic treatment than in pneumonia. When high fever and constant severe pain occur, bleeding, in such patients, on the first, second, or third day, should be the general rule. Leeches or cups may follow, or be used instead of venesection in doubtful cases. Tartar emetic, after a free purge, may be given, $\frac{1}{8}$ to $\frac{1}{4}$ of a grain every two or three hours, with $\frac{1}{2}$ to 1 grain of *opium*. Some practitioners add calomel, $\frac{1}{2}$ grain to 1 or 2 grains every two or three hours. [F. 9.] I believe it may be generally omitted without risk. When fever subsides, or vomiting occurs, the antimony should be withdrawn; the opium and perhaps the calomel may be continued, while the pain lasts—carefully avoiding over-narcotism by the former and salivation by the latter.

Dr. Anstie prefers the early *hypodermic injection* of acetate of morphia; the side being then enveloped in a hot poultice. Dr. F. T. Roberts[1] advises maintaining the affected side at rest by strapping it with wide strips of *adhesive plaster*.

As soon as the heat of skin has considerably abated, if the pain continues, a large blister should be applied over the affected part.

For the *effusion*, diuretics, as squill [F. 10], juniper-berry infusion, or compound spirit of juniper [F. 11], acetate or bitartrate of potassium [F. 12], etc., may be used. Iodine, in Lugol's solution, and iodide of potassium alone, are often advised. Anstie relied more on tincture of chloride of iron. Jaborandi (in drachm doses, four times a day) has been used with success by Créquy[2] and Da Costa. Repeated blistering sometimes has excellent effect. Purgatives seem to be much less successful in removing pleuritic effusion than in carrying off that of ascites, or anasarca. They should be used, if at all, with caution, to avoid debilitation. Dr. Sutton, of the London Hospital, insists on the importance, as a rule, of *rest in bed*.

When life seems to be threatened or the general health much impaired by exhaustion from dyspnœa, owing to large effusion not becoming absorbed, *paracentesis*, or puncture of the chest, is proper. This operation is now much more frequently performed, and at an earlier stage of pleurisy, than formerly. Anstie's rules (Reynolds' System of Medicine, article Pleurisy) for concluding upon it are these: Paracentesis should be performed "1. In all cases of pleurisy, at whatever date, where the fluid is so copious as to fill one pleura, and begins to compress the lung of the other side; for in all such cases there is the possibility of sudden and fatal orthopnœa. 2. In all cases of double pleurisy, when the total fluid may be said to occupy a space equal to half the dimensions of the two pleural cavities. 3. In all cases where, the effusion being large, there have been one or more *fits* of orthopnœa. 4. In all cases where the contained fluid can be suspected to be pus, an exploratory puncture must be made; if purulent, the fluid must be let out. 5. In all cases where a pleuritic effusion occupying as much as half of one pleural cavity has existed as long as one month, and shows no sign of progressive absorption." In

[1] Handbook of Theory and Practice of Medicine, 1873.
[2] Bulletin Gén. de Thérapeutique, March 30, 1875.

the history of thoracentesis the names of Trousseau (1843), Bowditch, Allbutt, and Dieulafoy have been most prominent. Dr. Bowditch has most frequently used Wyman's apparatus, which is a trocar, with a silver canula, having a stopcock, and capable of being connected with a syringe by an intermediate piece, also having a stopcock, both cocks acting the same way. The operation is performed while the patient is sitting up, if able, or lying over the edge of the bed. The puncture is made somewhere between the sixth and tenth ribs (Bryant prefers the sixth or seventh intercostal space; Laennec, Stokes, and Walshe have advocated the fifth), just behind their angles; making sure first of the position of the liver and spleen, so as to avoid them. Insert the instrument (rather quickly) near the upper edge of the lower rib, raising its point as it goes in.[1] When the trocar is withdrawn, the fluid may be *gradually* removed by the double-cocked syringe with safety to the slowly expanding lung. The operation may need to be repeated, even several times in the same patient. The occurrence of albuminous expectoration after thoracentesis has given rise to considerable debate in France.[2]

The grooved needle or exploring trocar (T. Davies) is often used to ascertain the nature of the contents of the chest. Blachey, of Paris, prefers a very fine "capillary" trocar for the operation of thoracentesis. Dieulafoy's *pneumatic aspirator* has attracted much attention. It does appear to be an improvement upon all apparatus so far employed for the same purpose; reducing the danger of puncturing the cavities of the body to a *minimum*. Suction should be stopped as soon as any distressing or very uncomfortable symptoms (stricture, violent cough, etc.) result. Vibert[3] recommends the preliminary hypodermic injection of morphia to prevent pain and syncope. When pus is present (empyema, pyothorax) in considerable amount, "drainage" may be resorted to. Following the grooved needle or trocar, a fine long iron probe, somewhat bent, is passed through to the lower and back part of the pleural cavity, against the intercostal space. Being felt there, an incision is made upon it; a strong silk thread is passed through its eye, and then drawn through the first opening. After this, draw in a drainage tube of India-rubber perforated with many holes; both of whose ends hang out and are to be tied together. Sometimes, by the tube, the cavity may be *washed out*, with water, or dilute astringent or antiseptic solutions. Dr. Bowditch latterly has expressed a preference for a *free incision in an intercostal space*, low down in the back, instead of tubular drainage, for empyema. Such an opening may be kept open with lint, as long as may be needful.

Roser, König, and Peltavy[4] advise (and have practised with some success) *resection of a portion of a rib* (usually the sixth) for the radical cure of empyema. One advantage claimed for this operation is that it does away with the necessity for a canula; so that the pleura is saved from the irritation liable to be caused by its presence. Yet practitioners of experience with

[1] Dr. Leale, of New York, uses a scalpel and male catheter, instead of the trocar and canula.
[2] Le Mouvement Médicale, 1873.
[3] Journ. de Thérapeut., Dec. 25, 1876.
[4] Berliner Klin. Wochenschrift, May 8, 1876.

paracentesis are by no means all agreed upon the necessity of such an exsection. Washing out or "spraying" the pleural cavity in cases of empyema, with dilute solutions of carbolic acid, iodine, permanganate of potassium, has become a prominent point in its treatment with several practitioners (Fraentzel, Morgan,[1] Ferguson, Lowe).

In chronic cases of pleuritic effusion or empyema, the strength of the patient requires usually to be supported by good diet, and sometimes by tonics. This, in empyema, is often the most important part of the treatment.

## ABSCESS OF THE LUNG.

In rare instances, inflammation of the lung, active or *latent*, may terminate in abscess. Before rupture, dulness on percussion, bronchial respiration, and dyspnœa proportioned to the size of the abscess, are present. When an opening occurs allowing the matter to escape into the bronchial tubes, the rather sudden commencement of purulent expectoration should attract attention. Then the physical signs of a *cavity* are discoverable by percussion and auscultation; amphoric or tympanitic resonance on percussion, cavernous respiration, metallic tinkling, etc., varying with circumstances. As is the case with pleuritic empyema, pulmonary abscess may communicate externally by a spontaneous opening.

The principal importance of abscess of the lung consists in the possibility of mistaking it for phthisis. The points of difference will be alluded to in connection with that disease.

## PULMONARY GANGRENE.

This may occur in pneumonia from extreme violence of the inflammation, or from a depressed state of the system; also from cancer within the chest, pyæmia, etc. It is rare, but less so than circumscribed abscess of the lung. Except when very narrowly limited, pulmonary gangrene is always fatal. Its signs are, coarse, mucous râle, taking the place of the vesicular murmur in the lower part of the lung; with copious brownish and offensively *fetid expectoration*, dyspnœa, and great *prostration*.

In bronchitis, occasionally, temporary fetor of the expectoration and breath may simulate gangrene; but transiently, and without the above-mentioned symptoms.

The treatment of pulmonary gangrene must be, of course, supporting and antiseptic. Alcoholic stimulants, rather freely given, will be proper, with concentrated liquid food, as beef-tea. Sulphite of sodium (ten grains in solution every three hours) may be tried; or chlorine water, a teaspoonful or two every two or three hours; or carbolic acid, one drop in solution every three or four hours.

Inhalation of an atomized solution or emulsion of *oil of eucalyptus* is recommended for its antiseptic effect.

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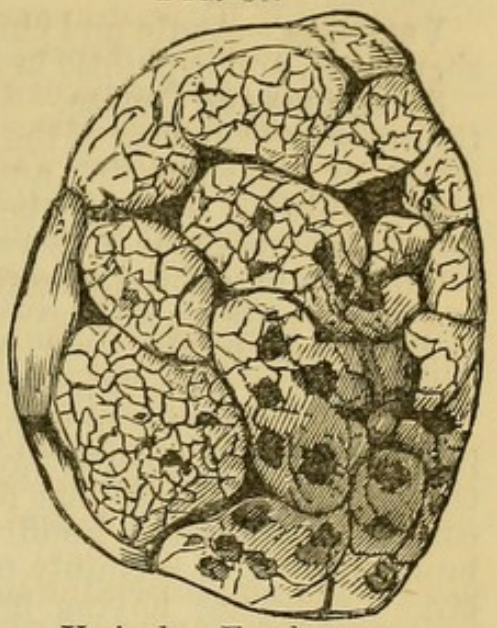
[1] Lancet, March 5, 1881.

## EMPHYSEMA OF THE LUNG.

This is dilatation of the pulmonary air-cells of one or both lungs. It may accompany prolonged asthma, or may follow chronic bronchitis. Sometimes it aids in producing dilatation of the heart. Its symptoms are dyspnœa, and when extensive, blueness of the lips, cyanosis, from interference with the circulation through the lungs; in many cases wheezing respiration.

FIG. 80.



Vesicular Emphysema.

There has been much controversy as to whether dilatation of the air-cells is produced by excessive distension during inspiration, or by obstruction to the expiratory movement. The experiments of Hutchinson have made it almost certain that the latter is the general rule; but probably both modes of explanation may apply to different cases.

The physical signs of emphysema are, bulging of the chest, increased clearness of resonance on percussion, and feeble inspiratory murmur with prolonged expiratory sound; sometimes displacement of the heart or liver. It is most easily mistaken for pneumothorax. But, in the *latter*, the resonance on percussion is more tympanitic, the inspiratory murmur still feebler, or quite absent, and there is no prolonged expiratory sound; besides which, the *concomitants* of pneumothorax usually serve to distinguish it.

*Pulmonary hydatids* are rare and difficult of diagnosis, for an account of which the student may be referred to more extended treatises. Hydatids of the lungs are said to be not uncommon in Australia. Dr. L. D. Bird,[1] of Victoria, claims to have cured a number of cases by tapping the cysts (mostly at the base of the lung), and then administering anti-parasitic medicines; as bromide or iodide of potassium and kameela.

## COLLAPSF OF THE LUNG.

In hooping-cough or in severe bronchitis, especially in children, obstruction of a considerable air-tube may lead to an exhaustion of air from the cells supplied by it, and a return of that portion of the lung to the unexpanded condition (*atelectasis*) of fœtal life. The same state may occur under other circumstances, from debility. It was formerly always mistaken for lobular pneumonia. It is usually fatal, unless very much limited.

Signs of it (often difficult of determination, however) are, moderate dulness on percussion, with absence of the murmur of respiration; and, in some cases, an inward motion or recession of the lower ribs during the effort at inspiration.

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[1] London Lancet, July 1, 1871.

## BRONCHITIS.

**Definition.**—Inflammation of the mucous membrane of the bronchial tubes.

**Varieties.**—Acute and chronic; general and capillary; plastic, rheumatic, and syphilitic bronchitis.

**Symptoms and Course.**—Systemic depression, followed by fever; tightness and soreness of the upper and anterior part of the chest; cough, at first short, dry, and tight; later, deeper and looser, with expectoration; the latter being at first mucous, in rare instances pseudo-membranous, in severe cases at a late stage purulent.

*Capillary* bronchitis is marked by greater dyspnœa and tendency to early depression and prostration. It is most common in young children and in the aged; and is considerably more dangerous than ordinary acute bronchitis.

*Plastic* or fibrinous bronchitis is more frequent in children than in adults, but is comparatively rare (Lebert) in the aged. Dr. Glasgow,[1] of St. Louis, has found records of twenty-three American, and more than a hundred European cases of this variety of bronchitis.[2] It is certainly rare; many practitioners of long and large experience having never seen a case. It is recognized simply by the expectoration of *casts*, more or less extensive, of the bronchial tubes. Most generally, it occurs in the chronic form. If the fibrinous exudation, when formed, cannot be thrown off, the patient dies of dyspnœa. In a number of instances, however, attacks of the same kind have taken place repeatedly for years.

*Chronic* bronchitis is often free from febrile symptoms; the cough and expectoration, with slight dyspnœa, characterizing it.

**Stages.**—Ordinary bronchitis may be divided in its progress into, 1st, the stage of *diminution* of secretion; and 2d, that of *increase* and *perversion* of it.

**Physical Signs.**—No dulness on percussion, except in case of collapse of part of a lung from obstruction, or extensive *capillary* bronchitis; sonorous rhonchus and sibilus, generally, though not quite always, on both sides of the chest; varying from time to time, in seat, character, and loudness. In capillary bronchitis, extended mucous, crepitant or subcrepitant râles, closely resembling the fine crepitation of pneumonia.

**Terminations.**—Acute bronchitis may end in death from apnœa, in the first or second stage; or in chronic bronchitis; but most generally in recovery.

**Complications.**—Asthma; pneumonia; bronchial dilatation; pulmonary collapse. *Broncho-pneumonia* is especially common in early life. Disease of the heart (especially of the left side) is, not rarely, attended by chronic bronchitis, as well as by attacks of pulmonary congestion.

**Morbid Anatomy.**—General redness and congestive tumefaction of the bronchial membrane; with more or less obstruction from mucus (in chronic cases pus), epithelium, and, rarely, casts of the tubes of plastic lymph.

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[1] Transactions of American Medical Association, 1879.
[2] Reported by Peacock, Riegel, Biermer, Lebert, and others.

**Diagnosis.**—No difficulty exists except in distinguishing chronic bronchitis from phthisis. Absence of dulness on percussion and of the signs of excavation, are most important; the expectoration also is whiter and of less weight in bronchitis; and there is no distinct hectic fever. The *temperature* does not rise to so high a degree in chronic bronchitis as in tubercular phthisis.

**Prognosis.**—Acute bronchitis may be dangerous in old persons and young children; seldom fatal in vigorous middle life. The capillary form is always most serious; death taking place sometimes from the tenth to the twelfth day. Acute *fibrinous* bronchitis, according to Lebert, has a mortality of one in four or five cases. Chronic bronchitis is not often fatal, even by exhaustion; but it may last an indefinite time, even many months.

**Causation.**—Exposure to cold is the most frequent cause. In certain employments, as needle-grinding, cotton-spinning, etc., solid particles inhaled cause bronchitis by mechanical irritation. Transference of rheumatism occasionally induces it in the rheumatic diathesis; and it is one of the possible manifestations of tertiary syphilis. The gouty element, also, may in exceptional instances be recognized in its production.

**Treatment.**—Abortive treatment of a "cold on the chest" may sometimes be effected within the first twenty-four hours, by taking, at bedtime, a glass of hot lemonade, six grains of quinine, or ten grains of Dover's powder, after a warm mustard foot-bath. Should this treatment fail or be omitted, a brisk saline purgative should be given, of Epsom or Rochelle salts, or citrate of magnesium. Then, when the fever is high, cough very tight, and breast sore, tartar emetic may be advised, $\frac{1}{8}$ to $\frac{1}{4}$ grain every two or three hours [F. 1], with frequent draughts of flaxseed tea or some similar demulcent; in some cases, leeches or cut cups to the upper part of the chest. A large sinapism over the upper sternal region will aid in giving relief; and so will friction with oil of turpentine.

In milder cases, or where the strength of the stomach is doubtful, syrup of ipecacuanha, $\frac{1}{4}$ to $\frac{1}{2}$ drachm every two or three hours, will answer; and it should be continued until the cough softens and the breathing becomes easier. Then syrup of squills [or, F. 13] may follow in fluidrachm doses, every three or four hours. Another excellent mild expectorant and palliative of bronchial cough is *syrup of wild cherry bark*, in teaspoonful doses. When the cough is troublesome at night, $\frac{1}{2}$ to 1 fluidrachm of paregoric [F. 15] may be added at bedtime; or through the day, occasionally, if coughing be very violent or frequent. Opiates do the most good, however, *after loosening* of the cough with free expectoration. When the fever has abated, and especially if dyspnœa continue, a blister may be applied over the sternum.

In *capillary* bronchitis, or in the ordinary form in the aged and feeble, instead of tartar emetic, the more stimulating expectorants may be required, as senega, in decoction or syrup, chloride [F. 15] or carbonate of ammonium, with quinine and beef-tea, wine-whey, or whisky punch. Inhalation of steam, alone, or from infusion of hops, sometimes soothes the air-tubes advantageously.

Dr. Bedford Brown,[1] of Virginia, in a number of cases in children, has found the early use of an emetic of ipecacuanha very serviceable; a combination of ipecac and quinine being continued afterwards. Korrmann recommends *muriate of apomorphia* as an expectorant; $\frac{1}{30}$ gr. for a child three years old. This is a rather large dose. Beck (Lond. Med. Record, April 15, 1881) advises $\frac{1}{30}$ grain doses of the same medicine for a child under ten years of age. In children, especially, *warm poultices*, as of mush and mustard, over the chest, are beneficial.

*Chronic* bronchitis requires persevering use of counter-irritation over the chest, by croton oil (3 drops with as much of sweet oil applied nightly till a papular eruption follows), painting with tincture of iodine, or plasters of Burgundy pitch, hemlock, etc., and alternation of stimulating and alterative expectorants, and tonics. Besides squill and senega, ammoniacum, copaiba [F. 17], and chloride of ammonium [F. 16] are most frequently useful. Eucalyptol (dose, about 5 minims) is an expectorant of considerable power. *Grindelia robusta*, of California, has lately acquired a similar reputation. Dose of fluid extract, half a fluidrachm.

Dr. T. Clark (Practitioner, April, 1878), has reported good effects in chronic cough from *oxalate of cerium;* five grains each morning, before rising. Others have preferred employing it in smaller doses, morning and night. It appears to act as a *calmative*, without disordering the stomach.[2]

Dr. Lander Brunton asserts that carbonate of potassium tends to render bronchial expectoration fluid and abundant; while nitric acid has the opposite effect, of diminishing its amount. These opposed indications may both occur at different periods in the same case. If the system be below par, quinine, iron, and cod-liver oil are important. When secretion is very copious, inhalation of tar-vapor or of creasote should be tried. The former may be used by putting an ounce or two of tar in a cup over boiling water; so as to diffuse the tar vapor through the chamber. Creasote, 20 or 30 drops, may be put into half a pint of boiling water, to be breathed from by means of an ordinary inhaler. Dr. J. A. Lidell[3] uses by preference the *atomizer*, with a solution of one grain of carbolic acid in an ounce of water. When medicine fails, change of air will sometimes entirely cure.

Dr. Greenhow[4] has pointed out that patients with chronic bronchitis generally do better when much out of doors, than when confined closely to the house.

On **Hæmoptysis,** see *Semeiology;* also the article on *Phthisis*, and that on *Hemorrhages.*

### ASTHMA.

**Definition.**—Paroxysmal and spasmodic dyspnœa.

**Varieties.**—*Idiopathic* and *symptomatic; dyspeptic* asthma; *hay* asthma.

**Symptoms and Course.**—Every night, or once a week, month,

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[1] Am. Journal of Med. Sciences, October, 1870.
[2] H. Cheeseman, N. Y. Med. Record, June 12, 1880, p. 664.
[3] N. Y. Medical Record, July 1, 1872.
[4] On Chronic Bronchitis, etc. London, 1869.

or year, or at irregular intervals, the attack comes on. Most frequently it is between one and three o'clock in the morning. Premonitory symptoms often are great drowsiness, or wakefulness, headache, flatulence, itching under the chin. Dyspnœa then becomes the characteristic symptom. The sufferer sits or stands up, leaning forward, and labors to breathe. The chest is expanded to its utmost, by the accessory as well as principal inspiratory muscles. The countenance is anxious, with pallor, coldness, and, in severe cases, lividness of the face and hands. Perspiration is often copious. A wheezing sound accompanies respiration; giving way finally, with relief, upon the expectoration of mucus, usually rather thick, and in pellets.

The attack may pass over in a few minutes, or may last for hours; or, with some remission, days or weeks. Where asthmatic symptoms are *persistent*, as is not very uncommon, for years, some structural change in the organs of the chest must exist; it is then *symptomatic* asthma.

**Physical Signs.**—Inspection shows unusual elevation of the ribs and shoulders. Placing the ear on the chest, sonorous and sibilant sounds, loud but mostly small in calibre, are found to take the place of the respiratory murmur. These sounds change their locality frequently; and they are usually *double; i. e.*, occur both with inspiration and with expiration. As the attack gives way with expectoration, the mucous râle is heard.

**Secretions.**—At the beginning of the paroxysm, the urine is abundant and pellucid ("nervous urine"); for some hours after the attack has ceased, it is more scanty, and deficient in urea and chloride of sodium.

**Complications.**—Bronchitis; pulmonary emphysema; dilatation or hypertrophy of the heart.

**Diagnosis.**—Laryngeal spasm may, without care, be confounded with asthma; but the modification or arrest of the voice ought to distinguish the former. Violent bronchitis is known from it by the febrile condition. Angina pectoris, by the extreme pain, and localization of distress about the heart. Hydrothorax, by the dulness of resonance on percussion, and absence of rhonchus.

Special exploration is necessary in each case to determine the presence or absence of pulmonary or cardiac complication.

**Prognosis.**—Death almost never occurs during the fit of asthma. Those subject to it often live to old age. But dilatation of the pulmonary air-cells, and enlargement of the heart, may follow in protracted cases, breaking down the health.

**Pathology and Nature.**—It has been made almost certain that asthmatic dyspnœa is owing to a spasmodic constriction of the smaller bronchial tubes, by tonic contraction, mostly reflex, of their involuntary muscular fibres. Perhaps the intercostal muscles and diaphragm may be sometimes involved. Savignac[1] considers *paralysis* (how paroxysmal?) of the bronchial muscular fibres more probable than their spasmodic contraction. This view is not likely to receive much support.

**Causation.**—Asthma is hereditary in a majority of cases. Males

[1] Bulletin Général de Thérapeutique, Nov. 30, 1867.

have it more often than females. It may occur at any age. Dr. Salter classifies cases according to their causation—1, by agencies acting upon the lungs, as fog, smoke, fumes of various things, ipecacuanha, mustard, new hay, etc.; 2, by reflex action, as irritation of the stomach from indigestion, loaded rectum, sudden emotion; 3, by pulmonary or cardiac disease. Behind all these there must be a predisposing peculiarity of constitution.

**Treatment.**—During the attack, our aim is to give relief, by relaxing spasm. Ipecacuanha wine, with tincture of lobelia, one-quarter to one-half fluidrachm of each [F. 18], every half hour until nausea or expectoration is produced, I have known often to act very well. Hoffman's anodyne, in one-half drachm or drachm doses, will sometimes do great good. Some practitioners advise hyoscyamus, musk [F. 19], hydrate of chloral, or hydrocyanic acid [F. 20]. Smoking tobacco relieves in some instances; smoking cigarettes of stramonium-leaves in others. More still find comfort in breathing the air in which are burned papers which have been soaked in a saturated solution of nitrate of potassium. Inhalation of oxygen has been found beneficial by Demarquay, Andrew H. Smith, and others; and so has the respiration of *compressed air*. Inhalation of ether, nitrous oxide, or nitrite of amyl (three to five drops), may be carefully used in extreme cases. Hypodermic injection of morphia (Hirtz, Huchard) has sometimes given immediate relief. Dr. T. M. Rochester reports well of half-drachm doses of fluid extract of *grindelia robusta*. Tincture of *quebracho*, in teaspoonful doses, is recommended during the attack, by Berthold and others. As an adjuvant, the warm mustard foot-bath may be employed; as well as sinapisms or dry cupping between the shoulders.

Between the attacks, endeavor should be made to rectify digestion and its tributary processes, and to invigorate the nervous system. Some cases will require blue pill, nitro-muriatic acid [F. 21], chloride of ammonium or taraxacum, bitter tonics and mild laxatives, such as rhubarb, etc. Others need iron and quinine. Iodide of potassium is highly recommended by some; conium, cannabis indica, and arsenic in small doses by others. There is reason for giving trial to the bromide of potassium in obstinate cases; most patients will bear from ten to twenty grains of this twice or thrice daily for weeks together without inconvenience [F. 22]. Dr. Faulkner, of Allegheny City, Pa., has found remarkably beneficial results in asthma from *painting with iodine* (tincture) the tracks of the *pneumogastric nerves* in the neck; from the thyroid cartilage to the upper borders of the clavicles. Dr. Robson (British Medical Journal, April, 1880) has used with advantage *nitro-glycerin;* from one to three minims of a one per cent. solution at a dose. *Pilocarpin*, hypodermically, succeeded well with Berkart (British Medical Journal, 1880, Vol. I., p. 960). Schæffer, of Bremen, has used with encouraging success the application of the *induced electrical current* to the throat (across the larynx and soft palate). A current is employed of sufficient strength to be decidedly felt by the patient. Dr. Yeo[1] reports a case in which this treatment answered very well.

[1] Lancet, November 13, 1880.

**Prophylaxis.**—No disease is more curiously capricious in its causation than asthma. Some always have a paroxysm if they visit the sea-shore; others are more secure there than elsewhere. One cannot sleep on the first floor; another does better there than higher up. Each must learn his own peculiarities and be governed thereby.

Dr. Whitehead, of Denver, insists,[1] after large experience, that the climate of Colorado has a remarkable influence in promoting the amelioration and cure of asthma.

Most remarkable are the annual attacks of asthma, hay fever, summer[2] catarrh, autumnal catarrh, or asthmatic bronchitis, to which some individuals are subject. The symptoms are those of a violent cold, coming on generally either in June or in August. There are many persons who for years are obliged to arrange all their business for such an attack, which is punctual almost to a day. Some escape the paroxysm only by going to the sea-shore, and others to the mountains, before the expected time, and remaining there through the time during which it would have lasted. Dr. Sebastian, of Texas, mentions the case of a gentleman who was enabled to escape his attacks by wearing a thick veil through the period of their expected return.

This periodical affection, however, is not incompatible with long life; several of its victims have been known to survive their eightieth year; and one, at least, lived to be ninety-five.

In a number of cases, the application to the nostrils of a saturated solution of *sulphate of quinine* has arrested the paroxysm in a day or two, several different years. Prof. Helmholtz, of Berlin, having been subject to "hay-fever," ascertained in 1868 that the secretion from his nostrils during the attacks contained a number of minute vibrio-like bodies, absent at other times. In view of the action of quinine in destroying infusoria, he applied a solution of it to his nostrils, with excellent effect. Drs. Frickhöfer and Busch have obtained like results. (See a letter from Prof. Binz, of Bonn, to Prof. Tyndall, in *Nature*, May 14, 1874.) Dr. E. C. Seguin advises frequent use of a strong gargle of *bromide of ammonium* (℥j or ℥ij in f℥j water) and a solution one-fourth as strong as a wash for the nostrils. Dr. Ferrier's[3] treatment for common nasal catarrh is worth trying in this affection also, viz., by snuffing into the nostrils powder of *subnitrate of bismuth*, mixed with a little morphia and gum arabic.

Dr. W. Moss, of Philadelphia, in his own case and in others, has found the hypodermic injection of morphia to give great relief. Dr. Hoover, of Ohio, shortened the duration of two cases by *atomization* with solutions of chlorate or bromide of potassium with morphia. Prevention, however, is, in the case of periodical catarrh, emphatically more attainable, as well as better than cure. As to localities almost certainly places of escape for those subject

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[1] American Journal of Medical Sciences, April, 1874.

[2] See Experimental Researches, etc., by C. H. Blackley, M. R. C. S., London, 1873. Blackley believes *pollen* to be the usual exciting cause of this affection.

[3] Philadelphia Medical Times, May 13, 1876.

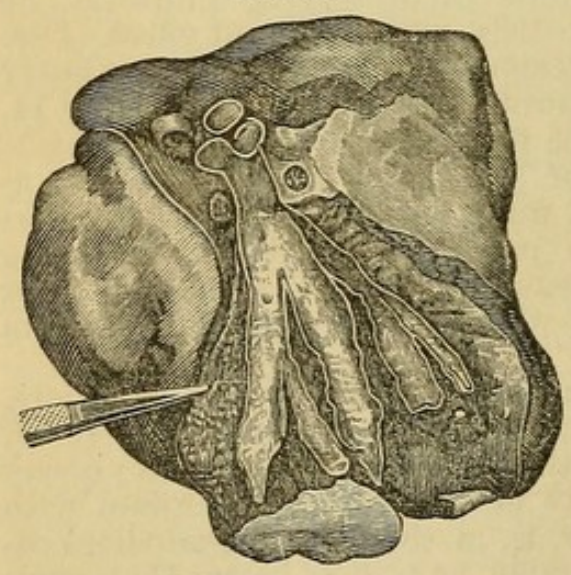
to it, the following is the report of Dr. Morrill Wyman, after careful investigation:

"Long and varied experience with numerous individuals has proved that (in New Hampshire) the Glen, Gorham, Randolph, Jefferson, Whitefield, Bethlehem village, the White Mountain Notch, Twin Mountain House, the high level about Franconia Notch, are all within the limits of safety. Other elevated tracts are safe: Mount Mansfield at Stowe, Vermont, and the Adirondacks are particularly safe, also the Ohio and Pennsylvania plateau, including the high range of southern counties in New York, from the Catskill Mountains to the western border of the state; the plateau in these counties having an elevation of two thousand feet above the sea. The valleys of the rivers and lakes of the same state, at a lower level, are not safe. The Island of Mackinaw, and the country north of the great lakes in Canada, and beyond the Mississippi, at St. Paul, Minnesota, have a certain immunity, but not equal to that of the Lake Superior region. Farther west are large tracts which may be resorted to. South, the Allegheny Mountains at Oakland, and other elevated points, and Iron Mountain, on the Tennessee and North Carolina line, are unusually free. To the east, the elevated interior of Maine and its extensive lakes afford both pleasure and safety. Mount Desert is not free, but some of the islands about it are thought to give relief. If the sea coast is preferred, the whole coast east of the St. John, thence quite around to Labrador, is open to the subjects of autumnal catarrh. Sufferers who actually pitch their tents in these favored regions, as a general rule, not only escape their enemy, but may find themselves at the end of the month with a vigor that nothing but living under canvas seems to give.

"The limits of the exempt regions are often narrow and very sharply defined."

In asthmatic persons generally, nothing is more important than prudence and regularity in diet and regimen.

FIG. 81.



Dilated Bronchi.

### BRONCHIAL DILATATION.

This (synonym, *bronchiectasis*), of which extreme degrees are not common, is of interest chiefly because it is possible for it to be mistaken for phthisis. There are two forms, the *tubular* and the *saccular* enlargement.

In either, slight dulness on percussion may occur from condensation of the lung around the expanded part. Sonorous rhonchus and coarse mucous râle exist, the latter especially in the saccular form. In this, the signs are almost identical with those of tubercular excavation; but they occur usually at the

middle or lower part of the lung, and are stationary, as they are *not* in tuberculization.

Dr. Gairdner describes the formation of ulcerative excavations of the lung communicating with the inflamed bronchi as "bronchial abscess."

Cough, very troublesome, and attended by copious mucous or slightly purulent expectoration, is common in bronchial dilatation. The palliation of this symptom, with care of the general condition of the patient, is all that can be accomplished for it in treatment.

## CHRONIC NASAL CATARRH.

This often troublesome affection is sometimes called *naso-pharyngeal* or *post-nasal* catarrh; or, when attended by obstruction of the nostrils, *nasal stenosis;* in cases of offensive discharge or odor, **ozœna.**

It is most common in children; not rarely in those of seemingly healthy constitution, but worst and most obstinate generally in those of *scrofulous* habit, or who inherit *syphilis.*

Mild cases exhibit merely an annoying constancy or frequency of mucous discharge, and more or less interference with nasal breathing. In others, however, there is painful irritation and copious discharge; or there may be obstruction of one or both nostrils, almost absolute, with a dry state of the swollen Schneiderian membrane, and an accumulation of thickened mucus in the posterior nares; which becomes offensive from putrefactive decomposition. The respiratory portion of the lining membrane of the nostrils, compared (Kohlrausch, Kölliker, Bigelow) to the erectile structure of the penis,[1] may undergo hypertrophy to such a degree as to be sometimes mistaken for polypus. It always differs from the latter, however, in the absence of a stem, and in the immobility of its mass.

Worse yet, is the occasional extension of inflammation from the mucous membrane to the bones of the nose; which may then suffer destructive caries. Sometimes (especially in syphilitic cases) this disorder, ending in necrosis, *begins* in the turbinated or other *osseous* structures.

*Ulceration* of the lining membrane of the nose is not common, except in patients of syphilitic constitution. I have seen it, however, largely affecting the septum, in a case in which such a taint was quite impossible.

Not unfrequently the *antrum maxillare*, on either side, or one or both of the *frontal sinuses*, may be involved. In the last case, dull aching pain over the brow may be experienced. It is in the instances of extension to the maxillary and frontal cavities that the fetid discharge called *ozœna* is most apt to be met with. Not uncommonly, in such cases, no *nasal* discharge occurs; whatever is secreted passes down into the pharynx; but the odor may still be extremely unpleasant to the sufferer and to others.

Predisposition to nasal obstruction appears to have, in some

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[1] Roe; N. Y. Med. Record, April 30, 1881, p. 486.

persons, an anatomical origin; in a symmetrical growth of the bony structure of the nasal cavities.[1] Usually, however (apart from strumous or syphilitic constitutions), chronic nasal catarrh is the result of repeated or prolonged exposure to changes of temperature, and especially cold and damp, such as abound in our American climate.

*Effects* of this disorder, besides its direct annoyances, may involve loss of the sense of *smell;* impairment of *hearing* (through extension to the Eustachian tube and middle ear); injurious modification of the *voice;* and the disadvantage of being obliged to *breathe through the mouth.* From the last named necessity, irritation and chronic troubles in the pharynx, larynx, or even lungs may result.

**Treatment.**—First, we must ascertain the cause and nature of the affection. Is it simply idiopathic, or scrofulous, or syphilitic? Moreover, surgeons have often relieved ozæna by the removal of *foreign bodies* from the nasal cavities. Careful *inspection* of the nose must be made, by aid of a small bivalve *speculum* and the rhinoscopic *mirror.* (See *Rhinoscopy*, under Semeiology, in Part I.) But it is of great consequence, also, to have full information in regard to the constitutional history of the patient. Should there be any reasonable suspicion of syphilis, iodide of mercury ought to be advised, followed by iodide of potassium. Either of these alteratives may be given along with syrup or pills of iodide of iron. For the scrofulous diathesis, Lugol's solution, iodide of iron, iodoform, and cod-liver oil may be prescribed, succeeding each other so as to impress the system through a long period. Plenty of time is apt to be allowed in the treatment of chronic nasal catarrh; which is often one of the *opprobria* of medicine as well as of surgery.

*Local* treatment, however, must not be neglected. It has become, of late, almost a special surgical department.[2] The most general indication is *cleansing*, and when ozæna is present, *deodorization* and *disinfection* of the nasal cavities. For this, syringing is less effective than Weber's and Thudichum's *nasal douche.* This consists of a reservoir containing the selected fluid, to be held a little higher than the patient's head; from it depends a quarter-inch-bore rubber tube, at the lower end of which is a nozzle, large enough to fill the orifice of the nostril. When the douche is administered, the patient must breathe altogether by the mouth, and avoid swallowing. Then the fluid will enter by one nostril and pass out by the other. A simple funnel, or a bowl or pitcher with a siphon, will answer for the reservoir. The movement of the liquid may be controlled by raising or lowering the reservoir, and by compressing the lower part of the tube between the thumb and fingers.

For simple cleansing, a solution of common salt in warm water (a teaspoonful in a pint) will be very suitable. Other lotions are employed, containing some of the following substances: alum, borax, boracic acid, chloride of ammonium, compound tincture

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[1] Harrison Allen; Phila. Med. Times, Dec. 6, 1879, p. 120.

[2] See Bosworth, on the "Throat and Nose;" Beverley Robinson, "Chronic Nasal Catarrh," etc.

of benzoin, chlorate of potassium, nitrate of silver, sulphate of zinc, corrosive sublimate, tar-water, permanganate of potassium, chlorinated soda, hydrate of chloral, iodoform, carbolic acid, salicylic acid, glycerin, etc.

Another mode of local medication of the nostrils is by *atomization* (see Part I.) with similar solutions. The *hand-ball* atomizer will suffice for the purpose. Many practitioners prefer *insufflation* of powders; *e. g.*, tannic acid, bismuth, cubebs, or iodoform. Woakes[1] and others use medicated *pellets* of cotton-wool, saturated with the preferred agent in solution with glycerin. [F. 340, 341, 342, 343, 344, 345.]

Latterly, obstinate cases, in which hypertrophy of the mucous membrane over the lower turbinated bone obstructs the nostril, *destructive* local treatment is much in vogue. Escharotics may be used for this; as nitric, chromic, or *glacial acetic* acid. The last named is probably the best for the purpose. When such applications have proved insufficient, *removal* of a portion of the obstructive mass may be performed by means of a snare-écraseur, in principle like that used by Bryant and others for the excision of polypi from the nose. Jarvis' écraseur[2] has been found to work satisfactorily. Some practitioners prefer the *galvano-cautery* for a similar operation.[3]

Dr. Blackwood, of Philadelphia,[4] reports the successful employment of induced *electricity* in the treatment of chronic post-nasal catarrh. It must be applied with care, on account of the vicinity of the region to be dealt with to the base of the brain.

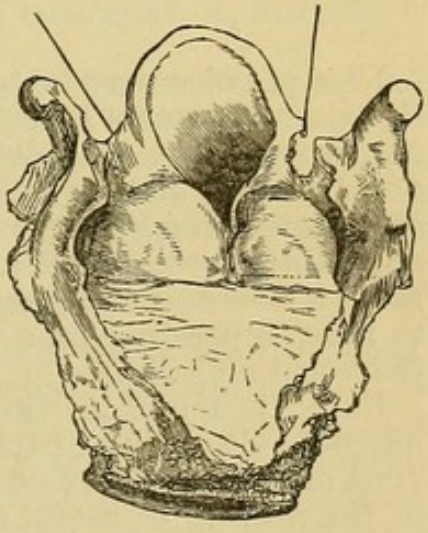
## LARYNGITIS.

Slight inflammation or congestion of the mucous membrane of the larynx is very common as the result of cold; its signs being hoarseness, with a dry, short, harsh cough and some soreness in drawing a breath. But simple acute laryngitis of severe grade is quite a rare affection.

When it occurs, there is fever, with hoarseness, "brassy" cough, distressing dyspnœa, and difficulty of swallowing. *Œdema glottidis*, or submucous effusion of serum, constitutes the greatest danger in laryngitis; the tumefaction obstructing respiration to a degree often fatal. This disorder is almost exclusively met with in adults.

Early purging, the application of leeches, the internal use of ipecac, in doses just short of nausea, with moderate quantities of opium, and the frequent inhalation of the steam of boiling water, constitute the best treatment. If dyspnœa become

FIG. 82.



Œdema of the Glottis.

[1] Lancet, vol. i., 1880, p. 876.
[2] N. Y. Med. Record, April 30, 1881, p. 500.
[3] Bosworth, N. Y. Med. Record, Nov. 6, 1880, p. 510.
[4] Monthly Review of Med. and Pharmacy, January, 1880, p. 8.

decidedly serious, threatening asphyxia, tracheotomy is advised. Some account of this operation will be given in connection with croup.

Œdema of the glottis may be produced immediately by the ingestion of boiling water, or of sulphuric or nitric acid, which has often accidentally happened.

*Chronic* laryngitis, with ulceration, is a not infrequent attendant on phthisis. Some cases of the latter begin with it; in others it occurs somewhat late in the course of the disease. An early sign in some cases of phthisis is (Seiler[1]) an ashy-gray discoloration of the mucous membrane of the pharnyx and larynx; along with pyriform swelling of one or both of the aryteroid cartilages of the larynx. *Syphilitic* ulceration of the larynx is tolerably common, as a secondary symptom. This, as well as polypi or other tumors of the larynx, may be discovered, and treated by operation for removal, or with solutions of nitrate of silver, etc., through the aid of the laryngoscope.

My confidence in the utility of very strong solutions of nitrate of silver in chronic inflammations of the mucous membranes, of the throat or elsewhere, has not increased, in fact has not been sustained, by what I have seen in practice. Dr. Horace Green and others made frequent use of it of the strength of sixty grains to the ounce. Except for *ulceration*, which may benefit even by the solid caustic, I believe that from four to ten grains in the ounce of water will do more good, in almost all cases, than the stronger proportions. *Iodoform* is a useful local application for ulceration of the fauces, threatening extension to the larynx.

The application of *nebulized* liquids, by apparatus for *atomization*, is now in vogue in both acute and chronic laryngitis. Some remarks upon this have been made already, under *General Therapeutics* (Part I.). Vapor of water containing laudanum, hops, or hyoscyamus, will probably do the most good in laryngitis.

## APHONIA.

Loss of voice may be transient or permanent; and either functional or structural in its origin. Especially in hysterical females, a nervous shock may produce a *paresis* or enfeeblement of the vocal power, lasting often for days together. I saw one such case in which a young woman could only speak in a whisper for more than three months. A *choreic* affection of the vocal apparatus is now and then met with; stammering is, in fact, analogous to this; depending on a want of command and co-ordination of the vocal muscles.

Faradization, *i. e.*, the use of induced electrical currents (as magneto-electricity), carefully applied, has sometimes cured nervous or hysterical aphonia.[2] I have known vesication of the back of the neck to be useful for it.

Congenital dumbness, except in idiots, is due to deafness, making the learning of speech impossible, unless by a recently invented system of instruction by sight.

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[1] Phila. Med. Times, July 3, 1880.

[2] Dr. Morell Mackenzie has pointed out that a shrill cough or the slightest dyspnœa should forbid the use of electricity for aphonia.—*The Practitioner*, vol. ii.

Organic or structural aphonia is caused by lesions of the larynx, such as ulcerative destruction of the vocal cords, tumors, etc., which are to be diagnosticated by laryngoscopy.

*Feigned* dumbness is detectable by careful watching, or, in the last resort, by *etherization*. In the stage of early excitement, or when reviving from anæsthesia, the pretender will betray himself by involuntary speech.

The term *dysphonia clericorum* has been applied to an affection of the throat not uncommon among clergymen and other public speakers, called by Dr. Horace Green "follicular disease of the pharyngo-laryngeal membrane." Its symptoms are soreness and irritation in the throat, with disposition to hawk and spit frequently, and hoarseness or partial loss of voice. On inspection, the fauces, pharynx, and glottis are found to be of a reddish granular appearance, with more or less enlargement of the mucous follicles, and, in severe cases, a muco-purulent secretion about the uvula. Sometimes, however, the membrane is dry.

A conventional treatment for this affection has formerly been the application every day or two of a solution of nitrate of silver, with a brush or probang. Saturated solution of tannin is also used for it. My belief is that, if these local remedies do not begin to relieve in a week or two, the frequent swallowing of small pieces of ice, or gentle gargling several times a day with ice-water, may be substituted with advantage. Counter-irritation over the throat, especially by croton oil, should, if necessary, be persevered in for a considerable time. Three drops of the oil (diluted with as much sweet oil for a delicate skin) may be rubbed over a limited space in front of the throat every night until a papular eruption comes out.[1]

Dr. J. W. Corson[2] asserts that relief will often be given when the voice has been suddenly lost, by slowly dissolving in the mouth and partially swallowing a piece of borax, containing three or four grains of the salt. Oil of *eucalyptus* is, latterly, a popular remedy for hoarseness.

Many cases of this complaint are as much constitutional as local in origin. Where real dysphonia (difficulty or imperfection of vocalization) exists, public speaking or singing must be avoided, to allow the organs repose. Tonics and change of air may often prove the best measures of treatment. (For *Aphasia*, see Diseases of the Brain.)

## LARYNGISMUS STRIDULUS.

This is an infantile affection, consisting in spasmodic closure of the glottis, causing a stridulous or shrill whistling respiration. It is most apt to occur during dentition, but is not very common. Its onset is sudden, and its duration brief. Though exceedingly alarming, it is seldom fatal. Of 52 cases recorded by Prof. Henoch, of Berlin, 33 were between 9 and 30 months of age, and 19 between 2 and 9 months.

The treatment must be prompt; producing derivation by slapping the back and limbs, and putting the feet into hot water, while

[1] Patients should be cautioned, of course, against allowing the oil to come near the eyes. I have known a severe ophthalmia to result from neglect of this.

[2] N. Y. Medical Record, Jan. 1, 1873.

cold water is applied to the head. Trousseau advised the application to the throat (better the *nucha*) of a sponge dipped in quite hot water. In severe cases mustard plasters (diluted with flour) may be applied to the chest and back. Some advise the momentary inhalation of chloroform; others (Charon, Henriette) of ammonia. When life is really in great danger from prolongation of the spasm, tracheotomy may be justifiable. Dr. Polk,[1] of New York, saved one child's life by the introduction of a No. 8 *silver catheter*. Children who have laryngismus are generally anæmic; requiring iron [F. 23] (perhaps bromide of potassium) and salt baths.

## CROUP.

We understand by croup, an acute cynanche or angina, whose signs are, a hoarse cough—difficult and audible respiration, and aphonia; the seat of the disorder being the upper portion of the air-passages. Its place in nosology has been empirically or conventionally (rather than systematically) established.

The identity of membranous croup with diphtheria, asserted by Dr. J. F. Meigs and many others, appears to me to be disproved, by a distinctness of history and pathology too signal to be put out of view. The one (croup) is a sporadic local inflammation, mostly sthenic; the other (diphtheria) is an epidemic constitutional affection, with local symptoms; mostly asthenic. As Niemeyer[2] points out, also, in croup the exudation is thrown out *upon the epithelial surface* of the mucous membrane, while in diphtheria it forms also *within its substance*. Of other authorities, we find among those holding the doctrine of the identity of membranous croup with diphtheria, Sir Thomas Watson, Hillier, George Johnson, and Morell Mackenzie. On the other hand, the frequent occurrence of cases of inflammatory, pseudo-membranous croup *not* identical with diphtheria, is maintained by such writers as Spence, Squire, C. West,[3] Hogg, Virchow, Hassenstein, Oertel, Oppolzer, Niemeyer, Trendelenburg, and Letzerich, abroad; and G. B. Wood, A. Flint, J. Lewis Smith, Fordyce Barker, and Cohen, in this country.

For brevity's sake, the following propositions may be advanced:—

1. The pathological elements of croup are, *a*, spasm; *b*, hyperæmia or congestion; *c*, inflammation, either ordinary or diphtheritic.

The spasm affects especially the muscles whose action tends to close the rima glottidis; but may involve also the muscular coat of the trachea itself.

The hyperæmia commences in the mucous membrane of the larynx or trachea, but often extends throughout the whole anterior cervical region.

The inflammation may be located in a small portion of the same mucous membrane, or, it may extend downwards indefinitely into the bronchial tubes.

2. We may mentally distinguish between cases, in which the croupal dyspnœa results from simple spasm, from simple tumefac-

[1] N. Y. Med. Record, June 19, 1880, p. 709.
[2] Text-book of Practical Medicine (transl.,) vol. i., p. 15.
[3] Until recently; not now (1881).

tion, or from inflammation without any spasmodic constriction of the glottis. But, in practice, the pathognomonic cough and breathing rarely attend such an isolation of one of these conditions. A certain number of cases, however, occur, of purely spasmodic or nervous croup; now and then substituting more general convulsions; as when worms have been, apparently, an exciting cause. A purely inflammatory case is at least equally rare. In fatal pseudo-membranous cases, autopsic examination has repeatedly shown that the amount of false membrane was by no means sufficient, alone, to have occluded the larynx or trachea; the result being due to the additional *spasmodic contraction*.

FIG. 83.

False Membrane in Trachea.

3. The most frequent form, common night croup, is pathologically characterized by spasm of the glottidean apparatus, with congestion and tumefaction (transient in character), of the laryngo-tracheal mucous membrane.

It is in these respects precisely *analogous* in nature to the asthmatic attack, whose seat is in the smaller air-tubes. There is no strongly marked line of separation between this form and the *catarrhal croup*, or croupal catarrh, in which more or less active inflammation occurs, prolonging the existence of the symptoms.

4. Looking, then, on the hyperæmic state as simply intermediate, we may classify the cases of croup, as they ordinarily occur, clinically, as, 1st, those in which spasm predominates; and 2dly, those in which inflammation is the dominant condition; or, bearing in mind the above expressed qualification, into spasmodic and inflammatory cases.

5. Pseudo-membranous, or "true croup," does not generically differ from inflammatory croup; of which it is only a grade or termination: *i. e.*, any case of inflammatory or catarrhal croup *may* end in the exudation of coagulable lymph within the air-tubes.

6. Whether this shall occur or not, in any given case, depends, *a*, on the degree of the inflammation; *b*, on the state of the blood of the patient; *c*, on the treatment.

7. It cannot be predicated on the ground of experience, that either vigorous and plethoric, or feeble and anæmic children, are especially prone to the membranous form or termination of inflammatory croup. It may and does occur frequently in both.

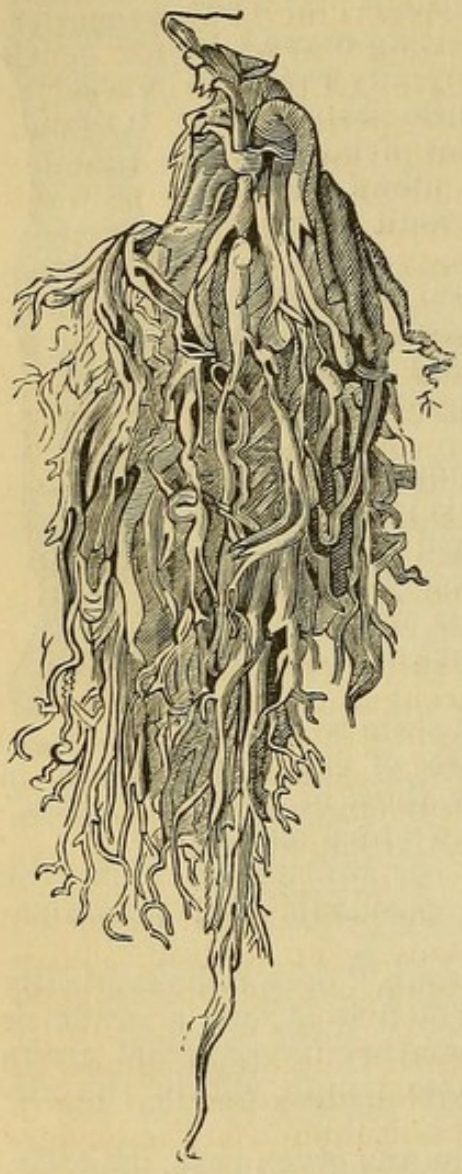
8. The ordinarily recognized signs for the diagnosis of inflammatory from non-inflammatory croup are sufficient, viz., the persistent duration of the croupal cough and voice—the (generally) slow onset—the febrile symptoms—and the *stridulous* inspiration, as the dyspnœa increases.

9. Inflammatory or true croup is, with the above inclusion (as always potentially membranous), not at all necessarily fatal, although highly dangerous. The presence of the false membrane itself does not inevitably determine a fatal result. Heart-

clot, from embarrassment of the circulation, has sometimes hastened death.[1]

10. In no disease does more depend on *early treatment*, which is often prevented by the insidious approach of the attack deluding the parents. The mortality of the disease may thus in part be accounted for.

FIG. 84.



Bronchial False Membrane.

11. In the treatment of all forms of croup, *relaxation* and *secretion* are the two great desiderata.

12. In the spasmodic cases, emetics and antispasmodics (*e. g.*, ipecacuanha, onion, assafœtida, or lobelia) will effect these objects, especially if aided by the warm bath or foot bath.

13. In mild inflammatory cases, saline purging, gentle vomiting, and the use of demulcents, counter-irritation, and pediluvia will relieve.

14. In the more active cases, the loss of blood by the lancet, or by leeching, or by both, will be necessary, and should be early used.[2]

15. The most satisfactory emetic for employment in such cases is a combination of ipecac and alum [F. 24]; the latter being used in half teaspoonful doses in urgent cases, until emesis is produced. Nor should the practitioner hesitate to compel repeated vomiting at intervals, in desperate cases. Better for a child to risk being sick for a month, than to die of cynanche (dog-choke, as the Greeks termed it). But the alum is unlikely to do harm. Turpeth mineral is preferred by some.

16. Tartar emetic should not be used as an emetic in croup; in sedative or expectorant doses, it may be advantageous. The same may be said of *veratrum viride*, *pilocarpin*, and *apomorphia;* each of which is greatly promotive of relaxation, but also of serious depression. Cure has been effected in a desperate case, by the hypodermic injection of $\frac{1}{20}$ grain of hydrochlorate of apomorphia. For a child the dose must be small, and its action must be watched before repetition. A case has been reported[3] in which life appeared to be saved by the hypodermic injection of three drops of a one per cent. solution of *sulphate of atropia.*

[1] B. W. Richardson, Med. Times and Gazette, March, 1856.

[2] Dr. F. Barker employs, instead, *tinct. veratr. virid.* in one or two drop doses; sometimes combined with carbonate of ammonium, and followed by large doses of quinine in severe cases.—*Am. Journal of Obstetrics*, May, 1870.

[3] De Pontêves; L'Union Médicale, 1879.

17. Calomel [F. 25], freely administered, that is, a grain every hour or two, has the highest authority in its favor, in serious croup.

18. Nitrate of potassium has both experience and reason in its favor. Being a solvent of fibrin, it may tend to prevent the excessive coagulability of the exudation. According to late theories, ammonia might do the same thing; but the clinical or therapeutic antecedents of ammonia point otherwise. Of the lately asserted value of sulphur in croup, I have no experience. Dr. Ozanam reports great success with *bromine* solution (one drop in an ounce of water), a few drops every hour; using also the bromine water and bromide of potassium by inhalation with boiling water.

19. The great evil in membranous croup is the solidifying tendency of the exudation; why should not, therefore, an abundant imbibition of fluids, even of water, do something towards counteracting this? Inhalation of steam, from hot water poured upon unslaked lime, is eulogized by several writers. Glycerin, in teaspoonful or half teaspoonful doses, is recommended by E. Hartshorne and others. Lactic acid, found by Bricheteau to be a powerful solvent of false membranes, has been applied locally, in solution, with success, by Dr. Dureau.[1] Keeping the air warm (over 70°, some say 80° or 90°) and moist around the patient is advised by several practitioners.

20. No clear indication exists for the use of opium in the majority of cases of inflammatory or membranous croup; although it may become useful, in cases which are protracted, or which are attended by a more than usual disposition to spasmodic symptoms. The objection to it, in my mind, is, its tendency to diminish bronchial (or tracheal) secretion; which, in croupal affections, we desire especially to promote.

21. Blisters are decidedly useful; but they should not be left on long in croup, a superficial vesication only being desired. With Trousseau, a favorite application was a sponge or compress dipped in hot water and applied to the throat.

22. The application of a strong solution of nitrate of silver [F. 26] to the fauces (and larynx, if possible), does good in many cases; in the pre-exudative stage as a medicament; in the exudative, as a mechanical operation aiding to dislodge the membrane.

23. Iodide of potassium is too slow in its systemic action to be relied on; and the same may be anticipated of the bromide; although nothing should forbid their fair trial.

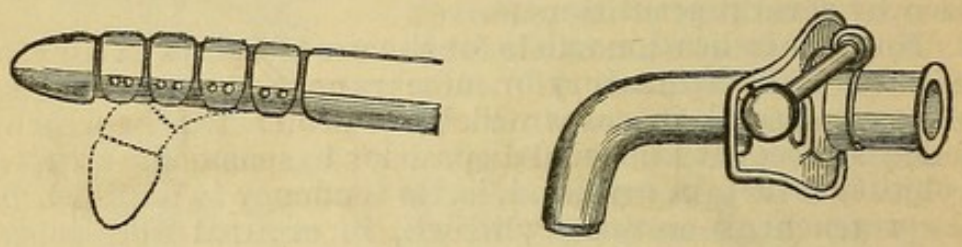
24. Tracheotomy or laryngotomy will, when performed early, succeed in a fair number of cases; but in many of those cases it is impossible to know that they (as well as some in which it fails) might not have recovered without it. Few practitioners, therefore, in this country, can demand the operation early; and in the moribund state, the vascular congestion, from asphyxia, about the throat, renders success difficult, sometimes impossible. Upon the whole, therefore, the cases in which the operation may be expected to add to our hope in croup, are few. In 1859, Bouchut, of Paris, introduced tubage (or catheter-like dilatation of the

[1] Bulletin Général Thérapeutique, Sept. 15, 1868.

larynx and trachea) instead of tracheotomy, at the same time publishing some statistics very unfavorable to tracheotomy. The Académie Impériale de Médecine, however, decided adversely to the use of tubage as a substitute for tracheotomy. An instance of the successful employment of a common *catheter* was reported by Dr. Paton (Brit. Med. Journal, vol. i., 1881, p. 803).

My own experience with tracheotomy has not been encouraging. With Dr. C. West, who had but one recovery in sixteen cases, I am obliged to admit its success, in some otherwise hopeless instances; especially in France, where Trousseau and others have operated earlier than in England or here.[1] It is most often fatal in children under three years of age. Where there is reason to believe the membrane to extend into the bronchial tubes, it is of course in vain. The danger of hemorrhage, from dilated blood-vessels especially, is least if the operation be early. Dr. Aitken thinks that it ought always to be performed if no symptoms of amelioration follow active treatment, by "bleeding, emetics, the warm bath, and calomel purgation" steadily pursued for twelve or sixteen hours. The suggestion is a good one, that the opera-

FIG. 85.



Durham's Canula and Pilot.

tion is most appropriate *when the tendency to death is more by continuous apnœa than by exhaustion.*[2] If delayed too long, the apnœa itself may produce an irremediable condition.

If performed, it should be deliberate, tying every vessel that bleeds, making a considerable opening in the upper rings of the trachea, and inserting a tube or canula[3] of good size. Some

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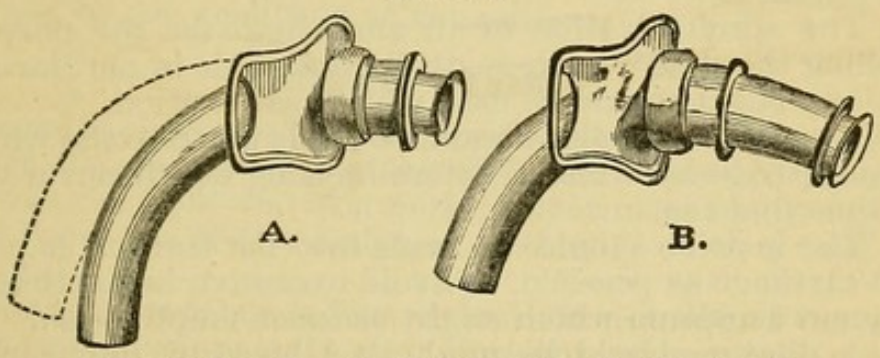
[1] Nélaton's first operation was successful; he then had twenty-three cases without one success. N. Y. Med. Record, June, 1869. From statistics published by Jacobi and others, it appears that of 1024 operations of tracheotomy, in Europe and this country, 220, or 21.48 per cent., have been followed by recovery. During the years 1861–1872 inclusive, there were performed in the department of Prof. Wilms, in Berlin, 330 tracheotomies on diphtheritic patients under 16 years of age. Up to 2 years of age there were 6 operations, and all died. In the ages of 2–3 years, there were 56 operations, 15 recovered; 3–4 years, 69, 22 recovered; 4–5 years, 74, 18 recovered; 5–6 years, 57, 20 recovered; 6–7 years, 33, 15 recovered; 7–8 years, 21, 5 recovered; 8–14 years, 19, 8 recovered; total, 103 recoveries (31¼ per cent.)—boys, 36⅔ per cent., girls, 24⅓ per cent. In the first two years, and between the ages 11–14 inclusive (of each 6), not a case recovered. Successes under one year have, however, been reported.

[2] Dr. G. Buchanan, Brit. Med. Journal, March 4, 1871.

[3] F. Howard Marsh (Reports St. Barthol. Hosp., vol. iii.) asserts, after careful measurements, that the diameter of the trachea is, before two years of age, 10-40ths of an inch; in the third year, 11-40ths; between this and the seventh year, 14-40ths. A canula may be 9-40ths of an inch for a child under four years; 11-40ths between five and eight, and 12-40ths from that to twelve years of age. Durham's canula is probably the best now in use. Luer's silver canula, movable on the shield, is preferred by some; others use Leiter's *hard-rubber* canula.

operators excise a small portion of one or two tracheal rings. Others, instead of a canula, use a leaden wire passed around the neck, its ends being hooked into the sides of the opening. A bivalve *dilator* (Trousseau's or Hutchinson's) should be inserted soon after the trachea is opened. R. W. Parker (Medico-Chirurgical Transactions, 1879) advises that a feather should be used to clear the trachea of membrane before inserting the tube. Sometimes medicated solutions are thus introduced; as (Trousseau) bicarbonate of sodium, or persulphate of iron with glycerin, etc. In the adult, Arnott and others have used a curved *trocar;* Marshall Hall, *scissors.* The use of chloroform or ether will facilitate the operation; the danger from the inhalation is least when the vitality of the patient is not yet greatly reduced. Some have observed partial anæsthesia of the skin to be a sign of increasing asphyxia, such as indicates the propriety of the operation. *Retraction of the chest-wall* during inspiration is yet more significant of danger to life from failure of breathing. After tracheotomy, the patient should be surrounded constantly with a warm, moist atmosphere. The canula should be withdrawn in as few days as possible, upon the return of permeability of the larynx. The wound may then be treated with ordinary

FIG. 86.




Bryant's Canula. A. Full length. B. Shortened.

mild dressings, to exclude the air and heal it up. Verneuil, Saint Germain, Ranse, Muron, and Bœckel have advocated tracheotomy with the *actual cautery.* Its especial advantage is said by them to be the division of the *tissues exterior to the trachea*, by means of a knife at a dull red heat, without the danger and delay of hemorrhage. They sometimes divide the trachea itself with a common bistoury; separating the edges of the wound with a dilator to insert the canula. Another method proposed (Reismann, 1879) for "bloodless tracheotomy" is, to introduce *sutures* through all the tissues along the sides of the incision made, before the trachea is opened.

The fact that lime will dissolve false membranes has been largely applied to the treatment of croup; by making the patient breathe the steam from boiling water poured over unslaked lime. Although the lime is not volatile, some of its minute particles will be raised mechanically by agitation. Several successful cases of its use are reported. Probably the absorption of the carbonic acid of the breath may partly explain the usefulness of lime. Kuhn, however, asserts that *carbonate of potassium*, given

early, will prevent the formation of false membrane. Lactic acid (inhalation of a solution of 20 drops in half an ounce of water) has been used with success (Adolph Weber) in croup.[1]

To sum up, I would begin the treatment of a case of inflammatory croup with a saline purgative. Then an emetic of ipecacuanha; which may have to be repeated. Leeching, and even venesection, will be useful in a robust subject if seen early. Between the times of emesis, there may be prescribed 1 grain of calomel with 5 grains of nitrate of potassium, every two hours; in urgent cases every hour. In children over three years of age $\frac{1}{32}$ to $\frac{1}{16}$ grain tartar emetic may be added; or one-drop doses of tincture of veratrum viride; watching the effect produced. The warm bath, prolonged, may be used once or twice daily. Hot compresses, or cloths wrung out of *cold* water (which soon becomes warm when applied) may be applied to the throat; but a blister should follow in a severe case. Inhalation of steam from lime or lactic acid should be tried, early as well as late. Alum must be added to ipecac, if relief be delayed. Nitrate of silver sponging, and catheterism or tracheotomy, are last resorts.

The following conclusions are laid down by Dr. J. S. Cohen, in his monograph[2] upon Croup and Tracheotomy:

"1. There are no insuperable contra-indications to tracheotomy in croup.

"2. The administration of an anæsthetic for the purpose of controlling the child's movements is admissible in performing the operation; but it should be used with great caution.

"3. A careful dissection should be made down to the windpipe, and hemorrhage be arrested before incising it, whenever there is at all time to do so.

"4. The incision should be made into the trachea as near the cricoid cartilage as possible, to avoid excessive hemorrhage, and subsequent accidents which might occasion emphysema.

"5. A dilator should be used, or a piece of the trachea be excised, whenever any difficulty is encountered in introducing the tube.

"6. The tube should be dispensed with as soon as possible; or altogether if the case will admit of it.

"7. Assiduous attention should be bestowed upon the after-treatment, especially that of the wound. A skilled attendant should be within a moment's call for the first twenty-four or forty-eight hours immediately following the operation."

The diagnosis between inflammatory croup and *diphtheria* will be referred to hereafter, in connection with the latter disease.

### PLEURODYNIA.

**Synonym.**—*Intercostal Rheumatism.*

**Symptoms.**—Pain, generally rather dull, sometimes quite severe, of one or both sides, oftenest on the left. It is increased by deep breathing or coughing, moving the arms or trunk.

**Diagnosis.**—From pleurisy, it is known by the absence of fever, and of all modifications of the sounds heard upon percussion and auscultation.

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[1] Med. Times and Gazette, Jan. 22, 1870. [2] Philada., 1874.

**Treatment.**—A large mustard plaster over the part; friction with soap or volatile or some anodyne liniment; dry or cut cups; covering the side with carded wool and oiled silk; a belladonna plaster; a blister if obstinate as well as severe.

### INTERCOSTAL NEURALGIA.

**Symptoms.**—Severe lacerating pains between the sixth and ninth or tenth ribs, along the intercostal spaces; frequently intermitting, or even regularly periodical. This affection is most generally met with in anæmic patients, or in those who have been exposed to malarial influence. Occasionally the paroxysms are attended by a sort of reflex pulmonary congestion, simulating pleuro-pneumonia. *Spinal tenderness* is often present.

**Treatment.**—A sinapism may be applied; or ointment of aconite [F. 27], or of chloroform [F. 28], or veratria [F. 29], may be rubbed upon the side during the paroxysm. Should these not relieve, a small blister may be allowed to vesticate, and then one or two grains of acetate of morphia diluted with powder of gum arabic may be applied to the surface; or solution of morphia may be used by *hypodermic injection*, half a drachm at a time being introduced by means of a syringe adapted to the purpose, over the part.

General treatment, by iron, quinia, or cinchonia, etc., will be determined by the condition of the patient.

### THORACIC MYALGIA.

This term has been applied (Inman) to an affection characterized by pain in the superficial muscles of the chest, mostly dependent upon ill-nourishment and overwork; sometimes produced by constrained positions of the body, or pressure; as by a desk, or a soldier's belt, etc.

Its treatment consists in the removal, if possible, of its cause; with local warming or anodyne applications, and general invigoration of the system.

### PHTHISIS PULMONALIS.

**Definition.**—Tuberculous or caseous consumption of the lungs.

**Varieties.**—Acute, chronic, and latent phthisis.

**Symptoms and Course.**—Consumption may begin after a severe acute bronchitis or broncho-pneumonia; or, more gradually, with an apparently slight hacking cough; or with a hemorrhage; or with dyspepsia and general debility; or with chronic laryngitis. Increasing, in most cases slowly, the pectoral and constitutional disorder becomes developed. We have, then, pains in the chest, frequent and severe cough, hemorrhage occasionally (in about two-thirds of the cases) and pallor, acceleration of the pulse and elevation of the temperature, with the paroxysms of hectic fever, *i. e.*, chills followed by fever with bright flush of cheek, but without headache; emaciation, arrest of menstruation in the female, night-sweats, colliquative diarrhœa; finally, often, though not always, delirium; and death, mostly by exhaustion, but sometimes by suffocation. The spirits of the patient are apt to be cheerful, even hopeful of life almost to the last. Appetite is

variable, digestion usually not vigorous; but to this there are exceptions.

The following description of advanced phthisis is from the late Prof. N. Chapman:

"The cheeks are hollow, the bones prominent, the skin arid, the nose sharpened and drawn, the eyes sunken, with the adnata of a pearl color, destitute of vascularity, the lips retracted, so as to produce a bitter smile, and the hair thinned by falling out, the neck wasted, oblique, and somewhat rigid or immovable, the shoulder-blades projected or winged, the ribs naked or exposed, with diminution of the intercostal spaces, and the thorax apparently narrowed; the abdomen flat, the joints, great and small, seemingly enlarged from the wasting of the integuments, the nails livid and occasionally incurvated, the extremities œdematous; the angular points on which the body rests, in several points protruded through the skin—the whole attended by a most afflicting cough, aphthæ, sore throat, difficult deglutition, and feeble, whispering voice, or entire extinction of it."

The expectoration in phthisis is at first mucous or bloody; later, muco-purulent and bloody, or else *nummular; i. e.*, in roundish masses like coins, not floating perfectly in water; or, abundant and purulent. Dr. T. Thompson first noticed (1852) the appearance of a rather deep-red line along the gums as one of the signs of phthisis.

**Stages.**—These are, 1. Incipient phthisis; 2. The stage of consolidation of the lung; 3. That of excavation or *vomicæ;* 4. Advanced or confirmed consumption.

**Physical Signs.**—The earliest indications upon physical exploration are, a sinking in under the clavicle upon the left side, with prolonged expiratory sound. Not long after, the evidence of consolidation is, increased dulness over the apex of the lung upon percussion (not invariably, but *generally* upon the left side) with blowing or bronchial respiration, or interrupted jerking respiratory murmur, and increased vocal resonance and vibration. Dry crackling follows, with mucous or coarse crepitant râle.

When softening of tubercular deposits occurs, moist crackling and gurgling become very distinctive signs. The presence of a *vomica* is shown by cavernous respiration and bronchophony or pectoriloquy. Percussion-resonance over a cavity will be dull if its walls be thick, and amphoric if they are thin and tense; if thin and relaxed, the *bruit de pot felé* or cracked-pot sound. On percussion over a cavity when the patient's mouth is shut, the sound produced may be of a lower pitch than when the mouth is open.

Pneumothorax and hydro-pneumothorax, *i. e.*, dilatation of the pleural cavity and compression of the lung by air, or air and liquid together, with perforation of the lung, are not uncommon results of tuberculization, although possible without it. Of pneumothorax, the percussion-resonance is tympanitic; respiratory murmur is lost. Hydro-pneumothorax may give tympanitic resonance above, with metallic tinkling on auscultation, and dulness below.

**Physical and Microscopical Peculiarities.**—Temperature has

been found to be a diagnostic aid in phthisis. It is asserted that there is a *continued elevation of the heat of the body* in all cases in which tubercle is being deposited; that this may occur for weeks before any local physical sign is discoverable; and that the rise in the heat of the body varies, during the progress of the case, with the greater or less activity of the tuberculization. It has been shown, however, that exceptions to this general rule do occur; and it is not certain whether the elevation of temperature is not due really to a concomitant irritative or sub-inflammatory process, rather than to the simple deposit of tubercle. This last is the most probable view.

When expectoration is copious, some micrologists aver that diagnosis may be aided by its minute characters; arched and anastomosing fragments[1] of pulmonary fibrous tissue, and tubercular corpuscles, being discerned. But it is not proven that the former are thrown off only in phthisis; and the latter may be absent or obscure in character in an otherwise clear case. Niemeyer regarded the presence of elastic fibres in the sputa as a sure indication of consumption. Dr. Fenwick, of London, detects minute portions of lung-tissue by boiling the expectoration a few minutes with its bulk of solution of caustic soda (gr. xv in f ʒj of distilled water), and adding cold water, in a conical vessel. The sediment is then examined with the microscope.

**Terminations.**—The cicatrization of vomicæ, and the cessation of tubercular deposition, have, although exceptional, been often found to occur; and so have the cornification and calcification of unsoftened tubercle. Recovery from phthisis may in such cases be expected to take place, as the arrest of the local disease attends the presence of a favorable constitutional state.

Death from consumption may come by *asthenia* or by *apnœa*. The first is most common. Suffocation or apnœa may follow—1, from hemorrhage; 2, rupture of a large vomica; 3, pulmonary œdema or hydrothorax; 4, excessive secretion or bronchorrhœa, beyond the power of expectoration.

**Complications.**—Pleurisy is a frequent concomitant of phthisis. Tubercular peritonitis is much more rare. On account of its duration, however, pulmonary consumption may be accidentally combined with various affections not specially kindred with it. Asthma is particularly *not* apt to be conjoined with phthisis.

**Diagnosis.**—It is from chronic bronchitis, cancer of the lung, pleuritic effusion, bronchial dilatation, and pulmonary abscess that phthisis requires the most care in discrimination.

Chronic bronchitis is not common except in old persons; its expectoration is thinner, whiter, and not nummular nor bloody; there is no hectic, although there may be emaciation; and there are none of the special physical signs of phthisis.

Cancer of the lung exhibits a marked dulness of resonance on percussion on one side, with blowing respiration, unless a bronchial tube be obstructed, when there is no respiratory sound. There is severe and almost constant pain in the chest. The pecu-

[1] Dr. J. G. Richardson calls attention to the *square fracture* of these fragments as being distinctive.

liar auscultatory signs of tubercular disease are absent; while the sallow, cachectic aspect of cancer, and the concurrent existence of carcinomatous tumors somewhere in the body, generally make the case clear.

In "chronic pleurisy," as pleuritic effusion is often called, the dulness on percussion is at the *lower* part of the chest; the side is expanded, unless after the fluid is absorbed; respiratory murmur and vocal vibration are suppressed; and the general symptoms, as irritative fever and wasting, are not so extreme.

Bronchial globular dilatation may give auscultatory signs exactly like those of a tubercular cavity; but there is no hæmoptysis nor emaciation, nor much loss of health. The expectoration may be as copious as in consumption; but the matter is more liquid, and pus much more diffused in it. The cough is more constant than in phthisis.

Abscess of the lung is to be distinguished from phthisis by its history, generally following recognized pneumonia; its seat mostly at the base of the lung; its physical signs decreasing instead of increasing; and, as with cancer, the affection being confined altogether to *one lung*. The extension of the signs to both lungs is important in most cases in the diagnosis of phthisis.

Dr. Walshe states that *caseous infiltration* is more likely to occur either at the base, or in the middle portion of the lung than is the case with *tuberculization*.[1]

*Syphilitic* disorder sometimes affects the lungs and bronchial tubes, with a condition almost undistinguishable from ordinary consumption. The previous existence of venereal disease, and periosteal nodes upon the clavicles, with the slower progress of the decline, will help to enlighten us.

**Prognosis.**—Phthisis is certainly one of the most destructive of diseases. In no case can recovery be anticipated; but it does occur, as every physician must have witnessed. I have seen a number of such recoveries; generally from the incipient stage, but also even where vomicæ, emaciation, and night-sweats had occurred. Dr. A. Flint has recorded the history of sixty-two cases of restoration from consumption. Cruveilhier said of phthisis, long ago, "Prevent inflammation, and you will cure your patient." Hérard and Cornil have lately asserted nearly the same opinion.

Under improved hygiene and medical treatment, the mortality from phthisis appears to be declining. Without referring to statistics (the nomenclature connected with which in past times would be a source of doubt, as chronic bronchitis, etc., were once called consumption), I am convinced that fewer people die of phthisis now than thirty years ago, in Philadelphia.

The *duration* of phthisis varies greatly, being least, as a general rule, in the youngest subjects. Eighteen months to two years is the most frequent period. But in some instances life is prolonged under it for twenty, thirty, or even forty years.

Dr. C. T. Williams[2] found the average duration of 198 cases, under favorable circumstances for treatment, over seven years;

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[1] Treatise on Diseases of the Lungs, 4th edition, 1871.
[2] Lancet, January 21, 1871.

and of 802 still living, the average continuance of the disease was more than eight years. It is probable that, in cases not cured, the hygienic and therapeutic measures now employed increase the length of life much beyond what was possible thirty or forty years ago.

In the United States, however, the deaths from phthisis still constitute about 25 per cent. of the whole mortality from all diseases.

**Acute** phthisis, or galloping consumption, may end life in from six weeks to three months. This sometimes follows pneumonia. Its symptoms differ from those of ordinary consumption chiefly in their rate of progress. Softening of the tubercle and the formation of cavities do not always occur to any extent, apnœa being caused by extensive diffusion or infiltration of the tuberculous or caseous deposit through the lungs.

In any case of consumption, the *state of the general system* is of primary import in prognosis. When the patient is gaining in weight and strength, and fever and night-sweats diminish or disappear, there is hope, for a time at least. Spitting of blood (when consumption is proved to exist already) does not increase the unfavorable aspect of the case. Rapid emaciation, chills, hectic, swelling of the feet, and diarrhœa are always discouraging; as, of course, are, also, all signs of increase in the local pulmonic affection.

**Causation.**—Hereditary taint of constitution[1] is general; independent origination of phthisis the exception. From 18 to 35 years is the time of life most subject to it; but it is now and then met with even in children, and frequently in the aged. Statistics in Europe and in this country show some proportion between the mortality from consumption and nearness to the sea-level; the lowest lands having the greatest total amount of it. High, dry, and equable climates and situations, even though cold, are most exempt from it. It is not a disease of the Arctic regions, and there is more of it in Tennessee than in Illinois.

The views of Oppolzer, Niemeyer, Virchow, and others, concerning the frequent origination of consumption in "caseous pneumonia" or broncho-pneumonia, or bronchitis, and the declaration that tubercle is absent in a large number of cases, even of fatal consumption, have received, as they deserve, critical examination by the profession. I believe it not safe to accept so great a modification of pathological doctrine as they involve; although the *occasional* occurrence of scrofulous phthisis without characteristic tubercular deposits may be (as indeed it has long been) admitted. If we accept the opinion of many pathologists, recent as well as older, that caseous softening is the *customary change* (Virchow, Waldenburg) which true miliary tubercle undergoes, it would seem quite supposable that the absence of true (so-called) tubercle in a number of cases in the lungs of those who have died of phthisis may be explained by the process of softening and transformation having had time to be *completed.*

Among the predisposing causes of consumption is congenital

[1] Even those who advocate the new views (resorption, or infection) of the nature of consumption mostly admit a "vulnerability" which is inherited.

stenosis (contraction) of the pulmonary artery (Farre, Gregory, Louis, Traube, Frerichs, Lebert).

Dr. A. Flint,[1] analyzing 670 cases of phthisis in private and hospital practice, concludes as follows: "Pneumonia and bronchitis have very little if any causative influence in developing this disease; and there is no clinical evidence of hæmoptysis having such an influence. Nor is there evidence to sustain the hypothesis which attributes miliary tuberculosis to absorption of morbid products in different parts of the body. The doctrine is sustained that pulmonary tuberculosis is eminently a *diathetic* disease; *i. e.*, one arising from a *constitutional* determining agency." Allusion has been made in a previous part of this book to what I believe to be the untenable theory of the existence of a *specific virus* (Cohnbeim, Martin) productive of tubercle. (See *General Pathology; Tuberculosis.*)

Individually, and in families, all causes that depress vitality produce consumption; but most of all *impure atmosphere.*[2] Sedentary employments and exhausting excesses, with foul air, make large cities very productive of it. In constitutions having the proclivity towards it, tuberculization may be brought on by any reducing disease, especially such as involves the breathing organs; as measles, bronchitis, or pneumonia. Dr. Copeland[3] considers that phthisis may be *communicated*, by the emanations from the lungs and skin of a patient; and hence urges that consumptive mothers should not nurse their infants; and that healthy persons should not sleep with consumptives. Parks, Budd, and others, confirm this opinion; which was held also by Morgagni, Laennec, Andral, and Sir James Clark. Dr. R. Payne Cotton, of the Consumption Hospital, Brompton, England, with extended opportunities for observation, denies it.[4] If proved, it is not a *specific contagion*, but *extension of decay by contact with decaying tissue.* Drs. W. H. Webb[5] and E. Holden,[6] in papers upon this topic, give references showing an affirmative opinion in regard to the communicability of phthisis to have been expressed by Galen, Cullen, Heberden, Morgagni, Laennec, Andral, Bright, Addison, Copeland, Drake, Dickson, Budd, Walshe, Beale, Bowditch, Flint, Stillé, Da Costa, and others. Dr. Holden obtained, in answer to circulars of inquiry, two hundred and fifty replies from leading physicians in different parts of the United States. Of these, one hundred and twenty-six affirmed their belief that consumption is communicable. The judgment of Sir T. Watson is no doubt well expressed; who, while denying that phthisis is contagious, would still, "for obvious reasons, dissuade the occupation of the same bed, or even the same sleeping apartment, by two persons, one of whom was known to labor under pulmonary consumption."

**Treatment.**—*Hygienic management* is, decidedly, more important

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[1] New York Medical Record, 1873.

[2] Dr. MacCormac, of Belfast, has rendered service to the profession by especially enforcing this. Dr. Bowditch, of Boston, U. S., and Dr. Buchanan, in England, have likewise shown the great importance of dampness of situation as a promotive cause of phthisis.

[3] On Consumption and Bronchitis, London, 1866.

[4] Brit. Med. Journal, Aug. 31, 1873.

[5] Amer. Journal of Med. Sciences, April, 1878, p. 426.

[6] Ibid., July, 1878, p. 145.

to the consumptive than medicine. The following precepts are well laid down by Dr. B. W. Richardson :—

1. A supply of pure and fresh air for respiration is constantly required by the tuberculous patient.

2. Daily exercise in the open air is imperatively demanded by the tuberculous patient.

3. It is important to secure for the patient a uniform, sheltered, temperate, and mild climate to live in, with a temperature about 60° and a range of not more than 10° or 15°; where, also, the soil is dry and the drinking-water pure and not hard.

4. The dress of the tuberculous patient ought to be of such a kind as to equalize and retain the temperature of the body.

5. The hours of rest should extend from sunset to sunrise.

6. Indoor or sedentary occupation must be suspended; but outdoor employment in the fresh air, even in the midst of snow, has been and may be advantageous.

7. Cleanliness of body is a special point to be attended to in the hygienic treatment of tuberculosis.

8. Marriage of consumptive females, for the sake of arresting the disease by pregnancy, is morally wrong and physically mischievous.

Dr. Hermann Weber asserts, upon experience, that prolonged residence in elevated localities is curative of phthisis.

Altogether, the *analeptic* principle is now universally adopted for the treatment of consumption. The diet must be nourishing; a "generous" regimen; and the same indication is to be followed in the employment of medicines.

There has been discovered, as yet, no specific to arrest tuberculosis. But cod-liver oil and alcohol, and, in lesser potency, iron, quinine, and other tonics, in a certain number of cases do manifest an important conservative and restorative influence; and palliation of symptoms, as pain, cough, loss of rest, may greatly help the comfort of the patient. My confidence in the *frequent* value of cod-liver oil is based chiefly upon observation. Three individuals in one family, for example, under my care, notwithstanding a well-marked family tendency (shown by the previous death by phthisis of three sisters, their mother, and uncle), recovered from incipient consumption under the use of the oil. Other cases, much more commonly, have life *prolonged* by it. Unfortunately, however, in quite a considerable number of persons the stomach turns against cod-liver oil. When that is the case, it is in vain to urge it. It may be taken in the froth of porter or ale, or after rinsing the mouth with brandy, which may also follow it. Some dislike it less when salted. Ammonia added to the oil lessens its taste; but I have not tried the combination extensively. Addition of *walnut* (or other) *catsup*[1] will disguise its taste quite effectively. The gelatinous capsules make it much less disagreeable to swallow; but less than two or three tablespoonfuls of the oil daily will hardly suffice. It can always be taken best in cold weather [F. 30, 31, 32]. Dr. B. W. Foster, on theoretical grounds, has proposed the addition of

[1] Pharmaceutical Journal, 1881.

*ether* to cod-liver oil, to promote its digestion by the pancreatic secretion. Dr. Van den Corput, of Brussels[1] gives, with asserted advantage, *boluses* of cod-liver oil saponified by hydrate of lime. A bitter tincture, as of bark (Huxham's), columbo, or gentian, will lessen the disagreeableness of the oil, while adding to its tonic effect. Carre, Lemoine, and Bouchut have found[2] cod-liver oil *bread* very available, especially for children. Every pound of bread may contain about five tablespoonfuls of oil, and six spoonfuls of milk. The taste is said to be thus very much disguised.

Alcohol, though variously estimated by different physicians, is, in my view, well established as a remedial or at all events a supporting agent of value in consumption. Not to be used in excess, nor ever to produce excitement in any degree; but simply as a *roborant;* an addition to the diet and a supporter of the strength of the invalid. The dose must, therefore, be proportioned to his condition; and it ought usually to be small.

Whisky is preferred by many; but ale, lager beer, and wine suit different patients best. A little, two or three times daily, will be much better than a full drink at one time. I would always begin with very small quantities—say two or three teaspoonfuls of whisky, or half a glass or even less of wine, or half a tumblerful of ale or beer. To do good, the stimulant *should not quicken the pulse, flush the face, or be felt to affect the head.* Kept under such restrictions, even when increased to meet great prostration, I have never known any hankering after excess to be caused by it. One patient of mine, with phthisis, would sometimes, when temporarily much reduced, take more than half a pint of whisky daily for a time; and then as his strength rallied, would diminish the amount to almost none, without any difficulty or longing for more.

We have heard of advantage accruing from the "raw beef and brandy" treatment for consumption; but I am doubtful of its possessing any very special virtue.[3] When it can be done, alcoholic stimulus is best given with nourishment, as in milk, or beaten up with a raw egg, etc. *Koumiss*, a fermented drink, made from mare's or cow's milk, is a popular remedy of the Tartars, adopted to some extent by the Russian physicians.

Beef-tea, as a concentrated nutrient, is very useful when digestive power is low, at any stage of phthisis. One lady under my care, who, with tussicula, hæmoptysis, and emaciation, had greatly the appearance of incipient consumption, and who could not retain cod-liver oil upon her stomach without loss of appetite, was put upon the daily use of a pint of strong beef-tea,[4] for several weeks together, with no medicine but a mild expectorant. She recovered, and has since married and become a mother.

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[1] Med. Times and Gazette, Nov. 26, 1870. [2] Bulletin de Thérapeut., 1873.

[3] The possibility of parasites being taken into the body with raw beef is exemplified by a case reported by Dr. Leidy, in which tænia mediocanellata was evidently thus introduced.

[4] The mode of preparation of beef-tea is not unimportant. I prefer the following: Cut up a pound of good lean beef into small pieces, pour upon it half a pint or a pint of cold water, and let it stand two hours beside the fire. Then boil it 20 minutes or half an hour. Take off all the scum and oil-drops, carefully; but *do not filter or strain it* unless through a coarse sieve. It should have a rich brown color; and with salt is agreeable to the taste.

The phosphates and hypophosphites of calcium, etc., have been sufficiently tried to prove their inferiority to cod-liver oil. My own experience with them, in the wards of the Episcopal Hospital in this city, as well as in private practice, has been discouraging; and I believe the best phosphate for analeptic use to be phosphate of iron. Dr. Henry Blanc (*Lancet*, June 13, 1874) insists on the value of the phosphate of calcium, given at the same time with the juice of raw meat; the phosphate being always taken at meal times. Chlorate of potassium has, I think, failed under fair trial, although a few (as Dr. E. J. Fountain, of Iowa) still confide in it. Glycerin will not take the place of cod-liver oil; nor has any oil been shown to be capable of doing so. Hérard and Sankey have used arsenic in small doses; Dr. Moutard-Martin[1] considers it a valuable remedy in phthisis. Dr. W. M. Logan, of Cincinnati, reports[2] the recovery of ten out of twenty-four cases, treated with thirty or forty drop doses of nitric acid (after meals) along with tincture of chloride of iron; besides hygienic measures, and in some cases, cod-liver oil. Drs. Blacque, of Paris, and Griffith and Milton[3] of Bradford, Pa., assert the cure of a number of cases under the use of *crude petroleum* (dose 3 or 4 drops). Dr. Inman, of Liverpool, and others, recommend frequent *inunction with oil.*

In 1879, *benzoate of sodium* was urged, especially in Germany (Kroczak, Klebs), as a valuable medicine in phthisis, when used by inhalation. Conflicting evidence, however, soon threw its usefulness into great doubt; as may be expected with regard to any special "remedy" for such a disease.

Maltine, or Malt Extract, is largely used in some German hospitals, instead of cod-liver oil; and a number of American practitioners place a high value on it. It remains, I think, to be proved that it can compare favorably with cod-liver oil as a recuperant.

Where expectoration is copious and fluid, I believe *creasote*, internally given, to be a useful medicine. Bouchard and Gimbert[4] found it to exert an evidently beneficial influence in 54 cases out of 93. It increases the appetite, and probably tends to retard the softening process in the lungs. It may be given in cod-liver oil,—with an aromatic or bitter tonic, as comp. tinct. of gentian.

Iron, especially the iodide [F. 33] and the tincture of the chloride, are frequently suitable; and so may be quinine, nux vomica [F. 34], or the simple bitter tonics. But the patient must not be worried and disgusted with much medicine; whatever depresses appetite is likely to do more harm than good.

For this reason, *expectorants* require discretion in their use. Those of a nauseous kind must be very sparingly prescribed in phthisis. The syrup or fluid extract of wild cherry [F. 35, 36] is one of the most suitable. Squills will do when loosening

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[1] Bulletin Général Thérapeutique, Nov. 15, 1868.
[2] Consumption: its Pathology and Treatment; Philadelphia, 1871.
[3] N. Y. Med. Record, July 2, 1881, Consumption is said to be rare in the oil region of Pennsylvania.
[4] Gazette Hebdomadaire, Nos. 31 and 33, 1877.

effect is particularly required. Ipecac and tartar emetic are too depressing to the stomach for the consumptive. Sometimes, at a late stage, carbonate of ammonium will be useful as a stimulant.

Anodynes and calmatives are almost always wanted as the case advances, to soothe the wearisome cough, and to give rest at night. Lactucarium, hyoscyamus, hydrate of chloral, and finally opium, or morphia, in some form, will be important sources of comfort to the patient, and may economize his strength. Mazza recommends cyanide of potassium in small doses.

Hæmoptysis, when not large in amount, requires only quietness, for the time, with little or no special medical treatment. Should much blood be raised, the patient ought to be kept in bed, with the shoulders somewhat raised; and only iced milk and beef essence, or beef-tea, should be given for food. Gallic acid, in ten grain doses every two or three hours, will then be an available styptic medicine. Ergot, however, is preferred by many (Anstie). The popular remedy of holding salt in the mouth may be of some temporary use in hemorrhage. Slowly melting and swallowing ice will probably do more good. If nervous disquietude exist, it may be allayed by an opiate at night.

The colliquative sweats seldom demand treatment, they being the *result* rather than the cause of debility. Oxide of zinc has been much used for them. Belladonna is found (Fräntzel)[1] to reduce the amount of perspiration. Atropia (S. Ringer) probably has the greatest control over it of all drugs. Ablution with brandy or whisky and alum may be practised if sweating is very excessive. Diarrhœa may require to be held in check, by simple astringents and opiates, especially in enemata.

If pleurisy or peritonitis supervene as a complication, the local inflammation must be treated in view of the general condition. Depletion is out of the question at an advanced stage. Dry cups, small blisters, and opium are all that we can use in the treatment. For the variable pains in the chest in the course of the disease, mild or moderate counter-irritation, by warming or belladonna plasters, tincture of iodine, or croton oil, may be used.

It is not, however, to be said that the name or character of phthisis should in *all* cases rule out local depletion in the *incipient* stage. In one of three cases in a family (already alluded to) who recovered, notwithstanding a strong inherited tendency to consumption, from a condition threatening it, a great relief and improvement followed the early application of two dozen leeches to the side; it was (to borrow an expression of Dr. Condie's) at the time an acute *tuberculous pneumonia*. Yet such cases are exceptional. The pervading indications in phthisis are economy and recuperation. Niemeyer's suggestion that the identification of phthisis with caseous pneumonia should lead us to put all consumptives, in the early febrile stage, to bed, and bleed or cup them, could not be approved as a rule of practice, even if his pathological views should be accepted.

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[1] Virchow's Archiv, lxviii. 1.

*Inhalation* has often been tried in phthisis. Not enumerating agents which have summarily failed, I believe that the best hope attaches, in this way, to inhalation of the vapor of creasote or of carbolic acid. These agents are styptic, and by coagulating albumen and albuminoid material may be expected to aid in arresting the softening and destructive process in the lung. At least, we might hope that this would (Curschmann has found it to do so) lessen excessive and exhausting expectoration. Dr. Marcet[1] reports favorably of the use, by inhalation, of carbolic acid, one or two grains to the ounce of water. Dr. G. H. Mackenzie[2] has recorded excellent effects produced in a marked case by the continuous inhalation of creasote; great diminution of expectoration resulting, with abolition of the night-sweats, and improvement in appetite and strength. Dr. Chéron[3] asserts the value, especially in slowly progressing cases, of inhalation of the vapors of oxygenated essences; as that of the *laurus camphoræ*, cedar, chamomile and *eucalyptus*. *Oxygen* is given by inhalation in the practice of some physicians; and so have been *compressed air* and very dilute *nitrous oxide* gas. I have no positive knowledge of their results.

Transfusion of *lamb's blood* has been tried in Germany, with doubtful advantage.[4] Assistant Surgeon Wood, U. S. A., has reported a case of recovery following transfusion of four ounces of *human blood*. Injection of a pulmonary cavity with alterative solutions (as tincture of iodine, carbolic acid, permanganate of potassium) has been proved, by Berkart, Koch, Mosler, Thompson, W. Pepper,[5] and others, to be safe, if a hollow needle (Dieulafoy's) or capillary trocar and canula be used; and, in some instances, the effects have appeared to be beneficial. In cases manifestly progressing towards death, such a practice seems worthy of trial; with the hope of promoting the cicatrization of cavities. Dr. J. H. Hutchinson has shown (*Phila. Med. Times*, May 30, 1874) that even Hippocrates recommended puncture of the chest in phthisis; the idea of it being revived by Baglivi (1723) and Ramadge (1836). Hastings and Stork practised it about 1845. Prof. J. H. Bennett (*Reynolds's System of Medicine*, article, Phthisis) asserts that, as might have been expected from the nature of the disease, such measures have uniformly and totally failed.

*Change of climate* is often proposed for the benefit of the consumptive. In an early, or middle, or even a stationary advanced stage, it may be of important advantage. When to forbid, or advise it, may be a very delicate question. More will depend upon the *rate* of progress than upon the period of the case. But the patient must have strength enough to travel, and must be not too dependent upon his home comforts, or he may be made worse instead of better. It is cruelty to banish one who is already on the verge of the grave to die in a strange place among strangers. Yet I have known life to be prolonged from

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[1] Practitioner, November, 1868.
[2] Lancet, May 14, 1881.
[3] Gazette Hebdom., No. 51, 1872.
[4] See *Transfusion*, Part I.
[5] Philada. Medical Times, March 14, 1874.

year to year, in those who were natives of a Northern city, by spending the winter South.

In selecting a climate for the invalid, equability and dryness are, unless at a late stage, more important than warmth. That climate which will allow the patient the greatest number of days out of doors, will be the best. Minnesota, and other places near Lake Superior, agree extremely well with some, in the *early*, but not so well in the later stages of the disease. Of southern localities, Florida (best of all its central pine-lands) presents an especially equable, almost maritime, climate. Cuba is often resorted to. A sea voyage (if not subject to exhausting sea-sickness) may do good at an early stage. Across the ocean, consumptives resort to the South of France, particularly to Pau or Biarritz; or to Mentone, or Malaga, or Malta; or Italy—especially Ischia or Capri, Sorrento or Palermo;—Madeira, and Algeria, the year round, and Egypt in the winter only, are favorite climes. For the winter, nothing could excel in salubrity the atmosphere of the Upper Nile.

Our own country affords all the requisites for the migration of an invalid, to escape the inclemencies of every season, if he can vibrate between Newport, R. I., in the summer, and St. Augustine or the interior of Florida for the winter; or else between Minnesota in the summer, and Southern California (Santa Barbara, San Diego) for the colder half of the year. The locality most recommended by the State Board of Health of California (1880) for a Hospital for consumptives, is Atlas Peak, in Napa county, on the ridge of the Coast Range mountains. Colorado, also, is now much resorted to; but it does not agree with all patients. *There is no one climate which will* do so. With those who can travel, individual experience is a better ground of choice than any climatic theory as yet established.

**Phthisis in Early Life.**—Dr. C. West[1] names the following as characteristics of consumption in children, among whom, however, it is certainly *rare*:—

1st. The frequent latency of the thoracic symptoms during the early stages.

2d. The almost invariable absence of hæmoptysis at the commencement of the disease, and its comparatively rare occurrence during its subsequent progress.

3d. The partial or complete absence of expectoration.

4th. The rarity of profuse general sweats; and the ill-marked character of the hectic symptoms.

5th. The frequency with which death takes place from intercurrent bronchitis or pneumonia.

The same excellent authority designates the following peculiarities in the auscultatory phenomena of consumption in the child:—

1st. The smaller value of coarse respiration, prolonged expiration, and interrupted breathing, owing to their general diffusion over the chest, and to their occasional existence independently of phthisis.[2]

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[1] Diseases of Children, p. 404.

[2] The occurrence of harsh respiratory sound as an initial sign in *pneumonia* of children is well established.

2d. The greater difficulty of distinguishing chronic bronchitis, in the child, from phthisis.

3d. The loss of that information which the phenomena of the voice furnish in the case of the adult.

4th. The smaller value of inequality of breathing in the two lungs.

5th. The difficulty of detecting minute variations in the resonance upon percussion.

6th. The frequent existence of dulness in the interscapular region, with moderate resonance and tolerably good respiration in the upper part of the chest—characteristic of enlargement of the bronchial glands.

The extremely common occurrence in young children of "caseous" local affections, of the glands, etc., and the much later period at which tuberculization of the lungs usually begins, afford together a strong argument against the theory (Buhl, Niemeyer) of the "resorptive" origin of tubercular phthisis; otherwise, at least, than in quite exceptional instances.

## AFFECTIONS OF THE ORGANS OF CIRCULATION.

### PERICARDITIS.

**Definition.**—Inflammation of the covering membrane of the heart.

**Varieties.**—Simple or idiopathic, and rheumatic pericarditis. The latter is very much the more common. Degrees of violence in the attack also cause variations, from the mildest and almost latent cases, through those of open and active severity, to those attended by rapid effusion and prostration.

**Symptoms.**—Fever; pain (occasionally absent) at and radiating from the heart; tenderness on pressure in the cardiac region; accelerated, irregular, or oppressed, rapid and feeble pulse; anxiety or delirium; nausea and vomiting in some cases; short hacking cough; towards the end, coldness and pallor or lividity, œdema of the face and extremities, loss of pulse.

**Stages.**—1st, Acute inflammation; 2d, Adhesion; 3d, Effusion.

**Physical Signs.**—Before adhesion or effusion, usually, exaggeration of the heart's impulse. Then, pericardial *friction-sounds* (to and fro); the vibration accompanying which is sometimes felt by the hand. After effusion, dulness on percussion, with muffling of the heart's sounds to the ear on auscultation. The friction-sounds disappear during this period, sometimes to return as the effusion is absorbed.

**Morbid Anatomy.**—In the first stage, there is a rose-redness of the pericardium, diffused, punctated, or in patches. Then, deposits of coagulable lymph, white and opaque, sometimes causing local or general adhesion of the two layers of serous membrane. In most fatal cases, effused serum is found in the sac, in quantity varying from ounces to pints. Great quantities of it may weigh down the diaphragm below it. *Purulent* exudation is sometimes met with. In scorbutic cases, it may be hemorrhagic. The muscular tissue of the heart is found to be less coherent than usual.

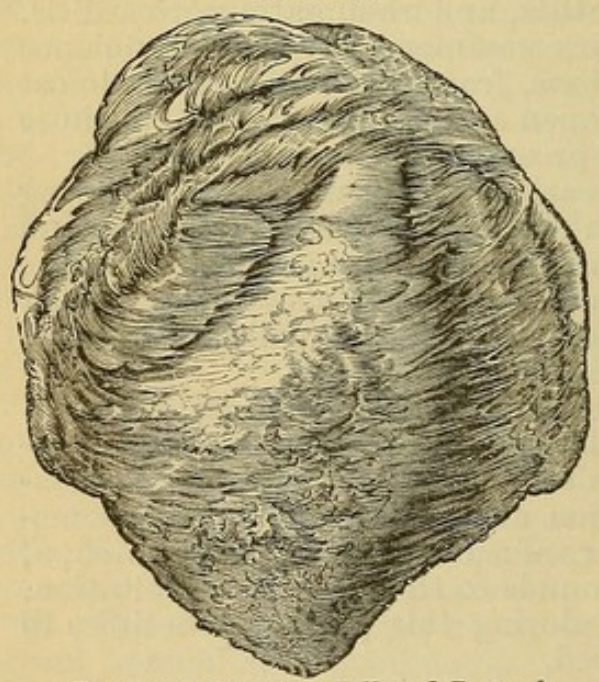
**Diagnosis.**—From *endocarditis* and from *pleurisy* it is sometimes not easy to distinguish pericarditis. The symptoms of the latter and those of endocarditis are the same; and the *friction-sounds* may occur in both. The heart's impulse is more apt to be sustained in strength in endocarditis; and in the latter, no dulness on percussion occurs, nor are the heart-sounds muffled at any stage; while valvular murmurs follow endo- and not pericarditis.

Friction-sounds which are outside of the heart (pericardial) have a *nearer* character to the ear than endocardial sounds; they are more narrowly *limited*, not passing along the vessels; they do not keep exact time with the cardiac sounds, and may vary from day to day; and sometimes the vibration may be felt externally.

*Pleurisy* causes friction-sounds and afterwards dulness on percussion. But the former sounds are more diffused, are generally *single*, not "to and fro" or double; and the dulness extends further over and around the side. Latent pericarditis may possibly, from some symptoms, be taken for inflammation of the brain, or of the stomach. Physical exploration should prevent such errors.

**Prognosis.**—There is great danger to life in pericarditis; and its course is sometimes terminated by death in a few days. In other cases resolution may take place promptly; but more often the heart is clogged for a considerable time (weeks or months) with effusion, or a more protracted interference occurs from adhesion of the pericardial surfaces. The latter is sometimes shown by a dimpling, or sinking in, with each beat of the heart, of the intercostal spaces above and below it.

FIG. 87.



Pericarditis, with Effused Lymph.

**Causation.**—The process of rheumatic fever is far the most common cause of pericardial inflammation, as it is of endocarditis also. Gout is accused of the same thing; but with much less frequency, or indeed, clearness of proof. Bright's disease of the kidney is occasionally associated with it.

**Treatment.**—In active cases, and good subjects, *one early and moderate bleeding from the arm* will be proper. Afterwards, in some, and instead with feebler patients, when fever is high and pain intense, leeches over the cardiac region may be used. A brisk saline cathartic, as Epsom or Rochelle salts, or citrate of magnesium, should commence the medication. Calomel, trusted still by some and condemned by others, may be confined to open

sthenic cases, in previously good constitutions. In such, I would give half a grain of calomel, with half a grain to a grain of opium, thrice daily for three or four days. *Veratrum viride*, in small doses, is preferred by some practitioners of experience; *aconite*, by others.

Where the rheumatic diathesis is marked, *salicylic acid* or *alkalies* [F. 37] will be indicated. Carbonate or bicarbonate of potassium, or bicarbonate of sodium may be given in scruple or half-scruple doses, with as much of Rochelle salts, three or four times a day. A blister over the heart, as the fever lowers, will often have a very good effect. If effusion occurs, blistering may be repeated. Should no opiate be given through the day, Dover's powder or morphia may be prescribed at night.

For the stage of effusion, or "chronic pericarditis," the usual treatment consists of diuretics [F. 38, 39, 40], as squills, juniper, sp. æth. nit., etc., varied and continued until absorption occurs. Tonics will often much promote the same end.

When the effusion threatens life by interfering with the heart's action, *tapping* the pericardium may be a justifiable operation. Romero, of Barcelona (about 1819), first ventured upon this. The first *paracentesis pericardii* in America was successfully performed by Dr. J. H. Warren, in 1852. Dr. Staples, of Dubuque, Iowa, and Dr. W. Pepper, of Philadelphia, both operated with successful results in 1877.

Hindenlang[1] and Roberts[2] collected, in 1879, accounts of sixty instances of this operation, in which there were twenty-four recoveries and thirty-six deaths. Trousseau, Roger, Allbutt, Villeneuve, Kussmaul, J. C. Warren, Porcher, and Comegys Paul have been among the operators. Dieulafoy's aspirator is generally preferred; using of choice a moderately large needle. The common hypodermic syringe has been found to answer for the purpose. The best point for puncture is in the fifth intercostal space, halfway between the left nipple and the left edge of the sternum, avoiding the internal mammary artery.

Much care is necessary, of course, in *diagnosis*, before deciding upon such a procedure. A greatly dilated heart has once, at least, been punctured by mistake for a distended pericardium. This should be guarded against by acquaintance with the symptomatic history of the case; and by noting the fact, that in dilatation of the heart, the apex beat is always at the lowest point of dulness, while in excessive pericardial effusion the apex is gradually *displaced upwards*, until at last it is almost or quite lost. Other diagnostic signs of distended pericardium are (Pepper)[3] "Prominence of the præcordial region; enlarged triangle of dulness, with its base below; very distant and feeble heart-sounds; displacement of the anterior border of the lungs; and extreme disturbance of circulation and respiration."

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[1] Freiburger Dissertation, Deutsches Archiv für Klin. Med., Oct. 23, 1879.

[2] Paracentesis of the Pericardium, by Dr. J. B. Roberts. Philadelphia, 1879. By the end of 1880, this operation had been performed thirteen times in America, with six recoveries.

[3] Clinical Lecture on Paracentesis of the Pericardium; Med. News and Library March, 1878.

A *rapidly distressing* case of pericarditis, with cold, blue skin and feeble, irregular pulse, will require a supporting or stimulating treatment from the first; with dry cups and blisters instead of local or general bleeding; and quinine, ammonia, and whisky instead of sodorifics or laxatives.

**Myocarditis** is inflammation of the muscular substance of the heart. It can hardly be said to have other than a nominal existence. Some writers consider the "white spot," found upon the surface of the heart occasionally, in soldiers and others, to be the result of a low form of muscular inflammation.

**Gangrene** of the heart is said to have been clearly proved in one or two instances.[1]

**Pneumopericardium.**—This (distension of the pericardial sac with *air*) is a rare affection. It may result from a penetrating or punctured wound; from ulcerative or suppurative perforation of the pericardium from the lung or œsophagus; or (possibly) from the formation of gas by ichorous decomposition of purulent exudation. Of these, the traumatic origin is the most frequent.

*Signs* of pneumopericardium are, *tympanitic* resonance on percussion over the cardiac region; metallic and distant character of the heart-sounds; bubbling, gurgling or splashing sounds also heard in auscultation over the heart.

H. Müller,[2] of Zurich, collected the history of twenty-eight cases of this affection, half of which were of traumatic origin. Nine of these cases terminated in recovery.

## ENDOCARDITIS.

**Definition.**—Inflammation of the lining membrane of the heart.

**Symptoms and Physical Signs; Diagnosis; Treatment.**—These have been sufficiently stated in the account just given of pericarditis, and need not be repeated. Like that disease, it is most often of rheumatic origin; but may occur in Bright's disease or in pyæmia. Dr. Peacock and others assert the opinion that endocarditis occurs most frequently in cases of rheumatism with severe articular symptoms; while pericarditis is somewhat more common in those in which the joints are more slightly affected. This remains doubtful.

Valvular derangement and its signs give great interest to endocarditis and its resulting changes. Mostly it is the left side of the heart that is chiefly affected. The simplest and most common sign of this is a blowing sound heard on auscultation. But a bellows-murmur is heard also in cases of anæmia, and a blowing sound occurs not rarely in fevers; or it may belong to an organic heart-affection of long standing. This last fact should be ascertained by the history of the patient, as well as by the aid of symptoms; but an *old* murmur is generally rougher and more fixed in its seat. It is *possible*, though very *rare*, for endocardial inflammation to be located so far from the valves as to cause no blowing sound.

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[1] Cincinnati Med. Repertory, May, 1868.
[2] Deutsches Archiv für Klin. Medicin, Bd. xxiv., Heft 2, 1879.

Clots occasionally form in the heart, in endocarditis (as well as in some other diseases attended by prostration), obstructing the circulation even to a fatal extent. Although most clots are post-mortem in origin, there is no doubt that sometimes firm fibrinous masses do occlude the valves for some time before death. The symptoms and signs produced are, blueness and coldness of the skin, indistinctness of the heart-sounds, feebleness and irregularity of the pulse, nausea and vomiting, anxiety of expression, and fainting.

Much more often, vegetation or fibrinous deposits of exudation on the valves of the heart are carried in fragments therefrom by the blood from the arteries. Being arrested, as in a vessel of the brain or of a limb, etc., the condition of obstruction designated as *embolism* results; which will receive attention in another part of this book. *Old* valvular vegetations, as well as the recent ones of endocarditis, may give rise to emboli; which may, also, arise from coagulation in a vein, or *thrombosis*.

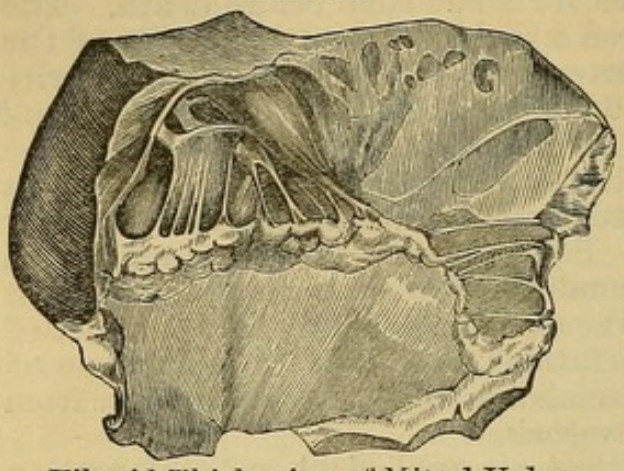
**Ulcerative** endocarditis is the term applied when disintegration of the lining membrane of the heart occurs; minute fragments of detached exudation passing into the circulation and obstructing the small arteries, especially of the kidneys, liver or spleen. The most frequent seats of this sort of change are the aortic and mitral valves. The right side of the heart is seldom involved; when it is so, abscess of the lung is apt also to occur.

Rheumatic inflammation of the endocardium may, exceptionally, assume this form; especially in its later stages. Sometimes ulcerative endocarditis follows injuries or inflammations of the uterus, bones, etc., in a manner which has caused the appellation *septic* to be applied to it. In other cases no such origin can be ascertained. Opinions concerning it have led to the employment of such terms in regard to it as *arterial pyæmia* (Wilkes), *diphtheritic* endocarditis, *mycosis endocardii*, and *infectious* endocarditis (Jaccoud, Klebs). These last expressions have been suggested by the observation of *microscopic growths* (micrococci, bacteria) after death upon the valves of the heart in some cases. So far as the evidence has yet gone, however, these minute organisms appear to be rather concomitants than causes of the disease.

Practically, ulcerative endocarditis is chiefly interesting as the source of *multiple embolism*. (See *Embolism*.) The symptoms of this condition usually resemble those of pyæmia, and sometimes (Bristowe) simulate closely intermittent fever. The movement of the attack is, however, slower than that of pyæmia, and its progress is more grave and intractable than that of ague. There are chills, followed by paroxysms of fever, with nausea, diarrhœa, enlargement and tenderness of the spleen, jaundice, albuminuria, delirium; in severe cases, coma, and death commonly in two or three weeks. Occasionally, a case may linger on for a few months. *Treatment* of such a malady can be palliative only, according to the symptoms, with measures adapted to promote and economize the patient's strength. No doubt slight cases of it often occur, and end in recovery; their nature being thus overlooked or not ascertained.

Endocarditis produces valvular derangement in the *mitral* valve most frequently in the young; in the old (from this cause as well as from degeneration), disease is rather more common in the aortic valve. The forms of disorder, indicated by murmurs, occur in the following order of frequency: 1st, Aortic obstructive; 2d, Mitral regurgitant; 3d, Aortic regurgitant; 4th, Aortic obstructive and mitral regurgitant together.

FIG. 88.



Fibroid Thickening of Mitral Valve.

Enlargement of the heart, either with muscular thickening (*hypertrophy*) or with attenuation (*dilatation*), is a common consequence of endocarditis with valvular lesion. Already (see *Semeiology*) the statement of Dr. Stokes has been adopted, that in every case the important question is, less the state of the particular valves, than the amount of interference with the functional action of the heart. In young persons, remarkable recoveries sometimes take place (as I have seen) from very considerable lesion of the valves. In other instances, *adaptation* of the heart itself, and of the general system, by degrees, is effected, so that quite good health, and even capacity for exercise, may be attained, while the physical signs of the local organic change remain. Sudden death is less common in heart disease than is popularly supposed. Some persons having it have lived twenty or thirty years.

## VALVULAR DISEASE.

The valves of the heart may be impaired either by inflammation, or by degeneration (*e. g.*, calcareous deposit or "ossification"). The latter, degenerative valvular changes, occur gradually; and mostly late in life. Either form of valve-disease, or at least of valvular alteration, is generally permanent; the *degenerative* form most invariably so.

Changes may occur by simple thickening, or by deposits of fibroid, fatty, or calcareous material; or by atrophy, contraction, adhesion, or ulceration of the valves; or gouty deposits of urates and carbonates of soda and lime. The valve (mitral or aortic primarily, tricuspid or pulmonary secondarily) may be thus rendered incapable either of perfect closure, or of full opening; in most instances, a permanently half-open state results.

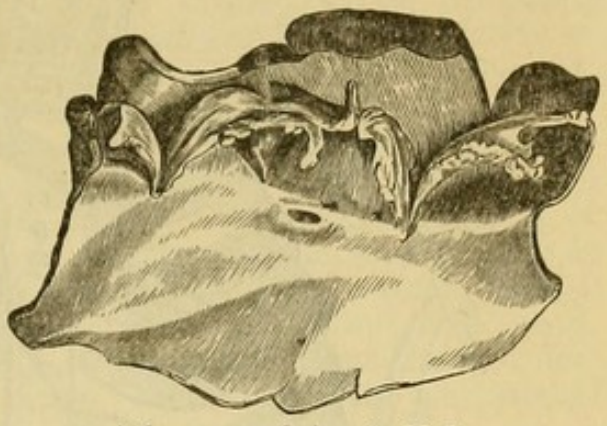
A considerable variety of pathological conditions may exist in organic disease of the heart; while the number of cases in which an exact and unequivocal diagnosis can be made, is comparatively small. We must not confine attention at all to the physical signs alone, but compare with these the pulse, and force of the heart, with other general symptoms, and the entire history of the case.

It is *possible*, though very uncommon, for valvular disease (especially mitral obstruction) to exist without any murmur.

*Certainty* can hardly ever be obtained, unless it be in the diagnosis of one of the following three conditions:—

1. Uncomplicated disease of the mitral valve. Signs of this are,—a permanent murmur with the first sound loudest towards the apex and left side, and not heard over the aorta; the second sound natural. The heart's action natural; the impulse not excited, the pulse natural. A *presystolic* murmur, just *before* the first sound, has been, by Gairdner, Salter,[1] and others, referred to constriction of the mitral valve. It is often accompanied by thrill, and associated with hæmoptysis. Dr. Gowers, especially, has pointed out[2] that this murmur is often much louder when the patient is lying down than when sitting up. I found it entirely inaudible in one case, except when the patient (a child) was recumbent.

FIG. 89.



Atheroma of Aortic Valve.

2. Disease of the aortic valves with permanent openness. With this, there is no murmur with the first sound; the second sound is replaced by a double murmur, loudest at the base of the heart, and heard along the aorta. In an advanced stage of this condition, the arteries give to the finger, or even to the eye, an impression of *bounding* pulsation; with a *jerking*, or abruptly ending pulse at the wrist. Quincke and Otto Becker have observed, with the ophthalmoscope, *pulsation of the retinal vessels* in cases of aortic valvular insufficiency.[3]

3. Disease of the aortic valves without permanent openness. Here, the action of the heart is slow and feeble, generally regular, or only occasionally intermitting. A murmur is heard with the first sound, the second sound being healthy; but a murmur may be heard with the second sound, in the aorta and carotids.

It must be remembered that in *anæmia*, without heart disease, a bellows-murmur is often heard, extending into the arteries. Chiefly by the concurrent signs and symptoms is this to be distinguished from organic disease of the heart. Anæmic and functional murmurs are more variable, and are not much increased by moderate exercise. Even organic murmurs, however, are, in some rare instances, variable.

When the aortic valvular orifice is greatly *contracted*, the pulse at the wrist may become very feeble, almost absent; while the heart's impulse is strong.

Dr. T. B. Peacock[4] considers it to be the result of his experi-

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[1] Lancet, Oct. 23 and Oct. 30, 1869.
[2] London Practitioner, 1873.
[3] London Ophthalm. Hospital Reports, February, 1873.
[4] St. Thomas's Hospital Reports, vol. ii.

ence, that *incompetency* of the valves is a more serious defect than obstruction; incompetency of the aortic being more dangerous than that of the mitral valve. Obstructive disease of the mitral, however, he regards as more unfavorable than that of the aorta in prognosis.

FIG. 90.

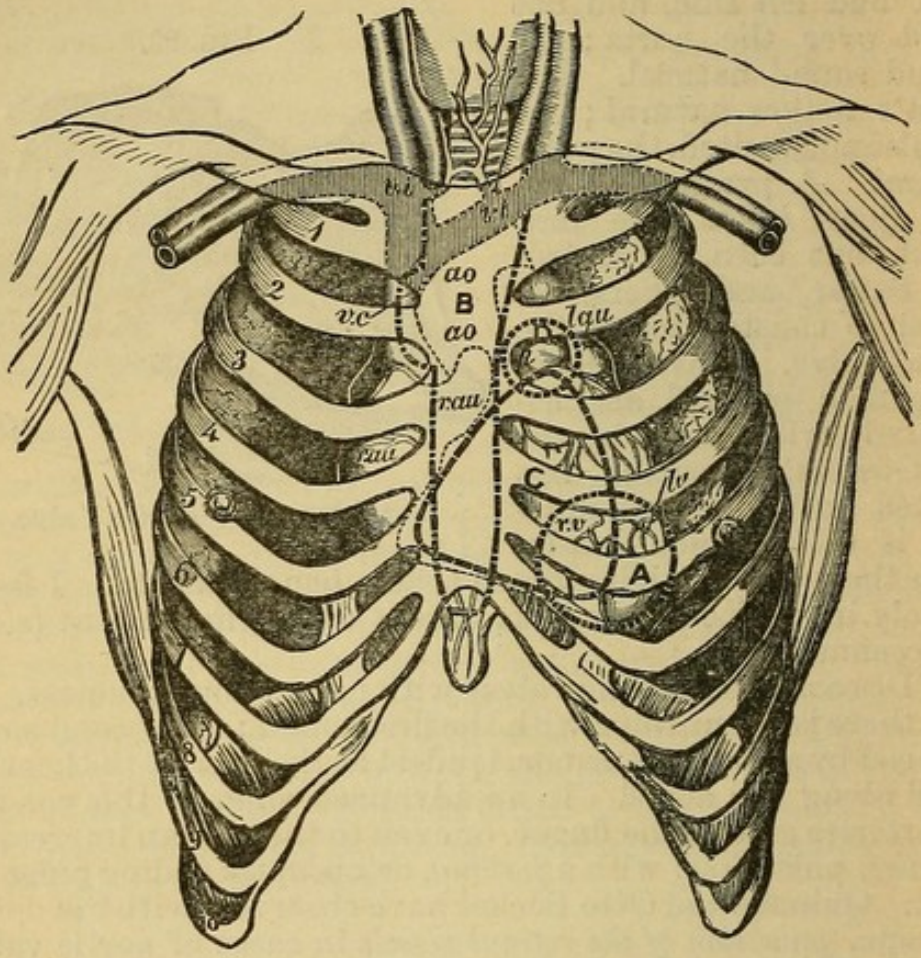


Diagram showing the areas over which murmurs produced in the different valves of the heart are chiefly audible. A. Seat of Mitral murmur. B. Seat of Aortic murmur. C. Seat of Tricuspid murmur. D. Seat of Pulmonary arterial valvular murmur. *r. v.* Right Ventricle. *l. v.* Left Ventricle. *l. au.* Left Auricle. *r. au.* Right Auricle. *ao.* Aorta. *v. c.* Vena Cava. (Gairdner.)

Advanced mitral or aortic disease is accompanied usually by derangement, sympathetic or obstructive, of the *lungs*, *liver*, and other organs; with hæmoptysis, anasarca, cyanosis, irregularity of the pulse, syncope, etc. *Pulsation of the jugular veins* usually indicates secondary disorder upon the *right* side of the heart, with regurgitation into the venæ cavæ. *Pseudo-apoplectic syncope* may occur in permanent patency of the mitral valve; or in fatty degeneration of the heart, with or without valvular disease.

For an account of the *Sphygmograph*, and its uses in diagnosis, see *Semeiology*, Part I.

## DILATATION OF THE HEART.

Uncomplicated dilatation of the whole heart, or of either pair of corresponding cavities, or of any one cavity, is very uncommon.

**Complicated** dilatation is frequent. It may depend—1, on a debilitated state of the cardiac muscle; 2, on valvular disease; 3, on obstruction beginning in organs remote from the heart.

The commonest form of dilatation is part of a triple affection, in which the *heart*, *lungs*, and *liver* are together involved. All this may come, in the first place, from a cachexia, such as gout, or scurvy, or from simple anæmia. Exacerbations in the disorder may occur; as, of pulmonary congestion, enlargement of the liver, cardiac asthma, bronchitis, or dropsy. The prognosis cannot be very favorable in such a case; and only palliative or recuperative treatment avails, along with hygienic management, to economize the powers of nature.

**Enlargement** of the heart is indicated, upon physical exploration, when, with extended impulse of the heart, we have dulness on percussion beyond the usual limits. If **true hypertrophy** or muscular thickening be present, the impulse is very *forcible* as well as extended. The heart-sounds are apt to be *clear*, though not loud, in **attenuated** dilatation; rather loud, but dull toned, in enlargement with thickening of the walls. But these differences are hardly to be relied upon. Bulging of the pericardial region is sometimes quite distinct in children.

Hypertrophy of the muscular tissue of the heart is most often induced by valvular obstruction or regurgitation, compelling unusual and continued effort to sustain the circulation. It is also a not uncommon attendant of Bright's disease of the kidneys.[1]

Sometimes, however, it is more truly idiopathic; following causes of over-action of a heart otherwise sound. Thus violent exercise, self-abuse, coffee, alcohol, tobacco, etc., are, with good reason in predisposed cases, accused of producing it.

Dr. Quain has described a condition of cardiac enlargement which he considers to be a hypertrophy (hyperplasia) of the *connective tissue* of the heart.[2]

In the **treatment** of simple hypertrophy, avoidance of exciting causes, and particularly of violent exercise, alcohol, and venery, is the main principle. Robust or plethoric patients will bear and will be benefited by moderate venesection, at long intervals; or by occasional leeching or cupping over the heart. *Acetate of lead* [F. 41], as an astringent cardiac sedative, is recommended by some, and is worthy of trial (one grain thrice daily), with care to avoid saturnine poisoning.

Digitalis was formerly relied upon as a reducer of cardiac action. Lately it is regarded, instead, as a *tonic* to the heart (probably through ganglionic influence), lessening its rapidity of action only when that depends on debility. Brunton, Gull, and Fothergill consider its use unsafe when there is fatty degeneration of the heart. I think, however, that evidence has been given (Withering, 1785; Holland, Fuller, H. Jones, Traube) to encourage us to use digitalis [F. 42, 43] moderately, where abnormal rapidity of the heart's action exists in conditions of debility;

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[1] In 100 cases, Dr. Bright found hypertrophy of the heart in 52; and in 34 of these there was no evidence of valvular affection.

[2] British Med. Journal, March 23, 1872.

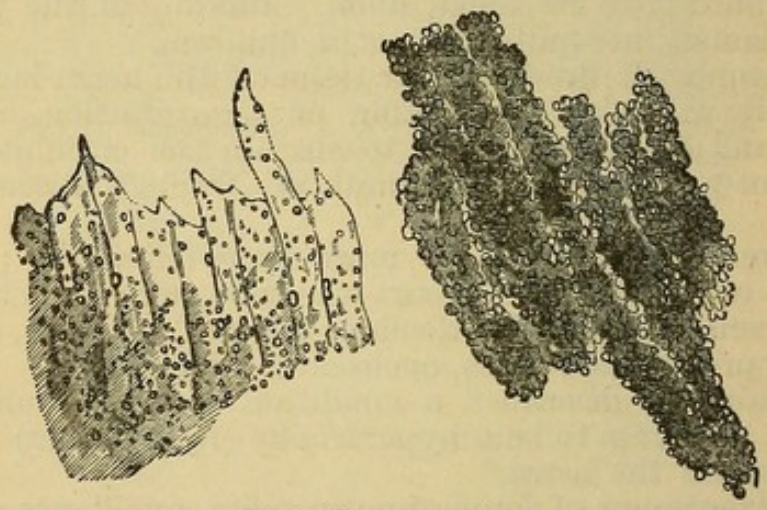
and to expect more from *veratrum viride* [F. 44] as a sedative and palliative, in *violent* acceleration of the pulse, as in muscular hypertrophy, and some forms of palpitation. Benefit may attend, in like cases, upon the use of *wild cherry bark*. An exclusive *milk* diet is recommended by Drs. Karell and Pechalier, in cardiac enlargement and other chronic affections. In attenuated dilatation of the heart, neither reason nor experience affords ground for the approval of such a regimen.

### FATTY DEGENERATION OF THE HEART.

**Definition.**—Substitution of fatty substance for the muscular tissue of the heart, to such an extent as to interfere with its normal action.

**Symptoms and Course.**—Though no doubt almost always gradual in its progress, this affection in many instances fails to make itself known by symptoms until a late period; sometimes even till the moment of death. Usually, feebleness and irregu-

FIG. 91.



Fatty Degeneration.

larity of the pulse and heart's impulse are observed; with exhaustion and dyspnœa upon exertion. The pulse is slow when at rest; sometimes only thirty or forty in the minute, although the heart beats fifty or sixty in the same time. Attacks of apoplectic syncope or syncopal apoplexy may occur; at first most like syncope, after repetition becoming more apoplectic. These are distinguished from true apoplexy by the feebleness of the pulse, coldness of the skin, sighing respiration,[1] and the slightness or absence of paralytic symptoms, notwithstanding several repetitions of the attack. They are made worse by depletion or reduction of the system; and may be relieved or warded off by timely stimulation; the recumbent position is most favorable in them. The first attack of this kind may, however, prove fatal.

**Physical Signs.**—Fatty degeneration is often complicated by

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[1] "Ascending and descending breathing" of Cheyne and Stokes. It is a succession of increasing and then decreasing acts of respiration, with an interval of apnœa so long that the patient may seem to be dead.

the presence of other structural changes of the heart. By itself, it is with difficulty diagnosticated by physical exploration. The heart's impulse is feeble and slow, often irregular, and the sounds weak. A bellows-murmur is frequently heard with one or both sounds.

**Morbid Anatomy.**—True fatty degeneration must be distinguished from fatty *accumulation* about the heart; which may impede its action, but is much less dangerous. In true interstitial degeneration, the heart is, in part or throughout, flabby and pale, or yellowish, though it may be more bulky than usual. Minutely examined, the muscular fibrils are found to have lost their transverse striæ, and to have resolved themselves, more or less, into streaks of oil-dots or opaque granules.

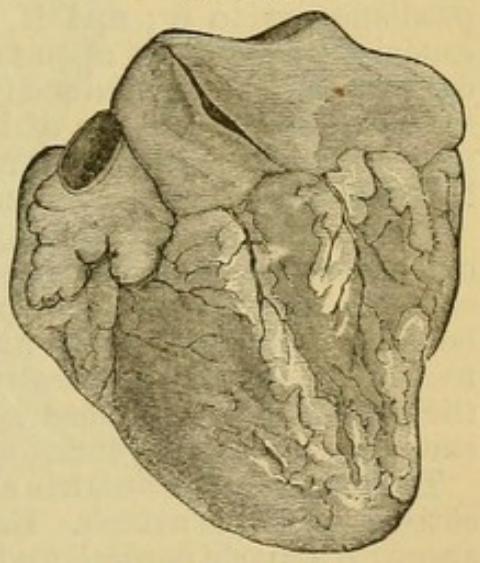
Death, sometimes, is shown to have resulted from rupture of the heart. In other instances that organ has, under some exertion or excitement, become exhausted and failed to act sufficiently to keep up the circulation.

**Prognosis.**—Recovery is not to be expected in cases of fatty degeneration; although life may be prolonged to old age. Much will depend upon circumstances of living, and care to avoid disturbing agencies.

**Causation.**—In early life this affection is uncommon; its most frequent cause, then, is pericardial or endocardial inflammation. Most cases occur after fifty years of age. It then comes as one of the local manifestations of waning vital energy; but it may be promoted by any or all exhausting or depressing causes. No special or peculiar line of causation can be pointed out.

**Treatment.**—This can be only *conservative*, not curative. Tonics, particularly iron, with generous diet, sea, or mountain air, change of scene, avoidance of anxiety and exertion, may do much to retard the degenerative process. Violent effort or emotional excitement may be suddenly fatal. Tranquil occupation only should be selected, and all rapid exercise, and even straining at stool, ought to be avoided.

FIG. 92.



Rupture of Heart.

### MODES OF SUDDEN DEATH IN HEART DISEASE.

We may briefly enumerate these as, 1. Arrest of the heart's action from debility of the muscular walls; 2. Spasm of the ventricles; 3. Extreme obstruction, or regurgitation; 4. Rupture; 5. Heart-clot. Indirectly, cerebral or pulmonary apoplexy.

Of heart-clot, *i. e.*, fibrinous deposit in the heart before death (undoubtedly a rare occurrence), the signs have been well pointed out by Dr. B. W. Richardson.[1] They are dyspnœa, not otherwise accounted for, pallor, fluttering pulse, and prostration, with

[1] Med. Times and Gazette, Nov. 21, 1868.

deficiency of one or both sounds of the heart, on the right or left side, according to the position of the deposit. Very seldom indeed does heart-clot form long before death ; reduction of vital energy seeming to be its essential condition. In autopsic examinations, an *ante-mortem* clot is characterized, 1st, by its filling a cavity ; 2d, its being grooved externally by a current of blood, or bored by a current through its centre ; 3d, its being firmly adherent by a mechanical or organic tie to the walls of the heart or vessel ; 4th, its structure being laminated, or containing in its centre broken up fibrin ; 5th, its being deeply indented by the surrounding structures.

### ANGINA PECTORIS.

**Definition.**—An irregularly paroxysmal disorder, characterized by sudden attacks of severe pain, extending from the heart along the left arm, with a sense of stricture in the chest, prostration, and alarm. The attacks are especially apt to come on while walking.

**Pathology and Causation.**—This appears to be a *symptomatic* affection ; a neurosis, connected in most, though not in all cases, with organic disease of the heart ; especially ossification of the coronary arteries. Gout predisposes to or excites it, but probably not in the absence of heart-lesion. It occurs generally in old people ; most often in men. Seneca, John Hunter, and Dr. Chalmers have been among its distinguished victims. Weakness of the muscular fibre of the heart is, very probably, important in predisposing to it ; and it may be, Sir T. Watson conjectures, especially dependent upon fatty degeneration of the heart. Lauder Brunton has explained (1866) the occurrence of its paroxysms by *spasmodic contraction of the coronary arterioles.* Probably this may account for most, but not for all cases of the disease ; but it leaves the *origination* of the arterial spasm still to be accounted for.[1]

**Prognosis and Duration.**—The attack may last from a few minutes to an hour, or even a day. Commonly it is short, going off with perspiration or copious urination. A first attack may be fatal. Returns occur at variable intervals—days, weeks, or months ; each one generally sooner or more violent, till one of them ends life. Persons subject to angina pectoris may, however, live for many years.

**Treatment.**—Stimulants and anodynes [F. 47, 48, 49] are indicated during the attack. Best will be Hoffmann's anodyne, laudanum, Warner's cordial, and whisky, in moderate doses, repeated in a short time if necessary ; with mustard plasters over the chest and between the shoulders, and the warm footbath. Where gout is present, colchicum [F. 45, 46] and alkalies are important. Arsenic is said (Philipp) to have done good in the interval ; and inhalation of a few drops of *nitrite of amyl* (Thompson, Madden), during the paroxysm. Electricity is worthy of careful trial.

### EXOPHTHALMIC GOITRE.

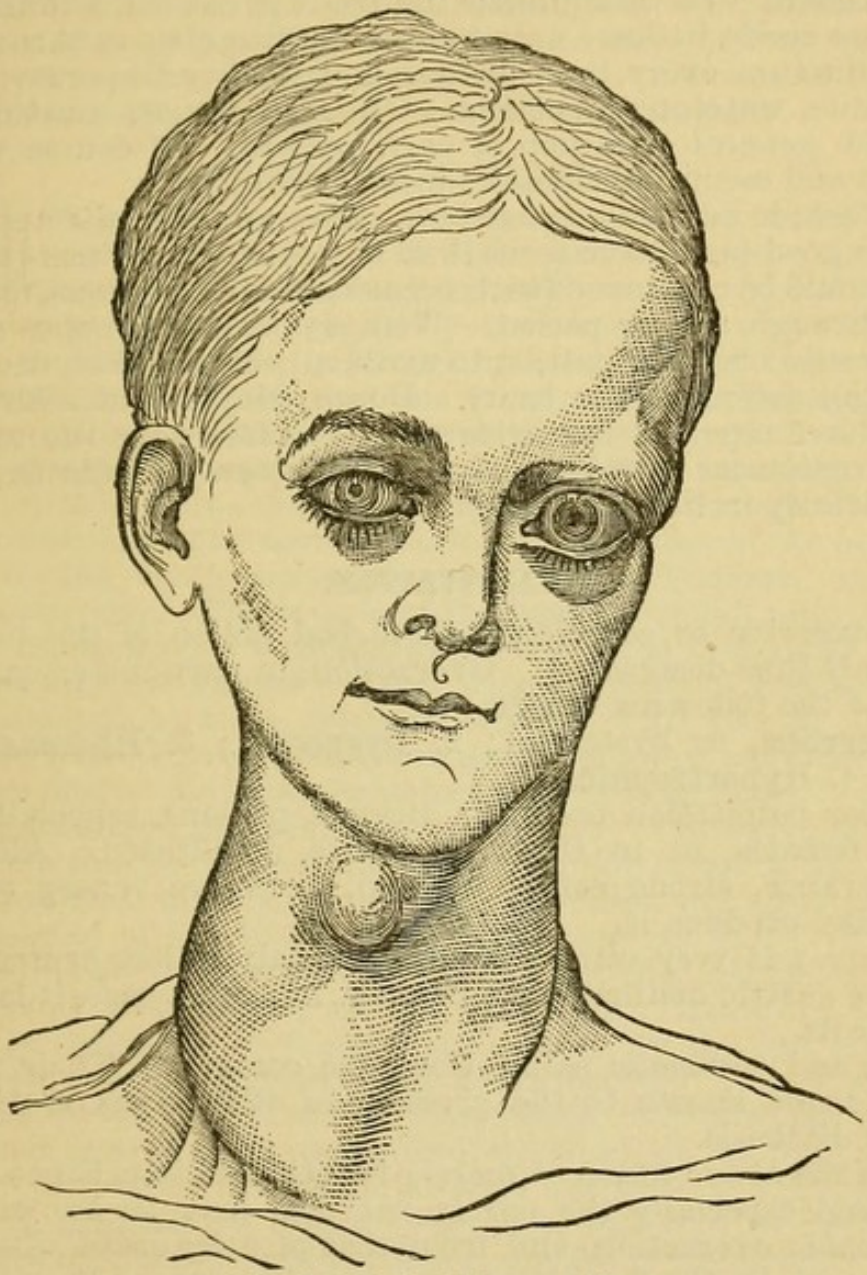
**Synonyms.**—*Thyro-cardiac Disorder ; Parry's Disease* (1825) ; *Graves' Disease ; Basedow's Disease.*

[1] I saw a case in 1879, in which, after angina pectoris of many years' standing, autopsy revealed no positive lesion of the heart, sufficient to account for any morbid symptoms. A number of similar cases have been observed.

**Definition.**— Enlargement of the thyroid gland in the neck, with overaction of the heart and cervical vessels, and prominence of the eyeballs.

**Nature.**—This uncommon affection is considered by Dr. Stokes to consist in a more or less permanent functional excitement of the heart; which may produce finally dilatation and hypertrophy, with dilatation also of the carotid arteries and jugular veins, and

FIG. 93.



Exophthalmic Goitre. (Yeo.)

an aneurismal condition of the thyroid gland. Although considerable disturbance and prostration of the system must attend such a state of things, yet it has been repeatedly recovered from. The *cause* of the affection has not been made out. Virchow asserts the heart to be found, after death, greatly dilated; sometimes the aorta and other large vessels are atheromatous.[1] Cruise and

[1] *Atheroma*, a gruel-like or pulp-like change.

McDonnell, as well as Recklinghausen, have observed marked changes in the *cervical sympathetic ganglia.*[1] Cheadle (St. George's Hospital Reports, 1877–78), dwells with emphasis upon the *dilatation of the arteries* in this disorder. A case which I studied in 1879 impressed me with the prominence of *atonic relaxation and dilatation of the whole cardio-vascular system* in its pathology. Behind this, there probably is a morbid condition of the cervical ganglia; Cheadle believes, of the upper part of the spinal marrow.

**Treatment.**—To tranquillize the heart is the main indication. *Veratrum viride*, in doses not at all nauseating (two or three drops of the tincture every three or four hours), may be persevered in for a while, watching its effects. Other treatment must depend upon the general condition of each patient. Of course violent exercise and mental excitement must be avoided.

Dr. Cheadle advises *absolute rest.* *Iron* and *digitalis* appear to do more good (as I have seen) than any other medicines [F.297]. They should be continued (with occasional interruptions, for a few days) through a long period. Without insisting upon rest in bed, I would urge the patient to avoid all efforts which decidedly hurry the action of the heart. Dusch, Meyer, Eulenburg, and others have reported favorable results as following the application of *continuous electrical currents* to the sympathetic nerve, or to its vicinity in the neck.[2]

## PALPITATION.

All excessive or consciously disturbed action of the heart is commonly thus designated. Overaction, in particular, may have either of the following origins:—

1. **Nervous**, or hysterical; 2. **Dyspeptic**; 3. **Rheumatic** or **gouty**; 4. **Hypertrophic.**

*Nervous* palpitation occurs in anæmic persons, especially hysterical females, or in those otherwise debilitated. Alcoholic intemperance, strong coffee, tobacco, excessive venery or self-abuse may produce it.

*Dyspepsia* is very often attended by palpitation, sympathetic with the gastric disturbance. Usually, in such a case, it is worst after meals.

*Gouty* and *rheumatic* palpitations are common. Their nature will be made known by the presence of other signs of the controlling diathesis.

All of the above forms of merely functional disturbance of the heart, and especially the purely nervous, may be known from *hypertrophic* overaction, and from that of attenuated dilatation of the heart, by the fact that they are not increased by moderate exercise; are often, indeed, much diminished thereby. When the heart is enlarged, especially with valvular change, active movement causes distress and dyspnœa, with great acceleration of the cardiac movement. In palpitation of all kinds, during the attack, it is generally not possible to lie with ease upon the left side; and orthopnœa may occasionally occur, without organic disease.

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[1] Irish Hospital Gazette, Sept. 1, 1873.
[2] London Practitioner, March, 1874.

The **treatment** of palpitation must vary according to its cause. If nervous in origin, invigoration of the system and enrichment of the blood are probably needed; by iron and other tonics, and regimen; especially avoiding a too sedentary life. Dyspepsia will require appropriate treatment; as a part of which, exercise in the open air will not be counter-indicated at all by sympathetic palpitation.

Functional overaction of the heart, without organic disease, is in itself not dangerous. It is alarming, however, to the patient, as well as a source of discomfort; and may, if long sustained, bring on true enlargement of the heart. All causes, therefore, of such disturbance ought to be sedulously avoided.

### CARDIAC EXHAUSTION.

In U. S. general hospitals during the civil war, under my own observation[1] as well as that of other practitioners, quite a number of cases of soldiers presented, who were rendered unfit for duty by heart-symptoms, and yet without signs of valvular or other organic disease. Careful investigation of these satisfied me that the condition was one of **muscular exhaustion** of the **heart**; owing to hard marching with deficiency both of rest and food; especially during McClellan's peninsular campaign. Symptoms of this were—constantly rather rapid though not strong pulse, with less than normal vigor of the impulse of the heart; the acceleration being increased greatly, with dyspnœa, upon even slight exertion. The sounds of the heart were not altered except in the diminution of duration and force of the first sound, making it more like the second. After many months of rest these men improved, so as to be likely to recover. No special treatment seemed to be required. British army surgeons have ascertained beyond doubt[2] that functional heart affections are decidedly more frequent among soldiers than in civil life. The explanation proposed for this is, the unsuitable construction of the accoutrements of the soldier, unduly compressing the chest and obstructing the movements of the heart. Dr. Myers asserts that "irritability of the heart" is shown very early by the sphygmograph; a marked dicrotism being always presented. Attention has been latterly called, by Fothergill and others, to the not infrequent action of *anæmia* in promoting heart disorder. *Heart starvation* is probably (in people who are under-fed, over-worked, or suffering from *worry*) often overlooked, or *mistaken for fatty degeneration of the heart.* I am familiar with the case of a distinguished literary man who, a dozen years ago, was told by an eminent practitioner that he had incurable disease of the heart; but who, after a few months of rest, recovered his health, with full capacity for work, lasting to this time.

### ANEURISM OF THE THORACIC AORTA.

A **bulging** in the front of the chest, in which pulsation is felt, not continuous or identical with that of the heart, and over which

[1] Trans. of College of Physicians of Philadelphia, in Am. Journ. of Med. Sciences, July, 1864. Drs. Stillé and Da Costa described this affection at about the same time.

[2] Myers, Alexandra prize essay on Diseases of the Heart among Soldiers. London, 1870.

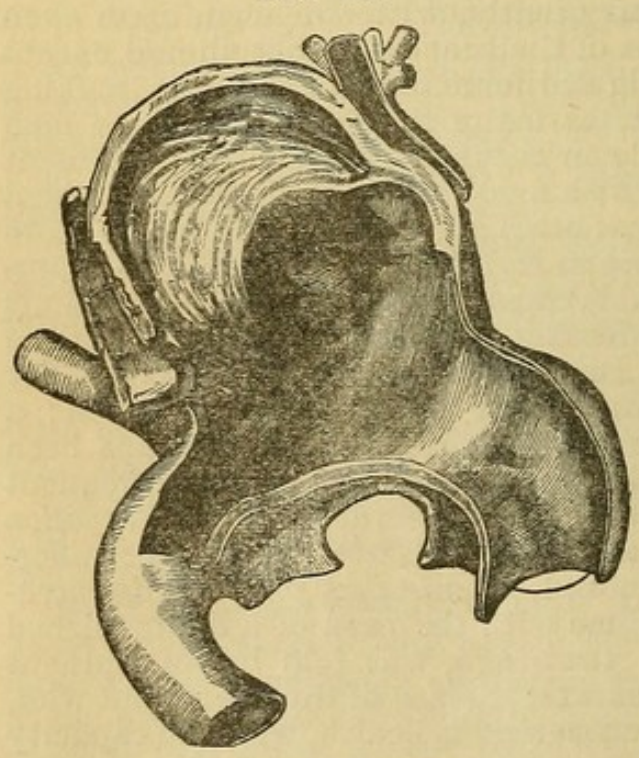
resonance upon percussion is dull—is probably an aneurismal tumor. If a thrill also is perceptible in it, with or without a murmur on auscultation, we may be still more confident in the diagnosis; and when the signs of pressure upon the air-tubes, œsophagus, sympathetic or recurrent laryngeal nerve, vena cava or thoracic duct occur, it is nearly certain. From sphygmographic observation, Marey, Mahomed and Franck infer that abnormal delay of the arterial pulse, after the cardiac impulse, is a sign of aortic aneurism; but there are exceptions to this rule.

Murmur may, however, be absent; so may thrill; the bulging may be slight, and the percussion-resonance little altered. The sign of most consequence is, the existence of *two* points of pulsation in the chest, the cardiac and the aneurismal; the latter coinciding almost with the diastole of the heart.

The signs of pressure are, chiefly, pain, cough, dyspnœa, loss of voice, difficulty of swallowing; and (as I have seen in one instance) emaciation from obstruction of the thoracic duct.

Cancerous or other tumors may produce all these latter signs; but such tumors do not pulsate. In *empyema* the beat of the heart sometimes impels the fluid so as to throb somewhat widely; but this is a *single* cardiac impulse. Occasionally a consolidated lung, in phthisis, may vibrate forcibly with the pulmonary artery; but other signs then make clear the disease. There are, however, cases of thoracic aneurism entirely *latent*, until death; no distinct sign making the affection known, even to a careful observer.

FIG. 94.



Aneurism of the Aorta.

The course of aortic aneurism is usually very gradual—often lasting for a number of years. Death occurs—1, from sudden rupture and copious hemorrhage; 2, from slighter rupture and slow leakage; 3, from slow exhaustion by pressure, interfering with respiration, deglutition, etc.

The causation of thoracic aneurism is obscure. It occurs nearly always in rather elderly people, in whom the process of degeneration of the vessels has commenced; but now and then it is met with before middle life. It is, relatively, frequent among soldiers.

Syphilis appears sometimes to predispose to it. Dr. Bruen[1] found evidences of a syphilitic history in fifty-five out of sixty-nine cases of aortic aneurism in two Hospitals in Philadelphia.

[1] Phila. Med. Times, May 21, 1881, p. 517.

Similar observations have been made concerning cases occurring amongst soldiers (as at the Hospital at Netley, England). But it is very improbable that any such predominance of this mode of causation exists in ordinary civil life.

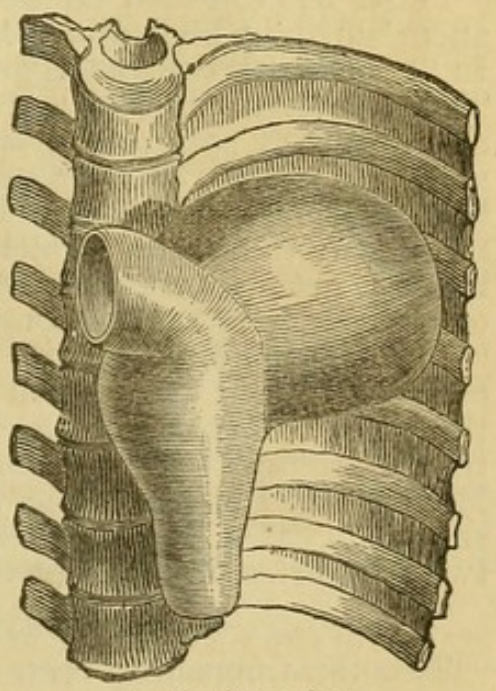
The following points may be added in regard to its clinical history (see *Stokes* on the Heart and Aorta):—1. The effects of the aneurismal pressure may vary from time to time; much more than they do in cancer. 2. The aneurismal impulse may be even stronger than that of the heart; but a feeble impulse in some instances attends a large aneurism. 3. Destruction of one or more vertebræ from absorption under pressure (as shown by autopsy) is not uncommon. 4. Phthisis is often associated with aneurism of the aorta.

### ABDOMINAL AORTIC ANEURISM.

Of this, the **signs** and **symptoms** are—deep-seated severe pain (occasionally intermitting) in the back and abdomen, increased by certain movements; unaccompanied by fever, but resisting all treatment; later, muscular spasms of the lower limbs, displacement of the liver, and the manifestation of a pulsating abdominal tumor, felt upon palpation, over which there is dulness of resonance upon percussion. The higher up the aneurism, the more severe are the pains and other symptoms of disturbance.

Aneurism of the aorta may, without careful examination, be confounded with aortic *pulsation* without tumor (common in dyspepsia, etc.), or with neuralgia, rheumatism of the bowels, colic, worms, disease of the liver, caries of the spine, psoas abscess, or cancer. Only the discovery of a distinctly *pulsating tumor* (not a tumor moved by subjacent pulsation) can establish the presence of aneurismal disease. An additional sign of value is a localized "bruit" or aortic murmur heard along the course of the spine.[1]

FIG. 95.



Aortic Aneurism.

The **treatment** of either thoracic or abdominal aortic aneurism is usually not hopeful. *Hygienic measures* may retard decline, and careful self-management may avert a sudden catastrophe; that is mostly all. Exertion and excitement must, of course, be prohibited altogether. Dr. Sibson urges the importance of limiting the *amount of fluid* taken by the patient, to a pint daily; in order to lessen the volume of the blood, and thus reduce the pressure upon the sac. Tufnell insisted upon *entire rest*, with low diet, for months together. The *medicine* most in favor for aneurism

[1] W. Moore, in Dublin Quarterly Journal of Medicine, August, 1869.

of the aorta with leading practitioners is *iodide of potassium* (Nélaton, Balfour). Excellent effects are ascribed to it in a number of reported cases.

*Electro-puncture* (Ciniselli, 1846) has succeeded, in a few instances, in curing, and in a greater number, temporarily relieving, aneurism of the thoracic aorta. It is applicable only to cases in which the aneurism approaches closely to the wall of the thorax. It may then be performed without danger. Petit[1] advises not delaying it (after other treatment has failed) until an external tumescence has formed; statistics showing the best results when that event has been anticipated.

For galvano-puncture, a battery of moderate intensity may be employed. Two sharp needles of platinum, steel, or soft iron are prepared by coating them, except the points, with gutta-percha, varnish, or gum. Many practitioners[2] connect one needle with the positive, and the other with the negative, pole of the battery. Dujardin-Beaumetz,[3] Dreschfeld,[4] and others, prefer to attach them only to the positive pole; the circuit being completed by connecting the negative pole with a metallic plate or moistened sponge applied either near the aneurism or on another part of the body. Pain may be diminished by freezing the skin over the aneurism, with pounded ice or ether spray. Then the needles may be plunged into the tumor, and the electrical current may be gradually increased, and continued for twenty or thirty minutes at a time. The operation may be repeated after an interval of weeks or months. The prevailing theory of the beneficial action of electricity is that it produces or promotes coagulation of blood within the aneurismal sac.

Petit[5] has collected 114 cases of galvano-puncture for thoracic aneurism, in which amelioration was effected in 69 instances. In 61 cases more or less aggravation of the symptoms resulted. The greater number of patients obtained by its means relief or diminution of pain and dyspnœa, with increase of appetite and ability to sleep. While scarcely any actual cures seem to have been effected by this method of treatment, the amount of benefit appears to be quite sufficient to justify it in cases which continue to grow worse, notwithstanding the employment of iodide of potassium and rest through a long period.

Dr. Headland Greenhow reports[6] the *entire cure* of a case occurring in an able-bodied seaman, aged 28, by pressure (continued, at intervals, for three or four hours at a time) with Lister's tourniquet upon the aorta above the tumor. Drs. Murray, Moxon, and Durham (in 1864 and 1872) have reported two other successful cases, under the same treatment. Dr. S. F. Speer had two recoveries under gallic acid internally, with iron.[7]

### AORTIC STENOSIS.

This term, meaning *contraction of the aorta*, applies strictly to cases of very rare occurrence, unless amongst still-born children,

[1] L'Union Médicale, Aug. 1, 1880. [2] Pepper, N. Y. Med. Record, Nov. 13, 1880.
[3] Bulletin Gén. de Thérapeutique, July 15, 1880.
[4] Lancet, Oct. 12, 1878. [5] L'Union Médicale, Aug. 21, 1880.
[6] British Med. Journ., June 14, 1873. [7] Med. and Surg. Reporter, March 28, 1874.

or those dying early in life. Occasionally, however, instances are met with, especially in subjects under age, presenting the following signs: a murmur in the aortic region, and extending from this more or less distinctly over the chest; feebleness or absence of pulsation in the arteries of the lower extremities; imperfect growth of the extremities and of the genital organs; dilatation of the intercostal and other superficial arteries; tendency to passive congestions, for instance, of the hands, feet, lips, and ears.

Such persons are not likely to attain to long life; but examples have been known of their surviving for a number of years after the evidences of this malformation have been discovered.[1]

The *origin* of aortic stenosis may be a simple defect of development; or the organization of a *clot*, or thrombus, during fœtal or infantile life; or an *inflammation* of the aorta, followed by its constriction, or partial obstruction by bands of lymph.

No *treatment* can exert any influence upon a true aortic stenosis. Warning must be given to the patient that his constitution unfits him for great or sudden exertion, or strong excitement.

## AFFECTIONS OF THE ORGANS OF DIGESTION.

### STOMATITIS.

**Definition.**—Inflammatory disease of the mouth.

**Varieties.**—1. Simple stomatitis. 2. Aphthæ. 3. Thrush. 4. Inflamed ulcer or cancrum oris. 5. Gangrene of the mouth. 6. Mercurial sore mouth or salivation. 7. Nursing sore mouth. 8. Scorbutic disease of the mouth.

**Simple Stomatitis.**—From taking very hot or corrosive liquids into the mouth, it may become inflamed; this condition being shown by redness, swelling, soreness and heat of the tongue, gums, lining membrane of the cheeks, palate, and fauces. Corrosives (as sulphuric acid or creasote) may *whiten* the mucous membrane superficially.

The course of such an affection is generally simple and brief—recovering in a few days under mild treatment. *Glossitis*, however, or inflammation of the tongue, may be more obstinate and serious. I have seen the tongue so swollen as to protrude from the mouth for more than a week, too large to return.

Slight ulcerations and fissures often occur in simple stomatitis, increasing the soreness and pain; and increase in the flow of saliva is common.

**Treatment.**—In the beginning, holding ice, iced gum-water or flaxseed-tea frequently in the mouth, or, if a corrosive agent be the cause, almond oil or dilute glycerin [F. 50], will soothe the irritation. In violent glossitis, leeches may be applied to the swollen tongue; even free *incisions* may be called for to relieve its swelling; later, solution of alum (℥ij in f℥vj of water) or sulphate of zinc (gr. j in f℥j) may be used as a wash. Remember that such articles ought not to remain in contact with the teeth, the enamel of which they may impair.

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[1] E. F. Ingalls, N. Y. Med. Record, Sept. 4, 1880, p. 255.

**Follicular inflammation** of the mouth is recognized by small red elevations over the tongue, soft palate, etc. This is common in infants during dentition; as well as in adults of deficient general health. It requires no specialty of treatment.

**Aphthæ.**—These are small ulcers, with whitish surfaces, following a vesicular eruptive inflammation of the mouth. The vesicles are small, round or oval, of a pearly appearance, and contain serum.[1] They break in a few days, leaving a sore white ulcer, with redness around it. They may be scattered or confluent. Fever may attend the latter, with disorder of the stomach. Though not common in the earliest infancy, children sometimes have this disease, but less often than adults. Decayed teeth may produce it. On the whole, it is to be considered rare. Its duration is generally a week or two, but confluent cases may last a month, and have occasionally been fatal.

**Treatment.**—The constitutional condition may require cooling laxatives or saline diaphoretics, and gastric irritation may call for antacids, as bicarbonate of sodium or magnesium. Chlorate of potassium should be given, 5 to 20 grains four times daily. Locally, at first, flaxseed tea or gum-water, or a solution of glycerin in rose-water, may be frequently applied. When ulceration occurs, a powder, consisting of equal parts of prepared chalk and pulverized gum arabic [F. 51], may be dusted or laid over each of the ulcers, several times a day. Some prefer a mixture of glycerin and prepared chalk, of the consistence of a soft paste. A wash of borax, myrrh [F. 52], alum, sulphate of zinc [F. 53], or acetate of lead, may also be applied. If the ulcer prove severe or obstinate, strong solutions of sulphate of zinc (15 grs. in f℥j of water) or nitrate of silver (20 grs. in f℥j), or solid sulphate of copper, may be used to touch the ulcerated surface every day or two.

**Thrush: Muguet.**—This is much more frequent in infancy. Its peculiarity is, the occurrence, after a day or two of diffused inflammation, of a number of small whitish points within the mouth, which coalesce and form patches of a whitish curd-like exudation (often confounded with *aphthæ*). In bad cases it may become brownish. This may fall off and be renewed, more than once. The mouth is hot, the stomach disordered; vomiting and diarrhœa may occur, with some fever. The attack lasts from one to two or three or more weeks; being seldom dangerous except in children otherwise in poor health. It sometimes attacks adults.

**Nature.**—The specific nature of the curd-like exudation appears to be connected with a *microphytic* (minute vegetative) growth, to which the name of *oidium albicans* has been given.

**Treatment.**—Experience favors the internal administration of *chlorate of potassium* [F. 54] in all severe forms of sore mouth. In the absence of a *rationale* by which its special applications might be definable, I would employ it in thrush as well as in aphthæ, etc. A child under five years of age may take from one to five grains of the chlorate, in solution, several times daily.

[1] Dr. J. Worms asserts the discharge of aphthous vesicles and ulcers to be *sebaceous*. He, therefore, regards aphthæ as a sort of *acne* of the mucous membrane.

As a laxative, magnesia will be suitable. Feeble cases may require quinine, beef-tea, whisky and milk, in quantities proportioned to condition and age.

Locally, at first, we may use flaxseed or gum arabic emulsion—then glycerin and rose-water (one part to four or five), borax in solution (2 drachms in 4 ounces) or in powder, equal parts with sugar—and later, tincture of myrrh in water (f℥ss in f℥ij), alum in solution, or sulphate of zinc, or muriatic acid with honey and water (acid. hydrochlor. ℥j, mellis vel syrupi f℥j, aquæ f℥ij); the latter being applied carefully with a camel's-hair pencil, occasionally.

**Cancrum Oris.**—Canker of the mouth is characteristically ulcerative, from the commencement. It begins on the cheeks, gums, or lining of the lips; but may reach the fauces. The ulcer is grayish or yellowish-white, with an inflamed border and environs; the cheek may swell from it externally. It is quite painful. Saliva flows freely, and the odor of the breath is offensive. Fever is often present. The complaint may last for several weeks or even months; but it is almost never fatal. It is most common in children, from two to six years of age.

**Treatment.**—Besides general measures, *adapted to the condition of the patient*, the same local applications, mentioned as appropriate in different forms of sore mouth, may be used. Direct touching of the ulcer with a strong solution of sulphate of zinc (gr. xv vel xx in f℥j), or with the solid bluestone (sulphate of copper) twice daily, will do the most for its cure; especially with the intermediate "dressing" of powdered chalk and gum arabic, and occasional washing with glycerin and rose-water.

**Gangræna Oris.**—Extreme inflammation or ulceration, in the mouth as elsewhere, may end in gangrene; but this affection is peculiar, and may be unconnected with any severe inflammation.

A morbid state of the system seems to predispose to it. It occurs mostly in children, but has been met with in adults.

There is, at first, an ash-colored ulcer, most often on the gums, or inside of the cheek. If the latter, it is accompanied by swelling. Spreading, it assumes a sloughing character; the breath grows fetid; acrid fluid is discharged, with copious salivation; other ulcerations are formed, the bones of the face are affected with necrosis, and the teeth fall out. Penetrating the cheek, mortification may go on rapidly, reaching sometimes even the ethmoid bone. Low fever and prostration attend these local changes; later, diarrhœa, colliquative perspirations, and death. The only well-marked promotive *causes* of this very serious disease are, bad air (especially *crowd-poison*) and insufficiency of food. When treated early, it is often quite manageable; but after extensive sloughing has occurred, the prognosis is bad.

**Treatment.**—Early, I should always try the chlorate of potassium. Quinine and tincture of chloride of iron [F. 56] will be required on account of the tendency to prostration. Beef-tea and wine whey, or brandy or whisky punch, *pro re nata*, are called for, by the same indication.

To the part, at first, the astringent lotions, mentioned already, may be applied. When the gangrenous condition becomes pro-

nounced, a solution of liquor sodæ chlorinat. in glycerin (f℥j in f℥ij) may be applied frequently. Solution of creasote in glycerin, or in water (gtt. iij to gtt. xx in f℥j) may meet the same purpose; or permanganate of potassium (gr. x in f℥j); or chloride of zinc (gr. j in f℥j); or sulphite of sodium (℥j in f℥j); or bromine (℥ss in f℥ij).

**Mercurial Sore Mouth.**—Salivation is made known in its approach, by a "coppery" taste, soreness of the gums, tenderness of the teeth when pressed together, with redness and swelling of the gums, and a broad white line just beyond their edge. The tongue also may swell. The flow of saliva increases greatly; the cheeks and even throat may grow sore and painful; the breath offensive. Ulceration of the gums takes place in severe cases, with loss of the teeth. Even sloughing may follow, approaching the state of things in *gangræna oris*. Difficulty of swallowing may be so great as to threaten starvation; and irritative fever may result from the local disorder.

**Treatment.**—Moderate salivation will always pass away in a few days, spontaneously. A good mouth-wash for it is brandy or whisky and water, one part of the former to four of the latter; alum may be added to it [F. 59], or a little tincture of myrrh. Ulcers or sloughs should be treated as in other varieties of stomatitis.

Opium may be called for, at least at night (*e. g.*, Dover's powder 10 grains at bedtime), by the distress of the system. Milk diet, or some other liquid nourishment, must be given during the difficulty of deglutition. In good practice, at the present day, no physician ever seriously salivates a patient.

**Nurses' Sore Mouth.**—Women who suckle children, and sometimes those who are advanced in pregnancy, are liable to ulcerative stomatitis. It begins with small, hard, painful swellings on the tongue and cheeks, which ulcerate and are attended by a great deal of local, and sometimes constitutional irritation. When the infant is weaned, the affection subsides soon.

**Treatment.**—Chlorate of potassium has in this complaint a special curative power. 20 grains of it may be given three or four times daily. Iron, quinine, etc., and full nourishment, may be required in subjects of obvious debility. Local treatment, such as has been given for *cancrum oris*, etc., will also have its utility.

*Scorbutic* mouth affection will be dealt with in another part of the book—under *Scurvy*.

## TONSILLITIS.

When severe, this is commonly known as *quinsy*. Soreness of the throat in swallowing, with pain or swelling of one or both tonsils, and fever, are its symptoms. Unless relieved in a few days, the pain becomes very constant and throbbing, dysphagia is extreme, and, when the patient begins to be seriously alarmed, a tonsillar abscess breaks or is opened by the physician, and recovery soon follows. In a very few instances, bleeding after the incision (or after excision of the gland) without wounding the artery, has been troublesome, and even dangerous to life. We

must suppose *hæmophilia* (constitutional predisposition to hemorrhage) to account for such events.

**Treatment.**—A dose of citrate or sulphate of magnesium, or other cooling aperient, should be given the first day. Then, wine of ipecac., twenty drops every three hours, with frequent draughts of flaxseed tea or flaxseed lemonade. If the swelling, heat, and pain of the throat are great, apply (in an adult) from 20 to 30 *American* leeches to it. Then, or instead, in mild cases or feeble subjects, poultice with flaxseed meal, to which lard and laudanum have been added; bathing, when the poultice is changed, with liniment of ammonia, or soap liniment to which aqua ammoniæ has been added. If still severe, and not certainly suppurating, a *small* blister may be applied, or the part may be painted with tincture of iodine. When an abscess is evidently forming, poultices will be better, until it is ready to open from within.

Lancing the suppurated tonsil requires care not to wound the internal carotid artery. The point of the lancet should be directed towards the middle, not to the outside of the throat.

Not unfrequently, especially in children, repeated attacks of non-suppurating inflammation of the tonsils will leave them inconveniently enlarged. Sometimes persevering use of astringent gargles, or touching daily with strong solution of tannin or nitrate of silver, will make them shrink to the normal size. If not, excision of a part of the tonsil may be proper. With Fahnestock's, or any other guillotining instrument, the operation is easy and safe; at all events, if it be not attempted to remove the whole gland, which is not necessary. Should hemorrhage occur, it may be suppressed by applying to the part, on the end of a short stick, a pad of lint which has been soaked in solution of persulphate, or tincture of perchloride, of iron; aided by the application of ice to the outside of the throat.[1] Ehrmann has reported a case in which (without any operation) the *spontaneous* rupture of a tonsillar abscess was followed by hemorrhage so severe as to require ligature of the carotid artery.[2]

## PHARYNGITIS.

Slight sore throat is among the commonest of affections, requiring for its treatment only mild gargles (as alum in flaxseed or sage tea), demulcents (flaxseed or gum arabic or slippery elm infusion), or laudanum and water, one part to eight, fomentation with volatile liniment or spirits of turpentine, and a dose of some saline cathartic, with *slop* diet. With children who cannot gargle, finely powdered alum may be blown into the fauces and throat, through a tube or quill, more readily than in any other way.

**Chronic** pharyngitis is often a much more troublesome, though not dangerous disorder. The mucous membrane becomes permanently hyperæmic, almost granulated; with either abnormal dryness or a thickened secretion; and constant soreness. In the treatment of this, all the different astringent, demulcent, and alterative applications may be tried—sometimes with little suc-

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[1] Liden reports a case where, from abnormal tendency to bleeding, the hemorrhage obliged him to tie the carotid artery. This must be a very rare accident.

[2] Centralblatt für Chirurg., No. 34, 1879.

cess. When nitrate of silver, tannin [F. 60], sulphuric and muriatic acids, sulphate of zinc and acetate of lead have been found to fail, it may happen that ice, or gargling frequently with ice-water, will prove more useful.

Counter-irritation, with repeated small blisters, tincture of iodine, or croton-oil, is always a suitable and important part of the treatment of chronic inflammation of the throat.

**Ulcerated Sore-throat.**—This may be idiopathic, syphilitic, or tuberculous. The second is most common.

The treatment in the first variety consists in the local application of bluestone or, lightly touched, solid nitrate of silver to the ulcers, if within reach. The syphilitic will require also iodide of potassium [F. 61] internally (gr. v vel x ter die); the tuberculous, tonics, generous diet, and cod-liver oil. Iodoform, in powder (applied with a moistened camel's-hair pencil), is an excellent local detergent and alterative for ulcerated sore throat.

## RETROPHARYNGEAL ABSCESS.

This most often follows fever as a sequela; but it is altogether rare; least so in children, in whom, however, it is liable to be overlooked. Of 144 cases reported by Bokai, of Pesth, 134 occurred under four years of age. Of these, 32 were scrofulous, and 10 rachitic. The affection is shown to the careful observer by dysphagia and dyspnœa, much increased by the recumbent posture; yet not, as in croup, increasing rapidly from day to day, or disappearing in a short time. There is also stiffness of the neck, and swelling on one or both sides of it. In such circumstances a finger passed over the tongue into the pharynx may find a firm projecting tumor occupying its posterior and lateral walls. It may prove fatal by asphyxia, or by preventing the patient from swallowing food. When diagnosticated in time, the matter may be let out by opening the abscess with a lancet through the pharyngeal wall. In an adult, a trocar will be safer, the head being rapidly bent forward after the operation, to prevent suffocation by the discharge suddenly entering the air-passages in breathing.[1] If there be doubt as to the nature of the tumor, *aspiration* (Dieulafoy) will aid the diagnosis.

## STRICTURE OF THE ŒSOPHAGUS.

This is uncommon. Its principal causes are, if structural, corrosive poisons, swallowed; or ulceration of the throat, involving the œsophagus, and contracting upon cicatrization. Functional stricture may be spasmodic, as in hysteria. Dysphagia, not otherwise accounted for, and obviously low down in its seat, or the rejection of food partly swallowed, may lead to a suspicion of stricture; and examination with a bougie will fix the diagnosis. For the structural affection I know of no appropriate treatment except dilatation with bougies made for the purpose, applied for a short period, oiled, once or more daily. Elias,[2] in one case, successfully performed gastrotomy; making an artificial gastric fistula.

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[1] Aberlin, Schmidt's Jahrbucher, No. 5, 1872.
[2] Deutsche Med. Wochens., No. 25, 1880.

## GASTRITIS.

**Simple gastritis,** in an acute form, is very rare. I have met with but one case of it, in a woman who was kicked over the stomach by her husband. Corrosive poisons almost always involve the intestinal tube with the stomach. The most common form of "idiopathic" gastric inflammation is "gastro-hepatic catarrh," or "a bilious attack," in which the stomach, duodenum, and liver are all somewhat involved.

*Signs* of stomachic inflammation are, epigastric pain and tenderness on pressure, rejection of all food and drink, jactitation, and fever; the pulse, however, being kept down by the impression made upon the circulation by constant nausea.

*Post-mortem* evidences of gastritis are—redness, browner or deeper and more livid than natural, and dotted, stellated, or arborescent, rather than diffused; moreover, not confined to dependent parts; enlargement of blood-vessels; in acute cases, softening of the mucous membrane; in more lengthened ones, either softening or hardening and thickening; abundance of thickened mucus; rarely, coagulable lymph; almost never, pus.

**Gastro-hepatic catarrh** (Chambers) may follow any of the causes of indigestion, or exposure to cold and wet. There is nausea, or vomiting of greenish-yellow fluid, generally not copious, but very acrid; headache and dizziness; constipation of the bowels, and fever. In the **treatment** of this, *magnesia* is a good quieting stomachic and cathartic; many patients will be relieved as soon by a bottle of solution of citrate of magnesium. Ice, melted in the mouth and swallowed slowly, will give comfort. Rest and abstinence from food as nearly as possible may, with the above, generally complete the cure in two or three, or not many more days.

The best **preventive** or *abortive* of a "bilious attack" is *blue pill*, timely administered. Let the first nausea, constipation, and headache be met by giving at bedtime two or three grains of blue mass in pill (the "*lang syne*" portion was from six to twenty), followed in the morning by a teaspoonful or two of Husband's magnesia. If the bowels are free, bicarbonate of sodium may be better than magnesia; the eighth part of a teaspoonful at a dose. Chloride of ammonium, in 15 or 20 grain doses, proves the best medicine for some such cases.

**Sick headache** is usually a modification of the above, the sympathetic cephalalgia being especially severe. In some persons it is periodic. The treatment above mentioned for gastro-hepatic catarrh, with rest in bed, will be adapted to a majority of cases of it. *Oil of turpentine*, in moderate doses, has been said (W. Begbie) to be remedial for it. Dr. Kennion[1] advises a solution of bisulphide of carbon, applied to the temples or behind the ear, for a short time. *Citrate of caffein* (3 to 5 grains at a dose) is highly recommended by several practitioners.

**Acute softening of the stomach** is described by a few French and other writers, as a rapidly prostrating and dangerous affection in children, sometimes epidemic. Its symptoms are said

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[1] Brit. Med. Journal, June 13, 1868.

to be, at first, those of simple gastritis; then, with or without diarrhœa, great agitation, prostration, want of sleep, insensibility —and death in one or two weeks from exhaustion. I have never met with any such case. An irregular fever with gastric irritation (gastric fever or infantile remittent) once had a regular place in the nosological catalogue among fevers. It appears to me to be scarcely uniform enough for so special a designation or consideration.

**Acute dilatation of the stomach** has been reported upon especially by Dr. C. Hilton Fagge.[1] It is very rare. Its symptoms are those of severe abdominal disease; particularly, profuse vomiting. As physical signs, we have rapidly increasing, *unsymmetrical* distention of the abdomen (largest on the left side), and a widely extended tympanitic resonance over the dilated region. In treatment, evacuation of the stomach by aid of the stomach-pump appears to be indicated; with continued rest to the organ, nourishment being afforded by *enemata*.

**Subacute Gastritis of Children.**—In the older books on medicine, and still by a few authors (*e. g.*, Dr. F. P. Porcher,[2] of Charleston, S. C.), this has been called *gastric remittent*, or *infantile remittent fever*. Its symptoms are those of irritation of the stomach, with fever, which has a more or less regular daily remission, almost always in the morning. Its *treatment* requires *rest*, *diet of milk* with *lime-water*, *barley*, or *rice-water;* mild laxative medicines; gentle abdominal counter-irritation, as by spice-plasters; and refrigerant diaphoretics, such as *small doses* of sweet spirits of nitre, acetate of ammonium, etc., during the febrile exacerbations.

## CHRONIC GASTRITIS.

While the same doubt as to the pathological correctness of the *name* (indicating inflammation) exists in the case of this disease as in other "chronic inflammations" (see *General Pathology*), an affection of some distinctness of character, commonly called by the above title, is often observed. With the greatest brevity, we may indicate its symptomatology by contrasting it with that of *atonic dyspepsia*.

| In Chronic Gastritis. | In Atonic Dyspepsia. |
|---|---|
| Much epigastric tenderness. | Little or no epigastric tenderness. |
| Pain increased by active exercise or stimulating food. | Pain not increased by exercise, lessened by stimulating food. |
| Vomiting usually. | Vomiting rarely. |
| Eructation of gas rarely. | Eructation of gas commonly. |

Chronic gastritis is apt to be obstinate, but not dangerous to life.

**Treatment.**—Counter-irritation over the epigastrium by repeated vesication, will be useful. Internally, *nitrate of silver* [F. 62], in pill, beginning with gr. ¼, with gr. ⅛ of opium, and increasing in a few days or a week, gradually rising to 1 gr. thrice daily, with a proportionate quantity of opium, I believe, upon experi-

[1] Guy's Hospital Reports, vol. xviii., 1873.
[2] Am. Jour. of Med. Sciences, January, 1881, p. 46.

ence, to be the most valuable medicine. Subnitrate of bismuth [F. 63] is for the same condition lauded by some. Most important is a *bland-diet;* lime-water and milk, arrowroot, tapioca, sago, jellies, cracker soaked in ice-water, etc., in small quantities at short intervals. Ice will often quench thirst to better advantage, without disturbing the stomach, than water. The *skim-milk* regimen (Karell) may be adapted to some cases of this disease.[1] *Feeding by the rectum* is indispensable in bad cases; beef-tea, defibrinated blood, eggs, milk, arrowroot, fruit, jellies, etc., may be thus administered.

### ANTI-EMETIC REMEDIES.

Vomiting is so frequent and troublesome a symptom, in many diseases besides inflammation of the stomach, as to demand much practical study from the physician. For this reason, though quite in deviation from systematic routine, I here introduce an enumeration of the most available medicines used for the relief of the *symptom* of vomiting—the selection among them depending upon the judgment of the practitioner as to the real *cause* of that symptom. At the same time it is clear that many of these remedies prove useful for vomiting when produced by very different and almost opposite causes; the symptom, *as such*, rationally demanding medication when we are uncertain or in search of its cause.

Ice.
Lime-water.
Mineral water.
Effervescing draught.
Champagne.
Brandy.
Paregoric.
Solution of morphia.
Aromatic spirit of ammonia.
Comp. tinct. of cardamom.
Comp. sp. of lavender.
Bicarbonate of potassium.
Bicarbonate of sodium.
Magnesia.
Camphor.
Calomel, small doses.
Blue pill.
Creasote.
Cinnamon-water.
Infusion of cloves.
Hydrocyanic acid.
Chloroform.
Hydrate of chloral.
Nitrate of silver.
Oxide of silver.
Subnitrate of bismuth.
Oxalate of cerium.
Enema of laudanum.
Spice poultice.
Sinapism. Belladonna plaster.
Blister; surface being dressed with acetate of morphia (gr. ij, with gum acaciæ, gr. x).
Ice-bag to the spine.
Hypodermic injection of morphia.

[See F. 64, 65, 66, 67, 68, 69, 70.]

For *sea-sickness*, the ice-bag to the spine is said to be sometimes remedial. In my own experience of this affection, iced effervescent (carbonic acid) water has given more relief than anything else. Hydrate of chloral internally, inhalation of nitrite of amyl (C. Clapham, Western Lancet, June, 1875), 3 drops at once, and morphia by hypodermic injection over the epigastrium, are reported upon favorably in its treatment. Surgeon Cory, of the Australian Mail S. S. Co., found nearly always successful, a mix-

[1] See an article by S. W. Mitchell, M. D., Philadelphia Med. Times, March 15, 1871.

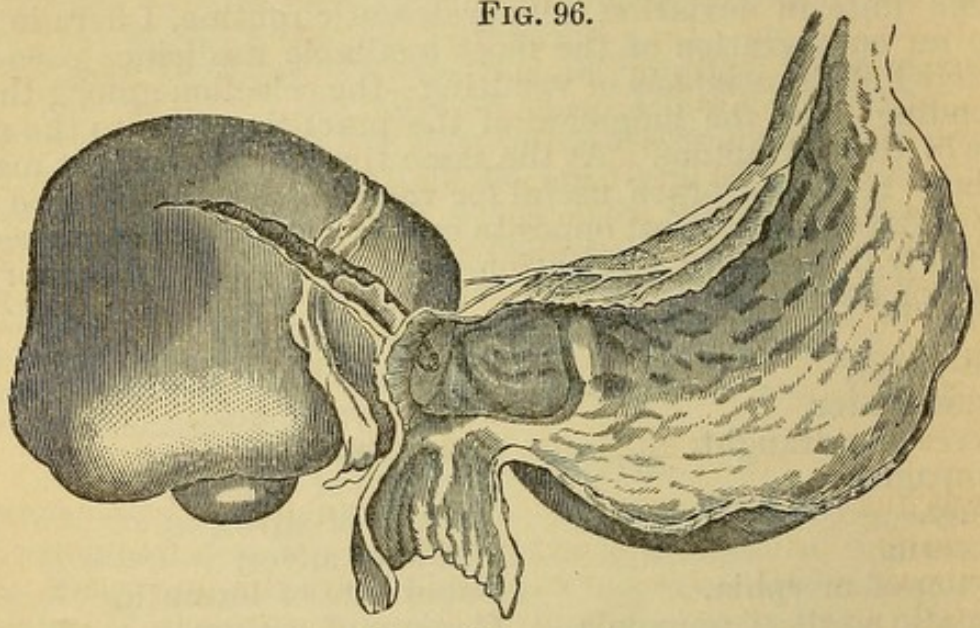
ture of bromide of potassium and hydrate of chloral, taken effervescing with citrate of magnesium. In the vomiting of *pregnancy*, bromide of potassium has been found very serviceable.[1]

## ULCER OF THE STOMACH.

This serious affection is rare after the middle of life. It is most often met with in feeble systems, especially in women.

**Symptoms.**—Dull, sickening pain in the stomach, extending to the back, with *localized* tenderness on pressure. The pain is increased by motion, and by food, especially by *hot* food, or by sugar. Vomiting occurs, not copious, but rather frequent. Vomiting of *blood* is an important sign; it is impossible to be certain of the existence of an ulcer in the stomach without it. The amount of blood thrown up at once may be very small.

FIG. 96.



Ulcer of Stomach.

It is often difficult to diagnosticate gastric ulcer from *chronic gastritis*, as well as from *cancer*, *caries of the spine* and *aortic aneurism*. No hæmatemesis, however, is met with in the first, third,[2] and last; and a tumor, at some period, will make known cancer. So will angular deformity demonstrate spinal caries.

*Perforation*, causing peritonitis, and copious *hemorrhage*, are the most dangerous terminations of gastric ulcer. The signs of the former are, abdominal swelling and diffused pain, with collapse. One instance has been reported (Chiari, Vienna, 1880) of the rupture of a perforating ulcer of the stomach into the left ventricle of the heart.

**Treatment.**—Bland diet is very important. Arrowroot, tapioca,

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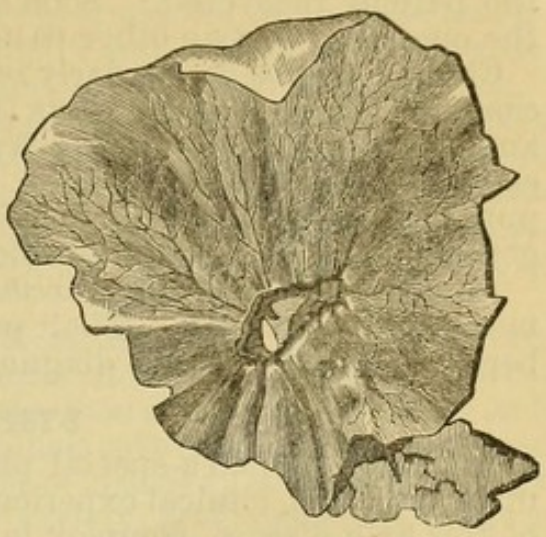
[1] Copeman's method of treatment of the vomiting of pregnancy is, to *dilate the cervix uteri* by insertion of the index finger. Dr. Baldwin, of Ohio (Ohio Med. Recorder, Aug., 1879), reports the immediate relief of an obstinate case in this way. Dr. J. S. Warren, of New York, has had great success with Fowler's solution of arsenic, in *drop doses*, upon an empty stomach.

[2] Unless (improbably) an aortic aneurism should *communicate* with the stomach.

sago, corn-starch, rice, eggs, and lime-water and milk are suitable. Beef or mutton tea (concentrated) will be better for feeble patients than solid food. *Rectal* alimentation will sometimes be indispensable, to afford the stomach complete rest. Milk, eggs, beef-tea, defibrinated blood, &c., will answer; but it is well to add *pepsin* to such materials, so as to approach gastric digestion as nearly as possible.

FIG. 97.



Perforating Ulcer of Stomach.

Nitrate of silver, in pill with opium [F. 62]; oxide of silver, in 1 or 2 grain doses; *iodoform* in one grain pills; and subnitrate of bismuth, may be given with the hope of promoting cicatrization of the ulcer. Opium alone, in pill, or laudanum, etc., or conium or belladonna, as anodynes, when the pain is severe. When hemorrhage is threatening,[1] ice, creasote (½ drop to 2 drops), tannic or gallic acid, acetate of lead, oil of turpentine (small doses), tincture of chloride of iron, ammonio-ferric alum. Hypodermic injection of morphia has been used with advantage, especially to check vomiting, in this affection.

## CANCER OF THE STOMACH.

**Scirrhus** of the **pylorus** is the most common form; occasionally the cardiac orifice is the seat of cancer. It is a frequent form of cancer; of 9118 cases of cancer in Paris in four years, 2303 affected the stomach. The usual symptoms are pain, in rare instances absent or nearly so, often excruciating; epigastric tenderness, about in proportion to the pain; vomiting of food, mucus, and "coffee-grounds," or mixed blood and mucus, almost never pure blood; acidity or other symptoms of indigestion; fetid breath; decided constipation; emaciation, and cachectic, almost jaundiced, sallowness of complexion; sometimes irritative fever. The diagnosis is made nearly certain by the discovery of a tumor; not absolutely so—as the tumor may be fibroid, and not malignant.

Cancer of the stomach seldom occurs before forty years of age. Its duration averages about a year; it seldom reaches two years. The patient commonly dies by slow starvation, the stomach becoming incapable of digesting and transmitting food.

No treatment can avail for the *cure* of such an affection. To nourish by concentrated articles of diet, as beef-tea, milk, etc., and to allay suffering by judicious use of anodynes, will be all that we can do. Kussmaul's method of washing out the stomach daily with a solution of bicarbonate of sodium, may prove an

[1] The same remedies may be used with advantage for hæmatemesis from other causes.

important measure of relief. Dr. J. H. Hutchinson[1] has reported a case in which, by this means, vomiting was arrested, and the patient was enabled to take and retain food. *Rectal* feeding may sometimes be necessary.

In 1881, Billroth removed a cancerous pylorus by excision, and the patient recovered.[2] Soon afterwards, however, he repeated the operation on two other patients, both of whom died.[3]

Chloral may be particularly recommended for trial; as, in some cases of cancer of other parts (uterus, breast, etc.), Drs. C. Paul and Martineau have found hydrate of chloral to exercise an especially favorable influence.[4] *Chian turpentine* (Clay) has been put (1880) under extensive trial for various forms of cancer. The general report is against its efficacy.

*Cancer of the Duodenum*, *Cæcum*, *Rectum*, and *Omentum* are much more rarely met with. Their possibility must always be remembered in considering the diagnosis of abdominal tumors.[5]

## DYSPEPSIA.

Although denied a special place in nosology by recent writers upon diagnosis, clinical experience calls for a separate recognition of this as a disease, complex in its pathology, and diverse in its symptoms. Of the latter only a very general account can here be given.

**Symptoms.**—The patient *feels* his stomach all the time, though not nearly always with pain. When the latter occurs, it is often in the breast, causing suspicion of pectoral disease. Little or no tenderness on pressure exists, nor is there much nausea, nor vomiting. The mouth is clammy, or has a sour or bitter taste. The complexion is more or less sallow. The bowels are costive, and stools deficient in color. Other frequent symptomatic affections are cardialgia (heartburn), pyrosis (waterbrash), hypochondriasis, palpitation of the heart, headache, and disorders of the senses, as diplopia (seeing double), etc. Dyspepsia is not a dangerous, but is frequently a very obstinate disease.

**Pathology.**—The functional disturbances above enumerated have their seat, more or less prominently, in different parts of the digestive apparatus; in the alimentary mucous membrane, glandular, muscular, or ganglio-nervous organs. The distressing gastro-intestinal irritation, cardialgia, pyrosis, etc., are located in the mucous membrane. Defective action of the liver and enteric glands produces constipation, with its consequences; imperfect secretion of the gastric juice and pancreatic fluid impairs the whole process of digestion. So does atony of the muscular coat of

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[1] Phil. Med. Times, May 27, 1876. Dr. Hutchinson found that the best way to effect this was by the use of *Thudichum's* douche. An ordinary stomach-tube was introduced into the stomach, and, by means of a rubber pipe attached to a bottle held above the patient's head, the solution passed into the stomach by its own gravity. While the tubes were still full, the bottle was depressed below the level of the patient's body, and the rubber tube was detached from the bottle. By the syphon thus made, the fluid passed out, emptying the stomach.

[2] Wiener Med. Wochenschrift, Feb. 5, 1881; Med. Times and Gazette, March 5, 1881. Péan had performed this operation, 1829; but his patient died.

[3] Allgemeine Wiener medicinische Zeitung, March 15, 1881.

[4] Lancet, March 14, 1874.

[5] Dr. D'Arpen, of Elba, has reported the apparently curative effects, in cancer of the *rectum*, of enemata of *gastric juice*. Lancet, March 18, 1871.

the stomach; while deficient power of the peristaltic intestinal contraction is perhaps the most *common* cause of constipation. Possibly the presence of *torulæ* (*saccharomyces*) may increase the formation of acetic and lactic acid from farinaceous and saccharine food, in some cases. Insufficient or perverted *innervation* may originate or intensify any or all of these morbid states and actions. Sometimes this is so obviously primary and predominant, as to justify the use of the term, in certain cases, of "nervous dyspepsia."

**Causation.**—Most briefly, we may assert the cause of dyspepsia to be, either one or several of the following: too much food, or too little food; imperfect mastication, and hurry in eating; too little exercise; too much fatigue; excessive study, or emotional excitement; inordinate use of ardent spirits, opium, tobacco, coffee; or of medicine out of place.

**Treatment.**—This involves *regimen*, as well as medication; the first is most important. The meals should be regular, and with sufficient time allowed; and all the food should be simple as well as nutritious; variety being obtained rather by having a change from day to day, than by a number of dishes at each meal. Some dyspeptics are obliged to eschew variety, and confine themselves to a routine of beef, mutton, and stale bread. Caution should be used not to blame, unjustly, particular articles as "disagreeing," when everything disagrees, because of the state of the stomach. But a sensible person will be able mostly to ascertain what things agree *best* with his digestion; and others should not be taken.

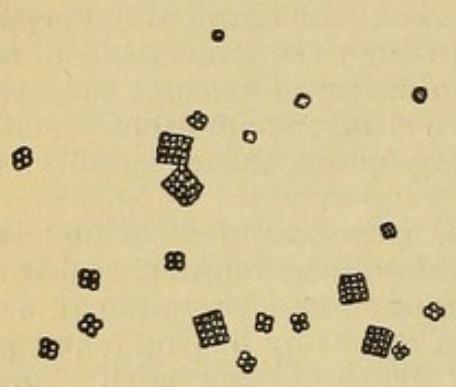
Most persons, even of feeble digestion, can eat beef, mutton, chicken, turkey, oysters (not fried nor raw, but roast, panned, stewed or steamed); with stale bread; bran bread occasionally, as more laxative; crackers, boiled rice, tomatoes, and young and tender beets. When weak enough to require any stimulant, sherry, or Madeira wine, or ale, or in the feeblest, whisky, in small doses, will agree best at dinner. Let Dr. N. Chapman's precept be here remembered, "whatever we grant, *let it be sparingly.*" Advise, for example, *half* a wineglassful of Madeira or sherry, or half a tumblerful of ale, or one or two *teaspoonfuls* of brandy or whisky, at or after dinner.[1] For breakfast and supper, tea will be the best drink for refreshment; milk for nourishment; although some persons do not digest milk with ease. Coffee I have so often known to *produce* dyspepsia, that I would forbid it altogether; notwithstanding its toleration by some highly respectable authorities. Cocoa is too *rich* for most dyspeptic stomachs; some find it acceptable. Fruit, especially when fresh, as a general rule is useful; peaches, in season, are so with few exceptions. Stewed fruit also is excellent for laxative effect. Preserves, cakes, and pies must be avoided. If a full meal cannot be taken without discomfort, it will be better to appease hunger or sustain strength by a small and simple "bite" between meals. Idleness and emptiness, as well as repletion, in the stomach promote disorder. Dr. Brown-Séquard has proposed to

[1] The author must dissent strongly from Dr. Anstie's opinion, that even a perfectly *healthy* adult will receive benefit from the use of at least an ounce of alcohol, in some form daily. Perfect health, I believe, is best maintained with *none*. The careful experiments of Drs. Parkes, Richardson, and others fully sustain this opinion.

treat obstinate cases of dyspepsia by administering very *small* quantities of digestible food, at very *short intervals*. Sometimes, in desperate cases, this may be temporarily important; but it must soon become inconvenient and tiresome, if, as he advises, the intervals be made so short as fractions of an hour.

Exercise, daily, in the open air, is very important to the dyspeptic. So is bathing, to maintain healthy action of the skin, with which the stomach sympathizes. But active exercise ought not to be taken just before or just after a meal. "After dinner sit awhile."

FIG. 98.



Sarcinæ.

Mental states and nervous impressions are of great consequence. Anxious occupation, or harassing responsibility, may increase greatly the difficulty of recovery. Thus travelling, or resorting to watering-places, with release from care, may assist the cure.

The *medical* treatment of dyspepsia involves a number of indications, not always exactly the same. Especially are *tonics*, *laxatives*, *antacids*, and other palliatives and alteratives, apt to be required.

**Tonics.**—Pure vegetable bitters, as gentian [F. 72, 73], quassia, and columbo, are most suitable as direct stomachics. Chiretta is a favorite with some. Oxide of silver has had one or two enthusiastic advocates. Where *nervous debility* is prominent, and particularly in cases of long standing, extract of nux vomica [F. 71], or strychnia in very small doses (one-fortieth to one-thirtieth of a grain) will often do more good than any other medicine. Iodide of iron, in anæmic cases, may be given.

**Laxatives.**—Rhubarb has been, time out of mind, the standby for habitual constipation [F. 75, 76, 77]. If it be insufficient alone, or lose its effect, compound extract of colocynth, aloes, or resina podophylli may be added, in pill. Senna, magnesia, and sulphur may be used occasionally, for special indications. Saratoga, Cheltenham, Vichy, and Hunyadi Janos (half a wineglassful or more at a dose) waters are found sometimes to have excellent regulating effects.

**Antacids.**—After meals, a pinch of bicarbonate of sodium (gr. v to gr. x) or half as much bicarbonate of potassium, or a dessertspoonful of lime-water, will, in cases of acidity, contribute much to the comfort of the patient. Carbonate of magnesium and aromatic spirit of ammonia are preferred by some; and *charcoal* has useful absorbent powers. Sulphite and hyposulphite of calcium or sodium, for antiseptic effect, may also be given to allay the after symptoms of indigestion.

**Alteratives.**—In the commencement of the treatment of a case of dyspepsia, in which derangement, and commonly inaction, of the liver is most generally present, experience fully justifies the moderate use of blue pill. I prefer to give it in fractional doses, in such a case, say gr. $\frac{1}{4}$ thrice daily for a week [F. 74]. Occa-

sionally it may require to be repeated, at intervals; but should never be pushed to salivation. Nitro-muriatic acid, in 3 or 4 drop doses, acts as a mild tonic both to the stomach and the liver; and may well follow blue mass, when hepatic torpor is believed to exist. The same indication may be met, with less certainty, by taraxacum. Nitric acid is lauded by some practitioners. Leube urges hydrochloric acid instead. Chloride of ammonium acts very well with some "bilious" patients. Among the agents shown by Corvisart, Blondlot, Lehmann, and Bernard to increase the secretion of gastric juice, were alkalies, common salt, diluted alcohol, ether, ipecacuanha, and nitrate of bismuth. *Pepsin*,[1] when pure and fresh, may be of considerable service; and so may lactopeptine, and Savory's essence of pepsin and pancreatin. Bouchut praises an extractive of the *papaya* plant, of Java and S. America, as a sort of *vegetable pepsin*. *Ingluvin*, from the gizzard of the fowl, is said by some practitioners to have similar effects to those of pepsin. English practitioners make considerable use in dyspepsia of "liquor pancreaticus" (containing the pancreatic ferment *trypsin*), along with a small quantity of bicarbonate of sodium to prevent its action from being arrested by the gastric acid in the stomach (W. Roberts).

**Cardialgia** seems to depend mainly upon acidity, aggravated perhaps by butyric fermentation. Aromatic spirit of ammonia, tincture of ginger, and camphor-water, as well as the antacids above named, may be given for it; or chloroform, in 5 or 10 drop doses [F. 78].

**Gastrodynia** is a technical name for stomach-ache, common in dyspeptics. Carminatives are appropriate for it; one of the best of these is oil of cajuput, 5 drops at a dose, on a lump of sugar. Spirits of camphor, compound spirits of lavender, compound tincture of cardamom, and essence of ginger, are among the most popular preparations for its relief. A mouthful of very hot water will sometimes quell the pain.

**Pyrosis** (water-brash) is best treated by mild astringents; as oil of amber, catechu, krameria, ammonio-ferric alum [F. 80], creasote ($\frac{1}{2}$ drop or $\frac{1}{4}$ drop doses) [F. 81], tincture of chloride of iron. Dr. Lawson considers the *sulphites* to be almost infallible in the treatment of pyrosis.

For *hiccough*, which is an occasional symptom of either acute or chronic indigestion, *hydrate of chloral* has been found[2] to be a useful remedy.

After all, the dyspeptic may be able to do the most for his own cure. In the words of the late Prof. N. Chapman, "If he be

[1] Dr. Chambers, of London, speaks well of "Boudault's *pepsin*," obtained from the sheep's stomach. Dr. Pavy, of London, states that a large part of Boudault's pepsin is inert. Glycerin extract of pepsin is said by some good authorities (Nature, 1870) to be active and stable. Dr. L. Beale asserts that pepsin can be obtained in an effective state by quickly drying the mucus expressed from the pig's stomach-glands upon glass plates; the dried mucus being then powdered and kept in stoppered bottles. (Med. Press and Circular, March 1, 1871.) The late Prof. William Procter, of Philadelphia, perfected a process for obtaining a reliable preparation of pepsin, which can now be obtained of the leading American druggists. Dr. R. T. Edes (Boston Med. and Surg. Journal, Jan. 1, 1874), after examination, speaks very favorably of pepsin prepared by Schaffer's process.

[2] Leavitt, Am. Journ. of Med. Sciences, April, 1871; and Whithead, N. Y. Med. Record, April 1, 1871.

intemperate, he is to become sober; if he use opium or tobacco, he must relinquish it; if indolent, he must be awakened to enterprise; if luxurious, he must consent to change his scheme of life; if studious, to abandon the midnight lamp; if afflicted, we must cheer him with the light of hope; or, if this be difficult, give him the great consolation of occupation, interest, employment."

The following table is, with some modification, from Leared:—

| EASY OF DIGESTION. | MODERATELY DIGESTIBLE. | HARD TO DIGEST. |
|---|---|---|
| Beef, | Mutton, | Pork, |
| Venison, | Lamb, | Veal, |
| Hare, | Rabbit, | Goose, |
| Sweetbread, | Young pigeon, | Liver, |
| Chicken, | Duck, | Heart, |
| Turkey, | Wild waterfowl, | Brain, |
| Partridge, | Woodcock, | Salt meat, |
| Pheasant, | Snipe, | Sausage, |
| Grouse, | Soups, | Mackerel, |
| Beef-tea, | Eggs, | Eels, |
| Mutton broth, | Butter, | Salmon, |
| Milk, | Turtle, | Herring, |
| Turbot, | Cod, | Halibut, |
| Shad, | Pike, | Salt fish, |
| Flounder, | Trout, | Lobster, |
| Sole, | Raw or stewed oysters, | Crabs, |
| Fresh fish generally, | Potatoes, | Shrimps, |
| Roasted oysters, | Beets, | Mussels, |
| Stale bread, | Turnips, | Oil, |
| Rice, | Cabbage, | Melted butter, |
| Tapioca, | Spinach, | Raw eggs, |
| Sago, | Artichoke, | Cheese, |
| Arrowroot, | Lettuce, | Fresh bread, |
| Asparagus, | Celery, | Muffins, |
| French beans, | Apples, | Buttered toast, |
| Cauliflower, | Apricots, | Pastry. |
| Baked apples, | Strawberries, | Cakes, |
| Oranges, | Raspberries, | Custards, |
| Grapes, | Fresh bread, | Nuts, pears, plums, |
| Currants, | Farinaceous puddings, | Cherries, pineapples, |
| Peaches, | Jelly, | Cucumbers, onions, |
| Toast water, | Rhubarb plant, | Carrots, parsnips, |
| Black tea, | Cooked fruits, | Peas, beans, |
| Sherry, | Cocoa, | Mushrooms, |
| Claret, | Coffee, | Pickles, |
| Ale. | Porter. | Champagne. |

## CONSTIPATION OF THE BOWELS.

There is no more frequent source of bodily discomfort than this; and it may produce or increase a tendency to serious disease. The principal *causes* of constipation are—neglect of timely attendance upon the call of nature; want of exercise; excess of mental strain; and all the causes of dyspepsia, of which it is an almost constant part. Organic obstructions may also, of course, give rise to it; as stricture, cancer, or other disease of the large intestines, or a tumor so situated as to press upon the rectum; or pregnancy. The most remarkable instances of constipation I

have met with, in the absence of mechanical obstruction, have been in sea-sickness.[1]

**Effects** of inaction or non-evacuation of the bowels may be, enteric irritation, or even inflammation; when much prolonged, dangerous intestinal obstruction; in other instances, diarrhœa; sympathetic headache, stomach, or liver disorder; urino-genital irritation; offensive perspiration; and contamination of the blood, by the retention of excretory matter which the bowels ought to remove.

**Pathologically,** costiveness may depend either upon muscular torpor of the intestinal canal, or defective glandular secretion, or both.

The **treatment** of constipation involves management as well as medicine. It is well to have a regular time to endeavor to empty the rectum. Straining is not beneficial, as it endangers piles or prolapsus ani; but the act of defecation may be facilitated by kneading the lower half of the abdomen with the hands, so as to increase and aid peristaltic contraction.

In diet, fresh and stewed fruits are the best natural laxatives. Prunes are especially opening. Bran bread, by the mechanical quality of the particles, is somewhat of a peristaltic persuader. Molasses occasionally will do, but it is too acescent to be taken constantly.

Of medicines, simple rhubarb, or pills of rhubarb and castile soap, one and a half grains each, may come first; afterwards podophyllin [F. 82], colocynth, aloes, etc., if needed for especial torpor. An occasional dose of senna infusion may give a good start to the bowels. Better than to take medicine every day or two, will be the use sometimes of *enemata.* An injection of warm water alone may answer at first. Then white soap, and afterwards brown soap may be added; salt and molasses, sweet oil or castor oil when the former fail. A *suppository* of soap [F. 83] is less disagreeable to some persons, and will generally act well.

Where the torpor of the rectum approaches a paralytic state of the muscular coat, nux vomica will be very important [F. 84, 85]. The addition of belladonna to laxative pills for chronic constipation is a not uncommon practice. Electricity may assist in relieving the same condition.

## ENTERITIS.

**Definition.**—Inflammation of the bowels.

**Symptoms.**—Pain in a portion of the abdomen, increased by motion or pressure; constipation; fever. Later, abdominal swelling, vomiting, and mucous, sanguinolent, or even purulent diarrhœa in bad cases.

**Causes.**—Blows or other injuries; neglected constipation, exposure to cold and wet. Corrosive poisons, as arsenic, etc., also cause enteric inflammation; and it is a part of the results of strangulated hernia or other intestinal obstruction.

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[1] I have, when at sea, passed seven days without any inclination for a movement: and a gentleman told me that he had been eleven days without an evacuation during a voyage.

**Treatment.**—A decidedly open and *active* case may require early venesection in the robust. Leeching should be the rule; and it may generally be free. After that, poultices, of flaxseed meal or Indian mush, covered with oiled silk to retain moisture. Soft food alone can be taken, as arrowroot, oat-meal gruel, etc., or, for weak persons, beef-tea. No medicine will do any good, unless it be opium in moderate doses, to relieve severe pain and promote rest. Cathartics are to be avoided, and entire stillness of the body in bed must be maintained. From slight or moderate inflammation of the bowels recovery may be confidently expected, with care; but aggravated cases of it are frequently fatal.

**Typhlitis** is inflammation of the cæcum or caput coli. It is rather more common than other forms of enteritis, especially after neglected constipation. **Peri-typhlitis** is a more obscure affection, involving a local or circumscribed peritoneal inflammation with typhlitis. Wirth[1] has given reason for believing that inflammation and ulceration of the *vermiform appendix* has to do with many of these cases. Pain, tenderness, swelling, and dull resonance on percussion, in the right iliac fossa, with constipation, are the symptoms. A number of cases which I have seen have all recovered. With more especial propriety than in most other cases of enteritis, opening the bowels, by enemata at least, and even by a mild laxative, as castor oil, is indicated. Rest, leeching, poulticing, and soft diet are the other main parts of the treatment.

*Abscess* may occur; with safe issue if it open outwardly, fatal if it rupture into the peritoneal cavity. Dr. Bull (N. Y. Med. Journ., Sept., 1873) advises early use of the *aspirator* in such cases.

Dr. Flint[2] remarks upon the "uniform success" of the operation for peri-typhlitic abscess, by opening it as soon as the nature of the case is determined, without even waiting for fluctuation. He refers to the performance of this operation by Hancock in 1848; Willard Parker, 1867; and since that time, by G. Buck, H. B. Sands, J. R. Wood, E. Weber, and others.

Dr. Sands has recorded[3] the history of twenty cases of peri-typhlitis, of which resolution took place in seven; recovery after operation in eight; recovery after abscess into bladder, one; recovery after rupture into rectum, one; death after abscess had been opened, one; death after unsuccessful attempt to reach the abscess, one; death without operation (from secondary meningitis), one. Dr. Sands prefers W. Parker's operation. An incision two inches long is made, parallel to Poupart's ligament, over the centre of the tumescent region. After cautiously dividing the abdominal wall to the level of the fascia transversalis, the hypodermic syringe is used for exploration to determine the exact locality of the abscess. Then a deep incision is made, half an inch in length. The wound should be kept open (by a tent or drainage tube) to discharge for several days.

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[1] London Med. Record, June 15, 1880.
[2] Clinical Medicine, p. 311.
[3] N. Y. Med. Record, Jan. 19, 1878.

## PERITONITIS.

Inflammation of the peritoneum is one of the most dangerous of the phlegmasiæ, because of the extent and important connections of the membrane involved.

**Varieties.**—Simple or idiopathic; accidental or traumatic; tubercular; puerperal.

**Causes.**—Exposure to cold and wet; falls, blows, wounds, or other injuries; abscess of the liver; opening of aneurism, or perforation of gastric or intestinal ulcer (as in typhoid fever); tuberculization; accidents of the puerperal state.

**Symptoms.**—Diffused abdominal pain and tenderness, increased greatly even by *slight* movements, as breathing deeply or raising the lower limbs in bed; vomiting; constipation; tympanites; fever; with *very rapid*, though not full pulse. Later, that is, in three or four days, in violent cases, delirium, insomnia, collapse. Its course is usually rapid; from the incipient chill to the fatal end, often occupying less than a week, though sometimes two. Simple sporadic peritonitis, however, even in puerperal women, is, with careful treatment, much more often recovered from than not.

**Diagnosis.**—The most important point is the discrimination of "simple peritonitis or metro-peritonitis in the puerperal state" from *puerperal fever*. The main difficulty about this is that the latter disease *includes* peritonitis almost as constantly as erysipelas does diffusive inflammation of the skin. We can best discuss this differential diagnosis after considering the fever in question. (See *Puerperal Fever*.) Occasionally, in children, the signs of peri-typhlitis may considerably resemble those of an early and inflammatory stage of *coxalgia*. This possibility needs, however, only to be pointed out for the careful practitioner to be upon his guard to avoid mistaking one of these affections for the other. (See *Coxalgia*, under *Diatheses*, later in the book.)

**Morbid Anatomy.**—After death from peritonitis, the swollen abdomen is found nearly always to contain fluid, often considerable in amount, serous, sero-sanguinolent, sero-purulent, or pus. The latter may form in a very few days; some facts have made it probable, even within forty-eight hours. *Adhesions* are present, with bands and false membranes of coagulable lymph, in various parts of the abdominal cavity; and redness, thickening, and opacity exist to a greater extent.

**Treatment.**—No disease requires or bears better the early use of the lancet than sporadic (non-epidemic) acute peritonitis. One free bleeding may sometimes, as it were, arrest the conflagration. Yet, apart from epidemic puerperal fever, in which large bleeding has, upon the amplest trial, proved rather destructive than curative, there are cases in which the need of economy of material makes venesection unsafe. Then leeching may be resorted to, in all but the very feeblest subjects. Fifty or a hundred American leeches may be borne upon the abdomen by a patient who would faint if the same amount of blood were taken rapidly from a vein. Exposure of the body, during leeching, may be, with care, avoided. Poulticing with flaxseed or Indian meal should follow the leeching; the poultices should be large, but light, and covered

with oiled silk, or changed very frequently to maintain warmth. If no leeches have been used, flannel dipped in spirits of turpentine may be put all over the belly. Later, if the case threaten obstinacy, a large blister should be applied.

Of medicines, *opium* has now the general confidence of practitioners. Except emptying the rectum at first by mild enemata, no agitation of the bowels by medicine is to be encouraged. Calomel, as an *antiplastic*, has been long valued by physicians of sagacity and experience. Though unable to *prove* that it does lessen the tendency to the effusion of coagulable lymph, I bow to the rational empiricism which, not hastily, in time past, raised it to the position of reliance for that end. I am not satisfied that its utility as an antiphlogistic, especially in severe inflammations, has been disproved.[1]

With opium, then, I would, in peritonitis, give calomel: ½ grain to one grain of the former, with as much or less of the latter, every two, three, or four hours, according to the severity of the pain, and the urgency of the case [F. 86, 87]. When the stage of debility comes on—or in very feeble cases from the first—quinine, instead of calomel, may be combined with opium; and support with beef-tea, and wine, brandy, or whisky, may be required.

The use of opium *after bleeding* in peritonitis, was introduced by Armstrong, in England, many years ago. Opium *without bleeding*, and in large doses (from two grains every two hours up to much greater amounts) is, as a treatment, credited to Dr. A. Clark, of New York (1841).[2] He applied it with great success in epidemic *puerperal* as well as in ordinary sporadic peritonitis. My own experience has led me to recognize a decided difference in the therapeutic indication in *simple, sporadic* peritonitis and in *puerperal fever*. In the former, I have known free venesection to be followed by rapid recovery. In the latter, I witnessed the signal failure of the same treatment in hospital epidemics, as long ago as 1845–48.

When peritonitis follows an *injury*, the treatment may necessarily have to be modified by the concomitant states of other organs involved, or by the general shock of the system. So, also, when perforation of an ulcer of the stomach or bowel, or the rupture of an hepatic or other abscess or aneurism, brings it on—*collapse* is apt to occur speedily, forbidding any except anodyne and supporting treatment, and affording very little hope of favorable reaction. Such cases are almost invariably fatal.

**Chronic** peritonitis is sometimes met with. When not tuberculous, although a very serious affection, it may be recovered from; the tubercular form, not with any more probability than pulmonary phthisis. Like that disease, however, it is not always incurable. Gee, Wells, Fagge and others have given authentic reports of recovery from it, especially in children.

Chronic peritonitis should be treated by rest in the recumbent

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[1] Prof. John Marshall, of University College, London, has recommended the local application, for persistent inflammations, of the *oleate* of mercury with morphia; made by adding oxide of mercury to oleic acid, at 300° F., and afterwards adding morphia. It may be applied in warm or hot solution, with a brush or very soft sponge.

[2] Ramsbotham's System of Obstetrics, Amer. edition, 1855, p. 533; also, Amer. Journal of Med. Sciences, July, 1876, p. 144.

posture (in tedious cases the patient may be *carried out* into the sunshine and air), with resolvent and counter-irritant local applications; as repeated blisters, tincture of iodine, mercurial ointment, unguent of iodoform, cerate of carbonate of lead. The latter, as a local sedative, I have sometimes found to have remarkable power. It may be prepared by adding ʒij of carbonate of lead to ʒj of fresh simple cerate [F. 88].

## COLIC.

**Varieties.**—1. Flatulent. 2. Bilious. 3. Spasmodic, gouty, or rheumatic. 4. Lead colic. Some writers speak of *nephritic* colic; the pain of which is chiefly owing to the passage of small calculi, from the kidney to the ureter; while *neuralgia* of the bowels may also cause pain of similar seat to colic. *Uterine* colic, in females, may be either neuralgic, spasmodic, or obstructive (dysmenorrhœa). Attacks of *ovarian* pain are, with some women, periodic. The following passage (from Cornillon[1]) is instructive:

"There is not the least resemblance between the painful points in hepatic colic and those of nephritic colic. In the first place, the latter are incomparably the most severe. In addition, the first are seated at the base of the thorax and above that point, as in the epigastric, cystic, dorsal, and scapular regions, while the pains in nephritic colic are referred to the inferior segment of the body,—the renal, lumbar, inguinal, and testicular regions. In doubtful cases the exact determination of their respective position is an excellent point in the differential diagnosis."

**Flatulent Colic.**—This is caused by indigestion; as, from excess in the amount, or error in the quality of food; or, from cold and wet, arresting perspiration and disturbing the balance of the "aqueous visceral circulation," which is indispensable to normal digestion. Acrid *irritation* and gaseous distention produce irregular tonic or spasmodic contractions in the intestines; principally in the colon. They are not confined to this, however. In a woman with irreducible umbilical hernia, I have, during an attack of colic, felt a portion of small intestine, several inches in length, grow rigid during the access of pain, and relax when it was relieved. Sometimes the stomach itself is the seat of pain.

In flatulent or crapulent colic the abdomen is distended, but not very tender, except after long continuance of the attack. There is constipation of the bowels; often nausea, with belching of wind, sometimes vomiting; no fever. A sign of the yielding of the attack is audible or palpable rumbling of wind in the bowels; showing a return of the arrested peristaltic motion.

**Bilious Colic.**—The onset in this form is slower. Nausea is greater, and vomiting, of a greenish or yellowish (biliary) fluid, is nearly constant. The pain may last, with very slight remission, for a number of days. The bowels are constipated. There

[1] Le Progrès Médical, 1880, p. 661.

may be considerable fever, and some tenderness of the abdomen on pressure. Meteorism is generally present; but less in proportion to the pain than in flatulent colic. In protracted cases, slight or moderate jaundice is quite common.

The greatest suffering in cases of bilious colic is attendant upon the passage of gall-stones from the gall-bladder to the duodenum. Then, the pain is chiefly in the right hypochondriac and lower part of the epigastric region; and sudden relief follows the escape of the calculus from the *ductus choledochus* into the intestinal canal. In other cases, we suppose the irritant giving rise to spasmodic pain to be acrid, unhealthy bile; which escapes into the intestines, and also, through the pylorus, into the stomach. Of course it is quite possible for the same condition of the stomach or intestinal canal which attends flatulent colic to coexist with hepatic derangement, without bile being a direct cause of local irritation. Anger, of Menil-montant, has reported[1] a case in which, after attacks of colic repeated at intervals for thirty years, a spontaneous rupture occurred in a swelling in the hepatic region, through which were extracted about a hundred gall-stones. This was followed by recovery. (For remarks on *Cholecystotomy*, see *Dilatation of the Gall-bladder*.)

Dr. Putnam-Jacobi found, in one case, post-mortem evidence that *spasm* of the gall-bladder, from irritation produced by calculi contained in it (and not passing into the duct) was the cause of pain in repeated attacks of colic.

Fatal impaction of the bowels (mostly the ileum just above the ileo-colic valve) by very large gall-stones has been reported by Stewart, Habershon, Abercrombie, Murchison, Woodbury,[2] and others. Such obstruction, however, is not nearly always fatal. Sometimes the stone may at last escape from the rectum; or it may be justifiably removed by abdominal section (laparotomy; see *Obstruction of the Bowels*). Dr. E. Brown, of New Jersey, recorded a case in which, after symptoms of obstruction for thirteen days, some purgative pills were followed by the expulsion of a calculus weighing 328 grains.[3]

Certain persons are particularly liable to such attacks; a large majority of people, indeed, are never subject to them. I have known, in a number of instances, the same patient to have severe bilious colic once in every two or three weeks; in others, the interval may be of months or years. In one case, under my care, the attack was fatal. Autopsy then showed rupture of the gall-duct, under distention from obstruction by an impacted calculus. This must be very unusual. But prolonged bilious colic is never quite free from danger of inflammation of the bowels, or, in feeble persons, exhaustion from continued suffering and inanition.

**Gouty Spasmodic Colic.**—In the "gouty diathesis," this is one mode in which the disease may invade internal organs. The stomach is the most frequent and dangerous seat of it; the

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[1] La France Médicale, April 16, 1879. [2] Amer. Jour. Med. Sciences, Jan., 1880.
[3] The Country Practitioner, June, 1879, vol. i, p. 19.

attack being commonly called "cramp in the stomach." It is characterized by suddenness, extreme severity of pain, and tendency to coldness and general prostration of the system. Repulsion of gout from the foot, as by cold applications, may bring it on.

**Lead Colic**; *Painter's Colic; Colica Pictonum.*—This disease has long been known as the result of exposure to the poisonous influence of lead. The name of "dry belly-ache" has also been applied to it. The abdomen is *shrunken* and rather hard; sometimes *knots* of contracted intestine may be felt. There is no tenderness, the pain being lessened or relieved by pressure. The suffering is often extreme, with restlessness; the face and body being thrown into grotesque contortions. Sometimes delirium occurs. Constipation is obstinate; the fæces, when passed, are small, dry, and hard. No fever exists. There is (Burton) a blue line along the edge of the gums. Malassez[1] ascertained that lead-poisoning is attended by a diminution in the number, and increase in the size, of the red corpuscles of the blood. Lead palsy may attend or follow colic. Amaurosis may supervene in protracted cases; ascribed, on ophthalmoscopic evidence, to *optic neuritis.*[2]

**Treatment.**—In all forms of colic, the indications in common are, 1, to open the bowels; 2, to relieve pain and spasm; 3, to prevent inflammation; 4, to prevent future attacks.

In **flatulent** colic we should ascertain if the stomach has just been overloaded, or any very unwholesome food has been taken. If so, a prompt emetic will be proper; as, a teaspoonful of mustard, or a tablespoonful of salt, in a teacupful of warm water—repeated in ten minutes if necessary. Then the antacid laxative, magnesia, may be given; a teaspoonful, with ten to twenty drops of essence of ginger, or ten drops of essence of peppermint, five or six drops of oil of cajuput, or some other aromatic in corresponding proportion [F. 89]. If the bowels are not opened, and relief of the pain not obtained, no great length of time must elapse without an enema of castor oil, salt and molasses, soap, assafœtida, or oil of turpentine, in warm water.

Should the stomach be much unsettled, and the pain violent, we may depend upon the immediate use of an injection to open the bowels; and may give by the mouth antacids and carminatives. Thus aromatic spirit of ammonia, spirits of camphor, compound spirit of lavender, essence of ginger, or oil of cajuput may be given, with bicarbonate of sodium [F. 90]. Small doses every few minutes will be better retained than larger ones at long intervals, and will act better.

Anodynes come next in order. Extreme and sudden cases of colic, belonging rather to the **spasmodic** variety, require them *at once.* Other cases, the majority, are best managed by commencing with *corrective* remedies as above mentioned. When relief is not obtained without, we must give opium, chloroform, ether, or Hoffmann's anodyne [F. 91]. The first is of all the

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[1] Le Mouvement Médical, 1873.
[2] J. H. Hutchinson, Phil. Med. Times, Jan. 17, 1874.

most certain, although chloroform, internally used, in ¼ drachm to ½ drachm doses, has not disappointed me.[1] Paregoric is a very good opiate for this purpose. Pills of opium (especially *old* pills) may do better sometimes, where as much as a grain at once may be needed for severe pain. The "chloroform paregoric" [F. 92, 93] combines several good antispasmodics conveniently. Laudanum is the oldest stand-by, and well deserves its place. Hydrate of chloral is relatively less valuable in giving relief from pain than in producing sleep.

It is remarkable how much opium a sufferer with great pain will sometimes bear without narcotism. I have known a teaspoonful of laudanum to be taken at once; not even drowsiness following it. But care must be taken not to overdo this, or to give any more than is really necessary, lest the remedy prove worse than the disease.

An important part of the treatment of colic is the use of warm external applications. Mustard should come first; a large sinapism, half and half with flour (if the mustard be of good strength) and covered with gauze or thin muslin, over the abdomen. When it is removed after making a decided impression, let a little lard, sweet oil, or cold cream be rubbed on, to prevent further irritation of the skin. A concentrated liquid preparation of mustard has lately been in use.[2] Then apply a hot flannel, dry or wrung out of hot whisky and water. For the latter the best mode is to add to very hot water an equal quantity of raw whisky. Such appliances should be often *renewed*, or they grow cold. Some persons, liable to colic, keep at hand a tin vessel constructed to hold hot water, and shaped so as to fit over the abdomen. The feet of the patient should be kept warm; if he is able to sit up, or recline with the legs over the side of the bed, a hot mustard foot-bath will be suitable.

FIG. 99.

Gall Stones.

Kneading the abdomen gently with the hand will aid to dispel flatus; but it requires tact not to make too violent an operation. I have found considerable relief to be given by firm pressure upon, and immediately below, both anterior superior spinous processes of the ilia.[3] In every case of severe colic the possibility of *hernia* must be held in mind, and its presence or absence should be ascertained.

**Infants** are especially liable to crapulent colic; some during their first year having almost daily or nightly attacks. Very simple treatment will often suffice for these; in children, too, over-

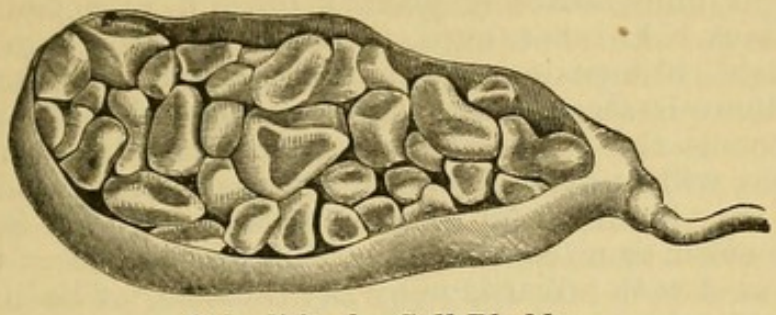
[1] A good way of preparing chloroform for internal use, is to dissolve it carefully in glycerin, one part to three of the latter. If, after standing 24 hours, any of the chloroform settles, it should be separated, and dissolved in an additional portion of glycerin. This preparation may be dissolved without precipitation in any quantity of water. However given, chloroform requires to be considerably diluted for internal administration.

[2] Druggists now keep *ready-made* sinapisms, which require, for use, merely to be immersed a few moments in warm water.

[3] I believe this observation to have been first made by myself. In my own person, quite severe pain has several times been thus entirely controlled.

medication should be even more sedulously avoided than in adults. For infantile colic of slight severity, peppermint water, or infusion of fennel seed, will frequently be enough, with the application of a *warm flannel over the stomach.* Wetting it with essence of ginger will make it more efficient. Worse cases may be treated

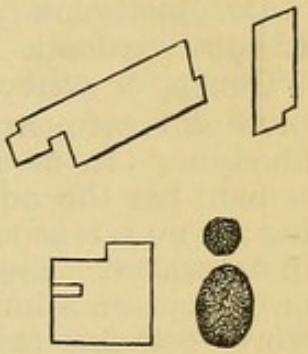
FIG. 100.



Calculi in the Gall-Bladder.

with lac assafœtidæ [F. 98], which children generally take well, if it be sweetened, in teaspoonful, or for very young infants half teaspoonful, doses. Antacids, as bicarbonate of sodium, will assist in giving relief [F. 94]. Keeping the bowels regular, never allowing a day to pass without an evacuation, is most important in young children. For this purpose the simple syrup of rhubarb, manna, and fluid extract of senna are the best medicines. The latter may give pain, but is less apt to do so if one drop of oil of cloves be added to each fluidounce. A *very small* quantity of *resina podophylli* added to syrup of rhubarb [F. 95] will make it more potent when the bowels are torpid. Glycerin may be occasionally substituted, in teaspoonful doses.

FIG. 101.



Cholesterin Tablets and Glomeruli; from a Gall-Bladder.

If the food of an infant becomes acescent, lime-water may be added to it when it is taken, *e. g.*, a tablespoonful of lime-water in each pint of milk. Overfeeding an infant is a very common cause of colic.

**Bilious** colic may be attended by so inflammatory a condition as, in a person of full vigor, to demand early and moderate venesection. Opening the bowels is a cardinal indication in this as in the flatulent form. If the stomach will bear it, castor oil will be the most effectual cathartic. The least unpleasant way of taking this is in thorough admixture with spiced syrup of rhubarb; two tablespoonfuls of the latter with one of oil. Magnesia may be retained better than oil upon the stomach. Notwithstanding its effervescence, I have known the *citrate* of magnesium solution to do very well in colic. The same *antacid*, *carminative*, and *anodyne* remedies (soda, ginger, camphor, etc.), mentioned for crapulent colic, will be suitable in the bilious, and may require more persevering administration. So also enemata, mustard plasters, pediluvia, and warm applications to the abdomen are of

great service. Besides these, however, a special indication exists for promoting healthy hepatic secretions,[1] so that it may be made less irritating and obstructive. A reasonable treatment then is, besides such palliatives as have been named, to give calomel, with opium, *e. g.*, ½ to 1 grain of calomel with about as much opium, every two, three, or four hours [F. 86]. Chloride of ammonium and resina podophylli are serviceable in some cases, but, unless the podophyllum, scarcely prompt enough in action during a severe attack. Leeches, cups, or, later, a blister over the liver, may be right, if hepatic or cystic inflammation threaten.

When there is strong reason to apprehend that the passage of a gall-stone is the cause of the severe pain, the warm bath, if practicable, will be useful by promoting relaxation, and full doses of opium may be called for by the patient's agony. Some prefer to inhale ether or nitrous oxide. Chloroform, taken internally, has been used with advantage by Dr. Buckler,[2] of Baltimore. He considers that it aids in dissolving biliary concretions, as well as by its anodyne power giving relief. *Choleate of sodium* has been advised for the former effect, by M. Schiff.[3] Its dose is about six or eight grains, twice daily. Dr. R. Kennedy, of Canada, asserts[4] that large doses (six ounces at once) of *olive oil* greatly promote the easy discharge of biliary calculi into and from the bowels. (On cholecystotomy, see *Gall Bladder.*)

Dr. Bartholow[5] considers *phosphate of sodium* the best solvent of biliary calculi. He gives it in drachm doses, three times daily.

**Gouty,** or other, **cramp of the stomach** generally needs very prompt treatment, essentially stimulent and antispasmodic or anodyne. In moderate cases, Warner's cordial (tinct. rhei et sennæ) has the advantage of being laxative as well as stimulating; from a teaspoonful to a tablespoonful may be given at once in *hot* water. Essence of ginger, 10 drops, or oil of cajuput, 5 or 6 drops on a lump of sugar, often gives immediate relief. In worse attacks, brandy, ether, laudanum, and Hoffmann's anodyne are more reliable [F. 97]; with a sinapism over the epigastrium, and a hot mustard foot-bath. Subsequent treatment, prophylactic of future attacks, as with colchicum, alkalies, or other medication, must be pointed out by the nature of each case.

**Lead** colic, when rapidly produced, may be treated antidotally, with sulphate of magnesium. If slowly brought on, we can do much less in that way; although it has been asserted that some chemical agents possess an eliminative power. Alum is confided in by some, notwithstanding its astringency. Castor oil as a purgative, the warm bath to relax spasm, and opium to relieve spasm and pain, are the most important usual remedies in this affection. The costiveness being mainly spasmodic, it is not unfrequently found that, contrary to its common effect, opium promotes, in lead colic, the movement of the bowels. Iodide of potassium is

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[1] Remarks are made elsewhere in this book upon the necessity of maintaining the validity of *clinical experience* with mercurials in affections of the liver, notwithstanding the results of some experiments upon animals bearing upon the subject.

[2] Boston Medical and Surgical Journal, Oct. 23, 1879, p. 583.

[3] L'Imparziale, No. 4, 1873.

[4] Lancet, September, 1880.

[5] Treatise on the Practice of Medicine, 1880.

believed to exert a decided power in removing from the system lead which has been slowly deposited in various organs. In Germany, *faradaic electricity* has been found beneficial in lead colic; also (Weinberg) pilocarpin. A milk diet is recommended in this affection.

**Prevention of Crapulent and Bilious Colic.**—This becomes the duty, if not the interest of the physician; when his patient has been relieved, to aid him in escaping returns of the disorder. To prevent the flatulent form, care in diet and regimen will ordinarily suffice. For the more serious attacks of bilious colic, to which certain persons are subject, prevention is attainable by the same means, along with especial attention to the *abdominal movements and secretions; i. e.*, the state of the liver and bowels. I am sure that I have enabled several persons, who for years had been liable to frequent attacks, to escape them altogether, by a very simple prescription, used upon the first threatening of any of the symptoms. Blue mass and rhubarb were here the sanative agents. A gentleman who has suffered terribly with bilious colic told me that twenty-grain doses of extract of taraxacum, taken once or twice, have repeatedly averted it with him. Flowers of sulphur, or *lac sulphuris*, given in teaspoonful doses or less, every day or two for several weeks, have answered the same purpose in another instance. Olive oil, taken daily, is commended by some. But nothing has so signally satisfied me, as a prophylactic against periodical colic, and also, by a similar rationale, against *sick headache*, as the preparation above alluded to, which is as follows:—

℞.—Mass. ex. hydrarg. gr. v.
Pulv. rad. rhei et
Ext. gentian, āā ʒss.
Ol caryophyll. gtt. iv.—M.
Div. in pil. No. 20.

S.—One or two occasionally, as directed; to be continued if required, thrice daily for several days.

### REMEDIES IN COLIC.

The following are put together simply as *memoranda:*

Peppermint, Fennel, Cajuput;
Lavender, Ginger;
Aromatic spirit of ammonia;
Bicarbonate of sodium;
Magnesia; Castor oil;
Warner's cordial; Olive oil;
Camphor, Ether, Chloroform;
Opium, in pill; Paregoric;
Laudanum;
Hot flannel or plate;
Pressure on anterior iliac spines;
Assafœtida;
Hot water;
Brandy;
Calomel;
Enemata of oil, or
Spirits of turpentine, or
Laudanum;
Sinapism;
Pediluvium; Kneading;
Warm bath;
Hypodermic injection of morphia.

Remember, always, the possibility of *strangulated hernia* as a cause of the symptoms of colic.

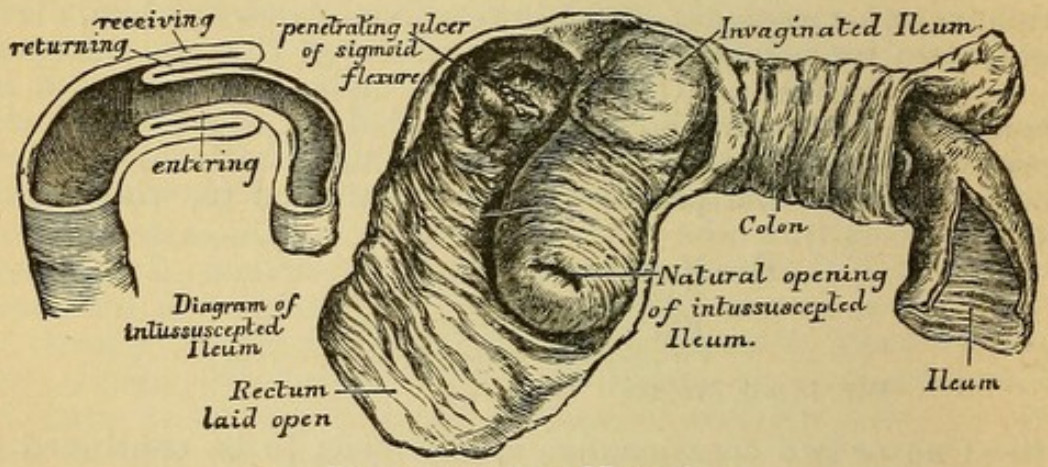
## OBSTRUCTION OF THE BOWELS.

Few maladies present so striking a contrast as this, between the facility of pathological explanation after death and the obscurity of diagnosis and uncertainty of treatment during life.

**Pathological Varieties.**—Dr. Haven has well classified these as follows: I. Intermural: *a*, cancerous stricture; *b*, non-cancerous stricture, viz., 1, contraction of cicatrices from ulceration; 2, contraction of the wall of the intestine from inflammation; *c*, intussusception; *d*, the latter with polypi. II. Extramural: *a*, bands of adhesions from lymph; *b*, twists or displacements; *c*, diverticula; *d*, tumors or abscesses; *e*, mesocolic or mesenteric hernia; *f*, diaphragmatic; *g*, omental, and *h*, obturator hernia. III. Intramural: impacted feces, calculi,[1] coagula, curdled milk, etc. Erichsen and others assert that severe and even fatal obstruction may result simply from spasmodic colic.

**Symptoms of Intestinal Obstruction.**—These are, persistent constipation; constant vomiting, partly or altogether stercoraceous; coldness of the skin, prostration, distressed countenance

FIG. 102.




Intussusception of Intestine.

(facies Hippocratica), collapse. Local evidences, rather more distinctive, are, hardness or swelling in one part of the bowels; arrest of enemata at a certain point, and of borborygmi (gaseous movements) in the same way. If the obstruction be high up, suppression of the urine occurs, with early vomiting. If it be low down, great meteoric distention and stercoraceous vomiting. When blood is passed from the bowels, with such symptoms, intussusception may be inferred. Sometimes an intussusception, beginning at the ileo-cæcal valve, may so progress as to bring the invaginated portion of intestine down as far as the anus; where it has even been known to be extruded. Flint[2] gives account of two cases, in each of which several feet of intestine were, in all, discharged. Tremain[3] also has reported a case in which recovery took place after seventeen inches of intestine had passed away.

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[1] Duménil reported, in 1881, a case in which a very large biliary calculus produced intestinal obstruction.

[2] Principles and Practice of Medicine, 5th edition, p. 487.

[3] Canada Med. and Surg. Journal, vol. vii., 1879, p. 450.

Death is apt to occur, from unrelieved obstruction, in from five to ten days. W. Hutchinson (Lancet, 1880) gives account of a recovery in one case after thirty-nine days without fecal evacuation.

But, at last, a *probable* diagnosis is sometimes all that the nature of the case will admit. The differential discernment of special forms of obstruction during life is often impossible.

*Anæsthesia* should be used in most cases, to facilitate the examination of the abdomen. Sometimes a *tumor* can be felt in intussusception; it may vary in form in the course of the attack. *Impacted feces* will cause a solid intumescence, rather low down, with dulness on percussion, perhaps reaching as high as the arch of the colon.[1] The same may be expected in the rare instance of obstruction by accumulated worms,[2] or by a very large biliary calculus.

**Treatment.**—The simple, primary indication in persistent constipation with unrecognized cause, is *catharsis*. Castor oil or citrate of magnesium may be justifiably given, aided or seconded by enemata of the same or similar purgatives. When the diagnosis of *intestinal obstruction* has been made out, no more cathartic medicines are to be advised; the reliance then being chiefly upon nature and opium. The use of opium should be moderate; enough to allay suffering and maintain quiescence of the bowels without excessive narcotism. Some practitioners have obtained advantage, in cases of supposed partial impaction of the intestinal canal, from the use of pills containing, each, $\frac{1}{40}$ of a grain of sulphate of strychnia with $\frac{1}{200}$ of a grain of sulphate of atropia, given thrice daily. Most authorities agree that little or no food or drink should be given by the mouth; nourishment being administered by enemata of beef-tea, milk, etc. Besides, we may try *large* enemata of warm water; or inserting a bougie; or a stomach-tube, to *catheterize* the bowel, as far as the ileo-cæcal valve; or, the Hippocratic remedy of large *air* injection, to distend and dislodge the intestine. Dr. R. Battey (*Atlanta Med. and Surg. Journal*, June, 1874) urges the persistent use of distensile enemata of from ten to twenty or more pints of water. Gustav Simon and Mosler also have advised the slow introduction of from five to nine pints of fluid at a time. This has succeeded in several cases of intussusception. Kneading the bowels gently while the patient is upon his hands and knees, and under the influence of ether (Lambl, S. Rogers, Burrall), is sometimes successful. *Scybala* or impacted feces, coagula, etc., may be removed by a spoon or scoop from the rectum. *Galvanism* has sometimes restored interrupted peristaltic action. The application of the continuous current has been very favorably reported upon by a number of practitioners in France (1879). Prolonged use of the warm-bath may be tried, to relax the system; and, as in strangulated hernia, the tobacco injection may be allowable as an extreme resort. On the other hand, M. Pyronac (*Gazette des Hôpitaux*, 1871) reports the recovery of a case under the application of *ice* to the abdomen, and injections of ice-water every

[1] See Bryant's Surgery, Am. Edition, p. 454, or Reynolds' System of Medicine, vol. iii., p. 191, for a table of Diagnostic Signs in Abdominal Obstruction.

[2] Downes, Lancet, Dec. 4, 1880.

quarter of an hour. Dr. F. H. Hamilton speaks well (Hospital Gazette, N. Y., Jan. 3, 1880) of the effects of *posture;* elevating the hips. Nuck, long ago, used *abdominal traction*, by an immense cup and pump. An instrument lately contrived by myself (intended to produce diaphragmatic respiration in cases of asphyxia) may answer the same purpose. It is a large syringe or hand pump connected with a metallic cup, six inches across at its edge, to be applied to the abdomen. N. Duplouy (*Gaz. Hebd.*, Feb., 1871) in a case of strangulated hernia, obtained relief by puncturing the intestine with a needle, and withdrawing the gas by means of a respiratory syringe. Other like successes have occurred, with Dieufaloy's aspirator. Broadbent[1] has shown that caution is necessary with this procedure. 1. An opiate or hypodermic injection of morphia should precede it, to restrain peristaltic movement. 2. A portion of gut should be chosen which contains only gas, not liquid; great danger attending the escape of the latter into the peritoneum. Most favorable, usually, will be the choice of the jejunum, above the umbilicus. 3. The perforation must be made at the most convex part of the intestine. 4. The needle must be steadily held while gas escapes from it; this may be promoted by gentle pressure and manipulation. Such an operation is, mostly, rather palliative or auxiliary than curative of existing obstruction. Annandale[2] recommends gastrotomy (abdominal section) in sudden and complete obstruction not relieved by ordinary treatment. He advises that the operation should not be delayed beyond thirty-six or forty-eight hours after the first symptoms appear; that the abdomen should be opened on the middle line, the best guide to the seat of obstruction being the contracted or dilated condition of a part of the intestine. If the bowel be gangrenous, or the obstruction not removable, the canal may be opened, and an artificial anus established.

J. Hutchinson[3] reports a successful case of gastrotomy (1873). When the colon is the seat of obstruction, Calliser, Amussat, Clement,[4] and others have shown that *colotomy* (in the right loin (Nélaton[5]) if the obstruction be above the rectum) is a justifiable operation. It is also least dangerous when not too long delayed. *Laparotomy* (instead of gastrotomy) is the term applied by some authors to abdominal section, as an exploratory, and when possible, a remedial operation, especially for intussusception. Dr. J. Ashhurst has tabulated (*Am. Journal of Med. Sciences*, July, 1874) thirteen such operations for intussusception, with five recoveries; also, fifty-seven similar operations for other forms of intestinal obstruction, with eighteen recoveries. Bulteau[6] collected ninety-two instances of laparotomy for intestinal obstruction, in which 33 or 36 per cent. were followed by recovery. An important argument in favor of laparotomy as compared with colotomy is, that it gives opportunity for *exploration*, before further interference is ventured upon; diagnosis of the nature of the obstruction by mere external inspection being often extremely difficult; sometimes impossible. Dr. Pyle, of Nashville, performed lapa-

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[1] Brit. Med. Journal, ii., 1879, p. 490.
[2] Edin. Med. Journal, February, 1871.
[3] Med. Times and Gazette, Nov. 29, 1873.
[4] Medico-Chirurg. Transactions, vol. xxxv.
[5] Littré (1710) operated in the left iliac [region.
[6] Thèse de Paris, 1880.

rotomy successfully for intussusception, in 1879.[1] Treatment of *stricture* of the bowel in a manner similar to that employed for the cure of stricture of the urethra, *i. e.*, by incision and subsequent moderate dilatation, has much argument in its favor. Several surgeons have *nicked* the strictured part. Dr. F. Lente[2] has practised free incision with success, in the median line, with precautions against hemorrhage. Verneuil[3] also has performed the same operation upon the rectum. He advises only a *posterior* incision, which is probably the safest.

## CHOLERA MORBUS.

This very unscientific name has become inseparably attached to what, in technical phrase, may be most briefly called *idiopathic emeto-catharsis; i. e.*, vomiting and purging, neither brought on by irritant poison nor by epidemic influence. The account which I shall give applies best to such an affection as we commonly meet with in this country, especially in the summer. English medical writers describe it sometimes as English cholera; or sporadic cholera.

**Symptoms.**—Nausea, and vomiting of greenish or yellowish fluid, with rejection of all food and drink; often, but not always, pain in the stomach and bowels; diarrhœa, with brownish or yellowish stools; debility, and coldness; little or no fever. Beginning with such symptoms, if the attack, not relieved, becomes aggravated, cramps in the limbs supervene, the vomiting and purging become more watery; prostration and coldness deepen into collapse—which may be fatal.

**Causation.**—Warm weather seems to predispose to it, by relaxing the mucous membranes and exciting the liver. Direct causes often are, indigestible articles of food, as unripe fruit, etc.; excess of ordinary food; sudden change of temperature, checking perspiration.

**Diagnosis.**—From epidemic cholera, it is important to distinguish cholera morbus; as the prognosis is not the same, nor will the same treatment answer for both. The difference is seen in the *bilious* vomiting and purging of cholera morbus, and the *rice-water* discharges of cholera; the greater nausea in the former; much more tendency to collapse, with blueness, dyspnœa, and suppression of urine, in cholera. The presence or absence, at the time, of an epidemic of the latter may complete the diagnosis by confirming or correcting the evidence of the above signs. It is only in an extreme case of cholera morbus that any real difficulty should exist. During, and before and after, the prevalence of epidemic cholera, an especial tendency to cholera morbus as well as diarrhœa often exists. This, called *cholerine*, may present more near resemblance to malignant cholera than our ordinary summer attacks.

**Treatment.**—A large sinapism should be at once placed over the epigastrium. All theory or *rationale* apart, the following

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[1] Nashville Journal of Med. and Surgery, January, 1880.
[2] Am. Journal of Med. Sciences, July, 1873, p. 23.
[3] Gazette Médicale de Paris, Jan. 4, 1873.

mixture, largely employed in the practice of the late Dr. Joseph Hartshorne, is *admirably useful* in ordinary summer cholera morbus:

℞. Sp. ammon. aromat. f℥j.
Magnes. optim. ℥j.
Aquæ menthæ. piperitæ, f℥iv.—M.
To be shaken when taken.
S.—A teaspoonful every twenty minutes.

Few cases will fail to be relieved in an hour or two, if this be given *early*.

When the diarrhœa is copious, or the case is seen rather late, paregoric may be added to the above— f℥ij or f℥ss, in the same mixture. When purging is very urgent and exhaustive, instead of magnesia a like amount of bicarbonate of sodium may be used. Infusion of cloves, cinnamon, or ginger, may assist to quiet the stomach in an obstinate case. After the sinapism, a spice poultice, of ginger, cloves, and cinnamon, each a full teaspoonful, with a tablespoonful of flour, moistened with whisky, should be applied. Ice may be given if thirst be great.

Extreme prostration may require the use of brandy or whisky internally. To check the diarrhœa and vomiting when threatening collapse, a laudanum and starch *enema* (40 to 60 drops of laudanum in ½ ounce of starch) may be given; and a blister may be applied over the stomach, the part to be dressed, when vesicated, with 2 grains of acetate of morphia mixed with 10 of powdered gum arabic; or the hypodermic injection of morphia may be used.

**Winter Cholera.**—During the very cold winter of 1880-81, there occurred in Chicago and some other western cities many cases of an affection resembling cholera morbus, but with some peculiarities; besides the exceptional fact of their taking place in the *winter* instead of the summer. The following account is taken from a report in the National Board of Health Bulletin (March 12, 1881):

"The two features that have attracted attention in this affection are the severity of the vomiting and the copious discharges from the bowels.

"The matters rejected from the stomach have usually given slight acid reaction, at the first consisting mainly of aliment and drinks, readily rejected, and then mucous secretion from the stomach, sometimes tinged with bile, sometimes not. The alvine evacuations have been markedly of a serous character; a fact specially noted. In some cases the typical appearance of bilious diarrhœa, giving the stool a bright yellow color, in others an absence of bile. The discharges varying from a bright creamy color to those characteristic of cholera, only that in them I have not noticed coagulated albumen.

"The urine is usually rather scanty and high colored until the diarrhœa is controlled.

"The nervous system, aside from the sense of prostration, does not seem to manifest disturbance.

"The mucous secretion is partially arrested in the respiratory passages, and especially in the mouth and fauces.

"The capillary circulation of the skin varies, but there is no uniform marked disturbance of the circulation.

"The subjective symptoms are, in the order of their severity—

"1. Inordinate thirst, with dryness of tongue and fauces.

"2. More or less frequently occurring nausea, with vomiting.

"3. Tenderness over umbilical region covering region of small intestines.

"4. Quite frequently a sense of fulness and pain in the region of the liver, with sometimes excessive secretion, and at others seeming congestion, with arrest of biliary secretion.

"5. Fugitive pains in various parts of the body."

In the practice of some physicians the choleraic discharges were not observed, all the stools being characterized simply by the absence of bile. The implication of the liver function was a very common feature, and jaundice was produced in some of the severer cases.

The onset of the disease was usually sudden; patients in some extreme cases on rising in the morning felt only a slight dryness in the mouth, but found themselves unable to keep even a drink of water on the stomach. Generally, however, the onset, though sudden, was not so abrupt as this.

The duration of the disease was very variable—many even of the severer cases recovered within a few days, sometimes within a few hours under prompt treatment; others have lasted many weeks.

As after-effects, there have been observed, besides the jaundice already mentioned, subacute enteritis, dysentery, and ulceration of the rectum. In most cases a tendency to relapse was observed, and changes of weather were very influential in bringing this about, as well as influencing the course of the disease during its existence. Imprudence and exposure generally were thought to produce it or to aggravate it.

During the earlier weeks of the epidemic the disease appeared to be mostly confined to adults, but later children were also attacked to some extent, the trouble in them often taking the form of cholera infantum. Very few deaths resulted directly from this disease. It was treated upon general principles, according to the symptoms; mostly with opiates and mineral astringents.

## DIARRHŒA.

Though rather a symptom than a disease, excessive discharge from the bowels often requires express treatment for its relief.

**Varieties.**—These are, principally, 1. Irritative diarrhœa, as from dentition; 2. Inflammatory, as in enteritis; 3. Symptomatic, as in typhoid fever; 4. Critical, as at the close of remittent fever; 5. Eliminative, as in septic or other poisoning; 6. Colliquative, as in phthisis.

The character of the *discharges* varies very much. They may be, 1. Fecal, although liquid; 2. Bilious; 3. Mucous; 4. Serous; 5. Adipose (very rare[1]).

[1] Bidie found fat in the passages of soldiers suffering from diarrhœa in India. Woodward (Med. Report of War of the Rebellion, Part II.) quotes authors who have observed fatty discharges in cases of diabetes mellitus, phthisis, typhoid fever, cholera, and chronic intestinal disorders of children.

Except in the beginning of attacks, discharges are rarely fecal in character when much beyond the normal amount. The *gutter-water* discharges of typhoid fever often have nearly the fecal appearance except in consistence. *Mucous* discharges occur in enteritis, and in many cases of summer diarrhœa. *Bilious* passages occur in cholera morbus. *Serous*, or "rice-water," in malignant cholera. *Bloody* discharges, in dysentery.

**Treatment.**—An important point is, that in many cases diarrhœa ought not to be abruptly checked; in some it should not be interfered with at all. The latter is true of the looseness of the bowels in typhoid fever, if the passages are not more than three daily, and are but moderate in amount. When excessive in that disease, they require checking, not arresting.

Ordinary summer diarrhœa, the most nearly "idiopathic" of all forms, demands *correctives*, generally before or with astringents. Blue mass or hydrargyrum cum cretâ; magnesia, with charcoal or with aromatic syrup of rhubarb [F. 101]; bicarbonate of sodium, with ginger or cinnamon, etc., or *charcoal* (Guérin) alone will often relieve the condition of the alimentary canal in which diarrhœa originates, and thus end it without the use of any astringents.

When the latter are indicated by continuance or increase of the discharges, *chalk mixture* has long held a routine place as an early prescription. Instead of it some prefer *testa præparata* or *oculi cancrorum*. In infants, lime-water, with cinnamon or camphor-water, will do for mild cases. Kino, catechu, krameria, and hæmatoxylon are familiar as pure astringents. The addition of opium, or camphor, or both (as in paregoric) in small doses to such preparations is generally proper, to increase the binding effect, even in the absence of pain [F. 102, 103, 104].

Drs. Toner and J. J. Warner have (1873) called the attention of the profession to the experience of residents of California with the root of *Anemopsis Californica* (a low herbaceous perennial plant) as a remedy for diarrhœa. During infancy, Dr. Brakenridge[1] advises *oxide of zinc* for frequent diarrhœa, as a nervous tonic as well as a mild astringent medicine. The *coto* bark of S. America is found useful in doses of from 5 to 8 minims of the fluid extract, in exhausting diarrhœa (Goit, Fronmuller, J. Burney Yeo). Coto has the advantage of not being a narcotic, and of being rather tonic than depressing to the stomach.[2] Dr. Messemer,[3] of New York, obtained several recoveries from chronic diarrhœa by injections of cold water, repeated after each passage from the bowels.

In *infantile* diarrhœa, when obstinate, Drs. Newell and Tyson,[4] of Philadelphia, have found good effects to result from injections into the bowels containing each 2 grains of hydrate of chloral in 2 teaspoonfuls of starch.

Dr. Comegys, U. S. A., has had excellent results in diarrhœa from *fluid extract of ergot*, in 20 to 40-drop doses.

Obstinate cases should be treated with tannin (gr. iij in pill,

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[1] Med. Times and Gazette, Feb. 15, 1873.
[2] Rhone, Virginia Med. Monthly, March, 1881.
[3] Am. Journal of Med. Sciences, July, 1878, p. 133.
[4] Philadelphia Med. Times, Sept. 14, 1878.

with ¼ or ½ grain of opium, *pro re nata*), or pills of acetate of lead and opium (gr. j of the acetate, with gr. ½ of opium) every three or four hours; or a mixture containing acetate of lead with acetate of morphia; aided when necessary by enemata of laudanum and starch (30 to 60 drops of laudanum to ½ ounce of starch cool or cold). As an article of diet in feeble cases, arrowroot, with milk and a small amount of brandy, will be especially suitable.

In **chronic** diarrhœa, besides the remedies last mentioned, sometimes enemata of acetate of lead solution, or of some other mineral astringent, will do good. Mention of these will be again made in connection with *chronic dysentery*.

The *food* in cases of diarrhœa always requires regulation. Vegetables and fruits, as a rule, ought to be forbidden; the popular prejudice which makes the blackberry an exception I believe to be a mistake. It has had its origin in the known astringency of the *root*. Boiled rice, and other *farinacea*, will nearly always be suitable. In severe cases, all solid articles of food should be withheld.

**Scorbutic** diarrhœa, however, from the nature of its *cause*, demands a quite different regimen. Officers in the army who were affected with diarrhœa on the Chickahominy in McClellan's campaign, told me that when astringents had no effect in checking the complaint, tomatoes, peaches, and lemonade cured it at once. I saw the same thing occur in a number of cases in army hospital practice in 1862.

## CHOLERA INFANTUM.

Popularly known as "*summer complaint*," this affection is very destructive to young children in the large cities of this country, in hot weather. The peculiar influence of high heat in an atmosphere contaminated by "town" causes, generates it. In New York and Philadelphia, its prevalence and mortality coincide with the rise of the thermometer above 90° F. in the shade. The deaths from all causes for the hottest week in July, 1866, in New York, were over 1200, and in Philadelphia over 700; more than occurred in a single week in either city during the prevalence of cholera later in the same season, and more than twice the usual mortality. In 1872, 1659 deaths from cholera infantum occurred in Philadelphia.

**Symptoms.**—These are diarrhœa, vomiting, rejection of food, languor, debility, apathy; sometimes stupor. At first the head may be hot, the abdomen swollen; as the case progresses, coldness and emaciation supervene. In some, with predominance of cerebral symptoms, death may be threatened after a very few days of sickness. In others, copious diarrhœa and constant vomiting endanger the same result. In many, however, without violent symptoms, the child is gradually reduced by diarrhœa and inanition. The period of dentition is particularly liable to this disorder; it seldom occurs after two or three years of age.

**Pathology.**—Although decided alteration of the *follicles* of the intestines, with some change in the general appearance of the mucous membrane, has been shown to be generally present after death from cholera infantum, the disease is most probably rather

a systemic than a local one. Its seat must be in the whole nutritive apparatus, including the ganglionic nerve-centres. Sanguification is evidently impaired, and an imperfect blood deranges the action of the brain and spinal cord ; hence the stupor, or extreme apathy, and in some bad cases, convulsions. I cannot see the propriety of excluding (as is done by Meigs and Pepper, and others) all cases from the category of cholera infantum except those having the character of extreme collapse, resembling epidemic cholera. The term cholera was used by the Greeks to mean a *copious watery discharge from the bowels*, long before Asiatic cholera was known. In regard to its local pathological anatomy, cholera infantum appears to be a *catarrhal enterocolitis*. The large intestine is chiefly but not exclusively involved. Redness and turgescence are found after death particularly near the sigmoid flexure of the colon. Sometimes, in bad and prolonged cases, round ulcers occur in the descending colon. With or without ulceration, the solitary intestinal glands are commonly enlarged and softened in both the large and the small intestines ; the agminated glands also, not unfrequently. Whether the whole of the alteration of these glands is most correctly indicated by the term *inflammation*, is a question of pathology which we have not room here to consider.[1]

**Treatment.**—*Correctives* are, here, especially important in the beginning. I am, from considerable experience, a full believer in the value of moderate doses of *calomel* in the early stages of summer complaint. I would always give it with an antacid [F. 107]. When stomach or head symptoms predominate, with but little diarrhœa, calomel with magnesia will do the best. When there is more looseness, bicarbonate of sodium should be used, with the calomel, instead. Spiced syrup of rhubarb may be added to either. Hydrargyrum cum cretâ is the preferred mercurial with many practitioners. I have found it to answer very well, after or even perhaps instead of calomel. J. Lewis Smith, Jacobi, and Banks[2] recommend subnitrate of bismuth.

A spice poultice or plaster should be kept over the abdomen so long as vomiting continues ; being renewed or wet freshly with brandy or whisky often enough to maintain its strength. Ice (pounded in a rag for young infants) may be given more often than water to quench thirst. The food may be lime-water and *fresh* milk, arrowroot, farina, chicken-water, beef-tea. It is of the greatest consequence that the milk given to the infant shall be fresh and good ; in hot weather, a few hours will spoil it, even before it becomes sour. Barley-water may be added, when the digestion of casein is shown to be imperfect by the passage of curds in the stools. Excessive dilution of milk given to young infants is always to be avoided. For an infant under two months of age, one-third of its bulk of water or barley-water may be added to the milk; under six months, one-fourth ; after that time, it may be generally given undiluted.

When milk seems not to agree with the patient, even with

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[1] See J. J. Woodward, Medical History of the War, Part II., p. 325.
[2] Fiske Fund Prize Essay on Cholera Infantum, 1879; p. 29.

barley-water and lime-water added, we may try rice-water, made thick, and added to milk in the proportion of two parts to one of the latter. Or, often still better, put a quantity of wheat flour into a bag, and boil it for several hours; then dry the mass, grate it, and make a gruel of it, to be mixed in equal parts with milk. Meigs and Pepper highly recommend *gelatin food* (see *Dietary Preparations*, at the end of the book). After the first stage, many children will require *small quantities* (drops, not drachms) of brandy or whisky (preferably with their food) for support. Kjellberg[1] asserts that enemata of from four to eight grains of hydrate of chloral, with one drop of laudanum, in a dessert-spoonful of liquid (as starch or mucilage) will often arrest the vomiting.

In the early stage, if the head continue to be hot and stupor be threatened, a *few* leeches behind the ears, and the application of cold water, upon a light cambric handkerchief, to the head, may sometimes be proper. Such a stage, however, does not often last long. The tepid or even *cool bath* (Comegys[2]), also, may do excellent service, repeated every day. Dr. J. L. Smith sometimes keeps down the temperature with Kibbee's fever cot.

Later, the two difficulties are, to check the diarrhœa, and to overcome the rejection of food by the stomach. For the bowels, astringents are then called for; especially logwood, blackberry root, geranium, krameria, aromatic syrup of galls; aided in serious cases by paregoric in small quantities by the mouth, or even the injection into the bowels of one, two, or three drops of laudanum with starch. Sometimes acetate of lead injections (from one to three grains, with starch) may be needed for the same intent. Acetate of lead with acetate of morphia, in mucilage with cinnamon-water, makes a useful combination in obstinate cases. Nitrate of silver, in $\frac{1}{12}$ of a grain doses, thrice daily, has sometimes an excellent effect. Dr. H. L. Byrd advises *sulphite of sodium;* 1 or 2 grain doses. Dr. Boardman Reed[3] has obtained good results with small doses of corrosive sublimate. Dr. J. L. Smith gives morphia and quinine hypodermically.

Protracted summer complaint affords scope for perseverance and contrivance in finding food available for the child. Well-made beef-tea agrees with most children. *Frozen* beef-tea (proposed by Dr. H. B. Hare, of Philadelphia) is especially likely to be acceptable. *Raw beef scraped* or rasped fine, has been found to answer the purpose best with some.

But all medical treatment may fail in some cases of cholera infantum, which will speedily recover on being *removed from the city to the country.* The immediate effect of a salubrious air is often surprising and delightful.

**Prophylaxis.**—This is very clear and simple. A child under five years of age ought never to be kept in the close-built parts of a large city, in our climate at all events, through June, July, and August, if it can be helped. Next to a *residence* for the summer in a high and open country, will be the benefit of frequent *excursions* or visits; riding or sailing; or even, if nothing else be pos-

[1] Amer. Practitioner, June, 1880.
[2] N. Y. Med. Record, June 29, 1876.
[3] Phila. Med. Times, Jan. 31, 1880.

sible, being carried daily into the squares or parks of the city. The proposition to have established *summer camps*, outside of each of our large cities, as places of refuge for the children of the poor during the hottest weather, is a very reasonable one. Immense good has been done in Philadelphia, New York, and Baltimore by children's *sanitaria* at the seaside or elsewhere out of town, and by the "country week" charity, by which poor infants are boarded (with their mothers if necessary) for a week or two at a time in the country during hot weather. A decided reduction in the annual summer infantile mortality of those cities has already been effected by these and kindred improvements.

## DYSENTERY.

**Definition.**—An inflammation of the large intestine, involving the muscular as well as the mucous coat.

**Varieties.**—Acute and chronic; sthenic and asthenic; endemic or epidemic; bilious; ulcerative; strumous or tuberculous.

**Symptoms.**—Pain in the lower half of the abdomen, with soreness or tenderness on pressure or motion; frequent disposition to go to stool, with small and bloody or blood-marked muco-fecal or mucous passages, sometimes containing shreds of lymph or false membrane; tendency to strain (tenesmus) with griping (tormina); fever in most acute cases.

Severe and protracted cases may be considered as going through, first, the inflammatory, and second, the ulcerative stages.

Simple **acute** dysentery is commonly sthenic, or open, active, and inflammatory, without early or great tendency to prostration. **Endemic** or epidemic dysentery (the first name is the more correct) is generally asthenic. In this form fever may be absent, brief, or of a typhoid character. Vomiting is not rare in this, as it is in the ordinary acute form. Coldness and debility come early.

Sometimes, in malarial districts, dysentery, like all other maladies, may be intermittent; with daily or tertian exacerbations and intervals.

**Morbid Anatomy.**—Redness, turgescence, thickening, softening, ulceration, suppuration, and occasionally pseudo-membranous deposits, are, after death from dysentery, found, in various degrees, in the rectum, colon, cæcum; chiefly in the lower bowel. *Pigment* deposits have been found especially in *scorbutic* dysentery, in the villi of the small intestine, and in the patches of Peyer; giving the peculiar "shaven beard" appearance of that affection. The hemorrhage which makes the typical bloody stools, is due to the congested and inflamed mucous membrane being constricted, in the tenesmus, by spasmodic and irregular contractions of the muscular coat. Abscess of the liver is not very uncommon.

**Chronic** dysentery presents nearly always ulceration of the rectum or colon, or both. The discharges in this may become almost entirely muco-purulent.

**Causation.**—Predisposition to dysentery is common in the latter part of summer; in Philadelphia and its neighborhood, from the middle of August to the end of September, especially. Relaxa-

tion from heat, with sudden exposure to cold and wet, may produce an attack. So, often, will indigestible food; as unripe fruit. Bad drinking-water is another cause.

At any season and locality such agencies may produce simple acute dysentery. But in certain regions it becomes at times endemic. This is particularly noticed in many localities having considerable elevation, not subject to malarial fevers, but *within a short distance* of ague districts; dysentery upon or among the hills, while intermittent and remittent occur in the adjoining or subjacent valleys and meadow lands.

**Prognosis.**—Either form of dysentery *may* be fatal; but the endemic and asthenic type is much the more dangerous. The other, with good *early* treatment, is generally quite manageable. When allowed to become chronic and ulcerative, the doubtfulness of recovery is much greater. *Bilious* dysentery, that is, the form in which disorder of the liver is a prominent feature, the discharges presenting an excess of more or less altered, irritating bile, is more intractable than ordinary simple dysentery. *Scorbutic* dysentery (such as was seen during the Crimean war, and in the Chickahominy region of Virginia during the civil war in this country) is frequently fatal.

**Treatment. Simple acute** form.—Now and then we may find a robust patient who will require to be bled during the first, active stage of dysentery. Much more often, leeches over the abdomen, where the tenderness is greatest, will be suitable. After these, warm poultices, of flaxseed meal, mush, etc., may be put on. Later, in obstinate cases, a large blister in the same region.

At the very *start*, the old practice of beginning with a dose of castor oil, with ten or fifteen drops of laudanum, will do very well. If left for a day or two, it had, as a rule, better be omitted.

Then the first prescription, in a mild or moderate case, may be of blue mass with ipecacuanha. After one or two days (sooner in an urgent case), camphor may be added, in pill. Next, we may substitute, for the blue pill, opium; afterwards, omit the ipecac., continuing the opium and camphor, *pro renata*. Some practitioners (Curci[1]) assert that *chloral* does more good in dysentery than opium. If the disorder be still not checked, we must resort to acetate of lead, with opium, or in solution with acetate of morphia [F. 111, 112, 113, 114].

Perfect rest is indispensable to prompt recovery from dysentery; there is no disease in which this is more important.

The diet must be bland; as rice-water, arrowroot, or other farinacea; chicken-water, or beef-tea in the feeblest cases. When thirst is intense, iced rice-water, or benne-leaf tea, or infusion of slippery-elm bark, may be used as a drink; or, during the active stage, ice in substance may be taken slowly.

*Enemata* are very important in dysentery. First, of flaxseed-tea as a demulcent (two or four ounces at once); the same with laudanum; or laudanum with starch [F. 115]. In decidedly *sthenic*, inflammatory cases, injection into the bowel of ice-water or finely powdered ice[2] may be resorted to; taking care that the

[1] Practitioner, October, 1879.
[2] Bodo Wenzel; Berliner Klin. Wochenschrift, Dec. 1, 1873.

effect be kept short of chilling the patient. In chronic cases, or obstinate acute ones, acetate of lead may be given by enema, with laudanum in mucilage. So may sulphate of zinc and nitrate of silver. Mæder has used with advantage enemata of *alum*, four teaspoonfuls to a pint of water. I have seen some remarkable cures of **chronic** dysentery by the use of an enema containing ten grains of sulphate of zinc, forty drops of laudanum, and four ounces of flaxseed tea. Such an injection may be painful at the time, and would be too irritating, except in an ulcerative case of considerable standing; for which it should be reserved. Solution of tannic acid, in water or in glycerin, will be worthy of trial for a similar purpose. Dr. Morse,[1] of San Francisco, reports success in chronic dysentery with injections of a solution of Labarraque's chlorinated soda (one part to twenty of water), two or three pints at a time.

**Asthenic, endemic** form.—In this there will be need of the earlier use of opium, and often of quinine and stimulants. No leeching, or little, is likely to be well borne, and ipecac may be prohibited by the occurrence of vomiting. When it can be taken in small doses (not more than ½ a grain every 3 hours), I believe it to be a valuable remedy. When malarial influence is obvious, and most of all in the intermittent form, quinia or cinchonia will be the remedy, to which others are adjuvants [F. 117]. *Hope's mixture* will be more likely to do good in this, the adynamic, than in the simple acute form. (℞.—Acid. nitric. f℥j; tinct. opii, gtt. xl; aquæ camphoræ, f℥viij; dose, a tablespoonful.) In India, the pods of the *mangosteen* (*Garcinia mangostana*) have been found to furnish an extract serviceable in dysentery.

**Bilious Dysentery.**—As a distinctive variety, this is not uncommon, and, if it last over ten days, it may be very hard to cure. Ordinary anti-dysenteric medication will not be inappropriate to it, but may disappoint much more than it is apt to in simple acute cases. Without having a very satisfactory recollection of the results of treatment of such cases in my own experience, I should trust most to the *withholding* of mercurials in the first stage, the gradual introduction of one of them in the second week, the application of a blister at the same period over the liver, and, besides opium, etc., as required for a stringent effect, the administration of chloride of ammonium, or nitro-muriatic acid. Of course the chemical incompatibility of this acid with lead must be remembered; but this will not interfere with saturnine injections while using the acid by the mouth.

Some physicians treat dysentery, with asserted advantage, by the internal administration of small doses of sulphate of magnesium or sulphate of sodium. Dr. L. D. Harlow uses the following: Sulphate of sodium, 1 drachm; laudanum, 40 drops; cinnamon-water, 4 fluidounces; mix, and give ½ a fluidounce every three hours. This mode of treatment must, I think, be best suited to the early stage of rather sthenic cases.

If *abscess of the liver* occur as a complication of dysentery, it may require surgical treatment. (See *Hepatitis*, later in this book.)

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[1] California Medical Gazette, Sept., 1868.

*Scorbutic dysentery* may require the use of opiates and astringents, as in the other forms; but *anti-scorbutic diet* is apt to be the most important portion of its treatment.

## HEMORRHOIDS.

**Definition.**—Piles; tumors at the verge of the anus or within the rectum.

**Varieties.**—External and internal; varicose and fibrous; dry and bleeding.

**Symptoms.**—At first, weight and fulness in the rectum; soreness about the anus; pain, increased upon having a stool. The pain may extend up the loins, and down the limbs even to the feet. As inflammation increases, throbbing and aching may become almost constant. Swelling, and then the formation of one or more distinct tumors, occur. If without the anus, there may be every variety of painfulness, aggravated at certain times. If internal, the prolapsus of the tumor during defecation, and its constriction or strangulation by the *sphincter ani*, cause great suffering; often the tumor requires to be put back by the hands. Occasionally it cannot be returned, but undergoes mortification, and sloughs away. **Bleeding** occurs from internal hemorrhoids. The amount may vary from a teaspoonful to a pint or more in a day. Cases are recorded by good authorities in which several pounds of blood have been lost in a single night. Commonly it is much less; but may be enough to blanch and reduce the patient to the extreme of anæmia and debility.

**Anatomy.**—Inspection shows **external** piles to be globate, broad-based tumors at the verge of the anus, covered by thin integument; livid in color when fresh, losing that hue when old; tense and elastic to the touch, and very tender, at least during inflammation.

The old idea that every hemorrhoid is a dilated vein has been corrected by observation. Piles consist of distended skin and connective tissue, with contained extravasation of blood, and deposit and organization of lymph, from local congestion.

**Internal** hemorrhoids are described as chiefly of three varieties: 1st. Solid, round or pear-shaped, attached by a peduncle, smooth, and dull in color, composed of mucous membrane, connective tissue, and thickened veins. These bleed very little, if any. 2d. Broad-based, bright red, spongy tumors, villous on the surface, and bleeding readily arterial blood; consisting of loose folds of mucous membrane, with hypertrophied connective tissue and enlarged capillary, small arterial and venous vessels. 3d. Florid, very vascular excrescences upon the mucous membrane, not of large size, but bleeding sometimes copiously.

**Complications and Sequelæ.**—These are, especially, ulceration, abscess, fistula, fissure of the anus, prolapsus ani, and sympathetic irritation of the urethra, bladder, prostate, or testicles in the male, or of the uterus and vagina in the female. *Sloughing* of a strangulated hemorrhoidal tumor is considered by some to endanger life; but my own observation of its occurrence would lead me to depreciate this danger. Certainly good natural cures thus occur.

Moderate bleeding from inflamed hemorrhoids gives temporary relief. When habitual and not excessive, its sudden arrest may possibly promote some internal congestion—as apoplexy.

**Diagnosis.**—Hemorrhoids may be mistaken for venereal excrescences, or polypi of the rectum, or for prolapsus ani. The first are harder, more abrupt in their elevation and margins, and of a quite different history; in addition to which other marks of the syphilitic constitution exist. Polypi are of slower growth, and unaccompanied by inflammation, or, as a rule, by hemorrhage, and their surface is smoother than that of piles. Prolapsus ought to be easily made out, by examination discovering the structure of the everted mucous membrane.

The source of bleeding from the rectum may sometimes be in doubt, as to whether it be hemorrhoidal or not. True hemorrhage from the bowels, other than from piles, is the result commonly of serious and obvious disease; as typhoid fever, yellow fever, etc. Such flow of blood is itself painless, and the blood is dark, clotted, and variously mixed with fecal matter when passed, and the symptoms of piles are absent.

**Causation.**—Hereditary predisposition sometimes exists. Hemorrhoids are uncommon in either sex before puberty; in females they are most frequent at the time of the cessation of menstruation. Warm and damp climates promote them, as in the East and West Indies, etc. The plethoric constitution is the most liable to them, especially with sedentary habits. Pregnancy is attended by them not unfrequently. Other causes are, long standing, or sitting upon hard seats; excessive venery or self-abuse; over-stimulating diet; misuse of purgatives, especially aloes; ascarides, diarrhœa, dysentery, stone in the bladder. Constipation of the bowels always predisposes to hemorrhoids.

**Treatment.**—This must be both *general* and *local;* the former depending upon the constitutional condition, and the cause of the affection. The bowels must be *regulated;* neither over-purged nor allowed to be costive; a *soluble* state is the most desirable. The bleeding of piles must be but cautiously interfered with, if it has been habitual, or if there be a tendency to apoplexy, gout, or insanity.

The *diet* must be made to consist of digestible and unirritating food. Long standing and sitting, or rough riding, must be avoided; although active exercise in the open air may be very advantageous.

External piles may often be averted in the forming stage by attention to the bowels, along with the frequent application of the simplest unguents to the irritated and swollen part. Lard, tallow, cold cream, simple cerate, benzoated vaseline, or spermaceti ointment, will answer very well; but the grease should be applied several times daily, and especially after a stool, so as to keep the part constantly soothed by it [F. 118, 119, 120, 121]. Dr. H. C. Wood[1] recommends enemata containing chlorate of potassium and laudanum.

The laxatives most approved for hemorrhoidal cases are rhubarb, sulphur, and senna. The confection of senna is a very good

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[1] Phila. Med. Times, Dec. 6, 1879.

preparation for such use. Magnesia is irritant to piles; and so are, though in less degree, the saline cathartics. Aloes is stimulant to the sensibility of the lower bowel; yet some practitioners (as Fordyce Barker) find it, in moderate or small doses, especially with hyoscyamus, a useful alterative in hemorrhoids. Dr. D. Young thinks highly of *glycerin* for a similar effect. Enemata are objectionable merely because of the mechanical pressure of the instrument. In internal hemorrhoids they are often decidedly serviceable. When piles are inflamed, washing with cold water, or a cool sitz-bath, may relieve. Some patients prefer warm water or soapsuds under the same circumstances.

When *bleeding* is so considerable as to need to be checked, cold water injections, or *hot* water, solution of alum, or tincture of iron, may be employed. A piece of alum made into a smooth suppository will sometimes do well. In really threatening hemorrhage the patient must lie still in bed.

On the other hand, inflamed non-bleeding piles may require local depletion by leeches, or, as many prefer, cupping over the sacrum.

Prolapsed internal hemorrhoids often have to be replaced by the hand. Oiling will of course facilitate such reduction.

Astringent and sedative ointments, as of galls, tannin, carbonate of lead, creasote, or iodoform, with regimen and laxatives, may cure piles even of considerable standing. [F. 118, 119, 120.] But old and obstinate cases demand removal by operation.

**External** hemorrhoids may be *excised*, with curved scissors or a probe-pointed straight bistoury; taking off no more integument than what covers the tumors. Pain during the operation may be prevented (Coote) by the ether spray. Allingham[1] employs a *clamp*. Good authority, also, pronounces touching carefully with *nitric acid* to be safe and successful.

**Internal** hemorrhoids ought, when operated upon, to be removed always by *ligature*. Excision is dangerous, and has several times been fatal by hemorrhage. Some prefer cauterization with nitric acid. In ligating hemorrhoids, it is best to apply a double ligature around the base of each tumor. Silk or hemp will answer; Bushe's needle-receiver is a good instrument for the application. Colles, of Dublin, 1874,[2] introduced the treatment of hemorrhoidal tumors by *injection* with tincture of chloride of iron. In this country, first in the West,[3] it has become common to inject *carbolic acid;* with reported success in many cases. Dr. Blackwood,[4] of Philadelphia, thus describes the operation: "I use *crystallized* carbolic acid, with enough glycerin (a few drops only) to render it fluid. Empty the bowel thoroughly the day before, and the rectum by enema an hour before operating. Do not inject during acute inflammation—a fit of the piles. Put the patient in bed. Anoint the mass of tumors, after their extrusion, with *fresh* olive oil or cosmoline, to prevent accidental caustic action on the adjoining parts, especially in females. Use a good glass

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[1] Diseases of the rectum, etc., 2d edition, 1873.
[2] Dublin Journal of Med. Science, June, 1874.
[3] Pooley, Toledo Med. and Surgical Journal, Nov., 1877.
[4] N. Y. Med. Record, Oct. 2, 1880, p. 386.

hypodermic syringe, with a tight piston, which moves easily, and a small, well-polished, and sharp needle. See that the needle is pervious to the acid (not to water) before commencing. Select the largest pile, and push the point of the needle to the *centre* only, and not beyond the tumor, then slowly inject from three to six drops. If the pile is as large as a small walnut, I put in three drops at one point, partially withdraw the needle, and deposit three drops at another point, and sometimes at a third. Inject only one pile at a time, unless they are small, when two may be attacked at one operation. Keep the needle *in* the pile for a few seconds before withdrawing it fully. The object is to permit the mass to harden before taking the needle out. If the pile bleeds, touch it with a piece of ice or the strong carbolic acid. No bleeding resulting, thoroughly anoint the tumors as at first, and return them within the sphincter. A suppository may also be introduced, but I prefer morphia hypodermically. Keep the patient in bed, and in two or three days inject another if it exist, and repeat at this interval until all are done. The process mummifies and shrivels the hemorrhoids, and does not cure by inflammation. Now and then the whole or a part of the pile may slough, but the process is limited."

### FISSURE OF THE ANUS.

This is a very painful and not uncommon affection, especially in middle life; perhaps most frequent in females. Neglected constipation and hemorrhoids, with relaxation of constitution and sedentary habits, are its principal causes.

Its symptoms are, at first, soreness or smarting at one point of the anus when at stool. This becomes afterwards very severe, with intense pain, burning, aching, and throbbing, and violent spasmodic constriction of the sphincter ani, lasting sometimes for hours.

Examination displays a lesion mostly of the mucous membrane only; though occasionally reaching even to the muscular fibres of the sphincter. In the beginning only a crack, it becomes at last an extended ulcer, and may exist on each side of the anus.

The stools are streaked with pus or blood, and often reduced in size by the spasm of the sphincter; suggesting stricture of the rectum; for which this complaint has now and then been mistaken. The suffering of the patient in bad cases is extreme; pain being produced not only by defecation, but also by coughing, sneezing, stimulating food, or even by the sitting posture.

**Treatment.**—Most cases, even of long standing, may be cured without an operation. The fissure may be managed as an irritable ulcer, by the constant application of soothing unguents—as spermaceti or oxide of zinc ointment, lead cerate, unguentum belladonnæ, or lime-water with oiled silk dressing. The latter will be convenient only in the recumbent posture. Experience leads me to have especial confidence in *collodion*, to which one-fiftieth of glycerin has been added to lessen its constricting effect. This may be painted upon the part with a camel's-hair pencil, as in fissure of the nipple; it makes an excellent artificial cuticle. Glycerite of tannin [F. 205] and compound tincture of benzoin, may also be useful. Iodoform suppositories are recommended by

Dr. J. C. Peters.[1] Tarnier dusts the part with iodoform powder. Créquy has employed a dressing of chorpie soaked in *hydrate of chloral* with advantage.[2]

Obstinate cases may be treated with nitrate of silver or sulphate of copper, applied every day or two, lightly, to the surface. Where suffering is great, suppositories of opium and cocoa butter, or of belladonna, may be introduced after defecation. Washing with soap and water, twice daily, will be serviceable.

Should all such measures fail, Boyer's operation, as modified by Copeland and Brodie, should be resorted to. It is, incision through the ulcer, with a bistoury, either from within outwards, or from without inwards. It is only necessary to cut through the mucous membrane, not through the sphincter. Mild dressings must follow the incision; which will usually produce rapid recovery.

Dr. W. H. Van Buren's operation consists in the forced dilatation of the sphincter ani, by the two thumbs of the operator; so as to overcome the spasmodic contraction.

### PROLAPSUS ANI.

Partial descent of the rectum beyond the anus is not rare in adults, but is more common in children. Relaxation of the mucous membrane, or weakening of the anal muscles, may induce it; straining at stool is its usual immediate cause. Tropical countries afford its most numerous examples.

**Treatment.**—The protruded bowel must be replaced. Commonly, gentle pressure, with lard or oil, and *tact*, will succeed at once. If not, leeches and cooling applications must be applied to reduce congestion and swelling. Sometimes anæsthesia will be a needful aid; but not often.

Having effected the replacement, a pad and T bandage will maintain it for the time. The bowels must then be carefully regulated. For the rest, *preventive care* is the main thing. Children affected with prolapsus must not be allowed to strain. The chair or other seat used by them ought to be *high*, so as not to flex the thighs much upon the body. The more nearly erect the posture, the less force in bearing down.

Old prolapsus in the adult may not be curable without operation; although the air-dilated gum-elastic pessary will sometimes give relief. I refer for the *operation* to works on surgery.[3] In cases of great relaxation, strychnia (Nélaton) by the mouth or hypodermically (L. Weber, N. Y., 1868) may be cautiously administered. Vidal has cured three cases by repeated hypodermic injections of ergotin (extract of ergot).

## AFFECTIONS OF THE LIVER.

### ACUTE CONGESTION.

This, with deficient secretion of the bile, is very common, as the result of exposure to cold and wet in warm seasons or climates, of the chill of intermittent, or of excess in diet. Its

[1] Phila. Med. Times, Nov. 8, 1879. See also, Tarnier, Union Médicale, Dec. 27, 1877.
[2] Bull. Gén. de Thérap., Sept. 30, 1875.
[3] See Ashton on the Rectum, p. 157.

symptoms are, a sense of weight and slight or moderate pain in the right hypochondriac region and under the right shoulder-blade, constipation and lead-colored stools, nausea, a furred tongue, bitter taste in the mouth, a yellowish skin and conjunctiva, and headache or dizziness.

**Treatment.**—Two or three grains of blue mass[1] at bedtime, one, two, or three nights (two grains only if repeated). When decided constipation exists, one purging dose in the morning, of sulphate or citrate of magnesium, or of magnesia. Then ten or fifteen grains of bicarbonate of sodium twice daily with light diet.

Dr. W. Stewart[2] particularly recommends *chloride of ammonium* for this affection, after diaphoretics (as acetate of potassium or ammonium) if the skin be hot and dry. I have no doubt of its value. Extract of taraxacum (dose, ten to twenty grains) has long been a favorite medicine with many practitioners.

Having no desire to ignore or depreciate the *suggestiveness* of experiments upon animals, the following may be given as a summary of the most important inferences derived from Rutherford's vivisections of dogs:

*Powerful stimulants* to the secretion of bile: podophyllum, benzoates of sodium and ammonium, benzoic acid (less), salicylate of sodium, sanguinarin, phosphates of sodium and ammonium, ipecacuanha, corrosive sublimate, aloes, colocynth, colchicum.

*Moderate* hepatic stimulants: leptandrin, jalap, dilute nitro-muriatic acid, rhubarb.

*Feeble* hepatic stimulants: scammony, Rochelle salts, croton oil, taraxacum, jaborandi, chloride of sodium; bicarbonates of sodium and potassium only when given in large doses.

## CHRONIC CONGESTION OF THE LIVER.

A number of attacks of temporary hepatic congestion, or of hepatitis, or prolonged dyspepsia, or intermittent or remittent fever, may induce a chronic hyperæmia of the liver, with variable disturbance of function. Pain in the right side and shoulder, with sallowness of complexion, constipation, and lowness of spirits, are the principal symptoms.

**Treatment.**—Supposing blue mass to have been temporarily and sufficiently used, as the leading remedy, nitro-muriatic acid may then be given, 3 or 4 drops twice or thrice daily, for two or three

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[1] It has been remarked already, that Prof. J. H. Bennett's experiments, and those of others, appearing to show that mercurials, in healthy animals, rather diminish than increase the flow of bile from the liver, do not in the slightest degree affect the value of the evidence which has established the usefulness of blue pill and calomel in acute or subacute hepatic disorders. It is only the *explanation* of their remedial action that can be thus brought into question; *not* the *facts* which prove it. Some experiments, moreover, have differed in their results from Bennett's; and we cannot argue with *certainty* from the case of dogs in the state of health to that of men in a condition of illness. See remarks of Dr. Da Costa upon a case in which increase of bile after calomel appeared to be proved. Proceedings of Pathol. Society of Philadelphia, July, 1869.

Röhrig, with an improved method of experimentation, approved by Stricker, showed (1872–3) that, in dogs, the secretion of bile is augmented by any cause of determination of blood to the liver. Several kinds of cathartics had this effect; salines, rhubarb, castor oil, etc. Rutherford's investigations also are very interesting; but more valuable still is Murchison's experience (Croonian Lectures, 1874) that "the clinical proofs of the efficacy of mercury as a cholagogue are overwhelming." Christison has given equally strong testimony.

[2] British Med. Journal, September, 1878.

weeks successively. Or it may be used in a bath (f℥vj–viij in each gallon of water). Chloride of ammonium, 10 grains, or taraxacum, 10 or 20 grains of the extract twice daily, or a wineglassful as often of the decoction of the root, or the fresh leaves in spring or summer, eaten as greens, may follow. Leptandrin (dose, gr. j–iij) is believed to be mildly cholagogue and safe. So is the resin of podophyllum, in very small doses. Ordinary laxatives, as rhubarb, etc., may be used to regulate the bowels. Care of the skin, by bathing, proper clothing, and, if chilly, friction with hair gloves or a rough towel (salt-bathing will be very good) is important. Exercise in the open air, not violent, should be had every day. Change of air, mineral waters, or sea-bathing, may be advised.

## HEPATITIS.

The most common form of inflammation affecting the liver is what some writers call "gastro-hepatic catarrh;" considered on a previous page. (See *Gastritis.*) There is reason to believe the duodenum, stomach, gall-duct, and liver, to be all, in variable degree, involved in such attacks.

Hepatitis may also be *traumatic.* Whether so or idiopathic, either the parenchymatous tissue, Glisson's capsule, the biliary ducts, or the portal vein, or all together, may be the seat of inflammation.

Some of the symptoms are nearly the same in all cases, and are in part the same as in acute congestion of the liver; but the pain in the side is greater, with some tenderness on pressure; there is fever, often vomiting, and sometimes diarrhœa.

In inflammation of the capsule (perihepatitis) the tenderness on pressure, movement, or deep inspiration, is considerable; the fever, slight or absent, and there is no jaundice. This may sometimes be confounded with *diaphragmatic pleurisy;* but there is, in the latter complaint, more severe pain, with cough, dyspnœa, and hiccough.

Inflammation of the portal vein may proceed to suppuration. Then the symptoms are scarcely distinguishable from those of hepatitis with abscess, to which attention will be given presently.

When inflammation is chiefly confined to the gall-bladder and ducts, the points of diagnosis are the comparative absence of fever and the considerable degree of jaundice.

**Abscess of the Liver.**—Although much most common in tropical climates, this may be met with anywhere. Besides the usual symptoms of hepatitis, when pus is forming we find rigors recurring sometimes almost as regularly as in intermittent, a very rapid pulse, prostration, copious perspirations, and loss of flesh. In a considerable number of cases, however (13 per cent., according to Louis), the disorder is latent, being made known only by the consequences of suppuration.

The greatest danger attends the escape of pus from the abscess. This occurs spontaneously either through the diaphragm by the lungs, into the stomach, or intestinal canal, into the peritoneal cavity, or, in a minority of cases, through the skin. Any of these may be followed by recovery, except the escape into the

cavity of the peritoneum. In this instance death is almost certain.

The **causes** of abscess of the liver, besides the predisposition belonging to hot climates, are: 1. Blows or wounds; 2. Inflammation of the portal vein, with deposit of pus, or transfer from *thrombosis* of some other vein, as the hemorrhoidal; 3. Dysenteric ulceration; 4. Inflammation and suppuration of the gall-bladder or gall-ducts.

**Treatment of Acute Hepatitis.**—A highly inflammatory case in a vigorous subject may be treated by early venesection. Otherwise, leeches to the right hypochondrium will be suitable. All mercurials should be avoided. Saline cathartics are proper, with rest in bed, low diet, and cooling drinks. A blister may follow leeches or cupping.

In the hepatitis frequently occurring, and sometimes fatal, in India, Dr. W. Stewart[1] considers *chloride of ammonium* almost a "specific" remedy.

The most serious question occurs when suppuration is known or believed to have taken place. Can we prevent or lessen the dangers of the discharge of the **abscess?** Nature in many cases makes this secure, by adhesion of the liver to the stomach or bowel, so as to allow of the direct flow of the pus into the alimentary canal. In other instances deep-seated fluctuation may be felt below the edge of the ribs. Possibly this might be a *dilated gall-bladder*, or *hydatids* of the liver. But if sure that it is an abscess, ought we to open it? The most prudent answer is, not unless we are confident that only the skin intervenes between the pus and the exterior. A very judicious medium between this and bolder practice has been proposed by Dr. Graves: to make an incision about four inches long right over the centre of the tumor, but reaching through the muscle to *within a few lines of the peritoneum.* This, even when the matter is deeply seated, is shown by experience to favor and hasten essentially its escape, without the dangers of a peritoneal incision. Dr. C. Murchison approves of making an opening in all cases in which there is a visible fluctuating tumor.

It seems probable that Dieulafoy's aspirator will contribute to the ease and safety of the management of such cases.

Dr. Hammond, several years ago,[2] asserted the observation that, in some cases, cerebral hyperæmia, depression of spirits, insomnia and gastric disorder are associated with hepatic abscess, without distinctive local signs of it. On aspirating the liver, in such instances, the withdrawal of a quantity of pus has been followed by recovery. When no such result has attended the operation, it has no ill effects. His punctures were made between the eighth and ninth, or ninth and tenth ribs, into the right lobe of the liver. J. M. Sims, Tausky, and others, confirm the safety, and in some instances the advantage of this practice.

On the other hand, Morehead, Maclean,[3] Lowe, and others, on the basis of experience in India, where hepatic affections are

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[1] Medical Press and Circular, Aug. 30, 1871.
[2] St. Louis Clinical Record, June, 1878.
[3] Reynolds' System of Medicine, Amer. edition, Vol. III., p. 374.

frequent, have objected to all such "exploratory" operations upon the liver. Maclean asserts that the most favorable route of discharge for an abscess of the liver is through the right lung, and the least hopeful that through the abdominal walls. Where rupture or escape of pus outwardly occurs spontaneously, it appears to be almost always (Morehead and Maclean) just below the ensiform cartilage.

Later experience, however (Brit. Med. Journal, 1880), appears to have led Maclean to favor puncture of large hepatic abscesses under (Lister's) "antiseptic precautions." Dr. Little, of Shanghai, China, has concluded it best to use aspiration for diagnosis, and free incision for treatment. Rochard, of Paris, also adopts this view. When "Listerism" is impracticable, incision or puncture of a large abscess may be made with a trocar and canula, followed by the introduction of a drainage tube, through which carbolized solutions may be injected.[1]

After the discharge of the abscess, convalescence may be expected; it is sometimes rapid, but may require a month or two.

## JAUNDICE.

**Icterus,** or jaundice, is a morbid yellowness of the skin, eye, and other parts. It has no uniform pathology, causation, or concurrent symptoms; but is itself so marked an occurrence as to deserve special study. Sometimes it is even epidemic, as in the U. S. army in malarial districts during the late war; to the extent of over 10,000 cases in a single year.

**Varieties.**—As to degree—*yellow*, *green*, and *black* jaundice. As to causation, jaundice from *suppression* and from *reabsorption* of bile; and *icterus neonatorum*, jaundice of young infants, of still different origin.

**Symptoms.**—In ordinary acute cases of jaundice, either suddenly or after some days of *malaise*, the whites of the eyes first become tinged with yellow; next, the roots of the nails, the face, neck, trunk, and limbs. The urine is of a porter color, stains linen yellow, and becomes green on the addition of nitric acid. At the same time the stools are slate or lead-colored, or almost white. The mouth has a bitter taste, and the patient suffers with lowness of spirits and indisposition for exertion. *Icterus neonatorum* commonly begins to appear within two or three days after birth, and seldom continues for much more than a week.

**Pathology and Causation.**—Many affections of the liver may induce jaundice, although in some of the most serious of them it may be absent. Most distinctly it is traceable in different cases to the non-removal of the biliary coloring matter, as well as of cholesterin, from the blood by the liver—other organs, especially the skin, then receiving it—or to obstruction preventing its transit, after secretion, through the intestinal canal, in which case it is reabsorbed into the blood, and is then thrown out elsewhere. Virchow recognizes a form of jaundice as "hæmatogenic," that is, originating in the blood. This is probably true,

[1] See a paper by Dr. R. Winslow, of Baltimore, in Annals of Anatomy and Surgery, June, 1881.

at all events, of the jaundice of new-born infants. Ponfick thus explains also the sudden production of jaundice by powerful emotion. The common view, that some cases of jaundice depend directly upon suppression of the removal of bile pigment from the blood by the liver, has had doubt cast upon it by Murchison[1] and others. It is even doubtful whether biliary pigment really exists pre-formed in the blood; especially as extirpation of the liver in animals is not followed by jaundice, and in a number of cases of destructive diseases of the liver jaundice is absent. Bence Jones asserts[2] that at all times a certain amount of bile is transfused through the coats of the *gall-bladder* into the blood; in health soon to undergo oxidation, but not so when the balance of blood-change is disturbed.

The remote causes of jaundice of greatest frequency are malaria, exposure to cold and damp in hot weather, pregnancy, and violent mental emotion.

**Diagnosis.**—In either form of jaundice we have the yellow conjunctiva and skin, or serum, if a blister be applied, or blood drawn; in both the stools are without color, and the urine yellow or yellowish-brown. But, as Harley first pointed out, in jaundice from *suppression* the biliary *acids* have not been formed, and we find only the bile *pigment* in the urine, while in jaundice from *reabsorption*, that fluid contains *both*.

Harley's test is as follows: "To a couple of drachms of the suspected urine add a small fragment of loaf sugar, and afterwards pour slowly into the test-tube about a drachm of strong sulphuric acid. This should be done so as not to mix the two liquids. If biliary acids are present, there will be observed at the line of contact of the acid and urine, after standing for a few minutes, a *deep purple* hue." (See *Semeiology*, Part I.)

After a time, in cases in which the secretory powers of the liver become impaired, the biliary acids disappear, and then *tyrosin* and *leucin* are found in the urine. To detect these, evaporate slowly an ounce of the urine to the consistence of syrup, and put it away to crystallize. Tyrosin is known by fine *stellate groups* of needles under the microscope. Leucin, by flat circular crystalline disks, soluble in water but not in ether.

Nothnägel[3] has pointed out that in intense jaundice (icterus catarrhalis), along with the biliary acids, *renal tube-casts* appear in the urine.

**Prognosis.**—Acute jaundice is not very often fatal. In the U. S. army, of 10,929 cases only 40 died. When it lasts a month or two, however, as well as when acute yellow atrophy of the liver exists, there is always danger connected with its organic cause. The jaundice of young infants is of short duration, and almost never of serious consequence.

**Treatment.**—When supposed to be temporary and functional, the great object must be to restore the action of the liver. As observed already, the large accumulation of clinical experience, sustained by some, though not by all, of the physiological experi-

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[1] Clinical Lectures on Diseases of the Liver, etc., 1868.
[2] St. George's Hospital Reports, 1866.
[3] Deutsches Archiv für Clin. Med., Oct., 1873

ments made by vivisectors, compels the belief that calomel and blue mass and other mercurials are *cholagogues*. If they be not so *always* in trials upon animals in *health*, they have proved so *generally* in human beings in cases of torpor of the liver. If *obstruction* be the trouble, their action is more doubtful, necessarily. But even then they may promote the solution of a recent gall-stone, if they render the bile more copious and liquid.

Heberden long since advocated the administration of *ether* as a solvent of biliary calculi. In obstructive jaundice, the abundant imbibition of water is reasonably indicated, to flavor fluidity of the secretions. (See *Bilious Colic*, p. 282.)

Moderate doses of calomel or blue pill may be urged, then, generally, during the first week or more of treatment. These may be aided by saline purgatives, as sulphate or citrate of magnesium, Rochelle salts, or cream of tartar. After them, small doses of *resina podophylli* may be tried, if required by persistence of the disease; or, if the bowels will not bear purging, chloride of ammonium or extract of taraxacum. But in a case of some weeks' duration, slow to recover, nitro-muriatic acid, 3 to 4 drops twice or thrice daily, will often hasten recovery very much. This occurred under my observation in a number of cases of malarial jaundice from the Army of the Potomac in 1862. Dr. H. Cook, of Bombay, has found *large doses of ipecac* very beneficial in jaundice.

## ACUTE YELLOW ATROPHY.

This is a rare but generally fatal affection, seen most frequently in those who have been intemperate, or injured by venereal excesses, or who have been exposed to malaria.

**Symptoms.**—Beginning like ordinary jaundice, with nausea, constipation, and headache, the skin becomes intensely yellow ("black jaundice"); vomiting comes on, the pulse is rapid, though variable, and delirium occurs. Then, with fever, and often pain in the side, the stomach and head are more and more disturbed. Vomiting of altered blood takes place; not unfrequently also hemorrhage from the bowels. Petechiæ appear on the skin. Prostration, tremors or convulsions, and *coma* end the history, usually in less than a week.

**Secretions.**—Marked *deficiency* of *urea* in the urine, and the presence of *leucin* and *tyrosin* in that excretion, have been remarked.

**Morbid Anatomy and Pathology.**—The liver after death is *flattened out* and diminished to perhaps less than half its normal size. Its cut surface has a yellow color like rhubarb; the blood-vessels are empty. The lobules are not distinctly marked, many of the secreting cells being destroyed; in their place are masses or spots of dark bile-pigment, fat, and hæmatin. Zenker[1] attributes the extremely fatty character of the liver contents, in many cases, to the detritus of broken-down cells. The kidneys are often found in a state of partial degeneration.

Evidently atrophy, with cessation of the functional action of

[1] Schmidt's Jahrbücher, No. 10, 1873.

the liver, is here the cardinal fact. Is it preceded by a violent and destructive inflammatory process? Some of the symptoms would point to this. Yet, in the absence of autopsic evidence, uncommon as primary rapid atrophy seems to be in any organ, the precedence of inflammation must not be taken for granted. Grainger Stewart believes it to be primarily a blood disease. The cause of death seems to be cholæmic poisoning. The resemblance of the history (and, to some extent, the morbid anatomy) of this affection to that of chronic poisoning by phosphorus, has been pointed out.[1]

**Diagnosis.**—From acute hepatitis this complaint is distinguished by the greater amount of jaundice, the occurrence of hemorrhage from the stomach or bowels, the severe headache and stupor; but, most of all, by the *diminution of dulness on percussion* over the hepatic region, in connection with symptoms showing violent disorder of the liver. The urine will also be found after evaporation to contain *tyrosin* and *leucin;* sometimes in crystalline deposits.

**Treatment.**—Unless, in the earliest stage, we are warranted in endeavoring to promote the "unloading of the portal circle" by mild purgatives, it is difficult to see any hopeful indication for treatment in this affection, other than palliation of fever, if there be such, by diaphoretics, aiding the depuration of the blood by diuretics and laxatives, and prolonging life by appropriate *support.* It is doubtful whether recovery ever takes place from acute yellow atrophy of the liver.

### PIGMENT LIVER.

Frerichs, Meigs,[2] and others have found after death from remittent fever, or in patients dying from other diseases after exposure to malarial influence, a peculiar condition of the liver. It is steel-gray, or blackish, or chocolate-colored; presenting brown insulated figures upon a dark ground. This change of color is due to the accumulation of pigmentary deposit in the blood-vessels.

The spleen is somewhat similarly altered; and so, to a less extent, are the brain and kidneys. The blood is deficient in corpuscles, and contains many floating particles or masses of pigment.

**Diagnosis.**—During life, examination of a few drops of blood will, in some cases at least, display the abundance of free pigment. The skin is sallow or dull yellow. Enlargement of the spleen, anasarca, albuminuria, diarrhœa or intestinal hemorrhage, and delirium or a tendency to stupor, may occur. There is but little jaundice.

**Pathology.**—The scientific interest of this affection turns chiefly upon the proof it affords of the effect of malarial poison in disorganizing the blood-corpuscles. This is in accordance also with the remarkable and important influence, in *chronic* malarial disease (as obstinate intermittent), of *iron*, as a remedy.

**Treatment.**—The discovery of pigmentary degeneration or deposit in the blood, or the supposition of its occurrence in the liver

[1] See a paper by Dr. J. Homans, Am. Journal of Med. Science, July, 1868, p. 53; and one by Dr. W. Pepper, in the same Journal, April, 1869, p. 347; also an account of experiments by Voit, Med. Times and Gaz., November 4, 1871.

[2] Meigs and Rhoads, Pennsylvania Hospital Reports, vol. i., 1868.

or other organs, does not afford any new or special indication for treatment, beyond what the other conditions of the case present. The malarial poison is to be antagonized, and the system is to be aided in restoring the disturbed organs and functions to their normal balance; the appropriate means for which ends will be considered under other heads.

## CIRRHOSIS.

**Synonyms.**—*Hob-nailed liver, gin-liver.*

**Anatomy and Pathology.**—In its commencement or first stage, cirrhosis is attended by some increase in the bulk of the liver; with increase also of its firmness. When the disease is more advanced, the organ lessens in size, especially the left lobe; the induration becomes aggravated. Knobs or granulations (nutmeg liver) project all over its surface. The capsule of the liver is always thickened.

The character of these alterations is believed to be due to the new formation of connective tissue, in the ramifications, through the gland, of Glisson's capsule. Bands of this material constrict the lobules, obstructing the blood-vessels and bile-ducts, as well as the gland-cells. Thus divers effects are produced. Commonly the subdivisions of the portal vein are diminished in size, or obliterated; those of the hepatic artery enlarged; and those of the hepatic vein unchanged. The biliary ducts are at first distended by partial obstruction, causing repletion of the cells; afterwards both cells and ducts may be in considerable part destroyed. The color of the granulations is dark or pale yellow. Along with these changes, in many but not in all cases, fatty or waxy degeneration of the liver-structure ensues.

Inflammation of the capsule of Glisson and its interstitial ramifications has been considered by most pathologists to be the primary element of cirrhosis. Without feeling at all certain of the correctness of this view, I am unable to suggest any other to take its place, without entering upon a discussion too complex for our present purpose. The principal doubt is, in regard to the change which occurs being properly designated as an inflammation.

Laennec (1819) gave the name of cirrhosis because of the tawny yellow color of the liver. Bouillaud called attention to the projection of the yellow substance in nodules, the red tissue of the liver undergoing atrophy. Kiernan (1836) showed that the abnormal increase occurs chiefly in the interstitial connective tissue; and Klebs (1868) first asserted the importance of early inflammation of the *portal venous ramules* as, probably, the beginning of cirrhosis.

**Symptoms.**—Nausea and indigestion, with furred tongue and slight yellowness of the skin and eyes, are the earliest (of course not pathognomonic) manifestations of this disease. Afterwards, mostly with slow progress, come constipation, vomiting, emaciation, debility, ascites, with or without general dropsy, and enlargement of the superficial abdominal veins. This last sign is especially significant of obstruction of the hepatic circulation. Towards the close of life, hemorrhage from the stomach or bowels, delirium, coma, or convulsions are apt to occur.

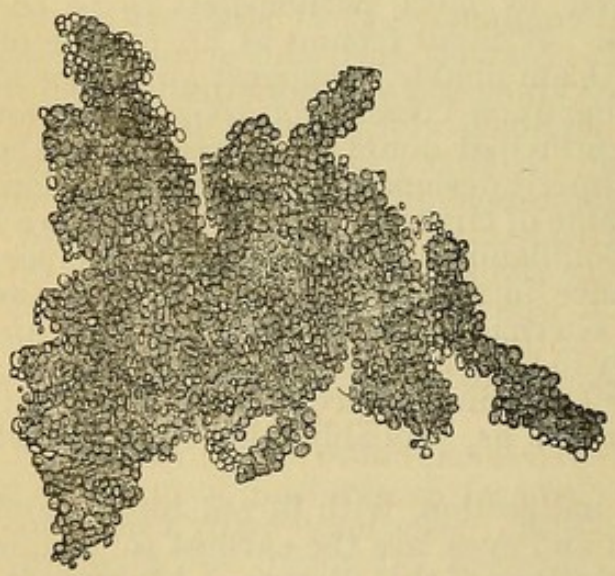
**Diagnosis.**—From acute congestive or inflammatory affections of the liver the slow progress of cirrhosis readily separates it. From fatty and waxy liver, and from cancer, it is distinguishable, though not always with ease, by the continued enlargement of the organ in those affections; while they are also less constantly attended by dropsy and enlargement of the abdominal veins. The spleen is often enlarged in cases of cirrhosis. This, however, occurs also when the portal vein is inflamed, or obstructed either by coagula or by pressure. There is, in that case, apt to be compression of the bile-ducts, producing decided jaundice, with clay or slate-colored stools. Chronic peritonitis is sometimes difficult to diagnosticate from cirrhosis; but in the former there is more abdominal tenderness, and less enlargement of the superficial veins.

**Prognosis.**—Recovery from cirrhosis of the liver is not to be expected; but its duration varies greatly, and may be favorably modified by regimen and treatment.

**Causation.**—Although malarial influence and syphilis may predispose to it, the most frequent special cause of cirrhosis is believed to be alcoholic poisoning. It is one of the most common results of continued intemperance.

**Treatment.**—Having the hope only of palliation and delay, we must, most of all, prevent the persistent action of the cause, by enforcing abstinence from spirituous liquors. Nourishing diet is at the same time very important. Milk, if well digested by the patient, meat, or concentrated liquid animal food, as beef-tea, chicken-broth, etc., will be suitable. The secretions must be attended to. Saline laxatives, especially the bitartrate of potassium, will often be useful. Bitters or other stomachics may be called for to relieve nausea and strengthen digestion. Dropsy may sometimes require tapping. Habershon[1] advises that this be done early, rather than to trouble the patient with long-continued medication for the removal or diminution of accumulated fluid.

FIG. 103.



Fatty Degeneration of Liver.

### FATTY LIVER.

This form of degeneration is not uncommon in intemperate persons or in those suffering from prolonged debility, as in phthisis. Perhaps its association with the latter disease is the most frequent.

In its **diagnosis,** beyond the fact of enlargement of the liver

[1] On the Pathology and Treatment of some Diseases of the Liver; London, 1872.

with smooth margin and surface, in an enfeebled constitution, unaffected by the symptoms of other hepatic disorders, unless it be slight jaundice, there is nothing positive. The change may go on undiscovered even by a careful observer, until after death.

**Anatomically,** the liver-cells are gorged with oil; their nuclei being destroyed or obscured. With enlargement, the whole organ presents a pale and flabby as well as greasy aspect; and the latter property is obvious to the touch.

There is no **treatment** especially appropriate to this affection, other than what the constitutional state will point out.

## WAXY LIVER.

**Synonyms.**—*Amyloid*, *lardaceous*, *colloid* degeneration of the liver.

This is often an accompaniment of fatty degeneration; but also occurs quite frequently without it.

**Anatomy and Pathology.**—The waxy liver is pale or mottled in hue, and when cut, smooth, hard, and dry. It is heavier than natural. The degeneration probably begins in the lobular ramifications of the hepatic artery, and extends to the secreting cells. Under the microscope these are found to have a pearly look, and to have lost their cell-walls and nuclei. The acini or lobules remain very distinctly marked out.

Fatty degeneration may coexist with the waxy; and hence they have been confounded together. The weight of the liver is modified (made lighter) by the presence of fatty degeneration.

The term *amyloid* has been applied to the waxy or colloid change because of a somewhat starch-like chemical reaction of the degenerated material; which becomes mahogany red (instead of yellow) with a solution of iodine. Laennec and Portal noticed the occurrence of waxy liver, but confounded the change with fatty degeneration. Rokitansky (1842) ascertained the occurrence of the same sort of change in the kidney and other organs. Virchow and Meckel (1853) observed the violet color given to amyloid material by free iodine. Friedereich (1860) asserted this material to be not starch-like, but albuminoid in nature. It is stained of a red or violet color by methyl-aniline (methyl-green).

This kind of degeneration is almost always secondary. It is especially apt to attend upon tuberculosis. In a way not well understood, it often follows continued suppuration, in different parts of the body; *e. g.*, caries of the bones.

**Symptoms and Physical Signs.**—Anæmia, emaciation, and dropsy (often with vomiting or diarrhœa, but little or no jaundice), unexplained by other local or general causes, and occurring in a scrofulous, syphilitic, or malarial diathesis, may justify a suspicion of this form of degeneration.

Examination confirms this if we also find the liver uniformly enlarged and firm, with at the same time enlargement of the spleen and albuminuria.

**Diagnosis.**—Fatty liver does not exhibit so much increase in size as the waxy, and the latter is of a softer consistence upon pressure; splenic enlargement and albuminuria less often attend

the former; and the same is true of dropsy. Syphilitic inflammation of the liver differs from it in presenting prominent nodules upon the surface of the organ.

**Causation.**—Syphilis is the most common predisposing cause of waxy degeneration. The tubercular constitution probably comes next. It exists most frequently in males.

There is no especially indicated **treatment** for this affection.

### SYPHILITIC LIVER.

Among the organic affections now recognized as displaying locally the effects of the syphilitic diathesis, is a form of chronic hepatic inflammatory degeneration; that is, inflammation followed by a specific organic change of structure.

**Anatomically,** the liver is somewhat enlarged; with an uneven surface, from cicatrices alternating with nodules. This unevenness may be felt upon palpation through the wall of the abdomen. The patient is pale, but not jaundiced; and dropsy is not present as a symptom, unless from other organic causes.

In **diagnosis,** syphilitic liver is to be distinguished from *cancer* of the liver by the smaller size and softer consistence of the projecting nodules in the former, the absence of tenderness on pressure, and the presence of the signs of general syphilis; such as the marks of cicatrized ulcers in the throat, copper-colored blotches upon the skin, or nodes upon the bones.

For the **treatment** of this and other analogous affections, see *Syphilis*, later in this book.

### CANCER OF THE LIVER.

Mostly in middle life, but occasionally even in the young, cancer of the liver occurs, and has a more rapid progress than most cancers. The *symptoms* are, pain in the right side and shoulder, with tenderness in the right hypochondriac region, disorder of the stomach and bowels, rigidity of the abdominal muscles (especially the *rectus*), debility, emaciation, a cachectic aspect, and ascites or general dropsy. Sometimes, however, there is a remarkable absence of pain and of other symptoms, until a comparatively short period before death.[1] There is usually little or no jaundice.

**Physical exploration** shows dulness on percussion below and above the usual limits of the liver; and on palpation, irregular prominences, hard in most cases, but sometimes, in encephaloid cancer, soft and elastic. The enlargement may become very extensive, and then all the effects of pressure upon the portal vein, etc., are observed.

Dr. Huger, of Alabama, reports a case in which a cancerous liver was found after death to weigh 15 pounds 10½ oz. avoirdupois. (Charleston Med. Journal, April, 1874.)

This disease is always fatal; affording no room for other than merely palliative treatment. Its duration is often less than six months; seldom more than a year.

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[1] See cases reported by Drs. Glynn and Carter, of Liverpool; Med. Times and Gazette, Dec. 13, 1873.

## HYDATIDS.

These are elastic tumors, consisting of *cysts*, developed around *echinococci*. The latter are the larvæ or immature progeny of a *tænia;* they are found not only in the liver,[1] but also in the brain, muscles, bones, ovary, uterus, kidneys, lungs, heart, spleen, etc. The sac or cyst grows slowly, and may exist for years without great disturbance of the health. If any symptoms occur, they are indigestion, debility, and dropsy.

Hydatids are discovered upon inspection and palpation; the liver being considerably enlarged, so as to press up the diaphragm and right lung, or to sink far down into the abdomen. On percussion, besides an irregular line of extended dulness, a peculiar jelly-like vibration is sometimes perceptible by the finger used to percuss upon. If the tumors be so near the surface and so evidently elastic as to warrant the operation of exploration with a grooved needle, hypodermic syringe, or aspirator, the fluid drawn out will be very characteristic. It is colorless, of specific gravity not much above that of water (1007–1010), and free from albumen; it contains a large amount of chloride of sodium.

Sometimes the entozoa within the cyst die, and the sac collapses and disappears. In other cases it bursts and is discharged into the alimentary canal, the lungs, or externally through the abdominal walls. Slow recovery may then be anticipated. Danger always exists, however, that the hydatids may open into the pleural or peritoneal cavity, producing pleurisy, or peritonitis. In a few instances suppurative inflammation occurs in the cyst.

In the **treatment** of hydatids some physicians have been disposed to confide in the supposed power of iodide of potassium, and of chlorate of potassium, taken internally, to cause the absorption of the fluid of the cyst, and thus destroy the parasite. But the evidence does not appear to be sufficient to justify such confidence.

Very large and superficial hydatids may, when the diagnosis is clear, be *tapped*, with at least temporary relief to the patient. Should this be safely done without cure, it may be repeated, and then a gum-elastic tube may be introduced and retained in the opening, so as by drainage to induce the shrinking of the cyst and thus the destruction of the *echinococcus*. Dr. Pavy reports success in one case with injection of male fern into a hydatid cyst of the liver; its anthelmintic or parasiticide power seeming to be thus shown. Skoda has reported the cure of a case of large hydatid in the *left* hypochondrium, by injections of solution of iodine, left in each time for thirteen minutes.

## TUBERCLE OF THE LIVER.

Primary tuberculization of the liver is never met with. In patients dying with phthisis, not unfrequently miliary tubercular deposits are found scattered over the gland; they rarely soften, but sometimes small *vomicæ* are met with. It is of course necessary to be aware of the possible existence of such formations, in the consideration of the morbid anatomy of the liver.

[1] Of 508 cases of hydatids, Cobbold and Davaine found the liver to be affected in 216.

### DILATATION OF THE GALL-BLADDER.

This may be produced by obstruction of the gall-duct or the common bile-duct, or, more rarely, by a morbid formation of serous fluid within it, allied to a local dropsy. The diagnosis of this may be important, as it may be readily confounded with hepatic enlargement. It is to be distinguished from cancer by the great amount of jaundice (in most cases), the previous occurrence of gall-stone colic (also not invariable), and the more uniform and softer character of the swelling. From hydatids the same signs, except the softness of the tumor, are distinctive; and hydatids grow much more slowly.

For the **treatment** of dilatation of the gall-bladder, the remedies suitable for obstruction of the biliary ducts will be appropriate. Surgical interference is, in any case, bold practice; unless, perhaps, by pneumatic aspiration. The operation of *cholecystotomy* (puncturing or incising the gall-bladder) for removal of gall-stones, has, however, several times been performed; in a few instances with success. Although proposed by Petit (1733), and several others since, the first recorded example of it (except one mentioned in Good's *Study of Medicine*, 1855, without particulars) was that of Dr. Bartholow, in 1876. G. Brown, Marion Sims, W. W. Keen, Bryant, Lawson Tait, and Calhoun have followed; the last three, with recovery of their patients.[1]

**Perforation** of the gall-bladder or gall-duct now and then occurs, from prolonged obstruction and dilatation. This must prove fatal (as in a case referred to upon a previous page) by the production of peritonitis, from the escape of bile into the peritoneal cavity.

*Gall-stones* are alluded to under "Bilious Colic."

## AFFECTIONS OF THE SPLEEN.

These are necessarily treated of at length in extended systematic treatises. It will be enough for our purpose to say a very few words of them. The spleen is commonly **enlarged** in *intermittent*, *remittent*, and *typhoid* fevers and in *leucocythæmia*; sometimes, in pregnancy (Simpson). **Rupture** of the spleen, causing death, has been several times reported. Such an affection (*i. e.*, rupture of the spleen) could scarcely be diagnosticated during life.

Enlargement of the spleen is readily ascertained by inspection and palpation. It often increases and diminishes, during and between the paroxysms of intermittent (ague-cake). Piorry asserted its *rapid* diminution under cinchonization. Some practitioners have found it to diminish under *hypodermic injections of ergotin*.[2] *Faradaic electrization* will also have a similar effect. Other affections of the spleen (**inflammation, tubercle, hydatids,** etc.) are so generally difficult of diagnosis as to have chiefly a post-mortem interest; and they present no clearly recognized

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[1] See papers on the subject by Dr. W. W. Keen, Amer. Journal of Med. Sciences, January and April, 1879; and by Dr. C. W. Calhoun, of Turkey in Asia, in N. Y. Med. Record, Jan. 29, 1881, p. 116.

[2] Da Costa, Amer. Jour. of Med. Sciences, Jan., 1875.

indications for treatment. About forty cases have been reported[1] in which the spleen was removed entirely; more than half of the patients recovered.

## AFFECTIONS OF THE KIDNEYS AND BLADDER.

### CONGESTION.

**Causation.**—Under exposure to cold, overdoses of cantharides or turpentine, or the disturbance belonging to different inflammatory and febrile complaints, *active* renal congestion may occur. *Passive* congestion is more common in heart-disease, or pulmonary obstruction, as by pleuritic effusion or emphysema, or when pressure impedes the circulation in the renal veins or ascending vena cava, as in pregnancy or abdominal tumors.

**Symptoms.**—Pain in the lumbar region, sometimes with tenderness on pressure on each side of the spine. Scanty urination, the fluid being high-colored, sometimes bloody, or containing albumen. Certain cases exhibit under the microscope fibrinous casts; epithelial cells are commonly met with.

**Diagnosis.**—It is only occasionally difficult to distinguish this condition from Bright's disease. Active congestion begins abruptly under a recognizable cause. Passive congestion shows a dependence upon some other organic affection, and although variable, is not progressive. They are thus distinguishable from advancing and more or less permanent disease of the kidneys.

**Treatment.**—For active congestion, cupping the lumbar region is proper, abstracting blood in amount proportioned to the state of the patient. Purgation may follow, by castor oil or citrate or sulphate of magnesium. Then, the warm bath or hip-bath, continued for some time.

### URÆMIA.

**Definition.**—The retention in the blood of the material which it is the function of the kidneys to excrete; from the suppression of their action.

**Symptoms.**—When well-marked, headache, dimness of vision, vomiting, diarrhœa, convulsions, and stupor; ending in fatal coma.

The temperature of the body is generally above the normal degree. This aids in the diagnosis between uræmic coma and opium poisoning; in which the temperature is lower than natural.

**Pathology.**—The question as to what is the *immediate* toxic agent in uræmia is not yet fully determined; *i. e.*, whether it is urea, or an ammoniacal educt from its decomposition in the blood. In the absence of demonstration of the latter, the former appears probable. A further view has been urged; that it is unchanged creatin, creatinin, and other extractives, that contaminate the blood. (See *Bright's Disease.*)

The term *urinæmia* is a safe one, not involving either of these

[1] London Med. Times and Gazette, Dec. 7, 1867. This is less extraordinary than Prof. G. Simon's case (Deutsche Klinik, April, 1870), in which he extracted successively the left ovary, the uterus, and the left kidney; and the patient recovered. See also Am. Jour. Med. Sci., April, 1878, and April, 1879.

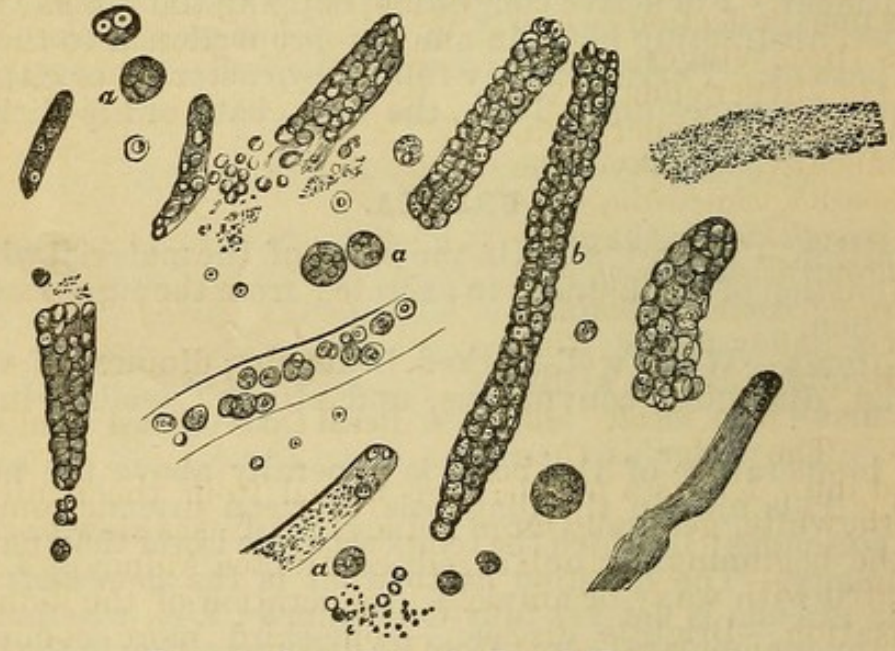
opinions. Traube has proposed the hypothesis that the uræmic symptoms, so considered, in Bright's disease, may depend upon œdema of the brain.

**Treatment.**—This must vary with the circumstances of the production of the suppression; but the great indication is to *depurate the blood*—by the kidneys, if they can be restored to action, and by the aid or substitution of the bowels and skin.[1] For this end, the warm bath, or the hot-air or warm vapor bath may be of great service. In acute sthenic cases, moderate venesection will do good. So may cupping, hot poultices or counter-irritation by mustard or tincture of iodine over the small of the back. Dr. B. W. Richardson has especially urged venesection as the most hopeful remedy for uræmia. Saline cathartics, even hydragogues, may be given to such patients as have strength to bear them; as cream of tartar, Epsom salts, elaterium, or croton oil; the last two most rarely. Lemonade drunk freely is often one of the best of diuretics. Others will be mentioned hereafter, in connection with Dropsy. Dr. A. L. Loomis has reported successful results in the treatment of uræmic convulsions with hypodermic injections of morphia.[2]

## NEPHRITIS.

In the present state of urinary pathology, it is common to merge the topic of inflammation of the kidney (except suppura-

FIG. 104.




Deposits from Urine in Renal Hyperæmia.

tive pyelitis) as distinct from active renal congestion—in Bright's disease. If this be questionable as a matter of pathological system, it has at least practically no disadvantage; as the symptoms of nephritis are included in one or other of the affections named;

[1] There is reason to believe (Cyon) that the liver also aids in the separation of urea from the blood.

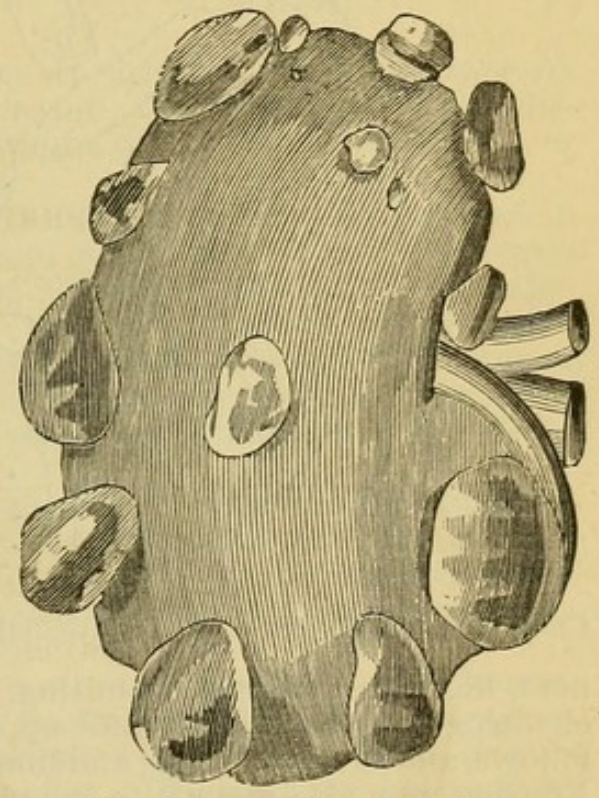
[2] N. Y. Medical Record, August 1, 1873.

and so is its treatment. We may submit therefore to the usage of authority upon this point, without hesitation. The symptoms of *acute pyelitis* (inflammation of the pelvis of the kidney) are essentially those of renal congestion, intensified ; with tenderness on pressure over the kidney, and fever, until suppuration is established ; then, purulent discharge for a variable time from the kidneys. (See *Pyonephrosis.*) Before pus appears, blood, in small quantity, mucus, and renal epithelial cells may be found in the urine. A tumor in one of the lumbar regions may precede for a while the escape of pus.

## BRIGHT'S DISEASE.

**Definition.**—Albuminuria, dependent upon structural change in the kidneys ; or, more correctly, disease of the kidney, characterized usually by albuminuria and dropsy.

FIG. 105.



Renal Cysts (dilated tubules).

**Varieties or Stages.**—Authorities differ as to the discrimination of these. Bright believed there were three varieties. Dr. G. Johnson asserts two—the desquamative and non-desquamative nephritis. Frerichs considers them to be grades of the same affection, and admits three stages, essentially of hyperæmia, exudation, and degeneration. Anatomically, we have the *large, smooth, white kidney*, the *small, smooth kidney*, the *granular uncontracted kidney*, and the *granular contracted kidney*. We may safely follow Roberts, dividing Bright's disease, first into *acute* and *chronic*. The latter is then divided into, 1. Cases which have lapsed from the acute state (smooth, white, generally large kidney) ; 2. Cases slow or chronic from the beginning (granular, red, contracted kidney) ; 3. Cases associated with waxy or amyloid degeneration of the kidneys.

**Causation.**—Bright's disease is one-third more common in males than in females. The greatest number of cases occurs between the ages of 45 and 65. *Acute* Bright's disease is most often produced by cold and dampness ; next by scarlet fever, pregnancy, or violent intemperance. *Malaria* is also to be included among its causes.[1] The acute form is most common in early life.

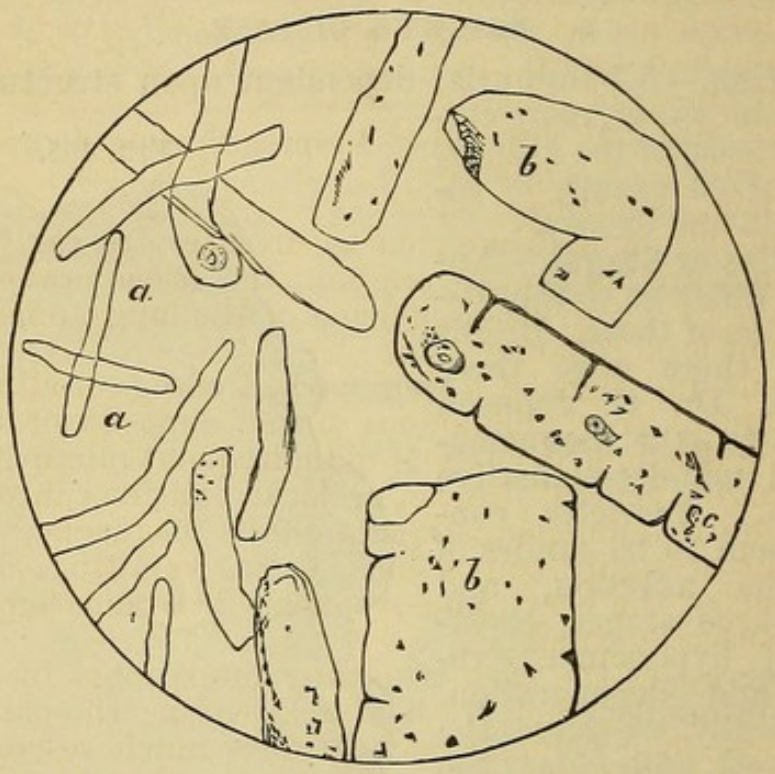
Chronic Bright's disease also is greatly promoted by exposure

[1] Busey, Am. Jour. of Med. Sciences, January, 1873.

to cold and wet; it is caused, moreover, very often, by abuse of spirituous liquors. Other predisposing causes are gout, valvular disease of the heart, constitutional syphilis, and affections of the bladder and urethra. Climate must have something to do with it; as the ratio of deaths from renal disease to all deaths is, in London 1 to 49, Paris 1 to 226, Bombay 1 to 2800, and Genoa 1 to 4303.[1]

**Symptoms. Acute Bright's Disease.**—After exposure to cold, or a drunken fit, or scarlet fever, the patient is seized with chilli-

FIG. 106.




Casts, in Bright's Disease. *a a*. Epithelial Casts. *b b*. Opaque Granular Casts.

ness, headache, nausea, vomiting, pain in the back and limbs, checking of perspiration, and oppression in breathing. Fever follows, and the face, trunk, and limbs become puffy with anasarca. Effusion may also occur into the pleura or peritoneum.

The *urine* is scanty, heavy, acid in reaction, and dark in color, from the presence of blood; and very albuminous. The disposition to void it occurs more frequently than during health. The deposit from it, under the microscope, shows blood-corpuscles, loose renal epithelium, free nuclei, tube-casts, and shapeless masses of fibrin and *débris*.

After one, two, or three weeks, or even a longer period, the attack proceeds to one of three terminations: recovery, death, or lapse into the chronic state. Death results through uræmia, or from secondary pneumonia, pleurisy, peritonitis, pericarditis —or hydrothorax, œdema of the glottis, hydrocephalus, or ascites. Probably two-thirds or more of the cases of *acute* Bright's disease recover.

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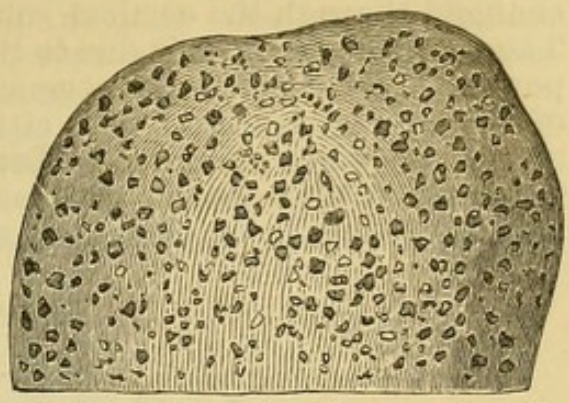
[1] See a paper by Dr. A. Flint, New York Medical Record, July 15, 1869.

**Treatment.**—Cupping the loins, hot water or hot-air or "blanket" bath; active purging, as with cream of tartar and jalap, or citrate of magnesium; and diaphoretics, as citrate of potassium, or liquor ammon. acetat. Mercury is not recommended. The diet should be *liquid* and simply nutritious.

FIG. 107.



Incipient Granular Degeneration of Kidney.

**Chronic Bright's Disease.**—This approaches so slowly as seldom to be detected until after the lapse of months or years. Gradual loss of strength, pallor or puffiness of the face, shortness of breath, and frequent disposition to urinate, are early signs of it. But they are not always present; the *dénouement* of the disease may be by a convulsion, œdema of the lungs, amaurosis, or some violent local inflammation.

Symptoms and signs of a well-marked case (not all present in every instance) are: albuminous urine, deposits of tube-casts and renal epithelium, dryness of skin, frequent micturition, especially at night, general dropsy, or local effusions into the cavities, indigestion, anæmia, uræmic effects (headache,[1] dizziness, impairment of sight,[2] convulsions, coma, vomiting, diarrhœa), enlargement of the heart, and secondary inflammations. Bronchitis is especially common.

The progress of the case is usually interrupted by exacerbations and intervals; each fresh attack leaving the patient manifestly worse than before. Such attacks much resemble acute Bright's disease; they are sometimes referred to known causes; the intervals may last weeks, months, or even years.

In **prognosis**, the tendency is always towards a fatal result. About one-third die of uræmic poisoning. A considerable number die of local dropsical effusions. One-fifth from secondary pneumonia, pericarditis, or pleurisy. The rest, by exhaustion, from anæmia, indigestion, and anasarca, or the complications of apoplexy, cirrhosis, phthisis, intestinal ulcerations, etc.

**Diagnosis.**—The presence of albumen in the urine, with dropsy, not of sudden origin or brief duration, is pathognomonic of this affection. The tests for albumen, by heat and nitric acid, are readily applied. The microscope will show also free renal epithelium and tubular casts in the urine; in advanced cases the casts are sprinkled with oil-dots. The solids of the urine, especially the urea, are reduced below the normal amount.

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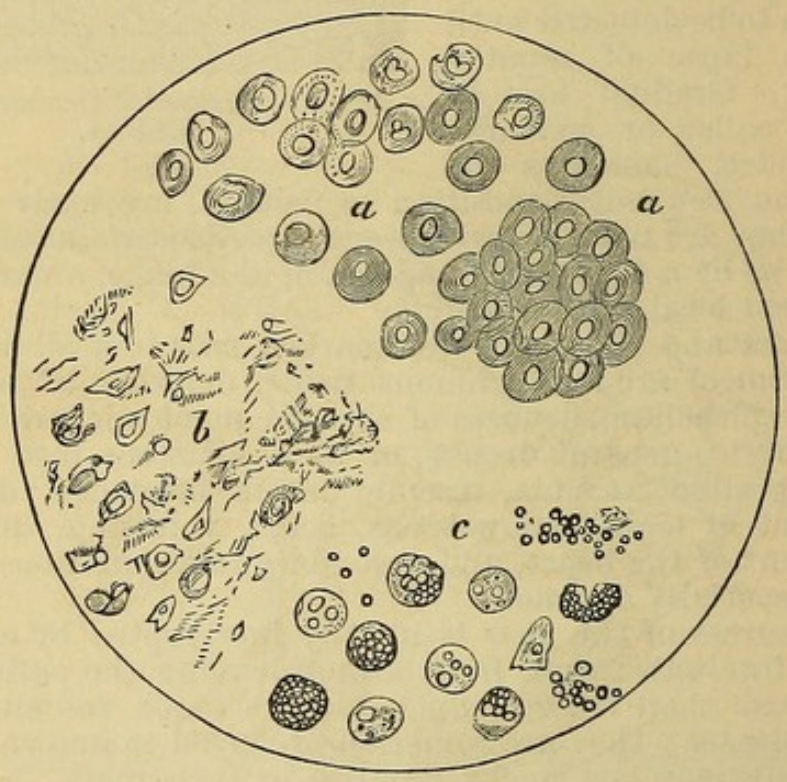
[1] *Occipital* headache is (Seguin) one of the signs of uræmia.

[2] Prof. J. Green, of St. Louis, has well described the ophthalmoscopic signs of albuminous retinitis in Bright's disease. There are usually white stellate spots on the retina, with enlargement of the retinal blood-vessels. Türck and others regard the affection of the retina as a fatty degeneration. Dr. Gouverneur Smith, of New York, remarks that dulness of hearing also occurs under similar causation, in some cases of Bright's disease. See Trans. of N. Y. Academy of Medicine, 1869.

**Pathology.**—Degeneration of the structure of the kidney (usually following interstitial inflammation) induces albuminuria, by allowing the serum of the blood to pass almost unchanged through the cortical substance into the *tubuli uriniferi.* The deficiency of urea is due to the same impairment of secreting power. The smooth white, generally large, kidney is the result of fatty degeneration; this either following an inflammatory attack, or being primarily a chronic atrophic affection. Dr. T. Grainger Stewart describes three forms of change: 1. The inflammatory form, with three stages: *a*, that of inflammation; *b*, fatty

FIG. 108.




Renal Epithelium. *a*, Normal. *b*, Atrophied. *c*, Fatty Degeneration.

transformation; *c*, atrophy. 2. The waxy or amyloid form, also with three stages: *a*, degeneration of vessels; *b*, secondary changes in the tubes; *c*, atrophy. 3. The cirrhotic, contracting or gouty form. Dickinson especially has shown the importance of the distinction into *tubal*, *intertubal*, and *vascular* disease. Dr. George Johnson has proved that in Bright's disease the coats of the small arteries in various parts of the kidney become thickened with hypertrophy. An early change in the arteries seems to be a part of most organic degenerations. Runeberg[1] suggests the occurrence of an abnormal *permeability* of the blood-vessels of the Malpighian tubes, as allowing the transudation of serum albumen.

Sir Wm. Gull and Dr. H. G. Sutton[2] advance the view that the affection of the kidneys is only a part of a morbid process going

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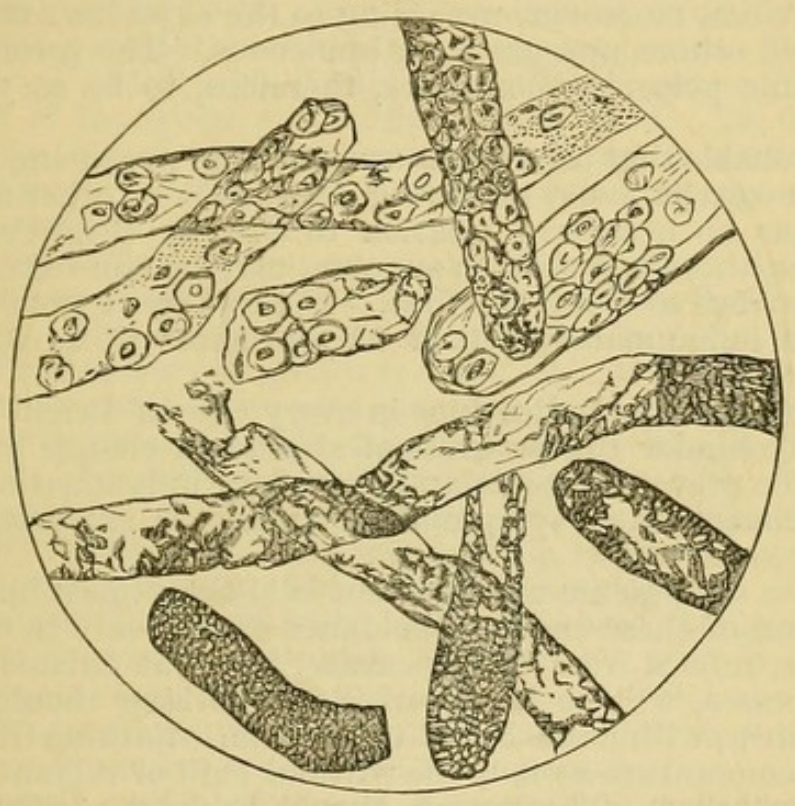
[1] Deutsche Archiv f. Klin. Med., vol. xxiv., p. 248.
[2] Medico-Chirurgical Transactions, vol. lv., 1872.

on in the general vascular system; to which they give the name "arterio-capillary fibrosis." In the vessels of the affected kidney, two kinds of change may occur; one, degeneration of the arteries; the other, thickening of their muscular walls. It appears improbable that these alterations should occur together. It is to be inferred, from all the facts, that when the disease is *tubal* (intratubal) in its origin and seat, *muscular hypertrophy of the renal arteries* results as an effect of the abnormal resistance to the flow of blood (as does also cardiac hypertrophy in the same case); while many instances also are observed in which the later

FIG. 109.



Waxy Casts.

morbid alteration is *intertubal*, consisting of arterial fibrosis or other degeneration of the vessels.

Da Costa and Longstreth,[1] on the basis of several autopsic examinations, assert the view that a morbid affection of the *nerve-ganglia* of the renal plexus precedes the disorder of the kidneys; giving a primary neurotic origin to the affection.

Bamberger, of Vienna,[2] insists that parenchymatous and tubular nephritis, as well as amyloid degeneration of the kidney, are very common secondary accompaniments of tubercular phthisis.

In regard to the immediate source of the albumen in the urine, evidence predominates that it transudes from the "glomeruli" or capillary tufts of the kidney. Litten considers its origin to

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[1] Am. Journal of Med. Sciences, July, 1880.
[2] Volkmann's Sammlung Klinischer Vorträge, No. 178.

be, in an early stage, dilatation of those capillaries; later, their degeneration.[1]

After having myself held for many years that (as above stated) the arteries and the heart *both alike* undergo hypertrophy in consequence of the obstruction to the normal flow of blood into the diseased kidneys, it is a gratification to find this view supported by Dr. W. H. Dickinson,[2] of St. George's Hospital, London.

As for the mode of death in Bright's disease, it appears reasonable to refer it to uræmia (urinæmia.) Jaksch and Treitz have used the term ammonæmia, to indicate a supposed poisoning by ammonia or its salts. But the amount of ammonia ever present at once in the blood is not likely to be sufficient to produce toxic effects. Urea, moreover, according to the experiments of Feltz, Ritter, and others, appears to be innocuous. The precise nature of urinæmic poisoning continues, therefore, to be as yet unexplained.

It is probable that the transitory condition producing albuminuria after scarlet fever, or during diphtheria or other acute disorders, has no necessary relation to chronic Bright's disease. The latter, there is reason to suppose, may be non-inflammatory and degenerative from the first. Yet, where a predisposition exists, an inflammatory attack may promote it, as with other degenerations.

**Treatment.**—The indications in every case of Bright's disease are: 1. To hinder the progress of structural change in the kidney; 2. To prevent uræmia and secondary inflammation; 3. To palliate concomitant symptoms or states, as anæmia, dropsy, dyspepsia, etc.

Regimen or hygienic management is of the utmost importance for the first of these ends. Avoidance of exposure to cold, wet, or fatigue, reform from intemperance, if it has existed, or from other excesses, will be indispensable. Clothing should be sufficiently warm, with flannel next to the skin. Bathing frequently, at such temperature as is borne without chill or relaxation, is to be recommended. The bowels should be kept regularly open. Nourishing diet, of which milk may generally be part, is of consequence. Yet, to give the kidneys as little work of elimination as possible, it is desirable that the amount of *nitrogenous* (especially animal) food taken should be limited.

Iron will do more good than any other medicine, unless it be cod-liver oil with persons of strong stomach. These medicines may be very well combined. The tincture of the chloride of iron is as good as any other chalybeate, as a general rule. With some, the citrate of iron in solution, or the carbonate or the iodide will agree more readily. Iodide of potassium is lauded by Cryni, of Brussels, and others. In the albuminuria of pregnancy and of scarlet fever, Dr. W. S. Hill,[3] of Maine, has found benzoic acid

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[1] Perls (1880), followed by Posner, Litten, and others, applied *coagulation by heat* to the post-mortem investigation of disease of the kidneys and other organs. By this method, in the "large white kidney," the capsules and uriniferous tubules have been shown to be distended with albuminous fluid. See Lancet, March 20, 1880.

[2] A Treatise on Albuminuria, 2d edition, 1881.

[3] Amer. Journal of Med. Sciences, July, 1881, p. 169.

(about two grains every four hours) very beneficial. It may do good also in some cases of Bright's disease.

It is very doubtful whether astringents ever check to advantage the waste of albumen through the kidneys. If any be worth the trial, it is ammonio-ferric alum. Counter-irritants over the kidneys, unless of the mildest character (tinct. iodin. emplastr. picis, etc.), will not do any important good in **chronic** Bright's disease.

For the dropsy, warm baths and hydragogue cathartics are advised. Of the latter, cream of tartar and jalap together are favorites; 2 or 3 drachms of the bitartrate with 10 to 20 grains of jalap two or three times a week. If serious dropsical accumulation threaten life, elaterium (gr. $\frac{1}{10}$ or $\frac{1}{4}$ every four hours, in pill, till it acts) may be given. But it is a decided mistake to harass the patient constantly with exhausting purgation. It is to be remembered that it can act only as a *palliative*, removing part of the *effects* of the malady, not the disease itself. Da Costa has recorded[1] a case of recovery from acute Bright's disease under drachm doses of *jaborandi*, thrice daily, producing copious sweating and urination.

If the warm bath do not agree, or fail to produce diaphoresis, those who have access to it should try the *hot-air bath*, at 130° to 150° Fahr. This rarely fails to produce free perspiration. For weaker invalids the vapor bath is available; or the *hot-sand bath*.

Of diuretics, acetate of potassium, spirit of nitrous ether, and infusion or compound spirit of juniper will be the least likely to disappoint. But all will not unfrequently fail.

Then we have a resource (where tapping for ascites is not demanded) for the relief of great œdema, in the use of incisions with a lancet, or needle, in the swollen legs and feet. I prefer a number of small incisions with an abscess lancet, plunged through the skin of the calf and dorsum of the foot. It is just possible that erysipelas may follow; but this danger will be lessened by repeated warm sponging of the limbs, washing them with diluted glycerin, or inunction with lard or cold cream.

For *uræmia*, blood-letting (W. Roberts) is a powerful, but, on account of debility, a *rarely applicable* remedy. We can, indeed, usually do nothing for this condition other than to urge all those measures which promote secretion, especially of the kidneys, skin, and bowels; to which allusion has above been made. Jaborandi (or pilocarpin) has been considerably employed for such action in recent practice. Dr. Prentiss, of Washington, has reported[2] a remarkable case in which pilocarpin gave relief after eleven days of suppression of urine.

The **complications** of Bright's disease must be treated according to their own indications, on general principles, bearing in mind always the *degenerative* and *asthenic* tendencies belonging to the malady itself.

## LITHIASIS.

**Definition.**—The formation of calculous deposits (gravel or stone) in the kidneys or bladder.

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[1] Hospital Gazette, 1879.

[2] Phila. Med. Times, July 2, 1881.

**Causation.**—Stone is, by statistics, nearly ten times as frequent, or at least as fatal, in the male as in the female. It destroys life most often after fifty years of age; but is far from uncommon in early life, even under five years. *Locality* has something to do with the causation of stone and gravel. They are common in England, Scotland, Iceland, France, Northern Italy, and Egypt, and uncommon in Ireland, Sweden, Norway, and Austria. In this country they are not rare; the greatest number of cases probably occurs in the State of Kentucky.

**Varieties.**—Of these a sufficient account (for our purpose) has been given in the first part of this book. (See *Semeiology.*)

**Diagnosis.**—Examination with the *sound* is indispensable to determine the presence of a calculus in the bladder. The characters of the urine will aid in determining its nature. If the urine be decidedly acid, the stone is probably uric acid or oxalate of calcium, or a combination of both. If alkaline from fixed alkali, it is either phosphate or carbonate of calcium (both rare). If alkaline from volatile alkali, whatever its nucleus or central part, the surface must be formed of the ammonio-magnesian phosphate with phosphate and carbonate of calcium.

Pain in the bladder and in the back, and pain or itching in the glans penis, retraction of the testicle, and interruption in the flow of the urine, occurring at times suddenly, are the most prominent symptoms of stone in the bladder.

**Gravel** consists of small calculous concretions, which may be voided through the urethra. Pain in the back, with chilliness followed by fever, commonly precedes an attack, or "fit of the gravel;" to which some persons are subject whenever they take cold or suffer from indigestion. *Extreme* pain may attend the transit of a small calculus through the ureter from the kidney to the bladder.

This troublesome affection (gravel), in the large majority of instances, is owing to undissolved uric acid and the urates.

**Treatment of Gravel.**—Under the indication suggested by the last-mentioned fact, the dilution and alkalization of the urine are called for. The small calculi often irritate the bladder painfully, inducing sometimes spasmodic retention of urine. Free draughts of a demulcent liquid, as flaxseed tea, will do good; and the secretion may be made more copious, and thus dilute, and the solution of uric acid and its compounds promoted, by the administration of spirit of nitrous ether and bicarbonate of sodium, in tolerably full doses, three or four times a day during the attack [F. 122]. The agonizing pain from the passage of a calculus through the ureter will require anodyne treatment, by opium, or inhalation of ether or nitrous oxide, and relaxation by the prolonged warm bath.

**Prevention.**—Any one predisposed to gravel (one sign of which tendency is a pink stain in the urinal left after the urine has been thrown out) should avoid highly animalized or otherwise stimulating food. The urine may be kept dilute by taking a tumblerful of water two hours before dinner, and another at bedtime. The skin must be kept open by baths, frictions, and sufficiently warm clothing. Exercise will generally be beneficial in prevention. If

acidity in the urine be positive, *small* doses of the bicarbonate of sodium, or of the acetate, citrate, or carbonate of potassium may be taken daily. Natural mineral waters appear sometimes to do good; especially those of the Crab Orchard Springs in Kentucky and Bedford Springs of Pennsylvania; and, in Europe, the Vichy, Friedrichshalle, Püllna,[1] Carlsbad, and other waters.

**Treatment of Calculus.**—Although the result of much experimentation had been, until of late, to turn over the management of stone to the operative surgeon, reason has been given for hoping for something in its relief without the knife or lithotrity. Dr. W. Roberts has, in this, made some promising observations and experiments.

Urinary calculi may be, practically, divided into those soluble in alkalies and those soluble in acids. Of the first, are uric acid and its salts, and cystine; of the second, phosphatic and mulberry calculi. Solvent treatment affords hope only by alkalizing the urine, in cases of the former, by medicines taken by the mouth; and injecting acid solutions into the bladder, for direct action upon mulberry calculi and the phosphates.

Very weak solutions of acetate or citrate of potassium, taken often, alkalize the urine most efficiently, according to Dr. Roberts's experiments. He does not encourage the hope that *large* or old calculi can ever be so dissolved. Koehler[2] affirms the solvent power of *boro-citrate of magnesium* for uric acid calculi. Its dose is a large teaspoonful in half a tumblerful of water, thrice daily. Dr. J. C. Murray[3] considers it important for the success of the solvent practice that the *drinking water* of the patient shall be comparatively free from calcareous salts. Dilute nitric acid is proposed for injection into the bladder for the solution of phosphatic calculi, especially after their being broken down by the lithotrite; and Sir B. Brodie and Mr. Southam have carried this procedure with some success into practice.

## DIABETES INSIPIDUS.

**Definition.**—Excessive discharge of almost colorless urine, of light weight, containing neither sugar nor albumen; with *polydipsia* or excessive thirst. **Synonym,** *polyuria.*

**Causation.**—This is various, and generally obscure. More males have the affection than females. It is most common between five and thirty years of age. Blows on the head, intemperance, cerebral disease, and exposure to cold, or drinking cold fluids while heated, are among the supposed causes.

**Pathology.**—This, too, is various and often undetermined. In some instances degeneracy or atrophy of the kidneys has been found after death; in others, renal congestion. Very probably the degeneration may be secondary. Probably the *immediate* cause of the excessive urination is dilatation of the capillary vessels of the kidneys; this having its origin in some remote

[1] Püllna water, however, is rather strongly purgative. Sir H. Thompson prefers the Friedrichshalle.
[2] Berliner Wochenschrift, Nov. 3, 1879.
[3] London Lancet, Feb. 1, 1873.

agency which disturbs the ganglio-nervous influence that controls the circulation.

**Symptoms and Course.**—Often beginning suddenly, the amount of water passed may reach ten or twenty quarts *per diem*. Thirst is intense, and withholding liquids does not arrest the polyuria. The skin becomes dry and harsh. Debility and emaciation attend, when the attack is prolonged.

The **duration** of the complaint varies from a few days or weeks to many years—or a lifetime. It is sometimes congenital. An intercurrent attack of febrile or inflammatory disease sometimes suspends, or even cures it.

**Treatment.**—This has been, so far, tentative only; no specific is known for it. Nitrate of potassium, valerian, ergot, iron, alum, lime-water, tannic and gallic acid, creasote, and bromide of potassium are the medicines most worthy of trial. Blistering the nape of the neck has also been suggested.

## DIABETES MELLITUS.

**Synonym.**—*Glycosuria.*

**Definition.**—Excessive urination, with the presence of sugar in the urine.

**Causation.**—Twice as many men as women have this disease. It is most frequent among young and middle-aged adults; the mortality from it being greatest from fifteen to fifty-five. It is more common in cities and manufacturing districts than in the open country. Occasionally it is hereditary. It is common in England, not infrequent in America, but in Germany and Austria, rare.

*Exciting* causes appear to be, exposure to cold and wet; drinking cold water largely when heated; excessive use of saccharine food; intemperance; violent emotion; febrile diseases; and organic affections and injuries of the brain and spinal cord. Temporarily, at least, saccharine urine accompanies several diseases, as chorea, epilepsy, hysteria, delirium tremens, insanity, cholera (period of reaction), pneumonia, and rheumatic fever (convalescence). Inhalation of ether and that of chloroform may have the same effect. *Milk-sugar* has been found (Hofmeister, Hoppe-Seyler) in the urine of puerperal women.

**Symptoms and Course.**—Beginning insidiously, with malaise and slight loss of flesh, urination becomes excessive, with corresponding thirst, and very often *bulimia* or excessive appetite; emaciation is progressive; the skin is harsh and dry; the tongue glazed and furrowed, the mouth clammy;[1] the sexual and mental powers fail by degrees. Symmetrical neuralgia (of the sciatic or dental nerves on both sides) sometimes occurs (Worms[2]). Lastly, hectic fever, œdema of the limbs, diarrhœa, and often all the symptoms of pulmonary consumption terminate the case.

**Complications.**—Tuberculization of the lungs occurs in nearly half the cases of diabetes mellitus which last over a year or two.

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[1] Guénau de Mussy asserts sourness of the breath to be a characteristic of diabetes.
[2] Archives Médicales Belges, Feb., 1881.

Inflammations of an asthenic type are common in all the organs. Boils and carbuncles are very frequent. Gangrene of the lower extremities has been several times observed. Amblyopia (obscure vision) is present in about one-fifth of the cases. *Cataract* generally forms in cases of long standing; but may be absent altogether in those of less than two years' duration. The *endosmotic* theory of diabetic cataract, suggested by the production of opacity of the lens in frogs by immersion in a saccharine solution, or by injecting the same into the cellular tissue, is of doubtful application. Objections to it are, the temporary nature of the saccharine cataract in the frog, the occasional occurrence of diabetic cataract in one eye only, and the late period at which the symptom occurs in the disease.

**Morbid Anatomy and Pathology.**—Much remains to be done before the pathology of diabetes can be said to be ascertained. In only about half of the cases some degree of renal alteration is found. Physiological facts and experiments, in regard to the "glycogenic function of the liver," point to that organ as the probable seat of the disorder. Other observations, as to the production of diabetes in animals by injuring the medulla oblongata or the base of the brain, are also suggestive. But, although in some instances autopsic inspection has agreed with such expectations, in many other cases it has failed to confirm them. The true theory of diabetes therefore remains for the future to discover, or, at all events, to complete.

The most plausible hypothesis, certainly, is that under disturbed innervation, the liver modifies its ordinary assimilative process so as to confiscate (to use a bold figure) most of the carbo-hydrogenous material derived from the alimentary canal through the portal vein, and convert it into glucose or diabetic sugar, which is then eliminated by the kidneys.[1]

**Diagnosis.**—The detection of sugar in the urine, not temporarily, but for a considerable time, is of itself sufficient to make out the case. The principal modes of testing saccharine urine have been already given in another part of this book. (See *Semeiology.*)

**Prognosis.**—Recovery is not impossible in diabetes; but a large majority of cases end in death. *Amelioration*—keeping the disease in abeyance—is often an attainable end. The younger the patient in whom the disorder begins, the less the ultimate hope. In old persons glycosuria seems more often compatible with tolerable health for a long time. Cases traced to mental emo-

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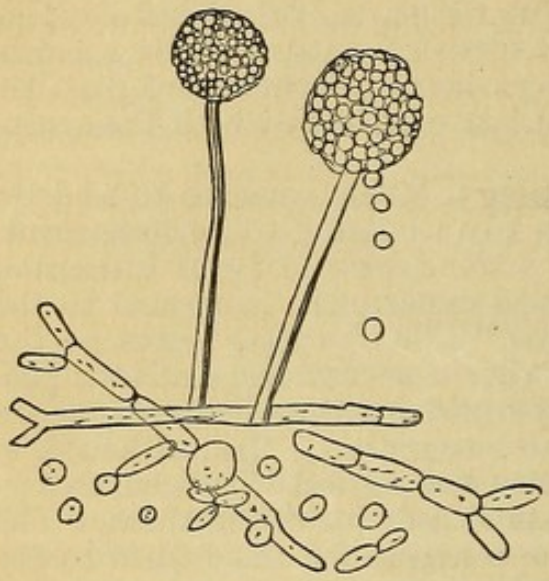
[1] It seems to be established that a natural product of the liver is an amyloid material (hepatin, liver dextrin, glycogen); whether Bernard's view of the normal destiny of this being its constant conversion into sugar (and subsequent combustion by oxidation in the blood) be correct, or rather that of Pavy, that such conversion is always morbid, or post-mortem. *Artificial* glycosuria may be produced in animals by puncturing the floor of the fourth ventricle of the brain, impeding respiration, thrusting needles into the liver, obstructing the abdominal venous circulation, injecting acid into the veins, poisoning with strychnia and woorara, and chloroform or ether inhalation. Dr. McDonnell has proposed the theory that "glycogen" normally in the liver combines with nitrogenous matter derived from food, to make plastic material for tissue; and that this process is interrupted or arrested in diabetes. Schiff caused glycosuria by merely inducing mechanical hyperæmia of the liver. Excision of the spleen in animals has produced the same effect.

tion or to injuries are somewhat more hopeful than those of indistinct origin.

Amblyopia, cataract, and albuminuria, as well as phthisical symptoms, mark the case as incurable. Considerable diminution of the sugar, or of the water passed, is always a favorable prognostic. But the diabetic patient is much more liable than others to those inflammatory complications which, on slight exposure, may hasten the termination of life.

FIG. 110.



Sugar Fungus.

**Treatment.**—No direct control over the sugar-forming process in the body has yet been obtainable by medicine. But, although it would seem that simply diminishing the formation of sugar by withholding material for it ought not to be *expected* to do much good, it does prove beneficial. At the same time Dr. Harley has shown that the *weight of the patient*, not the amount of sugar passed, is the true test of improvement or the reverse. The most generally approved measure in the management of diabetes, is the prohibition of sugar and starch, and of everything which can yield them, as food. Bread, except bran bread, which contains but little starch, potatoes, and nearly all vegetables and fruits, must be excluded. The safe exceptions are the cabbage, broccoli, onions, spinach, celery, and lettuce. Of animal diet, milk and liver are forbidden articles. Donkin's treatment, however, with *skimmed* milk, is reasonable in diabetes, and may answer very well. All meats, eggs and butter, and jellies, are allowable. *Gluten bread* is made in France, on Bouchardat's plan, without starch, inflated by machinery with carbonic acid or compressed air. Tea or coffee may be sweetened with glycerin (chemically pure, as Bower's or Price's). Spirits, wines, and beer should be avoided unless called for by very positive weakness; if that exist, the least saccharine should be preferred, as sherry, claret, or whisky, in minimum quantities. There is no advantage in restricting the amount of water taken to quench thirst. *Variety* of diet of course, within the prescribed limits, is important to prevent disgust and loss of appetite.

Of medicines, *none* have been yet shown to do much service in checking the disease. The most positive influence in diminishing the diuresis and secretion of sugar (Pavy), belongs to opium; but this does not appear to interfere much with the progress of the disease. Dr. Buttura reports the cure of a case by a seton in the neck. Sir T. Watson speaks well of the relief afforded by the *hot-air bath*. Various drugs have been tried, and lauded greatly by different users; but their effects will not bear scrutiny without

disappointment. Among them the most prominent are alkalies, yeast, rennet, pepsin, iron, quinine, creasote, carbolic acid,[1] alum, iodine, nitric acid, turpentine, citrate of sodium (half a drachm to a drachm daily), arsenic, *ergot*, *jaborandi*, and the inhalation of oxygen. Even free ingestion of *sugar* has been fairly experimented with. Dr. Wadham found, in one case, that using *bread* as food increased the sugar in the urine, while white *sugar* did not. No cure resulted, however, from the use of sugar. The remedy for diabetes remains to be discovered. Cod-liver oil and other *analeptics* are indicated, to counteract the tendency to debility and emaciation. Rubbing with oil (Inman) may perhaps do good in the same way. Drs. Donkin and Greenhow report recoveries upon an exclusive diet of skimmed milk.[2] Professors Cantani and Primavera,[3] of Naples, assert great success under an exclusive meat diet, with the administration, at each meal, of ℈ij–iv of lactic acid, in water f℥vj, and also f℥ss of alcohol in water f℥vj. The purpose of the lactic acid and alcohol is to substitute the saccharine and farinaceous constituents of food, without any material for the formation of sugar. Schaetzke[4] treated three cases successfully with salicylic acid. M. Lefort obtained improvement in a case by the *constant* galvanic current: one pole being applied to the back of the neck, and the other over the region of the liver (*Gazette Médicale de Paris*, April 13, 1872).

## HYDRONEPHROSIS.

**Definition.**—Renal dropsy; dilatation of the kidney from obstruction of the ureter.

**Causation.**—Quite a number of the cases recorded have been congenital, from anatomical malformations. Calculus in the ureter is the most frequent post-natal cause; but other mechanical obstructions from pressure may occur.

**Diagnosis.**—Intumescence of the abdomen, usually upon one side, in the hypochondriac, umbilical, and iliac regions, with a soft undulating feel, an outline often lobulated, and fluctuation, as well as dulness upon percussion, can, in the male at least, only indicate either hydro- or pyonephrosis. The *symptoms* may be almost null if only one kidney be affected. When both are so, uræmia finally results. The tumor is commonly quite painless, and not tender upon pressure. This affection is, however, quite rare. It may be fatal by uræmia, or by bursting of the sac into the abdomen; but it has in a number of cases existed for many years.

**Treatment.**—*Manipulation*, kneading gently, day after day, has sometimes succeeded in dissipating the renal distension. Nothing else should be attempted, unless life be endangered by the pressure of the tumor or by uræmia. If it be so, tapping is justifiable; and it has been repeatedly performed with success. Preliminary explorations may be made with the grooved needle, hypodermic syringe, or aspirator.

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[1] Ernstein and Muller, Berlin Klin. Woch., Dec. 8, 1873.
[2] Brit. Med. Journal, June 7, 1873.
[3] New York Med. Record, May 1, 1873.
[4] Berliner Klin. Wochenschrift, June 2, 1879.

### PYONEPHROSIS.

This differs from the last-named affection in the production, under similar circumstances, with more or less inflammation, of *suppuration* of the kidney. The symptoms are therefore more active, and the prognosis more grave. Rupture of the suppurating kidney into the colon, duodenum, or peritoneal cavity, is common, and is often fatal. Renal abscess may occur also from "purulent infection" and from embolism. Such an abscess *may* find escape for its contents externally; any appearance of such a tendency should be encouraged by poulticing, and, in fit cases, by aspiration, incision, and evacuation.

**Perinephritic** abscess has been described as a rare affection by Rayer, Trousseau, Bowditch,[1] and others. Its signs are pain and swelling in the lumbar region, chills and fever, emaciation and debility, with some lameness of the lower limb on the side affected. Pleuritic or pulmonary complication may occur. In three cases treated by Dr. Bowditch, recovery took place after incision for the discharge of pus, in a few weeks or months. Dr. F. D. Lente, of Cold Spring, N. Y., has also succeeded in obtaining recovery, after cutting down upon the kidney through the *quadratus lumborum* muscle, and effecting drainage by means of a tube or canula.

### CANCER OF THE KIDNEY.

**Primary** cancer of the kidney is, though rare at any age, *most* frequent in early childhood. Of adults, males have been the most numerous subjects of it. **Secondary** renal cancer may attend any case of the cancerous cachexia, without materially modifying its history.

The kind of cancer affecting the kidney is nearly always the **encephaloid**; called, when highly vascular, fungus hematodes. It always begins in the cortical substance. The tumor is generally large, and sometimes enormous; reaching in one case (Roberts) 31 pounds. It is exceedingly rare for both kidneys to be affected.

**Diagnosis.**—An abdominal tumor, with copious hæmaturia repeated at irregular intervals, is almost certain to be cancer of the kidney.

Beginning between the ribs and crest of the ilium on one side, the tumor grows forwards, upwards, and downwards, so as to fill in some cases the whole belly. The colon in this, as in all renal tumors, lies in front of it; as does also sometimes a part of the small intestine. Except over the intestine, percussion-resonance is dull.

The swelling is smooth or irregularly lobulated; now and then a sort of fluctuation, and in one instance pulsation, have been observed in it. It is *fixed* in its position.

Bloody urine, usually profuse hemorrhage, is present in about half the cases. No other tumor has such hemorrhage attending it:[2] its occurrence is therefore pathognomonic. The discovery

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[1] Boston Med. and Surg. Journal, July, 1868.

[2] Roberts mentions one case of great enlargement of the spleen with hæmaturia.

of cancer-cells in the urine, by the microscope is of course still more positive; but this sign is very often absent, and the cells are not at all easy of identification when they occur.

Pain mostly, but not always, attends cancer of the kidney; it is sometimes of great severity, shooting down the ureter to the thigh. Tenderness on pressure seldom exists. *Variable* symptoms are those of disorder of the stomach and bowels. Emaciation and anasarca show the exhaustion which precedes death.

The **duration** of cancer of the kidney in children averages seven or eight months; in adults over two years. This is a longer period than that of any other visceral cancer.

In **treatment,** as with other malignant diseases incapable of cure, the judicious management of *regimen* and *anodynes* is all that is possible; except that *extirpation* of the kidney has, of late years, been several times successfully performed.[1]

## TUBERCLE OF THE KIDNEY.

This may be either primary or secondary. Of all tuberculous subjects, the kidney is found to contain such deposits in only from five to six per cent. Among tuberculous children, in from fifteen to sixteen per cent. *Most* of these, however, were *secondary* cases.

The **symptoms** of primary renal tuberculization are, dull lumbar pain, frequent micturition (the urine being at first turbid or slightly bloody, afterwards purulent), emaciation, and hectic fever. Almost always other organs, especially the lungs, become also tuberculous; merging the case into one of complicated phthisis. The bowels are very frequently implicated. Death occurs mostly from exhaustion. If both kidneys are affected, it may take place from uræmia.

The **duration** of the affection varies from a few months to two or three years.

**Diagnosis.**—Only after softening of the tubercle can it be positively proved to exist. Then the abundantly purulent urine is found upon microscopic inspection to contain also "granular débris, sometimes with tuberculous matter (insoluble in acetic acid), shreds of connective tissue, and beautiful meshes of elastic fibres from the cast-off patches of disintegrated mucous membrane." Great debility and emaciation, with hectic fever, confirm these signs. The absence of tumor and of hæmaturia distinguishes renal tuberculization from cancer.

**Treatment.**—Here, again, we must confess the deficiency of our present therapeutics. Indications exist, essentially the same as in phthisis pulmonalis, to the consideration of which we may refer the reader.

## AMYLOID KIDNEY.

Under a constitutional tendency, congenital or acquired, resulting from syphilis, tubercular diathesis, long-continued suppuration, or some other source of degeneration, this change may occur in the kidney, though less often than in the liver. Its

[1] Byford, of Chicago, and Couper, of London, performed this operation successfully during the year 1880. See Boston Med. and Surg. Journal, Sept. 23, 1880, and Amer. Journal of Med. Sciences, January, 1881.

signs, as distinguished from other forms of chronic renal disease, are not unfrequently obscure.

Dropsy, if present, attains only to a moderate degree; it is especially apt to take the form of œdema of the lower extremities and ascites. Vomiting and diarrhœa occur late in the progress of the disease. The amount of urine passed may be normal, or even more than that secreted in health; in some cases it is reduced. In an advanced case albuminuria may be detected.

Unless through the cure of constitutional syphilis by appropriate medication, we have little to hope from the treatment of this affection. It is apt to be only a secondary part of a general tendency to decline in the system, manifested in other organs as well as in the kidneys. It has been incidentally alluded to already as one of the varieties of renal alteration classed together under the general head of *Bright's disease.*

After death, this form of degeneration may be recognized by the waxy aspect, translucency, and doughy elasticity of the affected portions of the kidney. Very often the whole of one or both kidneys may be thus altered. When complicated with other changes, the amyloid material may be clearly distinguished by two chemical reactions. 1. Wash the kidney thoroughly from blood, and then pour over it, or paint upon it with a brush, a watery solution of iodine. The amyloid parts will soon become violet-red, or of a mahogany color. A few drops of sulphuric acid will convert this to a blue tint. 2. Methyl-green (methyl-aniline) will cause a decidedly red-violet reaction with amyloid matter; while the same test will stain the healthy kidney with a bluish color.

**Cirrhosis** of the kidney is another of the varieties of degenerative change, analogous to cirrhosis of the liver, whose clinical history is with much difficulty separable from that of other affections which, in practice, are apt to be included under Bright's disease.

## HYDATIDS OF THE KIDNEY.

These are more rare than hydatids in the liver or lungs; but more frequent than in other parts of the body.[1] The left kidney is most often affected.

In a majority of cases the cyst formed by the *echinococcus* opens into the pelvis of the kidney. The hydatids then, in part or wholly, are discharged by the urethra. They may, however, also, or instead, burst into the stomach, intestines, or lungs.

If no such vent occurs, a tumor is formed in the side (with the colon always in front of it) which has a more or less distinct fluctuation, and sometimes the "hydatid fremitus," or vibration to the touch.

The discharge of the contents of the cyst allows the discovery, in some cases, of entire vesicles; in others, of a detritus, in which the microscope detects echinococcus-hooks, laminated shreds, and oil particles.

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[1] According to Davaine, the order of relative frequency is as follows: Liver, lungs, kidneys, pelvis, brain, bones, parietes of the body, heart, and orbit of the eye.

This discharge is apt to be recurrent or paroxysmal; at intervals varying from a few weeks to one or more years. Before it occurs, chills, nausea, hiccough, and colicky pains often exist, relieved by the passage of the vesicles. These, while in the bladder, may cause pain, irritation, and retention of urine.

After every such an escape the size of the tumor may be lessened for a time. A vesicle detained in the ureter may, by obstruction, induce a *hydronephrosis*, adding to the hydatid tumescence.

**Prognosis.**—This is more favorable than in any other seat of hydatids, except the uterus, because of the comparative facility of their evacuation. When, however, no escape by the kidney and ureter is effected, the tumor may become so large as to encroach seriously upon other parts, or the cyst may suppurate (pyonephrosis) and form a large and dangerous abscess.

**Treatment.**—Oil of turpentine, iodide of potassium, chlorate and nitrate of potassium, taraxacum, and other medicines have been asserted by different observers to promote the death and discharge of echinococci. Whether the "post hoc" was "propter hoc" in these cases, larger experience (which ought always to be recorded) will show. Electro-puncture has been tried for the same end; but without proof of success.

Hydatid **colic** (passage of vesicles through the ureter) may be treated like that from calculus, by the warm bath and opium. Irritation of the bladder, or obstruction causing retention of urine, will require rest, demulcent drinks (flaxseed infusion), and sometimes the catheter. Even in the urethra the escape of the vesicles may be obstructed, and sometimes may require to be aided by pressure for their dislodgment.

A closed renal hydatid tumor, when clearly diagnosticated, and itself endangering life, may be (after exploration by the needle-trocar) punctured, especially if it project *behind*. When in front, Recamier's plan is preferred by some surgeons, of applying caustic potassa repeatedly to cause adhesion of the peritoneum to the sac, before making the incision. Safer than this, and in at least one case successful, is *repeated* puncturing with the needle-trocar at intervals of a few days. *Nephrectomy* (extirpation of the kidney) has sometimes been performed for cystic disease.[1]

## CYSTITIS.

**Definition.**—Inflammation of the bladder.

**Varieties.**—Acute and chronic; idiopathic, traumatic, secondary.

**Causation.**—Blows or other injuries; the presence of gravel, or calculus, or hydatid vesicles from the kidney; irritating diuretics, or decomposing urine retained by stricture, may induce acute cystitis. The continuation or frequent repetition of these causes produces "chronic inflammation of the bladder."

**Symptoms: Acute Cystitis.**—Pain in the vesical region; frequent desire to pass water, with burning in the urethra, and *tenesmus*, or disposition to bear down or strain. There is fever, alternating

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[1] Couper, 1880; see Phila. Med. Times, Jan. 29, 1881, p. 283.

with chills. The bladder may sometimes be felt as a small round swelling, sensitive upon pressure. In bad cases there are nausea, anxiety, delirium, and cold perspirations; the scantily passed urine becomes purulent and bloody, alkaline and fetid.

**Chronic Cystitis** has usually much less severity of symptoms; but it may be very distressing, from the tenderness and irritability of the bladder, and the frequent disposition to urinate, with dysuria. The urine is either mucous or muco-purulent.

**Treatment.—Acute** cystitis, with perfect rest, may need leeching or cupping above the pubes or (leeching) at the perineum. As a laxative, castor oil is apt to be the best. Warm hip-baths will be very soothing. Where heat is great, however, small pieces of ice introduced into the rectum will give more relief. Flaxseed tea may be taken freely. Opium, chloral, hyoscyamus, or belladonna may be called for by great pain or nervous irritability. Opium or belladonna *suppositories* [F. 124, 125], or laudanum enemata, will answer best if anodynes have to be repeated often. A remedy reported well of by Dufau, Vaulthier[1] and Busey,[2] is the *stigma of maize* (Indian corn), in fluidrachm doses of the fluid extract. It appears to be an effective diuretic. Dr. Garnett,[3] of Washington, asserts that the seed of *broom-corn* (sorghum vulgare), in decoction, has similar efficacy. In **chronic** cystitis local depletion is much less likely to do good. The other measures named may be suitable from time to time; also injections of lime-water and glycerin, or *weak* solution of nitrate of silver, or of sulphate of copper, or acetate of lead, in water or in glycerin, may be serviceable. *Damiana Turnera*, of Mexico, is said to have a beneficial tonic effect upon the bladder. *Catheterism* may at times be indispensable, both in acute and chronic cystitis; but it should be avoided if possible, on account of the mechanical irritation of the instrument. Even in washing out the bladder, care must be taken, as harm may be done by the forcible introduction of too large an amount of fluid; or, still more, by too strong solutions of stimulating substances.

## RETENTION OF URINE.

**Synonyms.**—*Strangury. Dysuria, Ischuria.* Although the *mechanical* or *surgical* causes and history of difficult or arrested urination do not belong to this work, it will be proper to speak briefly of its occasional importance, as a sympton in the course of diseases which every medical practitioner must meet.

Retention of urine happens either from *mechanical* obstruction, from *spasm*, with or without inflammatory congestion at the neck of the bladder, or from vesical atony or *paralysis.* The first occurs in cases of stricture, calculus, etc.; the second under the influence of cantharides or turpentine, or in cystitis from any cause; the third, in typhus, typhoid, and other low fevers and states of debility.

It is very easy in all but the last-named cases to distinguish

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[1] Archives Med. Bélges, Aug., 1881.
[2] N. Y. Med. Record, June 4, 1881, p. 619.
[3] Amer. Journal of Med. Sciences, July, 1881, p. 164.

retention from suppression of urine. In low fevers, etc., it is not at all difficult to make this diagnosis upon *examination;* without this, the retention may be overlooked. The practitioner must never forget to *ascertain* whether his patient passes water or not. In all serious diseases, indeed, its regular *inspection* is important.

In the semi-paralytic retention of low states, catheterism is generally required; and, when *distention and dulness upon percussion above the pubes*, with absence of urinary discharge for twelve or twenty-four hours, or only dribbling, mark the case, the instrument should be used without delay, and repeatedly; at least once daily in most instances.

**Spasmodic** retention of urine, or strangury, with or without the concomitant existence of stricture or gravel, may demand other means of relief instead of or besides the catheter. The warm hip-bath, prolonged for half an hour, is one of the best measures. Cloths wrung out of hot water applied to the perineum and over the pubes may assist. Leeches to the perineum, when there is local tenderness, will often promote relaxation of the part. Laudanum enemata, and opium [F. 124, 125] or belladonna suppositories, will sometimes relieve when other measures fail. Anæsthetic inhalations might be resorted to in an extreme case. Hypodermic injection of morphia has been used to give relief.

### ENURESIS.

**Definition.**—Incontinence of urine. Except from paralysis or some local lesion, this troublesome affection is not apt to occur in the adult. In children it is common, especially at *night.*

**Treatment.**—Withholding fluids for some hours before bedtime, unless in very small quantities, and taking the child up to urinate after two or three hours of sleep, will generally prevent enuresis. Of medicines, those most employed (with variable success) are belladonna, benzoic acid [F. 126], and tincture of chloride of iron. *Chloral*[1] has been found useful, and so have *ergot* and *iodide of iron.*[2] Corrigan[3] recommends sealing up the prepuce at night with collodion.

*Moral* impressions, acting upon the child's sense of shame or wrong, are only proper to be made use of with great care and discretion; but sometimes they have much power.

## AFFECTIONS OF THE BRAIN AND NERVOUS SYSTEM.

### INFLAMMATION OF THE BRAIN.

**Synonyms.**—*Encephalitis, Phrenitis, Meningitis, Cerebritis.* The last two are not, of course, technically identical; but they are not clinically separable. Inflammation of the membrane derives its importance from the implication of the brain.

**Varieties.**—*Simple* and *scrofulous* encephalitis or meningo-cerebritis.

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[1] Bradbury, Brit. Med. Journal, Feb. 4, 1871.
[2] Barclay, Med. Times and Gazette, Dec. 17, 1870.
[3] Dublin Quart. Journal of Med. Science, Feb., 1870.

**Simple Meningo-cerebritis** (meningitis). **Symptoms.**—Intense headache, redness of face and eyes, an excited look, dizziness, roaring in the ears, extreme sensitiveness to light and sound, restlessness, wakefulness, wild delirium. Vomiting is common; the bowels are usually costive. Some dangerous cases exhibit but little mental excitement even at the beginning, and very little fever; dulness of mind, deepening into apathy, with vomiting, and general prostration, being the symptoms. Late in the attack in adults, at any period in children, convulsions may occur. Rigidity of the muscles is frequent in bad cases; paralysis often follows convulsions.

**Stages.**—These are generally described (since Whytt) as three. 1st. That of active congestion and inflammation; with hot skin, hard, *rapid*, full regular pulse, morbid sensitiveness to light and sound, headache, and delirium. 2d. That of commencing effusion and cerebral oppression; with more moderate heat of the surface, stupor, and *slow*, or irregular pulse. 3d. That of cerebral disability or disorganization; with unconsciousness, convulsions, muscular rigidity or paralysis, and *rapid*, *feeble* pulse. This precise succession of stages, however, does not invariably occur.

**Morbid Anatomy.**—Except in *traumatic* cases, the dura mater rarely takes part in the lesions of encephalitis. Rather minute hyperæmic injection is found here and there in the arachnoid[1] membrane; sometimes opacity and thickening occur, with adhesions. In the pia mater, generally with considerable increase of redness, serum has been effused; or even pus. The pia mater adheres firmly to the brain. The ventricles contain more serum than usual, sometimes several ounces. In some cases it is turbid, flocculent, or purulent. The brain itself is most frequently affected with redness in the convolutions, and dots of blood in the medullary portion; also, with softening in the gray or white substance, or in both.

**Diagnosis.**—The distinctions between simple and tuberculous or scrofulous meningitis or encephalitis will be considered presently. Typhoid fever, delirium tremens, and acute mania may be confounded with or mistaken for inflammation of the brain.

Typhoid fever does not generally have vomiting,[2] long-continued headache, or morbid sensibility to light among its symptoms; while tympanites, diarrhœa, bronchitic cough, etc., make it known. In delirium tremens, the origin of the affection in alcoholic excess, the usually horrible illusions, tremor, and insomnia, *without headache*, are characteristic. Acute mania is almost or quite without fever; often without headache; and the muscular strength is generally little impaired; vomiting, also, is absent.

**Subacute** or **chronic** encephalitis, now and then met with, presents greater difficulty in distinguishing it from mania. Indeed, the best authorities in psycho-pathology (study of mental disease) state that cerebral hyperæmia and inflammation bear a not unim-

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[1] The omission of the arachnoid as a definite membrane in the anatomical description of the brain, as practised by some recent authors, appears to me an arbitrary measure, not justified by facts.

[2] In infantile typhoid fever, vomiting occurs more often than in adults.

portant part in the pathology of insanity. (See *Winslow on the Brain and Mind.*)

Children afford not unfrequent instances of another question in diagnosis; how far *symptoms* affecting the brain may or may not depend upon the *stomach* for their causation. "Gastric fever" and "infantile remittent" are phrases formerly applied often to attacks occurring in childhood or infancy; in which with fever, indigestion, and vomiting, there is delirium, stupor, or apathy, with or without convulsions. In such cases, the heat of head and fulness of the carotid and temporal arteries are less, the gastric disorder, fur of tongue, etc., greater than in cerebral inflammation. Those not *ephemeral* are mostly cases of typhoid fever. *Cholera infantum* is often attended by brain symptoms; but its other features, the time of year, and locality (in a large city almost always) are distinctive.

The *ophthalmoscope*, under the investigations of Bouchut, Allbutt, Hughlings Jackson, Pagenstecker, and others, has now obtained a recognized place in aiding the diagnosis of affections of the brain, whether inflammatory or atrophic and degenerative. "Choked disk," *i. e.*, active congestion of that portion of the retina around the entrance of the optic nerve, appears to be mostly indicative of cerebral (or at least intra-cranial) inflammation.[1]

**Prognosis.**—Simple encephalitis, under good treatment, is not always fatal, but a majority of cases end in death. I remember a considerable number of recoveries; four from extremely severe symptoms. In one case, that of a girl ten years of age, a convulsion immediately preceded convalescence.

**Causation.**—Between fifteen and forty-five is the age most subject to this disease. Males are more liable than females to it. Hot climates predispose to it; and so does intemperate living. Exciting causes are blows or falls upon the head, exposure to the sun, violent or prolonged mental excitement, erysipelas of the head, scarlet fever, metastasis of rheumatic or gouty inflammation, repulsion of eruptions upon the skin, suppression of accustomed discharges. Extension of inflammation from the ear (otitis) to the brain is a possibility, important not to be overlooked. Cerebral *thrombosis* may sometimes result from the same cause.

**Treatment.**—No disease is more likely to be benefited by early venesection than acute inflammation of the brain.[2] Bleeding should be the rule—omission of it the exception—necessary in cases of debility, anæmia, etc. But its usefulness depends upon its being early; and it should seldom be repeated. Leeching or cupping may follow it, or sometimes take its place. In children, the difficulty of finding a convenient vein to open may induce dependence upon leeches or cups.

Purging actively is very important, by sulphate or citrate of

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[1] See a paper by Drs. S. W. Mitchell and W. Thompson, Am. Journal of Med. Sciences, July, 1874, p. 104.

[2] Dr. Rush (1798) gave an account of the recovery of seven severe cases of inflammation of the brain under venesection. Dr. E. Copeman (*Report on the Cerebral Affections of Infancy*, etc., 1873) cites, in favor of the same practice, Joy, Stewart, Risdon Bennett, Clarke, Davis, and other authorities.

magnesium, or, if dosing be difficult from delirium, croton oil [F. 127] or elaterium. After one free purging, *moderate* catharsis may be, if necessary, repeated every two or three days; and the bowels should be kept open through the attack.

Cutting the hair very short, or, still better, shaving the whole head, will aid in giving relief, and will allow the effectual application of cold. Pounded ice in a bladder or bag of india-rubber, will do if watched and changed in place often, to prevent too great an impression upon one part. I prefer a linen cloth (as a cambric handkerchief) folded once, dipped in *ice-water*, and laid over the head; it should be wet freshly *every few minutes*, or the good effect is almost lost. Merely wetting the heat now and then with cold water produces a *reaction*, not a *sedation*, which is required. Knomsley Thornton's *ice-cap* is a good application, if the patient is not too restless to allow it to remain in place. It is a coil of india-rubber tubing, through which a stream of ice-water is made to flow constantly. If the feet be cold, they should be made warm by mustard foot-baths or sinapisms. In children, the prolonged warm bath may be useful.

The diet in the first part of the attack should be as light and unstimulating as possible. Oatmeal gruel, panada, rice, toast-water, may come first; then milk, chicken-water, mutton-broth; later, beef-tea.

Blisters are undoubtedly serviceable after the intensity of the inflammatory excitement has begun to diminish. The best will be a blister *over the whole scalp*.[1]

In a late stage, with secondary debility, concentrated liquid diet, with alcoholic stimulants, and even opium, or bromide of potassium at night, may be required to support the flagging energies of the system.

Convalescence in the best cases may be slow. The faculties may remain feeble and the brain morbidly excitable for weeks or months; needing great care as to all mental impressions and efforts, lest a dangerous relapse occur, or chronic cerebral hyperæmia, perhaps insanity, follow.

*Chronic* inflammation of the brain or its membranes, of a simple form, is no doubt met with, but seldom distinctly diagnosticated. *Sub-acute* encephalitis (phrenitis) frequently has part (Forbes Winslow) in the pathogeny of insanity; especially acute mania. *Peri-encephalitis*, of a chronic character, is asserted by E. C. Seguin[2] to account for the symptoms of what is called by him paralytic dementia; more generally denominated general paralysis.

**Scrofulous Encephalitis** (tubercular meningitis, acute hydrocephalus).—From two to fifteen years is the age most apt to yield examples of this fatal disease. Evidences of the scrofulous constitution have mostly been manifested in the previous history of the patient. *Premonitory* symptoms usually occur: dulness, pettishness, and languor, headache, disposition to put the head in the mother's lap or to lie down, loss of appetite, vomiting, and

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[1] I cannot follow Dr. T. K. Chambers (Harveian Oration, 1871, p. 8) in including this treatment among *extinct* procedures. I am sure I have known it to do great good.

[2] N. Y. Med. Record, Feb. 26, 1881, p. 328.

either costiveness or diarrhœa. The child sleeps ill, with grinding of the teeth, or sudden starting with alarm. After four or five days, constant headache and anxiety of countenance, heat of head, sensitiveness to light, fever, and drowsiness, alternated with moaning or occasional *screaming*, and delirium at night, mark the case. In the middle period may be observed the "tache méningitique" of Trousseau, *i. e.*, drawing a finger across the forehead or the abdomen; upon removing it a pink or rose-red line will remain for a time, gradually disappearing.

Advanced symptoms are, total stupor, strabismus, convulsions, paralysis, and rigidity of the limbs. The *pulse* generally goes through similar changes to those of simple encephalitis: first, febrile acceleration, then irregularity and slowness, lastly, the rapidity of moribund prostration. The attack terminates on the average in between two and three weeks.

*Prognosis* is always unfavorable in this disorder. I thought I had met with recovery in one case, the third of his family to be attacked; he remained well apparently for a month, and then died in convulsions. Dujardin-Beaumetz has reported a case of recovery from tubercular meningitis in an adult.[1]

**Morbid Anatomy.**—Since[2] Papavoine, Rufz, and Gerhard showed the existence of a relation between tuberculosis and "acute hydrocephalus," autopsic inquiry has proved fully, 1st, that tubercle-like granulations, with opacity and thickening of the arachnoid at the base of the brain, adhesion between the hemispheres, and serous effusion, characterize a number of the cases; 2dly, that all of the other lesions may be found without any tubercle whatever; and 3dly, that the amount of such deposit in *most* cases is not sufficient to modify greatly the course of the local disease, at least in such a manner as tubercle acts elsewhere. I conclude hence (especially in view of such results, palpably shown in autopsy under my own eye), that the semi-transparent gray granulations found in the arachnoid after scrofulous meningitis may be rather tubercular inflammatory products than tubercles, while it is more the *diathesis* than the *deposit* that makes the disease to differ, as in progress and prognosis it clearly does, from simple meningitis or encephalitis.

**Treatment.**—What can we venture to do in medication for a hopeless disease? Not to abandon any case of it; for, first, our diagnosis may not be infallible; and, secondly, there are not, as in phthisis, obvious anatomical reasons for anticipating a fatal result in the nature of the case. Waiving argument, for which we have no space, my judgment is in favor of *treating* this form of inflammation of the brain *on the same principle as simple meningitis*, with more caution in depletion and other reducing remedies. I would not bleed from the arm; but draw blood *very moderately* by cups and leeches; purge freely, but not exhaustively; blister the head or back of the neck; apply cold with care, and allow liquid nourishment, such as milk and beef-tea, mutton or chicken broth, etc., from an early stage. Iodide (or bromide ?) of potassium

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[1] Le Progrès Médical, 1879, p. 208.

[2] Leannec observed the presence of tubercles in the brain in some cases of hydrocephalus.

may be given at least in protracted cases. If, in this mode, we do not save a patient whom autopsy afterwards shows to have been doomed to die of tuberculization in spite of any treatment, we shall still, according to the indications of clear analogy, have practised rationally; the next best thing to being successful.

### HYDROCEPHALUS.

**Definition.**—Water in the head; dropsy of the brain. This is almost always an affection of early life. Sometimes it is congenital. It is mostly a passive dropsical effusion; certain cases show signs of a chronic or subacute inflammatory condition of the arachnoid membrane.

**Symptoms.**—Languor, strabismus, convulsions, loss of appetite, increase in the size of the head. This last may be enormous; the fontanelles expanding, and, in a slow case, the bones growing excessively large. The mental faculties are nearly always dull. Bodily emaciation and debility attend.

Although cases are known and recorded in which hydrocephalic persons have lived for more than twenty years, the general rule is that they die in a few months; either from cerebro-spinal disability or atrophy, or from some intercurrent disease not endurable by the impaired vital energy of the system.

The term "hydrencephaloid disease" is a term applied by Marshall Hall to a condition, not very rare in infants, in which symptoms resembling those of acute hydrocephalus occur, with *functional* brain disorder only. The diagnosis is here not always easy; but with close attention it may be made out. While a doubt exists, reducing measures are, generally, to be avoided. Dr. W. Nickoll has given the name "cerebral erythism" to a transitory determination of blood to the brain, with signs of excitement, in children.

**Treatment.**—Small as is the encouragement given by experience in hydrocephalus, it is certainly justifiable to *try* measures not out of place in themselves. Such are, moderate purging, every few days, or once a week, sustaining the strength by nourishing food, and, if it be borne, cod-liver oil; diuretics; shaving the head and rubbing it nightly with mercurial ointment; occasionally blistering the back of the neck; in a child, preferably by painting it with *cantharidal collodion.*

Is *pressure* by bandages or adhesive straps, or *puncture*, tapping the head, to be advised? Were I to use either of these heroic measures, I would combine them. In a case clearly otherwise hopeless, the *aspirator* may be used, or a needle trocar and canula may be introduced through the coronal suture, an inch or a little less from the anterior fontanelle: then, during and after the withdrawal of a few ounces of fluid, a bandage may be used for pressure, watching its effects. Dr. West has collated accounts of sixty-three operations by puncture, of which eighteen were successful.

### BRAIN EXHAUSTION.

Under the pressure of intense competition in modern society for wealth, reputation, or political power, or sometimes, from

the needs of professional or other unavoidable duties, *break-down* often happens from "wear and tear" (Mitchell). This may be an exhaustion of the total energy of the body, or it may almost exclusively involve the brain. If the latter, there are usually premonitory symptoms. First of these, in many cases, is drowsiness and indisposition toward mental effort. Intensity of temperament, or excitement of motive, may often prevent or overcome this. Then comes a sense of tightness, perhaps numbness, in the back of the head and neck. Afterwards, *insomnia;* with perceptible throbbing of the arteries at the base of the brain; tinnitus aurium; *muscæ volitantes* before the eyes; nausea, or diarrhœa; attacks either syncopal or epileptoid, especially at night; "leg-heavy" sensations, approaching paralysis; and other evidences of cerebral "neurasthenia."

**Treatment.**—The indispensable remedy here is *brain rest;* immediate, total, and prolonged. Especially must the pursuit or engagement be at once given up, which has overtaxed the brain. Of course this is often difficult, especially because, much most frequently, it is the *emotional* care or *worry* which has done the mischief. I am sure, nevertheless, that without any worry, excessive brain *work*, when abundant sleep is not taken, may exhaust the brain seriously. Leaving home is commonly advised, to afford the benefit of a change of mental impressions. But these impressions must not be too exciting or fatiguing. In my own case, a winter in Egypt relieved obstinate insomnia; it returned at once among the picture-galleries and other sights of European travel.

*Medicinal* treatment, in such cases, is mostly secondary, apart from what may be called for on account of the general condition of the body. Cautious use may be made of quinine, strychnia, and phosphorus, as nervine tonics; beginning with minimum doses, and watching their effects. Besides these, *insomnia* may be treated (also tentatively) with bromide of potassium, tincture of valerian, vabrianate of ammonium, tincture of lupulin; reserving hydrate of chloral, hysoscyamus and opiates for a late necessity. Alcohol, in small doses (*e. g.*, a tumbler of lager beer at bed-time) is often, in such cases, the most effective of all hypnotics; but its use is accompanied by more danger of injurious excess than that of any of the others. A *semi-recumbent position* not unfrequently promotes sleep, when the over-full state of the cerebral arteries makes the recumbent position one of wakefulness.

Slow recovery, only, is always to be expected in cases of decided brain exhaustion. From one to three years of rest, as nearly absolute as possible, from accustomed "wear and tear," will commonly be required. When the attack occurs late in life, recuperation is seldom possible; the day's work is done. Either simple disability for mental exertion remains, or some form of cerebral disease shortens life; apoplexy, paralysis, etc., coming on.

Wisdom prescribes, on the part of every brain worker, *caution* in heeding every sign of approaching cerebral exhaustion; most of all, care to obtain a sufficient amount of sleep every night or day, or, at least, *sometime in every week.*

## SOFTENING OF THE BRAIN.

Pathologists have generally recognized two forms of this: 1. Acute red **inflammatory** softening; and, 2. Slow, white, **atrophic** softening or degeneration of the brain-substance. Both receive the name of *ramollissement.* Virchow has proposed the term *necrobiosis* (death of a part in the midst of living structure), to designate destructive local change in any part of the body.

The former of these (red softening) is further definable as a local cerebritis; whose symptoms are not nearly always separable, clinically, from those of meningitis or encephalitis, already described. Cadaveric inspection shows not only hyperæmic redness and softening, but, sometimes, abscess, or even gangrene of the brain. This last (gangrene) is probably always the result of injuries. The cerebrum is more often affected with red softening than the cerebellum.

**Abscess** of the brain is, in some cases, latent for a considerable time. Sudden headache is apt to be the earliest symptom. This is attended by feverishness, vomiting, difficulty of speech, numbness, convulsions, paralysis, and coma. *Otitis* and *pyæmia* are said to be, after injuries, the most frequent direct causes of it. Abscess of the *cerebellum* is occasionally met with. Its symptoms are variable and obscure; sometimes only muscular debility is observed before death. Nothnagel asserts that disorder of coördination (want of control of the muscles, abnormal movements) occurs when the vermiform process or median cerebellar lobe is affected.

**Diagnosis of Acute Softening.**—The occurrence of imperfect coma, with rigidity of the muscles of the extremities, or of paralysis without loss of consciousness, will make probable this lesion. Most cases die within two weeks; some within two or three days.

**Atrophic softening** or degeneration of the brain may take place as a result of old age, or from intense mental labor or excitement, from intemperance, or from *thrombosis* or *embolism;* that is obstruction of an artery within the brain by a fibrinous clot formed in the vessel or carried from some other part. Its approach and progress are more slow and insidious than those of acute inflammatory ramollissement. Neuralgic pains in the limbs, followed by numbness and paralysis; general debility, and dulness of the senses, gradually increasing to blindness, loss of hearing, etc., and a corresponding decline of the mental powers; these are the usual symptoms, which may be extended over a period of many months. Death is sure to be the final result. Hughlings-Jackson (the highest recent authority on cerebral pathology) asserts (1880) that "cerebral softening is always local," never general through the brain; and that (except occasional instances following local inflammation) its cause is always *blocking of cerebral vessels;* either by thrombosis or, less often, by embolism. The middle cerebral artery is the vessel most apt to be thus obstructed; and the resulting symptoms are chiefly those of hemiplegia and impairment of speech.

*Sclerosis* of the brain is a term applied by Proust and others to

a chronic organic affection; in which the cerebral substance becomes *hardened*, instead of softening. To this more attention will be given presently.

*Glioma* is a kind of tumor (most frequent in early life) affecting the *neuroglia* or connective tissue of the brain, retina, or nerves.

**Treatment.**—If **inflammatory** red softening can be diagnosticated at an early period, a similar treatment to that named for acute meningo-encephalitis may be advised. Local depletion at least, followed by counter-irritation with blisters, may be resorted to; the more freely because apoplexy, which most nearly simulates it, presents very similar practical indications.

**Chronic Atrophic White Softening** is not amenable to any such measures; nor, indeed, to any active remedial treatment. Prevention, by avoidance of its causes, especially by mental repose, and palliation or economy of the waning powers of the system, are alone possible. The management necessary upon such indications must vary somewhat with every case.

## INFLAMMATION OF THE EYE.

Although ophthalmology is appropriated as a department of surgery, every medical practitioner meets with cases of affections of the eye so often, as to make it proper to notice here, briefly, its principal acute disorders.

**Varieties.**—Conjunctivitis (*ophthalmia*, by usage), simple, catarrhal, pustular, and purulent (Egyptian, military, and gonorrhœal ophthalmia, and ophthalmia *neonatorum*, *i. e.*, of new-born infants); keratitis (corneitis); sclerotitis (rheumatic ophthalmia); iritis (simple, traumatic, syphilitic); retinitis.

**Simple and Catarrhal Ophthalmia: Symptoms.**—Bloodshot appearance of the eye, with soreness, pain, and dislike of light, characterize *simple* conjunctivitis. Blotched or irregular injection of the conjunctiva, becoming in severe cases general and velvet-like, with, sometimes, *chemosis* (raising of the mucous membrane in spots, like little water blisters) and mucous discharge, agglutinating the lids together, especially at night; these are the symptoms of the *catarrhal* variety or grade.

**Treatment.**—When the inflammation is severe and recent, leeches to the temple near the eye will do good. Iced sassafras-pith water may be applied by laying a light piece of linen, soaked anew every few minutes, over the closed lids; or, better, by the frequent use of a clean camel's-hair pencil dipped in the cold demulcent liquid. Nitrate of silver solution, two grains to the ounce of distilled water, is recommended to be dropped from a quill or camel's-hair pencil into the eye, twice daily. A saline cathartic at the beginning of the attack will generally be useful; and so will be, a little later, a fly-blister behind the ear. When convalescence has fairly commenced, the use of the injection may be made at longer intervals, once in a day or two; the eye being then kept closed, if the mucous discharge be slight, by a strip of isinglass plaster over the middle of both lids. After recovery, the eyes will be weak for a time, and must be used with caution and moderation. Adhesion of the lids is best pre-

vented, at any stage, by the application of spermaceti ointment, castor oil, or glycerin cream, to their margin.

Persistent redness and swelling of the lids will often give way, under the use, nightly, as an unguent, of the *cerate of carbonate of lead* [F. 88]. Painting the exterior of the lids, many times daily, by means of a camel's-hair pencil, with diluted extract of lead (one drop of Goulard's extract in an ounce of water), followed by cold cream or glycerin cream at night, has, to my knowledge, relieved greatly cases of long-standing "weakness" or irritability of the eyes. When ulceration of the cornea is present, the use of lead should be avoided, for fear of opacity being produced. *Granular conjunctiva*, or "chronic ophthalmia," not yielding to the above measures, may be referred to the resources of the special ophthalmologist. Among the more recent useful applications for it may be mentioned *iodoform*, applied in fine powder with a hair pencil. Another is *boracic acid*, in solution (Theobald), 2 to 4 grains in the ounce of water. *Pustular* ophthalmia is characterized by the formation upon the conjunctiva of small vesicular elevations resembling pustules, although rarely discharging pus. In other respects, the attack resembles catarrhal inflammation.

**Purulent Ophthalmia.—1. Ophthalmia of infancy.** Leucorrhœa or gonorrhœa of the mother may produce this; or it may follow exposure to cold or damp air, acting upon a system predisposed by imperfect nutrition. The danger of it is, the possibility of rapidly destructive ulceration of the cornea, causing blindness. It is possible, however, for a considerable ulcer of the cornea to heal, in a child, even without leaving an opaque cicatrix.

**Treatment.**—Introduce, by inserting the smooth point of a small syringe just within the inner commissure of the lids, several times a day, a solution of three grains of alum to the ounce of water; alternated occasionally with a solution (one or two grains to the ounce) of nitrate of silver. Boracic acid solution (gr. v to xv in f℥j) is also worthy of trial; and, later, solution of atropia. As very much depends upon the vital energy of the child's system, especial care must be taken as to its nourishment, bathing, and the state of its bowels.

2. **Gonorrhœal Ophthalmia.** — Produced by contact of the virulent poison of gonorrhœa, this is perhaps the worst form of inflammation of the eye. At the beginning, it (as well as ordinary purulent ophthalmia) may resemble catarrhal inflammation; but its course is so rapid and violent as to become suppurative in one or two days. Haziness of the cornea, and chemosis, followed by ulceration, perforation, or sloughing, may occur. Such ulcers are apt to leave white and opaque cicatrices, even if not very deep, in the adult.

**Treatment.**—Begin with a brisk purgation. Then apply, at once, and frequently, in alternation, solution of alum, ten grains in an ounce, and solution of nitrate of silver, four grains in an ounce. If the specific character of the inflammation can thus be annulled, the destruction of the cornea may be averted. Sometimes good surgeons have applied the solid nitrate of silver to

the ulcerated surface. Theobald recommends (*N. Y. Med. Record*, Feb. 7, 1880), a 20-grain solution of boracic acid. The prognosis, however, in this form of disease, is generally unfavorable to the safety of vision.

**Keratitis** (Corneitis).—A zone of vessels in the sclerotic, immediately surrounding the cornea, with *haziness* in the latter itself, amounting in time to opacity, marks this affection. When developed, we will find a plexus of fine vessels arranged in a crescent or semicircle, along the upper or lower edge of the cornea, or both. Intolerance of light is great; any exposure of the eye causes a flow of tears. Children and adolescents are most generally the subjects of inflammation of the cornea. It may be of short duration, the opacity disappearing, in a young person; at a later period of life, it is more obstinate; and if the attack lingers for several months, cloudiness remains.

**Treatment.**—Most subjects of corneal inflammation are of delicate frame and depressed health. Tonics and good diet are more likely, in them, to be indicated than depletion. Repeated blistering behind the ears will be proper. The bowels should be well opened, and the eyes sheltered from strong light, while photophobia (intolerance of light) exists. In no form of disease of the eye, however, unless for a short time in a very acute attack, should a patient be imprisoned in a dark room. The want of air, and even of sunshine, will do more harm than good. When otherwise in a state fit for it, he may go out with the eyes protected by a shade or suitable glasses, or a veil. Good authority prohibits the use of nitrate of silver solutions as *mischievous* in *corneal* inflammation. If ulceration of the cornea occur, *lead* in any form is forbidden, lest a deposit of albuminate of lead should cause opacity. Iodoform has been found (applied in fine powder with a hair pencil) beneficial in some cases of obstinate keratitis.

**Sclerotitis**; rheumatic ophthalmia. This is shown by diffused redness of the eyeball, with enlargement of the arteries converging to the margin of the cornea; and *severe pain* in the ball, with intolerance of light.

**Treatment.**—Not satisfied that there is always proof of the "rheumatic diathesis" in every case of sclerotic inflammation, I should still incline to prescribe for it, as a general rule, a combination of colchicum with an alkali (as carbonate of potassium), after a saline cathartic. A blister may then be applied behind the ear or back of the neck. *Anodynes* are apt to be called for; as belladonna or opiates; so severe is the pain in many instances.

**Iritis.**—Writers describe the forms of inflammation of the iris as **simple, traumatic, gouty** and **rheumatic, scrofulous,** and **syphilitic.** The first and last of these are the most important and distinctive.

In either form of inflammation, a *vascular zone in the sclerotic*, near the cornea, *fixedness* and *irregularity* of the *pupil*, with a greenish hue of the iris, if it be naturally blue, are the usual signs.

**Treatment.**—In a robust patient, leeches around the eyes; in a weaker one, a blister behind the ear; saline purgation, repose to the eye, and steaming it frequently over hot water, are measures

that nearly all will agree upon. More difference of opinion exists as to the use of *mercury* in iritis. Some give it with the hope of retarding the effusion of lymph in all cases. Others, only in the syphilitic. A number, rather increasing of late, in none. I would give calomel in all cases of active iritis, but in none so largely as to endanger salivation. One grain twice daily for a few days will be enough; stopping it if the gums be at all affected.

Maintaining moderate dilatation of the pupil is considered important in cases of iritis. For this purpose *atropia* is locally used. Once or twice daily there may be dropped into the eye two or three drops of a solution of two grains of sulphate of atropia in an ounce of water.

In all forms of severe inflammation of the textures of the eye, Dr. C. R. Agnew considers the *Turkish* (hot-air) *bath* an important measure of treatment.

**Retinitis.**—So obscure is the diagnosis of this, and so greatly has its pathology been modified since the introduction of the ophthalmoscope,[1] that it will be the best to refer for its consideration to works especially upon the eye.

*Retinal apoplexy*, or hemorrhage of the retina, sometimes occurs; especially in connection with cerebral or cardiac disease. It is generally sudden, causing partial or total blindness. (See a paper by Dr. C. S. Bull, *Am. Journal of Med. Sciences*, July, 1874.) It has been met with in a number of cases of progressive pernicious anæmia.

## OTITIS.

**Definition.**—Inflammation of the ear. This is most common in children. *Scrofulous* inflammation and suppuration of the external meatus, with chronic discharge, is frequently met with. *Scarlet fever* not rarely is attended by otitis, extending from the throat; sometimes ulceration destroys the *membrana tympani*, and even the *ossicula*, causing deafness.

**Otalgia,** earache, occurs often without much inflammation, as an almost entirely neuralgic affection. Pain, however, is the first symptom of otitis; with soreness on pressure upon the meatus or the mastoid process, and heat of the ear. An infant may suffer from this without being able to designate the seat of its distress. It cries or screams at intervals, and buries its head in the pillow, or leans the affected side against its mother's breast or arm. Often in the course of a day or two a purulent discharge gives relief to the intensity of the attack. In other cases pain returns again and again, the soreness continuing without discharge for weeks together.

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[1] In *acute* inflammations of the eye or brain its use appears to me unsuitable, on account of the intense irritation likely to attend the steady glare of a direct light upon the already morbidly sensitive eye. Bouchut, however, has written a volume upon it as a means of diagnosis in diseases of the brain, as meningitis, etc. In amaurosis, an important distinction has been made out between those cases dependent upon *neuritis optici intraocularis* (inflammation of the optic nerve within the eye), and those which are entirely paralytic in nature. Förster, Hirschberg, and Nettleship have shown that *excessive use of tobacco* often causes amblyopia (dimness of vision), resembling amaurosis. In defects of vision connected with loss of functional power in the optic nerve, Dr. D. Dyce Brown has found *santonin* (1 gr. daily) very useful. See Brit. and For. Med.-Chir. Rev., April, 1871.

Extension of inflammation from the external ear to the membranes of the brain is possible in severe acute otitis; but it is almost as likely to happen in cases of long-continued *otorrhœa*, or discharge from the ear; particularly if this be suddenly arrested.

Dr. Lidell and others have pointed out that the production of cerebral *thrombosis* (obstruction from coagulation in a vein or veins within the cranium) is one of the dangers of otitis. Sometimes the connecting link between the two affections is caries or necrosis of the petrous portion of the temporal bone.

**Treatment.**—*Earache* may be relieved usually by dropping into the ear three or four drops of olive or almond oil, with one or two drops of laudanum. If continued pain, with heat and tenderness on pressure show decided inflammation, a few American leeches may be applied behind the ear; and afterwards a small blister (when the leech-bites have healed) upon the same place. Painting with the cantharidal collodion will here prove very convenient.

Chronic discharge from the ear should be treated with mild astringents, very gently applied. Syringing is not nearly always necessary; if done with force it irritates, and may cause headache and nausea. Pouring the lotion from a teaspoon, the patient lying upon the other side and turning over to allow it to run out, will generally do better. Lotions so used should be *warm*.

Castile soap and water; lime-water; glycerin and rose-water (one part to five); and solution of acetate of lead, one or two grains in an ounce of water, will prove the best washes, and sufficiently strong to mitigate, without too suddenly checking the discharge. Pure alcohol (F. E. Weber) is sometimes employed for the same purpose. Bezold[1] has found *boracic acid* very serviceable in suppurative otitis. He washes out the meatus with a four per cent. solution of the acid, and then, after drying the ear, introduces *finely-powdered* boracic acid. The meatus is then closed with antiseptic (salicylic, carbolic, or boracic) cotton; which is renewed as often as it becomes moistened with the discharge.

**Deafness** (cophosis), in greater or less degree, may result from, 1. Accumulation of wax in the ear; 2. Inflammatory thickening of the membrana tympani; 3. Obstruction of the Eustachian tube; 4. Perforation of the tympanic membrane; 5. Destruction of the *ossicula* of the ear; 6. Paralysis of the auditory nerve. Only in case of the *last* is the patient unable to hear the ticking of a watch placed *between the teeth*. The effects of the first two are often transitory.

**Ménière's disease** is the name given (since 1861) to an affection in which severe symptoms, as giddiness (labyrinthine vertigo), *tinnitus aurium*, deafness, staggering, often rotary movements, and vomiting follow lesions in the labyrinth of the ear. The pathology of this disorder is not well known. Dr. Knapp,[2] of New York, believes that there is always either hemorrhage or serous or purulent exudation into the semicircular canals. The attacks

[1] Boston Med. and Surg. Journal, June 24, 1880.

[2] Archives of Ophthalmology and Otology, vol. ii., No. 1. See, also, Hinton, Guy's Hospital Reports, vol. xviii., 1873.

are, however, not unfrequently transitory and followed by entire recovery. Charcot's use, in all cases of this affection, of large doses of quinine, continued for weeks at a time, does not appear to me capable of rational justification; although certain cases may, no doubt, be appropriate for nervine and tonic medication.

## APOPLEXY.

**Definition.**—Sudden coma, produced neither by injury nor by poison.

**Varieties.**—Some terms once used have been shown to be without pathological justification; as *serous* apoplexy, *nervous* apoplexy. Good authority still sustains, however, the mention of two forms at least of genuine apoplectic seizure: *congestive* and *hemorrhagic*.

**Symptoms. Congestive Apoplexy.**—Premonitory symptoms often seen are, flushed appearance of the face and eyes, heat of head, throbbing of the carotids, distention of the temporal arteries and jugular veins; constipation, languor, dulness, drowsiness; dimness of sight, vertigo, headache. The attack is marked by sudden stupor; with slow and sometimes snoring respiration, full and slow pulse, dusky or turgid appearance of the face. The total loss of perception may be brief, its partial absence or deficiency continuing for some time. Slight convulsive movements are not uncommon. Paralysis of the muscles occurs only for a short time after the attack, if this be recovered from.

**Hemorrhagic Apoplexy.**—Generally no clear premonition is given, the attack being very sudden; a *stroke*, literally. Unconsciousness is complete, for some seconds, minutes, or hours. After this, general or local paralysis, most often hemiplegia, is left; the mental powers also, in many cases, being impaired, at least temporarily. During the coma, the breathing is commonly stertorous, the pulse slow and somewhat full, the head hot, the face more or less dark or flushed. But the fulness of the blood-vessels and heat of the head are less, as a rule, than in congestive apoplexy.

**Anatomy and Pathology.**—In the *congestive* form, excessive cerebral hyperæmia produces coma by pressure upon the brain; the extremest degree of which (vascular pressure from obstruction) is met with in strangulation.

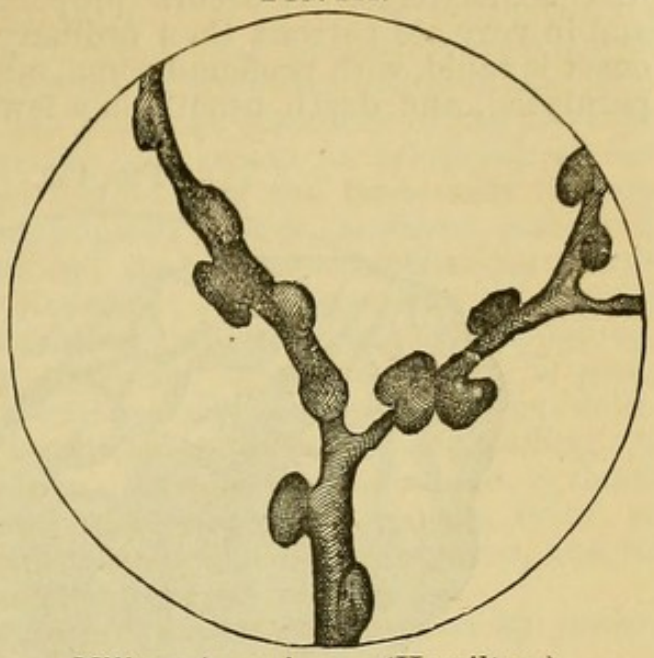
In *hemorrhagic* apoplexy, from the rupture of a degenerated artery, either in the substance of the cerebrum or cerebellum, in the ventricles, or under the arachnoid membrane, effusion of blood occurs, and a clot is formed. If this be small, it may be gradually absorbed; autopsic inspection sometimes showing the remains of such, where another hemorrhage has caused death.

Fatty degeneration of the arteries of the brain has been repeatedly, but not always observed. Embolism is asserted to have sometimes produced apoplectic symptoms; but this, I believe, must be comparatively rare. Dr. Lidell,[1] however, follows Nie-

[1] Treatise on Apoplexy, New York, 1873.

meyer in believing the immediate cause of apoplectic symptoms (whether produced by congestion, œdema, or hemorrhage) to be cerebral anæmia; or, at least, privation of oxygenated blood in the brain. Dr. Lidell has elaborately considered (*Am. Journ. of Med. Sciences*, Jan. and July, 1874) the clinical and pathological history of *cerebral thrombosis*, under its three varieties of origin, as *traumatic*, *inflammatory*, and *marasmic*. Of 130 cases, only 6 were traumatic, 86 inflammatory, and 38 marasmic, or due to debilitating influences. Among the inflammatory, facial carbuncle was the most frequent cause. Otitis and erysipelas are also liable to the same termination. The symptoms of cerebral thrombosis are not always distinctive, but they differ from those of apoplexy most of all in the comparative slowness of their successive occurrence; signs of brain trouble and failure being at last followed by stupor, often convulsions and paralysis. *Intra-cranial aneurism*,[1] with rupture of the sac, is probably not infrequent. Constant headache, with amaurosis, or some form of progressive paralysis, will, when aneurism is present, generally precede the apoplexy. The basilar artery is (Gouguenheim) most often affected; next, the middle cerebral; then, the internal carotid. Intra-cranial aneurism, or sacciform dilatation of some of the cerebral vessels (miliary aneurisms of Charcot and Bouchard) will no doubt account for a considerable number of cases of cerebral hemorrhage. *Atheroma* (fatty and calcareous degeneration and softening) may occur in the arteries of the brain, as well as elsewhere.[2] Zenker insists that minute inter-cranial aneurisms are due to sclerosis of the inner coat of the cerebral arterioles; although this is denied by Charcot and Bouchard.[3] The parts of the brain most liable to extravasation of blood are (Aitken) stated in this order: 1, corpus striatum, thalamus, and hemispheres above them; 2, corpus striatum alone; 3, hemispheres above the centrum ovale; 4, thalamus alone; 5, lateral lobes of cerebellum; 6, mesocephalon; 7, posterior lobe of cerebrum; 8, before the corpus striatum; 9, pons Varolii; 10, middle lobe of cerebellum; 11, meninges; 12, peduncles and olivary body. Hemorrhage into the *ventricles* of the brain is shown by

FIG. 111.



Miliary Aneurisms. (Hamilton.)

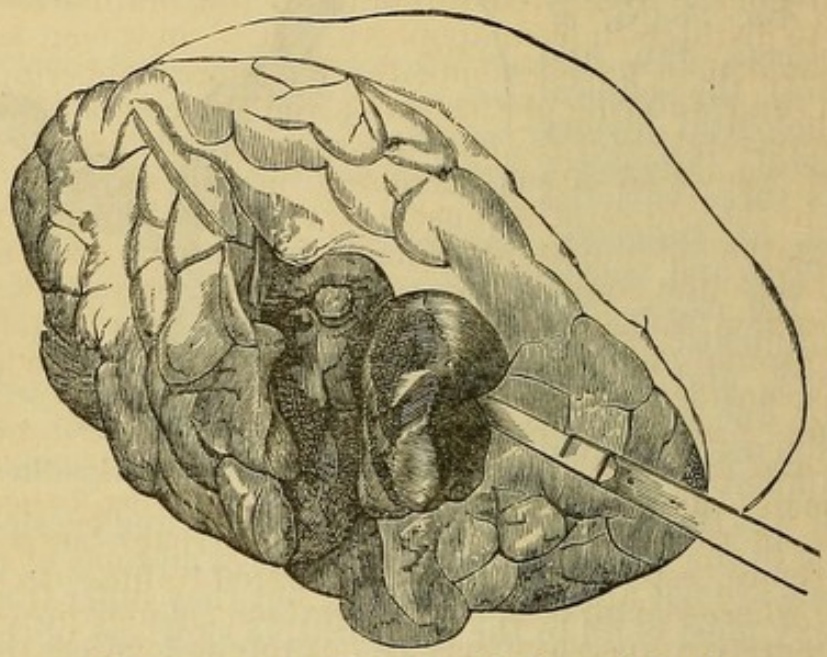
[1] See an article by Dr. J. H. Hutchinson, Penna. Hospital Reports, vol. ii., 1869.

[2] Virchow, Billroth, Wilks, and Moxon have shown that, in arteries generally atheroma is the result of a "sub-inflammatory" process.

[3] Le Mouvement Médicale, Jan. 11, 1873.

Sanders[1] to be more frequent than has been generally supposed. He has obtained the history of 94 cases of *primary* intra-ventricular hemorrhage. It occurs (proportionately) oftener in young and in very old persons than ordinary cerebral hemorrhage; its onset is rapid, with profound coma, often convulsions (not always paralysis), and death usually in a few hours. Recovery from it

FIG. 112.



Hemorrhage in Right Hemisphere of Brain.

is rare. The age of the clot may be ascertained in part by the discovery, with the microscope, of *blood-crystals:* which are not found until after seventeen or eighteen days from effusion.

**Diagnosis.**—Apoplexy is to be distinguished from *uræmia*, *alcoholic intoxication* (dead drunkenness), *narcotic poisoning* (as from opium), *compression of the brain*, or *concussion*, from blows or falls, *asphyxia* (suffocation), *sunstroke*, *catalepsy*, *cerebral hysteria*, *cerebral thrombosis*, *acute softening of the brain*, *chill of pernicious intermittent*, and *spotted fever* or "cerebro-spinal meningitis;" as well as from all forms of *syncope*. From uræmic coma it is only to be known by the history of the case, showing a renal origin for the symptoms, in partial or total suppression of urine. Alcoholic intoxication is revealed by the odor of the breath and the attendant circumstances. Similar aid exists sometimes in cases of narcotic poisoning; in opiate narcotism, moreover, the pupil is commonly *contracted;* in that from most other narcotics, it is as firmly *dilated*. Concussion and compression of the brain are generally suggested by the position of the body (if found without a history), and the external marks of injury. Asphyxia is also usually pointed out by the condition of things surrounding the patient.

In asphyxia, blueness of the lips, and embarrassment of respiration, with coldness of the surface, show the origin to be in the

[1] Amer. Journal of Med. Sciences, July, 1881, p. 85.

function of breathing. Sunstroke is attended by acceleration and feebleness of the pulse, at least in the majority of cases; in some, it *is*, identically, a congestive apoplexy. In catalepsy, there is rigidity of the muscles, with rapidity of the pulse, susceptibility of the pupil to light, brief duration and repeated recurrence of the attack, without any paralysis. Cerebral hysteria is rare, and occurs only in females, whose previous disorders of the nervous system will aid in interpreting even coma as belonging to the same category. Acute red softening of the brain may be very difficult to distinguish from apoplexy. It is, however, seldom if ever so sudden in its invasion; there is more slobbering or flow of saliva, and watering of the eyes; and there is not the partial or entire restoration of the faculties which an attack of apoplexy, not fatal, allows so often. Cerebral thrombosis, also, is more gradual in the course of its effects; with frontal headache, delirium, dilatation of pupils, swelling, sometimes ptosis (falling) of the eyelids; often convulsions. Thrombosis, moreover, is much more common in early life than apoplexy. Spotted fever, or "cerebro-spinal meningitis," will be especially described, and its diagnosis considered, in another place.

*Syncope*, of any form or origin, is always marked by *pallor*, *coldness*, and *loss of pulse*.

**Prognosis.**—This is always alarming; most so as there is the most reason to believe that cerebral hemorrhage has occurred; and, therefore, especially in those advanced in life. In younger subjects, where stertor of breathing is absent, under proper treatment, congestive apoplexy may be entirely recovered from. So may a single attack of the hemorrhagic form, with a small clot only, and limited, transient paralysis. Each succeeding attack becomes more dangerous; a third is seldom survived. The *immediate* danger connected with an attack of apoplexy should not be considered to have passed over for ten days at least after the stroke itself. Very seldom, indeed, after a hemorrhagic attack, are the mental or bodily powers so good, for the rest of life, as before.

**Causation.**—*Age* is the most constant promotive cause of apoplexy. Cases are on record, though of extreme rarity, in children;[1] between thirty and fifty it is much more frequent; but after fifty it is one of the most common modes of death. Arterial degeneration is here generally the occasion of the catastrophe; some mental excitement, or bodily shock or effort, as danger, or joy, or a few glasses of wine, or the stooping posture, or straining of stool, causes a rupture of the weak vessel, and fatal cerebral hemorrhage. Neither sex seems to be more liable to this disease than the other.

Full living, especially with alcoholic intemperance (even moderate), and indolent habits, predispose to it in a marked degree. So does excessive brain-work. Florid, short-necked, big-bellied people are thought to be most exposed to it. Hypertrophy of the left ventricle of the heart is believed to promote it. So also

[1] One well-marked case has come to my knowledge in a child. Hanner, of Munich, asserts that it occurs in young patients more often than is commonly supposed. See *Journal für Kinderkrankheiten*, 1, 1871.

(Quain) degenerative disease of the right side of the heart may favor it, by affording impediment to the return of blood from the brain through the veins. After dinner and during sleep are the two most likely times for the attack to occur.

**Treatment.**—The younger the patient, and the more vigorous his antecedent health, the more probable is the existence of the congestive form: and also, the better the prospect of recovery from hemorrhage within the cranium, if, only, the effects of pressure be averted at the time. If, then, in a person under sixty, not before of broken constitution, we find the head hot, face turgid and flushed, the arteries and veins of the neck and temples full, the pulse strong, and the *heart's* impulse strong also (or the heart's action vigorous though the pulse at the wrist be oppressed), *bleed.*[1] Watch the effect, with the hand on the pulse. If the breathing improve, and the pulse rather gain than lose in naturalness and force, take out ten or twelve ounces. Should the improvement progress, but a relapse into deeper stupor afterwards threaten, either the lancet again, or cupping to the nucha, may be used.

Older or more doubtful cases may be treated tentatively, with cups alone, aided by mustard-plasters to the legs, back, and epigastrium in turn; with laxative injections into the rectum during the attack, and saline purgatives afterwards. The head should be kept raised, and cooled with wet cloths until its temperature becomes normal. If the hair be thick, it should be cut very short or shaved off entirely. In congestive apoplexy, *artificial respiration* (Corso), e. g., by Sylvester's plan,[2] has sometimes succeeded in restoring the patient to animation.

Dr. Foster,[3] of Pesth, has used hypodermic injections of ergotin; with the effect, in two cases, of considerably diminishing the coma.

When, however, there is reason, as usually is the case in really *old* or *broken-down* patients, to believe that *structural degeneration*, arterial, or that of ramollissement, is the source of the attack, loss of blood will be *out of place*. It may even, by exhausting the enfeebled system, hasten death. Such cases, if they survive the first apoplectic fit, require rather nourishing diet, and sometimes even tonics, to support strength, favor repair, and prolong life. Great delicacy of judgment, of course, is necessary in deciding, in different cases, between these apparently so opposite modes of treatment. It is right to add, that the tendency of medical opinion, for the last ten or twenty years, has been towards the curtailment of the use of the lancet in apoplexy.

Where a moderately plethoric condition is present, and the taking of blood, generally or locally, is not decided upon, purgation is safe and likely to be useful. Jalap, resina podophylli, or

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[1] Dr. Da Costa's expression is, "My rule in all cases of apoplexy is to draw blood at once; but where there is marked degeneration of the walls of the arteries, I have never had any striking results from this withdrawing of pressure upon the brain." *N. Y. Med. Record*, Dec. 20, 1879, p. 582.

[2] See *Asphyxia*, in a later part of this book. Dr. Cleborne reported, in the N. Y. Medical Record, 1876, a case in which recovery ensued, after an hour and a quarter's perseverance, with this method.

[3] Journ. Medico.-Chirurg. de Pesth, No. 8, 1879.

croton oil, in small doses, will have the advantage of convenient administration [F. 135, 136].

### INFLAMMATION OF THE SPINAL MARROW.

**Clinical Synonyms.**—*Myelitis, Spinal Meningitis.*—The symptoms of this rather uncommon affection are, constant and severe pain in the back, increased by motion; spasmodic contractions or rigidity of the muscles, followed by paralysis, fever, constipation of the bowels, and retention of urine. Authors state that in **myelitis proper,** as distinguished from **spinal arachnitis,** there is no pain nor muscular rigidity, but only paralysis of motion and sensation.

**Morbid Anatomy.**—Diffuse redness and opacity of the arachnoid, swelling, and infiltration of the pia mater, with effusion of serum, communicating freely with the cavity of the cranium, are generally found. Adhesions of the membranes from plastic lymph are less common; and still less so, though repeatedly recorded, is suppuration within the arachnoid. The dura mater is occasionally affected with inflammation, and even ulceration and gangrene, commencing from without. The cord may be reddened from injection of its substance, and softened; more rarely, indurated in parts.

**Treatment.**—Local bleeding, by rather free cupping or leeching along the spine, followed by a blister, and active purgation with saline cathartics, along with entire rest of the body, constitute the essential parts of the treatment of simple acute inflammation of the spinal cord or of its membranes. If the diagnosis be doubtful, the practice must be disproportionately less bold; this is, of course, a principle of general application in therapeutics.

**Epidemic** *cerebro-spinal meningitis* will be considered hereafter, as **cerebro-spinal** or **spotted fever.**

### SOFTENING OF THE SPINAL CORD.

Rejecting the not uncommon view which refers **ramollissement** of the cord in *all* cases to inflammation, I have considered softening as one of the lesions which may be produced by myelitis or spinal arachnitis; but would separate from this, as in the case of cerebral softening, the **chronic atrophic** degeneration which results in a similar change.

The **symptoms** of spinal softening are, first, numbness in the extremities, with a sense of coldness; pain in a portion of the back, with local tenderness on pressure; then impaired mobility, and gradual loss of sensation in the limbs, or in one limb, if only one side of the cord be affected. When the anterior columns only are softened, *motor* paralysis prevails; if the posterior columns, *sensibility* is impaired or destroyed. Difficulty in walking, especially on first rising in the morning, is an early symptom. Contractions and rigidity of muscles occur later. At a still more advanced period, loss of control over the bladder and rectum adds to the distress of the patient, who is apt to suffer also from bed-sores, ulceration and sloughing of the parts upon which the body rests; the system becoming gradually exhausted.

**Prognosis and Treatment.**—Recovery is not to be expected from atrophic spinal softening. The most unfavorable symptoms are decided paralysis, involuntary urination and defecation, with *alkalinity of the urine.* **Treatment** must be palliative and supporting only. Passive exercise (as by riding in an easy carriage, sailing, or being carried) in the open air will be beneficial; and so may salt bathing and frictions of the surface of the body. Good diet, appetizing tonics (especially phosphorus), and sometimes alcoholic stimulants, very carefully regulated, may retard the decline of the patient.

## SPINAL IRRITATION.

Under this term (now discarded by many writers upon nosology and diagnosis) have been included several affections of different pathology, and not always identical in symptoms. Pain, tenderness, and weakness in the back, with flying pains in the chest and sides, and sometimes local spasms, without proof of any decided or progressive lesion of the cord, or either motor or sensory paralysis, appear to be the common features in such cases. I think a name should be reserved for this combination, for practical or clinical use; although, as in the case of dyspepsia, and some other complex disorders, the term used may not very well define the disease. It was first proposed in clinical medicine by Dr. Brown, of Glasgow, 1828. Teale (of Leeds) wrote a work upon it. Dr. W. A. Hammond more recently (1870) reasserted its practical importance. He considers tenderness of the spine on pressure an essential sign.

Some cases included in this account are really **rheumatoid** (chronic non-febrile rheumatic) affections of the sheaths of the spinal nerves; others are instances of **myalgia**; that is, *muscular* pains from weakness and exhaustion in the muscles. Others again display, with anæmia and general nervous debility, a real irritability of the cord, shown by (hysterical) spasms of some muscles, or general convulsions, under disturbing impressions of various kinds. Dr. Benjamin Lee,[1] of Philadelphia, has written elaborately upon *spinal arthro-chondritis*, or inflammation of one or more of the intervertebral articulations, involving the intervertebral fibro-cartilage. The typical symptoms described are pain, often remote; muscular spasm; and permanent muscular contraction.

**Treatment.**—The discovery of the *nature* of the case (as above indicated) is important. If, in an otherwise vigorous person, the attack comes on after some exposure, the rheumatoid condition is most probable; and then cupping along the spine will do the most good. Afterwards counter-irritation, as by croton oil, may be used, and wearing flannel next the skin will be important.

**Myalgic** or purely muscular pains follow generally upon fatigue, and are best cured by repose, aided by warm frictions, as with spirit of turpentine, whisky and hot water, whisky and salt, etc.

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[1] Transactions of Medical Society of Pennsylvania, 1868.

**True** spinal irritability (*i. e.*, of the cord, *not always* attended by sensitiveness to pressure along the back) is generally an affection of the anæmic and weak. Iron and other tonics, with nourishing food, salt bathing, and pure air, are demanded; and with these, mild counter-irritation over the spine. Hemlock or Burgundy pitch plasters; repeated dry cupping; painting with tincture of iodine, and the limited use of croton oil externally, are the best measures of this kind for such a purpose. Electricity may also be serviceable; especially the continuous current.

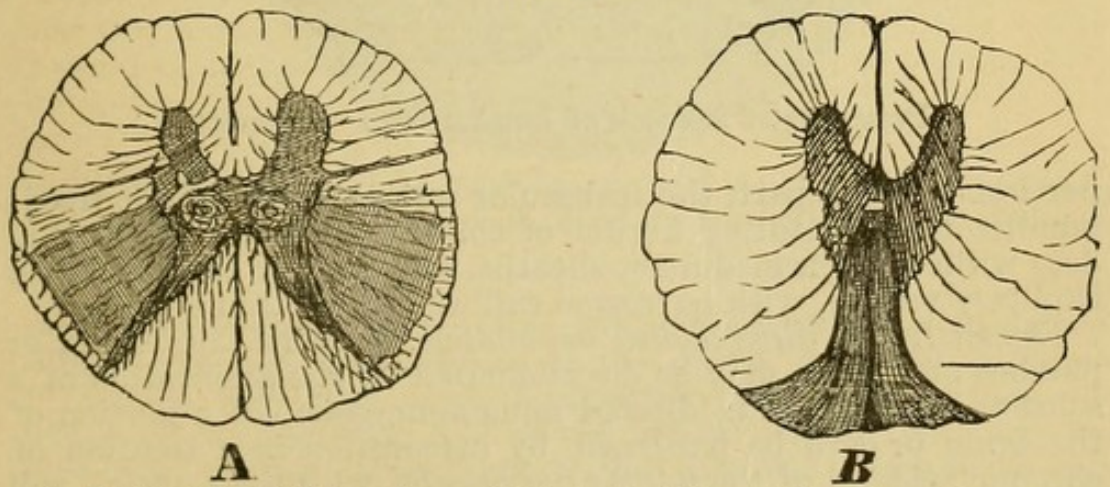
## CEREBRAL AND SPINAL SCLEROSIS.

Induration or sclerosis has now a much larger place in neuropathology than was formerly awarded to it. By the researches of Vulpian, Charcot, Frommann, Türck, Westphal, Erb, Gull, Lockhart Clarke, Moxon, Seguin, Hamilton, and others, it has been exhaustively studied. From the protracted nature of the maladies with which it is connected, they being seldom fatal at an early stage, the *primary* character of the morbid process of which it is the result is inferred rather than positively known. The common opinion of pathologists is that inflammation, of a subacute character, has to do with its beginnings.

*Chronic inflammation* is, with some writers (as Bristowe) synonymous, in affections of the nervous apparatus, with sclerosis. Its later and most important alterations, at all events, are *atrophic* and *degenerative*.

When patches of disseminated spinal or cerebral sclerosis are closely examined, they are seen, even with the naked eye, to have a grayish or yellowish gray, translucent appearance, almost like cartilage. They are clearly defined from the healthy tissue;

FIG. 113.



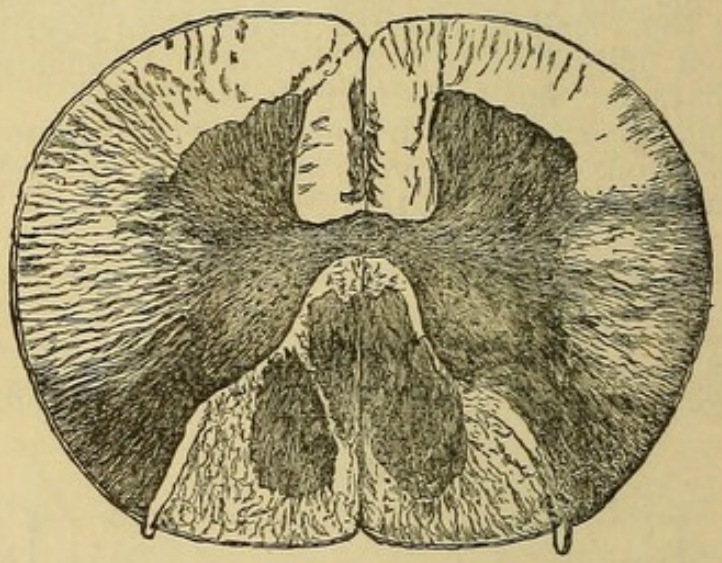

A. Antero-lateral Sclerosis. B. Posterior Spinal Sclerosis. (Charcot.)

sometimes being slightly raised above it, in other instances level with it, or sunken below it. They are roundish, but irregular and various in form. When exposed to the air, they become somewhat rose- or salmon-colored. In consistency, they are firm enough to be felt distinctly by the finger; to the knife, they

present much more resistance than the normal tissue of the brain and cord. On division, they show a clean smooth surface, giving out a small quantity of transparent liquid. In a few instances, in which death from other causes has allowed examination at an early stage, they have been found (Zenker) soft, gelatinous, or semi-fluid in consistency. They vary in size from microscopic minuteness up to the magnitude of a hazel-nut. In the cord they may extend longitudinally for a considerable distance.

Microscopically examined, the parts affected by sclerosis are seen to have undergone structural changes of an atrophic character: consisting chiefly in the partial or total disappearance of the *medullary sheath* of the nerve-tubules, while their axis-cylinders are still of normal diameter, or have even become enlarged; along with alterations in the cell-forms present, whose nuclei appear to be more voluminous than usual in the outer zone of the *plaque* or patch, but smaller and less numerous in its central

FIG. 114.



Disseminated Sclerosis of Lumbar Cord. (Charcot.)

portion. At that part, the trabecular reticulum has disappeared; bundles of substituting fibrillæ of connective tissue, axis-cylinders without their medullary sheaths, and more or less thickened capillary vessels, with narrowed calibre, are all that remain.[1]

Especially in *disseminated* or *multiple* sclerosis, the spots or patches of disease may be discriminated by the application of a solution of carmine in diluted aqua ammoniæ. If a portion of the brain or cord be hardened by maceration in a solution of chromic acid, all of the *healthy* nerve-cells, with their nuclei, will be decidedly stained by the carmine solution; and so will be the *axis-cylinder*, only, of the nerve-filaments. *Sclerosed* nerve-tissue, however, will *not be colored* by the carmine.

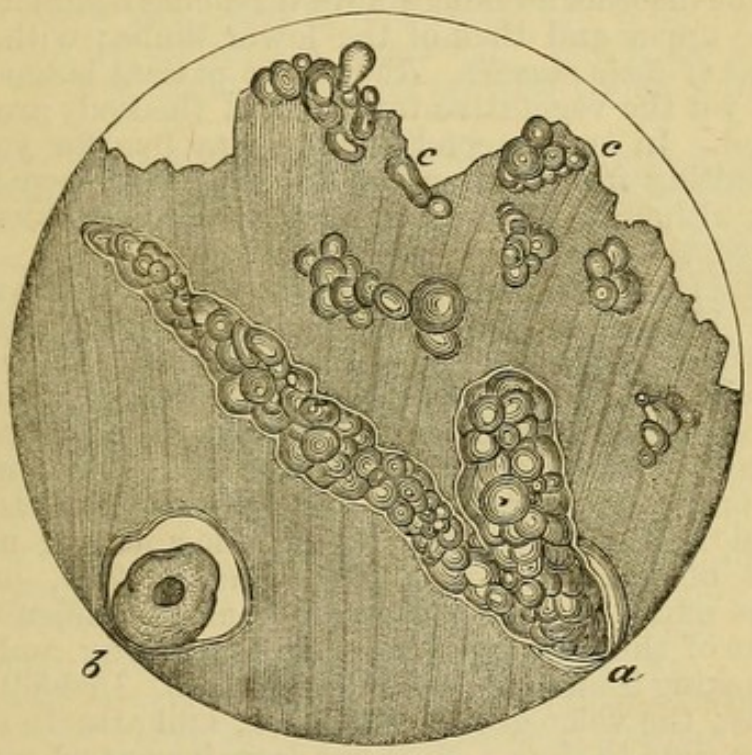
[1] For a full account of these microscopical appearances, see Charcot's Lectures on Diseases of the Nervous System, Lect. VI. See also an abstract on the subject of Sclerosis by the author, under *Induration*, in Reynolds' System of Medicine, American edition, Vol. I., pp. 1009–1015.

All the anatomical elements of the nervous apparatus may, in some cases, be affected with sclerotic lesion; the capillaries (probably) first; afterwards, the nerve-cells, the nerve-tubules with their sheaths, and the neuroglia (intervening reticular tissue of Kölliker and Virchow); as well as, frequently with increased deposit in the cord, the trabecular connective tissue.

**Lateral Spinal Sclerosis.**—This may be either *primary* or *secondary*. The latter follows, sometimes, cerebral disease (apoplexy, or *ramollissement*), or else that of the crura cerebri, pons, or medulla oblongata. This constitutes (Türck's degeneration) *descending* sclerosis; occurring (from decussation) in the cord on the side opposite to that of the brain lesion.

*Primary* or idiopathic lateral sclerosis is symmetrical, upon the two sides of the cord. It occurs at first and chiefly in the "crossed

FIG. 115.




Patch of Sclerosis. *a*, Lymphatic sheath of a vessel distended with fatty globules; *b*, a vessel transversely divided, showing distention of sheath. (Charcot).

pyramidal columns" of Flechsig, which are posterior to the lateral columns proper, but anterior to the direct cerebellar columns. Extension may take place horizontally, so as to include the whole of the posterior half of the lateral column, reaching the posterior cornua. The form of the sclerotic patches is then wedge-like or triangular in transverse section, and they extend to the spinal pia mater. In descending, secondary sclerosis, the patches are rounded, and do not reach the pia mater. Charcot has given the appellation *tabes dorsalis spasmodica* to this disorder; corresponding with the *spastic spinal paralysis* of Erb, or *tetanoid paraplegia* of Seguin. It commences usually between the thirtieth and fiftieth years of life. Its most frequent cause is exposure to

cold and wet. Early symptoms are those of great muscular weakness, the limbs dragging heavily. Then follow twitchings of the limbs while at rest, especially after exertion; trembling of the legs when, in sitting, the toes are made to touch the floor; and increased tension of the muscles, causing a peculiar gait in walking. The patient rises on his toes at each step, so as to be constantly in danger of falling forward.

At this stage there is a marked *increase of the tendon-reflex* (see remarks upon this later, under *Locomotor Ataxy*) of the knees, when they are struck in the sitting posture, one being crossed over the other. The same phenomenon may also, in such patients, be manifested in the triceps and biceps muscles of the arm. The *ankle-clonus* is exaggerated in the same cases. No disturbance of sensibility, or muscular atrophy, occurs; nor is there any symptomatic trouble in the bladder, rectum, or sexual apparatus.

Slowly the disorder advances, until it reaches complete paralysis, first of the upper and then of the lower limbs; with, also, *rigid contractions of their muscles.* At last the patient is unable to walk or stand; yet the vegetative functions of the body are commonly unimpaired. In such a condition he may live for years; death finally resulting from some other disease. Recovery is not to be expected; although Westphal and R. von der Velden[1] have recorded exceptional cases of its occurrence.

**Bulbo-nuclear Sclerosis.**—This, the *glosso-labio-laryngeal paralysis* of Trousseau (progressive bulbo-nuclear paralysis of Kussmaul), was first described by Duchenne. Its seat is in the motor nuclei of the medulla oblongata. Happily rare, it is one of the most terrible of all chronic diseases. Beginning mostly after the age of forty, generally in males, its first symptoms are pain and oppression in the neck and back of the head, with dizziness and hesitation in speech, and slowness in mastication. Weakness of the lips ensues; the mouth falls, producing a lugubrious expression. Swallowing becomes difficult, from enfeeblement of the muscles of the palate, pharynx, and epiglottis; so that choking is endangered in taking food. Dribbling of saliva is frequent; the voice grows indistinct; and attacks of dyspnœa occur from time to time. Without impairment of general sensibility or of the mental functions, these disabilities all increase, until it becomes impossible for the patient to take any nourishment. At last, death occurs from starvation; unless hastened by some intercurrent attack, as of pneumonia. In not a few cases, progressive atrophy of the muscles, especially those of the tongue, palate, and face, coincides with the above symptoms. Some pathologists (Kussmaul, Charcot, Erb) have asserted the essential identity of this disorder with *progressive muscular atrophic paralysis.* Others (Duchenne, Friedreich, Hammond) oppose this view.

After death, in some cases, the unaided eye can perceive no morbid change in the medulla oblongata. In many instances, however, diminution in bulk and alteration of consistence, with

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[1] Berliner Klin. Wochenschrift, Sept. 23, 1878.

gray discoloration in spots or patches, may be seen. Microscopic examination has shown the characteristic change to be a yellow pigmentary *degeneration of the nuclei of the hypoglossal, spinal accessory, vagus, and facial nerves.*

**Multiple Cerebro-Spinal Sclerosis.**—This is the "sclérose en plaques disséminées" of Charcot; *insular sclerosis* of Moxon. It may occur in the spinal marrow alone, or in the brain alone; but most frequently both are more or less involved in its course. Cruveilhier[1] mentioned it many years ago; Carswell, Türck, Rokitansky, and Frerichs partially described it; but the observations of Vulpian and Charcot have most definitely marked out its present place in pathology.

It is most common in women, between the ages of twenty and thirty; but is sometimes met with in still younger subjects. Hereditary predisposition is more noticeable in connection with this than with other forms of sclerotic disease. Exposure to cold or wet, and disturbing mental influences, are believed often to have to do with its immediate causation. Shock from physical injury, and various acute disorders, are also thought to promote its occurrence.

The *symptoms* of multiple sclerosis are, so to speak, a variable composite of those of sclerosis of different parts of the cerebro-spinal axis. Its first signs are obscure. Weakness and dragging of the limbs, pains in different parts of the body, dizziness and headache, are among the earliest of these. Afterwards, symptoms may present themselves which belong, in turn or together, respectively to locomotor ataxy, spasmodic spinal paralysis, or bulbo-nuclear sclerosis. Both in its semeiology and in its morbid anatomy, this disease is truly multiple or *polymorphous.*

Typical cases, nevertheless, possess a combination of characters tolerably distinctive; such as tremor accompanying all voluntary movements; monotony of speech, and a "scanning" articulation; nystagmus (rolling of the eyeballs from side to side); amblyopia (feebleness or indistinctness of vision); diplopia (double vision); vertigo; and apoplectiform attacks.

The *volitional* tremor of multiple sclerosis differs from the *constant* trembling of paralysis agitans. The *head* is usually involved in the shaking of multiple sclerosis; seldom in that of shaking palsy. The tremor is also smaller, finer in its vibrations in paralysis agitans than in multiple sclerosis. Charcot refers the causation of the trembling in the last-named affection to the persistence of many of the *axis-cylinders* of the spinal nerve-fibres, with degeneration of their medullary substance, giving rise to an imperfect and jerking conduction of motor impulses.

Erb, Ordenstein, Vulpian, and Hammond have offered evidence in favor of the opinion that tremor occurs only when some portion of the brain (not the spinal marrow alone) is involved in the disease.

The *duration* of cases of multiple sclerosis is ordinarily from five to ten years. If the symptoms in some instances remit for awhile, they may be expected to return, probably after a short

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[1] Atlas d'Anatomie Pathologique, 1835, 1842.

interval. Vulpian has reported one case, in which a remission lasted for three years.

**Posterior** (or *Postero-lateral*) **Spinal Sclerosis.**—This is *Locomotor ataxy:* an account of which will be given upon a later page.

The **treatment** of all varieties of sclerosis of the nervous centres has proved, so far, generally unsatisfactory. Palliation of distressing symptoms, economy of vital power, and prolongation of life by the most favorable conditions, seem to be all that can be reasonably looked for. Yet a justifiable employment of various tentative measures has not been neglected. *Counter-irritation*, by blisters, issues, setons, and moxas; nitrate of silver, arsenic, chloride of gold, ergot, phosphorus, strychnia, belladonna, iodide and bromide of potassium, corrosive sublimate, and chloride of barium; the "wet pack" (hydropathic system); massage; and lastly, electricity, have all been tried, with but limited success in most instances. Da Costa[1] recommends, upon experience, administration of corrosive sublimate in non-salivating doses, from an early period, continued for months together. S. Weir Mitchell advises the use of hypodermic injections of morphia, alone or combined with atropia, for the relief of suffering. *Massage* and the *continuous voltaic current*, with occasional *warm or hot salt baths*, are as promising as any other measures of treatment in these intractable affections. But *hygienic* recommendations may have an important influence, at least in lengthening life and making it more tolerable. Regulation of the diet (which should be nourishing, concentrated, digestible, and sufficiently varied to promote appetite); warmth of clothing, and protection from undue exposure, with air and sunshine as often as practicable; a choice of climate for residence; avoidance of, or extreme moderation in, sexual indulgence; occupation, to interest, but never to weary or harass; social, domestic, and all other mental and moral influences of the patient's environment: all these may make a difference of months, perhaps of years, in the duration, and a great mitigation also of the sufferings, of the most incurable of diseases.

## PARALYSIS.

**Varieties.**—*According to the proximate cause:* 1. Cerebral palsy; 2. Spinal; 3. Reflex paralysis; 4. Toxæmic (*e. g.*, lead palsy); 5. Hysterical palsy. *According to the extent of the affection:* Facial or other local palsy; Hemiplegia; Paraplegia; General paralysis. *According to its nature:* Motor (acinesia) and Sensory paralysis (anæsthesia).

**Facial Palsy.**—This is an affection of the *portio dura* of the seventh pair of cephalic nerves, the motor nerve of the face. It occurs at any age, usually from rheumatoid inflammation of the sheath of the nerve at its escape from the cranium through the stylo-mastoid foramen. One side of the face is without change of expression; and the eye on that side is not closed (in severe

[1] N. Y. Med. Record, April 5, 1879.

cases), on account of the paralysis affecting the *orbicularis palpebrarum* muscle. The tongue is not affected in its movements.

The facial motor nerve is seldom involved in the much more serious cases of *cerebral* palsy. In facial palsy the retention of control over the tongue, while the power over the eyelid is partly or wholly lost, with the absence also of severe cerebral symptoms, will, especially in a young person, make the diagnosis easy as well as important. The **prognosis** is generally of recovery in a few days or weeks. The **treatment** of this form of local palsy may be by repeated small blisters behind the ear, followed, when convalescence has begun, by some warm covering (cotton wadding, flannel, or silk) to protect the part from cold.

**Other Local Palsies.**—Pressure upon a nerve may cause its paralysis, generally temporary. I remember the case of a man, whose hand was rendered powerless for about three weeks by sleeping all night with his arm bent under his head. Frictions, the endermic application of strychnia, and galvanism were used in that case. *Writer's cramp*, or scrivener's palsy, is the result of exhaustion of certain muscles from overuse. Its cure is rest.

Palsy of the optic nerve is designated as *amaurosis;* of the sense of hearing, *cophosis;* of taste, *ageustia;* of smell, *anosmia.* Except the first, however, these terms are not much used.

**Hemiplegia.**—Brain-lesion is most often the cause of this affection; either an apoplectic clot, a tumor, embolism, or softening. Spinal disease may, however, produce it; and some cases are, by writers upon the subject, referred to a peripheral or reflex origin. There may occur also, transiently, *epileptic*, *choreic*, and *hysterical* hemiplegia. Owing to the decussation of the anterior pyramids of the medulla oblongata, lesion of one side of the brain produces paralysis of the other side. In spinal lesion the palsy is usually on the same side. Brown-Séquard, however, has shown decussation in the cord, also, of the sensory nerve-filaments.

Ferrier, in accordance with his experiments upon localization (see Part I., *Neuro-pathology*), gives the following summary statement:

"While we cannot be quite certain of the position or extent of a cortical lesion causing a sudden and complete hemiplegia, we may take a monoplegia (paralysis of one limb, or of a few muscles only) of the leg, or of the arm and leg, as an indication of lesion of the upper extremity of the ascending convolutions close to the longitudinal fissure; brachial monoplegia as a sign of lesion of the upper part of the ascending frontal convolution, or, if the paralysis affect the hand more particularly, of the ascending parietal convolution; brachio-facial monoplegia as indicating lesion of the mid-fronto-parietal region; while facial and lingual monoplegia, or this combined with aphasia, indicates lesion of the lower part of the ascending frontal convolution, where the third frontal unites with it."

**Symptoms.**—Suddenly, almost always, but not in every instance with loss of consciousness, the patient loses the power of motion, and more or less of sensation on one side. In *complete* cases, the parts involved are the arm and leg, the muscles of mastication

(with the buccinator), and the half of the tongue. In trying to protrude the tongue it is pushed out towards the affected side; in retracting it, the reverse happens; that is, it is drawn towards the sound side. The palsied cheek hangs; but the eye can be shut or opened at will. Both eyes are apt to be turned towards the side not paralyzed; and the head turns also towards that side. The third, fifth, and ninth nerves are especially likely to show implication by disturbance of the actions under their control; of the fifth, those of the muscles already mentioned, as well as of facial and lingual sensation; of the third, loss of power to lift the eyelid, strabismus, and dilatation of the pupil; of the ninth, one-sided movement of the tongue, affecting also the speech.

Hemiplegia may be attended by either rigidity or relaxation of the muscles, and the former may be early or late. Where there is decided relaxation in cerebral paralysis, it is probable that white softening, or atrophy from thrombosis[1] or embolism of some of the vessels of the brain, is the lesion, with or without a clot; where early rigidity is marked, an apoplectic clot may be inferred. Late rigidity is probably due to an atrophic state of the muscles—a "*rigor mortis in vitæ.*" Contradictory accounts are given by authorities as to the susceptibility to galvanic excitation of the muscles on the sound and on the *paralyzed* side. It is probable that the loss of excitability of muscles is in proportion to their atrophy.

The **prognosis** in hemiplegia depends greatly on the ascertainment of its causation. If it follow an epileptic fit, or attack of chorea, or occur in an hysterical subject, it may be of comparatively brief duration, ending in recovery. If an apoplectic attack precede it, or if any lesion of the brain be inferred from the history of the case, the prospect is bad. Partial improvement may occur, but not often entire restoration; and renewed attacks or "strokes" are likely to take place. A form of *hemichorea* (post-paralytic chorea) in rare instances follows hemiplegia.

Dr. S. Weir Mitchell has made the curious observation[2] that, in cerebral palsy the growth of the nails is retarded; a more rapid elongation of them being therefore a prognostic of partial or complete recovery. In hysterical palsy the nails grow as usual.

**Treatment.**—Essentially the same principles are applicable to this as have been mentioned in connection with apoplexy. The younger the patient, the more vigorous his previous health, and the fuller the circulation, the more appropriate will be the general or local abstraction of blood to diminish pressure upon the brain. Where softening is apprehended, bleeding should be exceptional. Epileptic, choreic, and hysterical hemiplegia indicate little or no depletion as a rule. Rest, regulation of the bowels, counter-irritation by dry cups to the upper part of the spine, and afterwards a blister, with frictions, as with brandy and red pepper, or whisky and hot water, or salt and spirits to the

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[1] Lidell, Am. Journal of Med. Sciences, April, 1873.
[2] Trans. of Phila. College of Physicians, April, 1871; Phila. Med. Times, June 1, 1872.

affected limbs; these are measures of general utility. A seton in the back of the neck is sometimes recommended. As to strychnia, it is not safe where cerebral or spinal irritation is likely to exist, as near the commencement of most attacks. Even at a late stage, it should be used with extreme caution, watching its effects [F. 137]. Precisely the same statement may, upon the best authority, be made as to electricity in cerebral paralysis. In the *hysterical* form, if this last long, electricity may be applied locally, with safety and advantage. In any curable case, *massage* and *passive exercise* of the weak limbs will be very useful.

**Paraplegia.**—This is paralysis of both the lower extremities. *Spinal* disease or injury is its source; with or without cerebral implication or complication. It may come suddenly or gradually; generally its beginning, at least, is sudden. *Reflex* paralysis, as described by several authors, is sometimes paraplegic.

**Symptoms.**—In organic or spinal paraplegia, as well as in the reflex form, numbness in the feet and pain in the back are apt to be early signs. The power of motion is lessened or lost in the lower limbs. The muscles may be either relaxed or contracted. The lesion of the spinal marrow, if progressive, is productive, finally, in many cases, of loss of power over the bladder and sphincter ani. Bed-sores, with deep ulceration and sloughing, may occur in protracted cases.

**Treatment.**—When *myelitis* is believed to exist, at an early stage, local depletion to a moderate extent, in otherwise good subjects, may be advised. In any case, counter-irritation (not vesication, in a bed-ridden patient, unless he can lie well on either side), by repeated sinapisms, or stimulating liniments [F. 138, 139], will be proper.

While inflammation or active irritation of the spinal cord is made apparent by the symptoms (pain, cramps, muscular twitchings, or rigidity) strychnia is not suitable. After these have subsided, it may be given—not more at first than the thirtieth of a grain twice daily. If it produce jerking movements of the hands or feet, or nervous restlessness, or any marked uneasiness, it should be suspended. Electricity may be used, with similar caution, in a secondary or relatively late stage of paraplegia. Moderate (at first very gentle) shocks of the interrupted circuit are preferred.

**Hysterical Paralysis.**—In females, this is among the many forms of functional disorder which that strange and not yet clearly defined disorder, hysteria, may produce. It is diagnosticated by the aid of the history of the patient. Dr. Todd stated that, in it, the affected limb (it is most often hemiplegic) in walking is dragged after the other, as if a dead weight; while in cerebral hemiplegia the palsied leg and foot are brought round in a curve, the body being bent toward the sound side at the time. I am doubtful of the universality of this sign. The palsy in hysterical paralysis is, at all events, incomplete, and has usually a marked degree of numbness associated with it. Briquet asserts that it affects the left side of the body much more often than the right.

**Treatment.**—Tonics, good nourishment, and change of air (in

a word, analeptic management), are needed in nearly all hysterical cases. For the paralysis itself, electricity has been found useful. Mild shocks for a few minutes twice a day may be given with the magneto-electric apparatus.

**Reflex Paralysis.**—From the times of Whytt and Morgagni, occasional instances of palsy of motion or sensation, caused by an injury at a distance from the affected parts, have been recorded. Since Stanley's paper (1833) asserting the production of paralysis, sometimes, by disease of the kidney, a number of medical writers have added to the list of supposed cases of "paralysis without apparent lesion." Worms, dysentery, diarrhœa, uterine irritation, teething, and external injuries are all thought to induce reflex paralysis in certain instances. Diphtheritic and scarlatinal palsies have by some been placed in the same category. The simplest and clearest cases are those of wounds; *e. g.*, Morgagni's case, in which amaurosis was suddenly produced by a blow upon the eyebrow, affecting the supra-orbital nerve. Lardier[1] has recorded the case of a boy in whom amaurosis was connected with caries of a tooth, the removal of which was followed by restoration of sight. I would exclude most of the asserted instances of *visceral* reflex paralysis.

The *pathology* of this form of palsy has been a subject of much controversy. To my judgment (after reading considerably upon it) the best explanation is that of Handfield Jones and S. W. Mitchell; expressed in the term proposed by the former—"inhibitory action." Denying, against no matter what present authority, the existence of *inhibition* or repression as ever proved to be the *normal* function of any nerve (such as many assert on the ground of experiment in regard to the pneumogastric), I consider it most reasonable to admit it here *pathologically*. In other words, a *morbid* impression, from injury or disease, in one part of the body, being transmitted along a nerve in the nerve centre, overwhelms or paralyzes it; the effect being shown, of course, in the parts to which it distributes nervous branches.

**Treatment.**—In true reflex paralysis, of short or moderate duration, the removal of the irritant cause produces instant relief; as in H. Jones's case, where strabismus from palsy of the external rectus oculi muscle disappeared after a piece of dead bone was extracted from a whitlow on the thumb; or Lawrence's, in which blindness of one eye (of thirteen months' standing) was cured by the extraction of a carious tooth, with a splinter of wood projecting from one of its fangs. When the nature of the case does not admit of such prompt relief, if the diagnosis be clear, the same indication remains—to address our remedial measures to the seat or source of peripheral irritation. Palliate, if we cannot cure, the trouble there, and we will obtain palliation, if not relief, of the reflex disability. Electricity has proved signally useful in the subsequent treatment. This form of disorder is, however, very rare.

**Diphtheritic Paralysis.**—After the termination of an attack of diphtheria, commonly within three weeks, the muscles used in

[1] L. Union Médicale, Dec. 14, 1874.

swallowing and speaking, or, less often, those of the upper and lower limbs, or the sense of sight, may be partially paralyzed. Loss of sensibility usually accompanies the loss of motor power. This condition of things may last for weeks or even months, but is generally recovered from. Whether the immediate cause of the paralysis be the peripheral lesion of the nervous terminations (in the pharyngeal and laryngeal affection) or the toxæmic influence, upon the nerve-centres, of the morbid poison of diphtheria, cannot yet be decided. In extended palsy, as a sequela, the latter is the more probable explanation.

**Treatment.**—Passive exercise, stimulating frictions, and electricity, sometimes with change of air, strychnia cautiously given, and sea-bathing, are suitable measures for this affection.

**Syphilitic Paralysis.**—The most unequivocal instances of this nature are accounted for by periostitis within the cranium, involving the dura mater, or by nodular exostosis, pressing upon the brain. The most remarkable fact connected with such cases is the recorded experience showing the prompt curative effect upon it of *iodide of potassium* [F. 140]. Obscure paralysis, without apoplectic symptoms, and in a syphilitic constitution, may be always tentatively so treated, on the basis of such experience.

**Lead Palsy.**—Considerable time of exposure to the influence of lead is generally necessary to cause this. So commonly does it first affect the extensor muscles of the forearm, that the cognomen of "wrist drop" is often applied to it. When it lasts for some weeks, the muscles waste away. A blue line is observed to form along the edge of the gums. Pain precedes the palsy, and attends recovery of power. During the attack the muscles have their excitability by electricity considerably diminished or lost.

Lead poisoning sometimes seriously (even fatally) involves the brain (*encephalopathia saturnina*). Tanquerel, Desboise, Rosenstein, Leidesdorf, and others, have recorded cases in which the symptoms were, amaurosis, hallucinations of vision, and epileptoid convulsions.

Mostly, though after a long time, lead palsy is recovered from. Iodide of potassium appears to act as an eliminant of the lead accumulated in the system. Ergot is asserted by some to be curative also. Faradaic electricity has been found decidedly beneficial; used in moderate strength for a few minutes two or three times a day. (See *Medical Electricity*, in Part I., Sect. III.) A milk diet is asserted by M. Péligot, an experienced glass manufacturer, to be preventive of lead poisoning in those exposed to it.

**Mercurial Palsy** is occasionally met with in those who work with the metal. Mostly *tremor* is a predominant symptom. Early withdrawal from the influence of the cause, and the continued use of the iodide of potassium, are the principal measures of treatment.

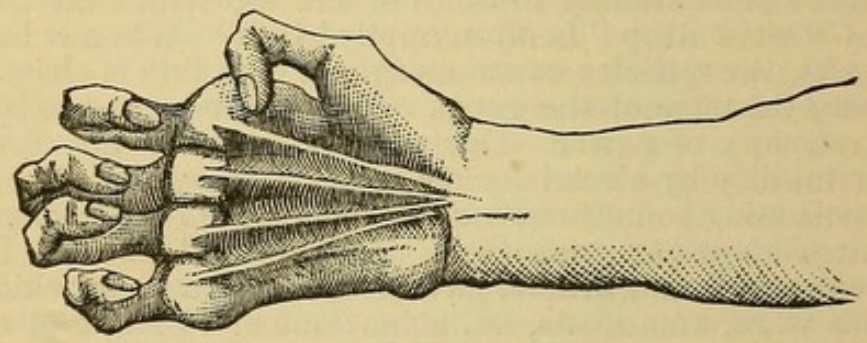
**Paralysis agitans,** or shaking palsy, is a more or less constant involuntary and uncontrollable shaking of the hands, arms (seldom the head), and progressively of the whole body. Slight or moderate degrees of such tremor are common enough from general nervous debility. Extreme cases evince the wreck of the cerebro-

spinal system, and are therefore incurable. Since the study, by Charcot and others, of disseminated or multiple cerebro-spinal sclerosis, some cases are referred to that affection which formerly would have been included as examples of paralysis agitans. Two kinds of tremor are described; one *constant* (that of paralysis agitans), and the other *volitional*, *i. e.*, occurring only when some muscular action takes place under an effort of the will. The latter belongs to disseminated or multiple cerebro-spinal sclerosis. No absolutely certain demonstration of the morbid anatomy of paralysis agitans has yet been obtained; and no especial treatment can be pointed out for it.

**Spastic Spinal Paralysis**—*Lateral Spinal Sclerosis.*—This has been already sufficiently considered. (See *Cerebral and Spinal Sclerosis.*)

**Wasting Palsy** (Cruveilhier's)—*Progressive Muscular Atrophy.*—A few of the muscles of one limb, or the voluntary muscles of the whole body, may lose their power, and then waste away almost to nothing. The shoulder and the ball of the thumb are frequent points of commencement for the palsy and atrophy. Insidious in its approach, the affection may last from six months to several years. It may end in recovery, in permanent arrest at

FIG. 116.



Advanced Wasting Palsy.

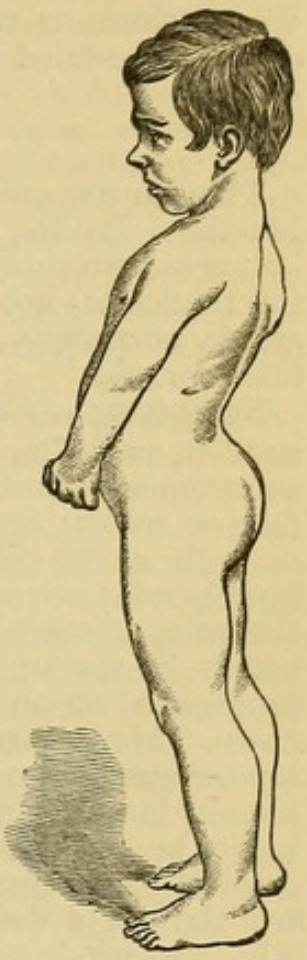
a certain stage of the disease, or in death. Twelve months is the earliest recorded period for the occurrence of a fatal end. This is the result always when the *trunk* is invaded. After death, the spinal marrow has been examined in but a few cases. No lesion has been found in most of them; in a certain number it has. Dr. J. Lockhart Clarke in one case[1] found the diameter of the cord one-fourth less than the average. Joffroy, Hayem and Charcot assert the coincidence in several instances of progressive muscular atrophy with *degeneration* of the *anterior gray cornua* of the spinal cord. Friedreich, Cohnheim, and Lichtheim have reported cases where no lesion of the cord or nerves was ascertained; but, considering the possible minuteness of such alterations under some circumstances, positive observations outweigh the negative, which may be exceptional. Our methods of inspection of nervous tissue are yet too imperfect for it to be pronounced that such an atrophic disease is ever independent of the nervous

[1] Brit. Med. Journal, Dec. 7, 1872.

centres. It may be the *ganglia* which regulate *nutrition* that are most directly in fault.

A similar remark may be made in regard to the pathology of progressive muscular sclerosis, the **pseudo-hypertrophic muscular paralysis** of Duchenne; the singularity of which consists in the fact that while some of the muscles are wasted, or at least weakened, *enlargement* afterwards occurs, in the same or in other muscles,[1] by morbid proliferation of connective-tissue elements. Friedreich and Gowers believe this to be an idiopathic disease of the *muscular tissue*.

FIG. 117.



Pseudo-hypertrophic Paralysis. (Bristowe).

The subjects of this affection are mostly young. Its progress is gradual and not painful. The muscles of the calves of the legs, lumbar region, and buttocks are especially often involved. The affected muscles are not contracted at any stage. For progressive muscular atrophy, the most hopeful **treatment** is by means of *electricity*.

**General Paralysis of the Insane.**—Only a minority of insane persons have this affection. Difficulty of speech and general tremor characterize it, followed by the gradual loss of all mental, muscular, and sensory power. Delusions of an extravagant kind commonly attend it: whence some French writers have called it "folie ambitieuse." It is incurable. In diagnosis, Dr. Bucknill has pointed out the significance of the loss of electro-motor excitability in the muscles. In pathology, general paralysis, or *paresis*, seems to be connected with a change in the cortical substance of the brain. Calmeil, who first clearly described it (1825; Bayle, 1822), believed it to be due to chronic inflammation of the brain. More probably, its cause is a defect of nutrition; a degeneration; whether or not preceded by inflammation. Dr. Howden, of Montrose, has found granular degeneration of the nerve-cells in some cases.[2] Granulations of the lining of the ventricles are asserted by M. Joire[3] to be peculiar to general paralysis; but Maudsley, Blandford, Shew, and Seguin[4] have found them in cases of mania and dementia. Allbutt has, by the ophthalmoscope, detected atrophy of the optic nerves in nearly every case. Ludwig Meyer, of Göttingen (Virchow's Archiv, Aug., 1873), advocates the view that the essential affection is a chronic inflammation of the brain and its membranes; involving the minute

[1] See a careful analytical report of a case of this affection by Dr. W. Pepper, Phila. Med. Times, June 15th, 1871. The researches of Lockhart Clarke have made it certain that wasting palsy is essentially a *central* disease.

[2] London Lancet, July 31, 1869, p. 157.

[3] Bulletin de l'Acad. Imperiale de Médecine, 1861.

[4] Amer. Journal of Med. Sciences, July, 1871.

vessels and interstitial material, not the nerve-cells. Palliative treatment only, and that which economizes the energies of the system, can be employed in this affection. For the relief of the occasional paroxysms of excitement, physostigma (Calabar bean) has been found rather particularly useful.

Constitutional *syphilis* has probably a causative relation to some, but certainly not to nearly all cases of general paralysis. When there is room to suspect this, anti-syphilitic treatment ought to be tried for its relief.

## LOCOMOTOR ATAXY.

Though recognized in its essential features by Sir Charles Bell, Matthew Baillie, Hufeland, and others, this affection has been better known since its especial study and designation by Duchenne (of Boulogne) not many years since. Dr. R. B. Todd called it *ataxic paraplegia;* an older name, especially in Germany, was *tabes dorsalis.*

**Symptoms.**—*Pains* generally first occur; mostly in the limbs, sudden, variable, but often very severe; "fulgurant," compared sometimes to *toothache in the legs.* Occasionally they are in the face or trunk; and commonly they are aggravated by pressure, as well as by cold and wet. *Strabismus* and *dimness of vision* (amblyopia) are apt to be early symptoms. *Loss of sensibility* of the skin, or more deeply seated, especially in the feet, and afterwards in the upper extremities, follows. Insensibility to pain (analgesia) on pinching or pricking with a needle occurs in many cases. More rarely, there is local *hyperæsthesia*, or excessive tenderness to the touch. *Retention* or *incontinence* of urine come usually later; spermatorrhœa often quite soon in the case. Impotence, in an advanced stage, is the general rule. The *bowels* are generally constipated; though the patient may lose power to control the act of defecation. The *pulse* is moderately accelerated. The *stomach* is subject to attacks of indigestion and vomiting. Sometimes a rheumatoid affection of the *joints* occurs. This may go so far (Charcot) as almost to destroy the ends of the bones, at the knee, shoulder, or elbow. Papular, or even pustular, eruptions are not rarely met with, perhaps increasing and remitting according to the severity of the lancinating pains.

The *tendon-reflex disappears* (Westphal) early in locomotor ataxy. By it we mean the jerking of the leg and foot upward and forward when, one leg being crossed over the other in a sitting posture, a sudden blow is struck upon the tendon of the *quadriceps femoris* muscle, at its junction with the patella.

In a healthy person, this is almost always observed. It is *exaggerated* in lateral spinal sclerosis (spasmodic spinal paralysis). Analogous to it is the *ankle-clonus.* If the foot be flexed firmly by pressure upward on the sole, and the *tendo Achillis* be then briskly tapped, the foot at once undergoes flexion and extension, in rapid succession, for a considerable number of times. As this, like the tendon-reflex, is increased in cases of spastic spinal paralysis, it is to be expected that it would be diminished in locomotor ataxy; but the constancy of this diminution has not been established.

*Inactivity of the pupil* (Argyll Robertson) under changes from light to darkness and the reverse, is another not infrequent sign, in locomotor ataxy, of the diminution of reflex susceptibility. The pupil may be either more or less than usually contracted under moderate light; but it responds sluggishly or imperfectly to stimulation of the contractile tissues of the iris.

The *pathognomonic* sign of this affection is *asynergia* (Bazire), *i. e.*, loss of co-ordination of the muscular movements of the lower limbs. The gait, in walking, is *unsteady* and insecure; the limbs feel heavy and are easily fatigued. Each step, in an advanced case, is apt to be made with a sort of jerk forwards; quite differently from the slow and dragging movement of ordinary hemiplegic paralysis. If the patient shuts his eyes, he is likely to fall down. A similar loss of co-ordination in the arms and hands is met with not unfrequently, but to a less extreme degree. Although Duchenne asserts the persistence of muscular power without loss in this disease, it is almost certain (Oppolzer, Allbutt) that it is more or less impaired from the beginning in every case.

**Prognosis.**—It is a progressive disease, but of various duration; from six months to thirty years; average perhaps about seven years. Recovery is scarcely to be hoped for.

**Causation.**—This is a disease of middle life, especially in males. Obscure in its origin, and perhaps, as Trousseau insisted, connected with hereditary predisposition, its main promotive causes appear to be, exposure to cold and wet, depressing mental influences, and venereal excesses, particularly self-abuse, and syphilis.

**Morbid Anatomy and Pathology.**—The *posterior columns* of the spinal cord are characteristically altered (*sclerosis* of Charcot) in locomotor ataxy. With atrophy and degeneration of the nerve-filaments, increase in the bulk of the connective tissues gives a gray and semi-transparent appearance to the structure; especially in the dorsal and lumbar portions of the cord. The posterior *nerve-roots* (Vulpian) are similarly affected. So are, also, the cranial nerves, at first apparently at their peripheral ends, and progressively toward the centres. The 5th, 7th, and 8th pairs of nerves are not reported as having been found subject to the same lesions. Dr. James Tyson[1] observed, in one case, softening of the lumbar enlargement of the cord, with partial sclerosis of the antero-lateral column, higher up. According to Erb, the sclerotic change probably begins in the *external bands* of the posterior columns, and spreads thence further; the sclerosis of the *fasciculi graciles* (Goll's columns) being a secondary degeneration. Simultaneous involvement of the *posterior gray horns* and of certain portions of the *lateral columns* is inferred rather from clinical than from anatomical evidence. Examination of the ganglia and nerves of the sympathetic system has seldom been made in connection with this disease. Dr. Gull believes the brain to be frequently involved.

Although physiological considerations suggest a *cerebellar* as well as spinal seat for this disorder, in which loss of muscular co-ordination is so prominent a symptom, this view does not seem

[1] Phil. Med. Times, Jan. 31, 1874, p. 286.

to be confirmed as yet by observation. The difficulty would appear to lie rather in the *perceptive* apparatus by which the natural stimulus of the motor centres is afforded and their functions maintained.

**Treatment.**—Almost hopeless of cure, the life of a sufferer from this malady may be prolonged, and his discomfort lessened by the best hygienic management, as to food, atmosphere, clothing, and rest, aided by tonics, electricity (especially the constant current), and perhaps the careful use of strychnia, hypodermically (Drinkard) or by the mouth. Dujardin Beaumetz[1] recommends phosphorus, in $\frac{1}{70}$ grain doses, in almond oil (F. 252). Dr. S. Weir Mitchell advises *rest* as an important portion of the treatment.[2] Althaus[3] asserts that he has "completely cured" two cases with drachm doses of liquid extract of ergot, three times a day, continued for six or eight months. Dr. Mitchell has confidence in the advantage of rather large doses of iodide of potassium, for alterative effect. Debove, Langenbuch, Esmarch, and Erlenmayer have performed *nerve-stretching*[4] (of the sciatic, radial, or median nerves) in several cases of ataxy; with the effect not only of relieving the lancinating pains, but of at least palliating the other symptoms of the malady.

## ATHETOSIS.

Hammond first applied this term in 1871 to an affection characterized by a *constant*, *involuntary*, and more or less *regular movement of the fingers and toes*, on one side or both. As an occasional phenomenon, it had been before noticed, by Charcot in 1853, and by Heisse in 1860. Charcot regards it as a variety of chorea. Gowers and McLane Hamilton do not admit that it requires clinical or pathological separation, as a distinct disease, from other affections of disordered movement, chiefly following hemiplegia. There is no doubt that hemiplegia has preceded athetosis in most instances; but not in all.[5]

Athetosis may be *unilateral*, or *double* (on both sides). If the former, it is nearly always upon the same side with the hemiplegia. Oulmont has written a short treatise[6] upon this affection. Cases of it have not been very often reported.[7] In the autopsy of one, by Dr. Sturges, of London (the patient having died of phthisis), the following appearances were observed: the whole right hemisphere of the brain was distinctly smaller than the left; atrophy of some of the convolutions had occurred, especially those of the frontal and parietal lobes; the whole of the gray substance of the right corpus striatum, and nearly all of its white substance, was destroyed. In this case the regular movements of the thumb and fingers (alternation of clasping and pronation with supination and extension) had, during life, occurred in the left hand alone.

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1 Bulletin Gén. de Thérapeutique, Jan. 15, 1868, *et seq.*
2 Am. Journal of Med. Sciences, July, 1873.
3 Ibid., October, 1878, p. 348.
4 Brain, January, 1881.
5 See London Medical Record, March 15, 1879.
6 Étude clinique sur l'Athetose, Paris, 1878.
7 See Revue Méd. Tr. et Étrangère, Jan., 1879; and London Lancet, March 15, 1879.

## INFANTILE PARALYSIS.

Under this name is designated what Handfield Jones would call *paresis* (diminution, without total loss, of power) of some of the nervous centres, extending so far as, in infancy, to arrest nutrition, as well as to abridge power in the limbs. Adams points out the following characteristics of the affection: 1. The paralysis is usually partial, single muscles or groups of muscles only being affected. 2. Sensation in the paralyzed parts is generally perfect, or nearly so. 3. The bladder and rectum are commonly not distinctly implicated. 4. The paralyzed muscles are not rigid at any stage. Dissipation or bad health in the parents will predispose to this disease in children. No violent symptoms attend the onset of the attack, although it sometimes comes on quite suddenly. There may be moderate fever; in a few cases, convulsions. Nausea and vomiting are quite common. The susceptibility to Faradaic electricity is less than normal. In fatal cases, Rosenthal, Duchenne, and Damascina have found an atrophic malformation of the anterior cornua of the spinal cord; with enlargement and thickening of the blood-vessels; the latter being regarded as the primary change.[1] Spinal congestion is thought by many observers (Heine, Fliess, Laborde, Radcliffe) to be an early condition in this disease. Roth, of Bâle, Prévost, Vulpian, and others, have proved that the typical lesion of this affection is myelitis of the anterior horns of the gray substance of the cord (anterior *poliomyelitis*). Barwell considers it characteristic that the loss of power comes on suddenly, without other premonitory or attendant symptoms. But, since paralysis does actually occur during infancy, sometimes with and sometimes without evidences of spinal congestion, there is need of some further addition to our terminology to make clear the discrimination among such cases. (*Lancet*, Feb. 24, 1872.) Duchenne considers that a disorder identical with "atrophic paralysis of youth" may occur even as late as forty-five years of age. Anton Frey also refers to a "temporary paralysis" of adults, similar to that of infants, consisting in acute myelitis of the anterior cornua of the cord. The attack, in adults, is described as commencing with feverishness, delirium, deafness, and sometimes convulsions. Generally its duration is but one or two months; if more prolonged, the prognosis becomes unfavorable. Mostly, with care, this affection in infants tends to recovery. But want of knowledge or of attention may allow *deformity* to result from it; especially club-foot. "Talipes equinus" (in which the heel will not touch the ground), says Dr. Taylor,[2] "is the first, and simplest, and most natural sequence of the paralysis—the weight of the foot being all that is necessary to produce it—and no other form of talipes is likely to occur while the patient lies in bed. The bending of the ankle outward (talipes varus) is the result of weight on a foot with a shortened tendo-Achillis; bending inwards (talipes valgus) of the ankle is the result of weight *partially* overcoming the gastrocnemius, soleus, etc., and talipes calcaneus

[1] Centralblatt f. d. Med. Wisensschaften, No. 11, 1872.
[2] Infantile Paralysis, p. 83.

(where the toes are raised so as to be unable to touch the ground at the same time with the heel) of weight entirely overcoming those muscles." The author just quoted concludes, from special experience, that all such deformities are *preventable*, by proper care as to the position and use of the limbs and muscles of all parts of the body during the paralytic or paretic state. The *treatment* of club-foot is a subject for surgical treatises.[1]

In some cases fatty degeneration of the muscles takes place to such an extent as to render the case almost or quite incurable. Brodie observed that a case is likely to recover, in which, when the child is lying on the back, there is power to draw the limbs up by flexing the thigh towards the body.

**Treatment** of infantile paralysis should consist of general recuperative management, including tonics (strychnia in some cases, with caution) and cod-liver oil, salt bathing, passive exercise of the affected limbs, and galvanism ; especially the constant current. The latter must be very carefully conducted in children. Local application of *heat* is advised by Drs. Taylor and Hammond. The former prefers dry heat ; seating the child before a fire and thrusting its legs through a screen, so as to be thoroughly warmed for hours together. Dr. Hammond immerses the paralyzed limb in hot water at 140°–160°. The hot *sand*-bath might be employed. Dr. Dio Lewis has proposed for analogous cases a *sun-bath*. Dr. Jacobi[2] recommends small doses of ergot, internally, in the early stage of the disease, when spinal congestion is believed to exist. This practice is now followed by many practitioners.

## EPILEPSY.

**Definition.**—Periodical convulsions, with unconsciousness during the attack.

**Varieties.**—*Grand mal* and *petit mal* of the French ; the latter is the *eclampsia minor* of some writers ; in which unconsciousness occurs with scarcely any convulsion. The term "Jacksonian epilepsy" (after Hughlings-Jackson, who has best described it)[3] has been applied to unilateral or *partial* epileptic convulsions ; which may sometimes involve only a small group of muscles, as those of one side of the face, one hand, or one foot. Often, however, these are followed, in time, by the more usual form of attack.

**Symptoms.**—*Premonition* occurs in a minority of cases before a seizure ; headache, dizziness, terror, spectral illusions, or the epileptic *aura*. This is a creeping or blowing sensation, like that of a current of air or stream of water, beginning in a hand or foot, and extending toward the trunk. It (if it occur) immediately precedes the paroxysm. Then, sometimes with a scream, the patient falls down, and is violently convulsed. Foaming at the mouth, grinding of the teeth and biting of the tongue are common ; the face is flushed, the eyeballs roll, the pupils are unaffected by light, sometimes vomiting or involuntary urination or defecation takes place ; and respiration may be very laborious.

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[1] *Adhesive plaster* has been successively used for gradually rectifying congenital club-foot, in early infancy.

[2] N. Y. Medical Record, Oct. 1, 1870.

[3] Reynolds' System of Medicine, American edition, Vol. I., p. 72.

Epilepsy is sometimes counterfeited. Among the best tests for a genuine case (Delasiauve, Trousseau) is a *deadly pallor*, immediately preceding the fall of the patient in the attack.[1] Huppert (Virchow's Archiv, LIX., 3 and 4) asserts that *albuminuria* is a constant concomitant of epileptic attacks.

The fit lasts on an average from five to ten minutes. The interval between the attacks may be from several months down to a few hours. Old cases may have two or three paroxysms daily. They vary much even in the same individual.

The condition after the attack is various. Generally, drowsiness or deep sleep follows it; or headache, debility, or delirium; sometimes maniacal frenzy. Homicide has been committed in this state; for which, of course, the person is not criminally responsible.

**Anatomy and Pathology.**—Epilepsy is not often the immediate cause of death. Autopsies of epileptics (Schrœder van der Kolk) have shown changes, especially in the pons and medulla oblongata; dilatation of the blood-vessels and extravasations of blood being prominent. Exaggeration of reflex motor excitability, with loss of the controlling power of the brain over the spinal axis, would seem to be part, at least, of the morbid condition. Marshall Hall's idea of "trachelismus," or temporary partial asphyxia from spasm of the muscles of the neck, has been exploded. Brown-Séquard's opinion of the importance of the *aura*, as indicating a peripheral irritation at its seat, has, after causing the tentative amputation of a few limbs, suffered the same fate. Perhaps as near an approach as can be now had to a true statement of the pathological nature of epilepsy is that of Hughlings-Jackson: that it is the consequence of "an irregular discharge of nerve-force occurring in any part of the gray matter of the brain or spinal cord."

**Diagnosis.**—From *hysterical* convulsions, which also may be periodical and violent, those of epilepsy are distinguished by the total loss of consciousness—which is partially retained during the hysterical paroxysm. Curability belongs much more to the latter than to the epileptic disease.

**Prognosis.**—Few cases of genuine epilepsy recover. The younger the patient, and the longer the interval, the more hope. Life may last indefinitely with the disease. Gradually, in most cases, the mental faculties are impaired. Yet several great men have been epileptic: Cæsar, Mahomet, Petrarch, Newton, Peter the Great, Napoleon, Byron. Canon Liddon maintains the probability that the Apostle Paul was subject to epileptic attacks.

**Causes.**—Hereditary transmission of this disease is common. Intemperance, venereal excess and self-abuse, blows on the head, and fright, are among the most frequent exciting causes.

**Treatment.**—During the paroxysm, when *habitual*, little or nothing is to be done. Place the patient so that he cannot strike his head or limbs against anything hard; loosen the clothing about the neck to favor free respiration and circulation; and insure fresh air about the patient; that is all. An *occasional*

[1] C. B. Radcliffe; Croonian Lecture, Lancet, April 12, 1873.

convulsion requires treatment; of that more will be said hereafter. (See *Convulsions.*)

To break up the recurrence of the fits is the problem, for which a vast number of remedies have been tried in vain. To name them would be to go over almost half the materia medica. Prominent, since nitrate of silver was abandoned as useless in this disease, have been belladonna, arsenic, valerianate of zinc, digitalis, and bromide of potassium. I have known valerianate of zinc to postpone the paroxysm for considerable periods. Beginning with one grain twice daily, it may be gradually increased to three or four times that amount. A case of recovery occurred under my knowledge in which rather large doses of digitalis were persevered in for several months. Bromide of potassium[1] is now the favorite medicine with many; upon the evidence that it is a direct sedative to the excito-motor susceptibility of the medulla oblongata and other nerve-centres. From ten to twenty or thirty grains, twice or thrice daily, may be given, and continued for an indefinite length of time. Dr. Echeverria found it powerless in 104 out of 486 cases.[2] *Bromide of ammonium* (dose 10 grains) is spoken favorably of by some who have used it. *Bromide of arsenic* is the favorite remedy with Dr. Clemens, of Frankfort-on-the-Main. (*London Med. Record*, Feb. 15, 1877.) Dr. Hammond,[3] latterly, prefers *bromine* itself (Bromine, ℥j; water, f℥viij; dose a teaspoonful, diluted). Bannister,[4] Spitzka, Jewell, and others, have observed that the arrest of epileptic convulsions by bromides is, not unfrequently, followed by furious mania. This would suggest moderation in the use of the remedy; especially after its controlling influence has been shown. Combining *quinine* with bromides (L. Carter Gray) has been found beneficial. *Strychnia* is lauded by Walter Tyrrell, of London. Dr. Weidener, of Jena, reports the cure of a case by the hydrate of chloral, given in full doses shortly before the times of the expected paroxysms. Drs. Echeverria and MacDonald have found *conium* to act beneficially.[5] Dr. Pollock,[6] of Charing-Cross Hospital, cured one case, which had resisted bromide of potassium, with half-drachm doses of tincture of assafœtida three times a day. Many reports have been made of success in warding off epileptic attacks by inhalation of *nitrite of amyl.* From two to five drops may be used at a time. *Nitro-glycerin* has recently been so employed (as well as for *angina pectoris*); one or two drops of a one per cent. solution in alcohol. So simple an expedient as pulling the great toe forcibly, is said (Brown-Séquard) to often arrest an attack.

General *roborant* treatment may sometimes contribute to the good effect of special nervine remedies. Cod-liver oil was found

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[1] In this country, at least, the introduction of bromide of potassium as an anti-epileptic may be credited to Dr. C. E. Brown-Séquard. It was first used in medical practice by Dr. Williams, in England, for treatment of enlargement of the spleen.

[2] Philadelphia Med. Times, Nov. 23, 1872.

[3] N. Y. Med. Record, July 2, 1881, p. 21.

[4] Ibid., p. 18.

[5] Philadelphia Med. Times, April 15, 1871. The preparation used was, in some cases, the English *succus conii* (from the green fruit), in ½ ounce doses or more; in others, Squibb's fluid extract, from the fresh unripe fruits, in thirty minim doses.

[6] Lancet, August 21, 1869.

to do so in a marked instance by Dr. Fairbairn,[1] of Brooklyn. W. Pepper advises continued *rest in bed.*

Several instances are reported[2] of benefit from *nerve-stretching* (median and ulnar nerves) in epilepsy.

Hambursin[3] has recorded the cure of six cases of long standing by the continuous use of large doses (ten drops twice daily, gradually increased to sixty or a hundred drops) of tincture of *cocculus Indicus.* Dujardin Beaumetz and Planat also recommend it. Gowers and Ramskill have tried *picrotoxin* (active principle of cocculus Indicus) without satisfactory results. Gowers found cannabis Indica to do good in a few inveterate cases; and some such also had the fits arrested by *borax*, ten or fifteen grains thrice daily, continued for a considerable time. Hypodermic injection of *apomorphia* ($\frac{1}{12}$ grain) will *abort* an epileptic attack, with some tendency to prolong the interval before its recurrence.

Self-management is very important to the epileptic. Temperance, with *nutritious* diet, as the disease is one of *asthenia*, is necessary. Regularity of the evacuation of the bowels is a *sine qua non.* Abundant exercise in the open air, short of exhaustion, often does good; systematic gymnastics have even *cured* some cases. They are worth trying always. Avoidance of, or the extremest moderation in, sexual intercourse must be insisted upon. Self-abuse will make recovery impossible. Tobacco ought not to be used, unless by smoking only a single pipe or a segar or two in the day. Coffee has not been generally recommended; but Dr. Echeverria, on the basis of extensive experience, asserts that coffee is beneficial to epileptics.

It has been already implied that *tracheotomy*, suggested by Marshall Hall, and amputation of the limb in which the aura is felt, are useless although severe measures in epilepsy.[4]

A seton kept in the back of the neck is well worth trying in every case. I have known it to promote recovery.

## CATALEPSY.

This is a periodical disease, in which the attack is marked by unconsciousness, and fixed rigidity of all or many of the voluntary muscles. It is rare. The attack generally lasts but a few minutes. Sometimes, in lunatics, a semi-cataleptic state of the muscles is permanent.

I am not aware of any special treatment appropriate for this affection. Management like that suitable for the epileptic will be in place also in catalepsy. Both are now so well understood to be asthenic disorders, with impaired *hæmatosis* (blood-making) as an important element, that all reducing measures are properly omitted in their treatment. This must be essentially tonic and *analeptic* or restorative.

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[1] N. Y. Med. Record, Dec. 11, 1880, p. 671.
[2] Le Progrès Médical, Feb. 5, 1881.
[3] Bull. de l'Académie Royale de Méd. de Belgique, No. 2, 1880.
[4] Another operation, *clitoridectomy*, practised by Baker Brown, of London, in certain cases in females, has not met with favor in the profession.

## HEATSTROKE.

**Synonyms.**—*Sunstroke; Coup de Soleil; Insolatio.* Two forms of heatstroke undoubtedly occur. In one the direct rays of the sun upon the head induce *cerebral congestion;* in the other excessive heat, often not under the immediate influence of the sun, affects the whole system with prostration, apparently from a *blood-change;* the chemical operations of the economy being modified by heat in a manner incompatible with the vitality of the blood. Nerve and muscle-tissue are at the same time impaired. After death, Arndt has found the large veins generally distended with uncoagulated blood; the heart contracted, the brain, liver, and kidneys anæmic but swollen with œdematous effusion.

**Symptoms.**—Genuine *sun*stroke is commonly sudden. Falling unconscious, the head is very hot, the temporal arteries distended; the breathing is apt to be stertorous (snoring), the pulse full, generally rapid, but in a few instances slow. In severe cases convulsions may precede death.

In heatstroke of the second variety (more common than the first), almost equal suddenness marks the attack. There is, however, no excessive heat in the head; the pulse is rapid and weak; unconsciousness is less complete, and without stertor of the breathing; the whole condition resembles syncope rather than apoplexy.

**Causation.**—It is remarkable that few cases of heatstroke occur in the country among farm laborers, and very few at sea, even in the tropics. *Large cities* afford nearly all the cases. In New York over 800 cases have occurred in a single week (1868). This looks as if the *atmosphere* had much to do with predisposing to it, at least by deteriorating the blood and lowering the resistance of the vital energy. In tropical climates the attack often occurs at night.

It is almost always, in the case of *heat-exhaustion*, those who have been *fatigued* by exertion in the sun or shade who are overcome. Drinking largely of cold water when thus exhausted increases the danger. *Intemperate* persons are particularly liable to heatstroke.

**Treatment.**—For *heat-apoplexy*, cupping or leeching the back of the neck or behind the ears should generally be the first remedy, after the application of ice or iced water freely to the head. The head and shoulders should be kept raised. A purgative enema should also be administered, and sinapisms applied to the lower limbs.

*Heat-exhaustion* requires quite different treatment, in part at least. Cold water or ice should be applied to the head and body, and then sinapisms to the spine, epigastrium, and limbs, in turn. First *cool the blood*, and then excite physiological stimulation. Local depletion should be avoided. If syncopal symptoms be *decided*, ammonia may be for a few moments applied to the nostrils, and, if the patient can swallow, aromatic spirits of ammonia may be given by the mouth, 10 drops every fifteen minutes at first, gradually increasing the interval. *Mixed* cases of course occur, demanding an intermediate or composite treatment. A. R. Hall, of India, has found the utmost benefit from the hypo-

dermic injection of sulphate of quinia in heatstroke.[1] Brown-Séquard asserts the *actual cautery*, with a hot iron momentarily applied, to be very serviceable.

## INSOMNIA.

**Definition.**—Morbid wakefulness; impossibility of sleep.

**Causation.**—Apart from pain, or severe acute disease affecting the brain (as delirium tremens), insomnia may be brought on by intense or prolonged mental labor or emotional excitement. Excessive use of strong coffee or tea, or belladonna, stramonium, or cannabis indica, may produce it.

**Pathology.**—Only within a comparatively recent period (Durham, Hammond) has the correct view been adopted, that during sleep the arterial circulation of the brain is at its minimum. In sleeplessness the most certain *error loci* is an *erethism* (morbid erectility) of the cerebral arteries, which keeps their circulation full and *prevents* sleep. It is not possible to be sure that this is all, as the precise nature of brain-action and nerve-force is unknown. But this furnishes a basis for rational management.

**Treatment.**—This must vary with the cause. The overworked brain of the professional, literary, or business man must be withdrawn from his employment. Irregularity of the circulation dependent upon general debility must be met by tonics and generous diet. Accumulation in the head must be diminished by such physical exercise as the strength will bear. Decided *cerebral exhaustion* is apt to be attended by such loss of nerve-force as will forbid much effort of any kind; but milder cases of insomnia will be benefited by exercise. The brain should be especially allowed to rest from excitement near the usual hour for sleep. Hence a walk, or the use of dumb-bells, just before bedtime, will be suitable. If the stomach is empty, a little easily digested food, even late at night, will promote sleep, notwithstanding the familiar fact that heavy suppers induce wakefulness or nightmare. A glass of lager beer at bedtime is, as my own experience has proved, one of the best of hypnotics.

The warm bath or pediluvium, with cold to the head, will sometimes be serviceable in abstracting blood from the brain. *Position of the body* is important. The sufferer from insomnia may often be very sleepy before lying down, yet after going to bed he becomes wide awake. Several persons in such case, to my knowledge, have found it best to recline with the head and shoulders raised. Thus, by gravitation, the flow of blood to the head is retarded and sleep is promoted.

As medicines for simple insomnia, in the absence of pain, opium and other powerful narcotics are not appropriate. Hops, lactucarium, and hyoscyamus are safer. Bromide of potassium, in 10 or 20 grain doses, is much used as a cerebro-vascular sedative [F.

[1] Dr. Herbert Norris treated successfully, in the Pennsylvania Hospital (1868), four cases, in which restlessness was a prominent symptom, by the hypodermic injection of one-quarter of a grain of sulphate of morphia. Dr. Marino, of Palermo, asserts that *ergotin*, hypodermically used, is very efficacious in sunstroke.—*Gazz. Clin. di Palermo*, June, 1876. Tomlinson and Murphy report success with *hydrochlorate of apomorphia;* one-sixteenth of a grain producing vomiting and relief.—*Practitioner*, June, 1880.

134]. Its action appears to differ from that of morphia, as it will not produce sleep by narcosis in a healthy person. It seems rather to relieve insomnia by allaying the local or general irritability which causes or maintains it. Dr. Da Costa[1] has found the combination of bromide of potassium (40 grains) with opium or morphia to correct the unpleasant effects of the opiate, while it adds to its hypnotic power. *Hydrate of chloral* is a positive and valuable soporific. In 15 or 20 grain doses it seldom fails, and is rarely followed by any disagreeable after-effects.

### NIGHT-TERRORS.

Dr. C. West[2] gives the following description of an attack which is not very uncommon, occurring in infants or children under ten years of age. "A child who has gone to bed apparently well, and who has slept soundly for a short time, awakes suddenly in great terror, and with a loud and piercing cry. The child will be found sitting up in its bed, crying out as if in an agony of fear, 'Oh, dear! oh, dear! take it away! father! mother!' while terror is depicted on its countenance, and it does not recognize its parents, who, alarmed by its shrieks, have come into its room, but seems wholly occupied with the fearful impression that has aroused it from sleep. In from ten minutes to half an hour, as the terror abates, it may become quiet at once and fall asleep; but frequently it bursts into a fit of passionate weeping, and sobs itself to rest in its mother's arms. In some instances a quantity of limpid urine is voided as the fit passes off, but this occurrence is by no means constant. Usually the remainder of the night is passed in tolerably sound sleep; two attacks do not often occur in the same night." "Seizures of this kind may come on in a great variety of circumstances, and, according to the cause whence they have arisen, may continue to return for many weeks together, or may occur but a few times. As far as I have had the opportunity of judging, they are never the indications of primary mischief in the brain, but are always associated with some disturbance of the intestinal canal, and more or less obvious gastric disorder. In the majority of cases constipation of the bowels exists."

My experience with such cases confirms that of Dr. West, as indicating that these attacks do not prove disease of the brain. But the nervous system of a child so affected must be morbidly susceptible; and signs of indigestion, constipation, or irritation of the bowels are not always present.

During the attack, the child should be at once gently lifted up from the bed, and either carried for a few moments or laid down in a different position. Washing the face softly with a rag dipped in cool or cold water may arouse thoroughly. If any medicine be suitable, it will be a teaspoonful or two of camphor-water. Care is needed to *prevent* the attacks. *Violent exercise* and mental *excitement* are almost as apt to bring them on as indigestion or constipation. The bowels should, however, be kept open, as by fluid extract of rhubarb, or senna, etc. Bromide of potassium is

[1] Am. Journal of Med. Sciences, April, 1871, p. 359.
[2] Diseases of Children, p. 210.

advised by Dr. S. Ringer in obstinate recurrent attacks. Some practitioners prefer chloral, in from three to six grain doses. To promote tranquil sleep, some one should remain with the child, if timid, for a while after it goes to bed; or a light should be left burning low. A child liable to night-terrors ought to be allowed to finish its morning sleep undisturbed. Abundance of sleep is sedative to an over-excitable brain. Neglect of such precautions may convert a mere transitory functional disturbance into a serious attack of brain disease.

## CONVULSIONS.

These may be classified as, principally, **infantile, epileptic, parturient** and **puerperal, hysterical,** and **occasional** convulsions.

During infancy, causes which in an adult would cause delirium produce convulsions; excito-motor action having in early life the predominance, and being then less under the control of the brain. They are, usually, of less serious prognosis in the infant than in the adult.

The *exciting* causes of infantile convulsions are numerous. Constipation of the bowels; indigestion; worms; irritation of the gums in teething; and excitement of the brain, as by fright, are the most frequent. Many acute and chronic diseases of infancy (*e. g.*, scarlet fever, meningitis, hooping-cough, etc.), have convulsions among their occasional symptoms or complications. Sudden drying up of eruptions on the scalp may bring them on, also. Bouchut has shown that *cerebral thrombosis* (obstruction of the veins by coagula) is often the pathogenetic cause of convulsions in the chronic diseases of childhood.

*Premonition* of a fit may be observed in a child's fretfulness, or restlessness, or gritting of the teeth in sleep. When a fit comes on, the muscles of the face twitch, the body becomes rigid at first, then in a state of jerking motion; the head and neck are drawn backward, the limbs violently flexed and extended. Sometimes these movements are confined to certain muscles, or are limited to one side. Nurses call by the name of "inward fits" cases in which the limbs move but little, but the countenance is affected, the eyes are unnatural in expression, or roll spasmodically, and the body is more or less rigid. During a fit, consciousness is absent. The eye shows no sign of sight, though open; a finger passed over it does not make it wink. The pupil is immovably contracted or dilated; the ear is insensible even to loud sounds. The pulse is small and very frequent; breathing hurried or labored; skin wet with perspiration, often cold and clammy. After this condition has lasted a few minutes it mostly gives way. The child falls into a quiet sleep; or it becomes conscious and bewildered; or gradually resumes its ordinary healthy state; or dies in the fit. Sometimes one attack is followed by another, with intervals of conscious or unconscious quiet between, for many hours. These are the most serious cases, although recovery often happens even from them. *Salaam* convulsions, or nodding convulsions of infants (eclampsia nutans), are a rare form of disease, usually the precursor of epilepsy.

**Treatment.**—Ascertain, if possible, the *cause* of the convulsion. If the gums are swollen, or have been tender and irritated, at the time of teething, lance them freely; dividing the gum with a sharp gum-lancet down to the coming tooth.

This practice, formerly universal, has been objected to by Trousseau, and scarcely sustained by Rilliet and Barthez. Marshall Hall strongly urged it, in accordance with the theory of *reflex irritation*, which explains the convulsions of abnormal dentition. Dr. C. West says "the circumstances in which the use of the gum-lancet is really indicated are comparatively few." If this be true, I believe that they are, nevertheless, very important. Dr. A. Jacobi (Dentition and its Derangements, p. 171) testifies that he has seen, once or twice, the instant cessation of convulsions upon lancing the gums. Dr. J. Finlayson[1] has collected reports of a number of fatal hemorrhages following the operation. Others assert injury to the growth of the teeth, cicatrices, etc. All these objections do not, in my mind, outweigh the frequent and manifest advantage which I have seen in practice, from clean, free incisions (not gouging or laceration) of the gums, when they are *congested* or *inflamed*, or when, with *tension* without congestion, they are *evidently a source of nervous irritation* to the child. I have several times known a child, after the experience of relief obtained, *ask* for the use of the lancet. In a very extensive practice, lasting for half a century, my father, the late Dr. Joseph Hartshorne, met with no accident from lancing the gums, and retained his confidence, to the last, in its frequent utility.

If the bowels have not been moved, or if the abdomen be swollen and tense, give at once an enema, of castor oil, soap, and molasses [F. 141], or some other laxative material, with warm water. When the head is hot, apply cold water all over it, by wet cloths, renewed every two or three minutes. If the fit lasts long enough for it, place the child in a warm bath; supporting, of course, the head while the body is immersed. Then mustard plasters may be applied, to the back, epigastrium, and legs, at once, or successively.[2]

Bleeding from the arm is to be recommended only in a child of known vigor and fulness of system, the attack being severe, and not habitual. But a moderate amount of blood should be taken. Cupping the back of the neck, in doubtful cases, where time is allowed by a protracted fit, may be resorted to. Pressure upon one or both carotid arteries is said, by M. Favez, to have promptly succeeded in checking convulsions.

Etherization, so much used by some practitioners in puerperal convulsions, requires certainly more caution in its use in infants. I regard it as justifiable in an obstinate case at any age; watching its effects. Dr. J. Lewis Smith uses with reported advantage *rectal injections of hydrate of chloral.*[3]

**Convulsions of Pregnancy.**—Probably about one pregnant

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[1] Obstet. Journal of Great Britain, December, 1873, and January and February, 1874.

[2] The objections urged by Dr. Hammond and some others to this usual practice do not appear to me to be well founded.

[3] N. Y. Med. Record, May 8, 1880, p. 522.

woman in fifty has more or less albuminuria,[1] principally from the pressure of the womb upon the renal veins producing congestion of the kidneys. About one in ten of these will have epileptiform convulsions, either during gestation, while in labor, or after delivery.

**Pathology.** — All convulsions of pregnant women are not uræmic; this has been proved. There are (putting aside instances of Bright's disease already existing) several conditions possible: 1. Uræmia; 2. Cerebro-spinal reflex irritation, of uterine origin; 3. Cerebro-spinal (apoplectic) congestion, connected especially with the bearing-down efforts of labor itself; 4. According to Traube, cerebral œdema and consequent anæmia.

**Treatment.**—It is important, particularly during gestation: 1. That plethora should be avoided; 2. That free action of the kidneys, as well as regularity of the bowels, should be maintained. For the first, care of the diet is proper, that, in women of full habit, it be not too highly animalized or stimulant. If headache, with a full, hard pulse, occur, a mild cooling laxative may be given; if not relieved, cups to the nucha or bleeding from the arm will be a safeguard. When urination is not free and copious, even if no albumen appear in the urine, cream of tartar, a teaspoonful or more every day or two, or acetate of potassium, may be a useful prophylactic, by favoring free excretion from the kidney.

When convulsions actually occur, in the pregnant or puerperal state, the question is to be considered—are they reflex, uræmic, or simply congestive or apoplectic?

When they come without previous signs of cerebral disturbance, in a woman of delicate and impressible nervous organization, without much heat of head or snoring respiration, the pulse being rapid and feeble, it is probable that *reflex irritation* is the nature of the case. Counter-irritation by dry cups to the spine and sinapisms to the epigastrium and limbs, and *etherization*, may be here used.

Inhalation of *nitrite of amyl* (a few drops) sometimes relieves.[2] Where the convulsions are repeated, hydrate of chloral, in full dose, has been given (A. Milne). Conderau has found advantage in using a hypodermic injection of three-fourths of a grain of muriate of morphia, followed in a few minutes by a large dose (a drachm or more) of chloral hydrate. In convulsions before labor, Fordyce Barker combines the hypodermic use of morphia with the inhalation of chloroform. Dr. Fearn[3] and others report excellent results with large doses (half a drachm or a drachm of Norwood's tincture, or one-half as much of Squibb's extract) of *veratrum viride*. This remedy, so powerfully depressing under ordinary circumstances, can surely be adapted only to *sthenic* cases; especially in vigorous women, where the pulse is hard or firm as well as rapid. Some unfavorable results under its employment

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[1] A different reaction with oxide of copper and potassa has been observed in the albumen of Bright's disease, from that of the albuminuria of pregnancy.

[2] W. F. Jenks, Philadelphia Med. Times, Aug., 1872.

[3] N. Y. Medical Record, March 16, 1874. Dr. Fearn's first paper on the subject was published in 1869.

have been reported. Still, in desperate cases, it is well worthy of further trial. Braun (1879) treated a case successfully with hypodermic injection of *pilocarpin*.

When plethora has been present, and the head is hot, its vessels distended, the coma profound, with snoring respiration, and full, rather slow pulse, either uræmia or simple congestive apoplexy is to be concluded upon. In either case, but especially in the latter, bleeding from the arm, or by cups from the back of the neck or temples, will be advisable. Laxative enemata may be used also. After bleeding, if the convulsions be protracted, while the coma is less intense, careful inhalation of ether or chloroform may be tried; but it is less hopeful here. The prognosis of the apoplectiform convulsion is always one of great danger. The *uræmic* condition, if labor be survived, generally passes off spontaneously, soon after delivery.

The signs commonly interpreted as indicating plethora during pregnancy are by some (Cazeaux) ascribed to *hydræmia*, with (Frank, Munk) increased arterial tension. If this view be correct, as it may be, probably, with regard to *some* cases, we may still expect moderate venesection to be a useful mode of treatment; only, the support of the patient ought to be afterwards provided for by strong, concentrated nourishment.[1] Prof. J. Carson, in an elaborate article[2] on puerperal eclampsia, asserted the belief that the tendency to convulsions during pregnancy depends upon "altered nutrition of the nervous centres."

Upon the idea of "œdema of the brain" Jaquet, of Berlin, advises the *wet pack* (sheet wrung out of cold water) for diaphoresis.

**Occasional** convulsions in adults, from whatever cause, should be studied and treated upon the same principles, essentially, as those just laid down for the convulsions of pregnancy. *Hysterical* convulsions will be considered under *Hysteria*.

## CHOREA.

**Synonym.**—*St. Vitus's Dance.*

**Symptoms.**—Irregular movements of the voluntary muscles, over which the will has but partial control. Walking, in severe cases, is difficult or unsafe; the hands cannot be regulated enough to write or work; speech may be affected; the muscles of the face often twitch grotesquely. During sleep all these movements cease. The pupil is, in some cases, unnaturally dilated; palpitation of the heart may occur; and also constipation and indigestion. The urine is of great density. A cardiac murmur is often heard on auscultation, which Sir William Jenner affirms[3] to be owing to irregular action of the muscular apparatus of the mitral valve; sometimes with irregular contraction of the heart itself.

**Prognosis.**—The mean duration of chorea is about four weeks; but it may last for several months. Recovery, if the attack be

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[1] See Fordyce Barker on Bloodletting in Obstetric Medicine; D. Appleton & Co., 1871.
[2] Am. Journal of Med. Sciences, April, 1871, p. 405.
[3] Lancet, Nov. 5, 1870.

uncomplicated, may always be anticipated. Dr. J. W. Ogle, however, has reported the details of sixteen fatal cases.[1] The so-called *post-paralytic chorea* (Weir Mitchell), hemichorea, or hemikinesis of Hughlings-Jackson, is a quite different affection from ordinary chorea. It follows hemiplegia, in rare instances, and is often incurable. The occurrence of any form of paralysis, in a case which commences as chorea, is always a very unfavorable sign; although patients thus affected may often live for a long time.

**Complications.**—Endocarditis and pericarditis have been observed in connection with chorea in a number of cases. Generally, however, the affection of the heart precedes the chorea; both probably depending upon the same cause, *rheumatism*. Mental derangement sometimes accompanies chorea. Drs. Kirkes, Hughlings-Jackson, and Broadbent believe the disease to be often dependent upon embolism of the cerebral arteries; especially those of the corpus striatum and thalamus.

**Paralysis** complicating chorea increases greatly, of course, the seriousness of the case. Although it *may* be of the transient, hysterical form, yet the danger exists that it may be the result of organic lesion of the brain or spinal cord.

**Causation.**—From six to sixteen, in both sexes, especially often in girls, chorea occurs. It is extremely rare in negroes. Nervous debility is nearly always present before the attack. Fright is a frequent cause. Over-fatigue, or mental excitement, blows or falls may produce it. Rheumatic fever is sometimes followed by it.

**Treatment.**—Good diet, salt-bathing, and systematic gymnastic exercises (light gymnastics or calisthenics) will suffice for mild cases. Where marked anæmia exists, iron (citrate, phosphate [F. 142], or pyrophosphate, tincture of chloride, syrup of iodide) is important. Obstinate cases may be treated with Fowler's solution of arsenic, in small doses, gradually increased. Cimicifuga has been a good deal used, perhaps with benefit. Cod-liver oil should be given if great debility exists. *Calabar bean* (physostigma) has been introduced as a remedy in chorea; f℥ss of the tincture, or from gr. j to gr. vj of the powder thrice daily. Dr. C. West confides in the *sulphate of zinc*. Dr. Hammond has used the *sulphate of manganese* with success. Ether-spray applied to the spine, four or five minutes at a time, every day, is reported to have been curative in the hands of Dr. John Rose[2] and Perroud of Lyons.[3] Bromide of potassium has been tried, without very much advantage. Chloral ought to be of service in this disease. Trousseau used strychnia; if employed, it should be with great caution. Electricity has sometimes done good.

It is well to separate a child having severe chorea from other children; both because of the annoyance of their curiosity, and because *sympathetic irritation* sometimes extends the affection from one to another. This has been repeatedly observed.

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[1] Brit. and Foreign Medico-Chirurg. Review, January, 1868.
[2] Lancet, Dec. 10, 1870.
[3] Phil. Med. News, February, 1870.

## APHASIA.

Loss of speech may occur as one of the symptoms of disease of the brain, either functional and transient, or organic and irremovable. Such a loss of *language* is termed (Bouillaud) *aphasia*. Importance has been given to it by the observations of Trousseau and others, and resulting speculations (Dax. P. Broca) as to the seat of the faculty of speech. Not articulation, as in aphonia, but *expression* is, in this affection, wanting. The power to *write* words from memory, to convey meaning, is lost; but, in some cases, at least, they may be *copied* correctly. *Thinking without words* may go on in such instances; as Lordat recorded, after recovery, in his own case. In certain cases, especially in hysterical persons, the loss of speech appears to be "spasmodic" or functional, without permanent disease of the brain.

Hemiplegia of the right side has in a number of examples coincided with aphasia; and, several times, also, autopsy has shown softening or other lesion of the left anterior portion of the cerebrum. On the suggestion of these facts a hypothesis has been based, that the site of the faculty of language is in the third anterior frontal convolution of the left hemisphere of the cerebrum. This is a very *unphysiological* supposition, in view of the *symmetry* of the cerebro-spinal axis throughout; nor does this objection disappear even upon the conjecture that the "organ" upon the right side may exist always in an undeveloped state. A remarkable case has been reported,[1] in which impairment of speech followed a severe injury of the *right* cerebral hemisphere. A number of instances of a similar kind, adverse to Broca's theory, have been collected by Dr. J. W. Ogle.[2] Valvular lesion of the heart sometimes accompanies aphasia. Embolism is possibly an occasional cause of it. Dr. H. C. Bastian[3] divides the cases into *aphasia*, when the patient can think, but cannot speak or write; *aphemia*, when he can think and write, but not speak; and *agraphia*, when he can think and speak, but not write.

Cases of aphasia are rare. I am not aware of any special measures of treatment for it pointed out as yet by experience. Dr. Osborne recommends (having succeeded with it in one case) teaching the patient to speak anew, as is done in infancy. While this can have no effect upon the cerebral lesion, it may much diminish, in some cases, at least, the inconvenience of the resulting symptoms.

## TETANUS.

**Definition.**—A disease characterized by continued and intractable tonic contraction of the voluntary muscles. *Trismus* is local tetanus or *lock-jaw*.

**Symptoms.**—Stiffness of the muscles of the jaws commonly

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[1] Western Journal of Medicine, March, 1868.

[2] London Lancet, March 21, 1868. See also Dr. Wadham's case, St. George's Hospital Reports, 1869; and one reported by Dr. Echeverria (N. Y. Medical Record, March, 1869), in which post-mortem examination revealed sclerosis of both third anterior frontal convolutions, without symptoms of aphasia having occurred.

[3] Brit. and Foreign Medico-Chirurg. Rev., January and April, 1869.

begins the attack. This extends to the throat and neck, face, trunk, and lastly to the limbs. Though never ceasing entirely, the spasm of the muscle is paroxysmally increased. Sometimes *opisthotonos* occurs, *i. e.*, arching of the body upon the back and heels, the abdomen projecting; or *emprosthotonos*, arching forward, the face approaching towards the toes. *Pleurosthotonos*, or lateral curvature, is much more uncommon.

Chewing food is impossible; swallowing nearly or quite so; respiration becomes very difficult. The patient suffers dreadfully, and cannot sleep; but delirium scarcely ever occurs. Death in most cases takes place within a week.

**Varieties.**—These are, 1. tetanus from cold (idiopathic), 2. traumatic tetanus (from an injury), and 3. *trismus nascentium*, or tetanus of infancy. The first is least certain to be fatal.

The third, *tetanus neonatorum*, is rare in Philadelphia, somewhat less so in the tenement houses of New York; common in Iceland, the Hebrides, and some tropical countries. It was formerly not very uncommon among the negroes of the plantations of the Southern States. Its chief cause is *close, unsanitary living.* Some foundling hospitals have suffered great mortality from it. The time for its occurrence is mostly within the first two weeks after birth; and death usually occurs within two or three days. In *symptoms*, this form of tetanus differs from that of adults chiefly in the frequent occurrence of *clonic* spasms of the voluntary muscles, or of *paroxysms* of extreme rigidity. These are produced by slight causes; as a sudden sound, a flash of light, a breath of air. Recovery from the attack is scarcely to be looked for in any case. Yet recoveries have been reported; by Drs. Gaillard and De Saussure, under treatment with *cannabis indica;* by Dr. G. Troup Maxwell and others, with chloral. Dr. Osterlong, of Kentucky, has succeeded with injections of chloral into the rectum.

Colles, of Dublin (1818), called attention to evidence making it appear that *inflammation of the umbilicus* connected with the cord is a frequent local source of tetanic irritation at the time of birth. Sims (1846) published cases seeming to show that *pressure of the occipital bone upon the medulla oblongata* at the time of delivery produces trismus nascentium; and that laying the child upon its side at once after birth may prevent the attack. But many cases of the disease have occurred in which neither Colles' nor Sims' mode of causation could be ascertained. While, therefore, each may have a considerable share in its production, neither can be regarded as universal or essential.

Much the greater number of cases, after infancy, results from lacerated and punctured wounds; but amputations and other operations may be followed by tetanus. Irritation (not inflammation) of the ends of sensitive nerves, transmitted to the spinal cord, produces the reflex spasm, whose general extension and continuance prove fatal. Strychnia, in poisonous doses, causes a very similar state. While there can be no doubt that the spinal marrow is the seat of the disease, no *characteristic* organic change has been found in it; sometimes not even congestion.

Dr. Allbutt has recently[1] reported softening of the cord in four traumatic cases.

**Causation.**—This is principally included in the above account.

**Treatment.**—In two cases of tetanus which I have seen to recover, opium and brandy were the remedies used. A tablespoonful of brandy or whisky (to an adult) every two or three hours, with milk or beef-tea, and a grain of opium every three or four hours, may be given. The opium may be, if needful, increased to a grain every hour at night, and every two hours through the day. Beyond that I would not go. Hypodermic injections of morphia will answer the same purpose.

Chloroform and other anæsthetics, by inhalation, have been tried, with variable effect; nearly always without success. Belladonna, conia, aconite, hydrocyanic acid, cannabis indica, tobacco, woorara, and quinine, are among the many medicines favored by different practitioners. Demmé is said to have cured eight cases out of twenty-two with curara. Drs. E. Watson, of Glasgow, and Frazer, of Edinburgh, have used Calabar bean, one grain at a dose; or five drops of the tincture.[2] In so desperate a disease it is excusable to give them all further trial. Dr. Joseph Hartshorne used vigorous counter-irritation all along the spine, by the decoction of cantharides in turpentine (linimentum cantharidis). Lately *chloroform* has been locally used in the same way. Hammond advises the use of *ice-bags* to the back; Sporer, a succession of *hot-water compresses* along the back. Perroud, of Lyons, has employed successfully the application of *ether-spray* to the spine; Demarquay, the *hot-air bath*. *Chloral* has been employed, with recovery in some, though not in all cases, by Verneuil, Dufour, Denton, Lavo, Beck, Coryllos, Lewis,[3] and others. It has proved to be especially beneficial in *trismus nascentium*.

Prof. E. de Renzi[4] draws the following conclusions from his observations of tetanus:

1. Light renders the tetanic contractions of animals and man more frequent and intense.

2. It can be demonstrated experimentally in animals, that *absolute repose* during the absence of all stimulus, retards the tetanus and renders it less fatal.

3. Of three cases of severe tetanus, treated almost exclusively by absolute repose, two cases were cured. The patients were kept isolated in a dark room; all noise or other stimulus or irritation was avoided, except such as was caused by the administration of food and beverage at long intervals.

When, after severe local injury, the nerves of the part appear to be involved and tetanic symptoms occur, Key and Bryant approve of amputation. In 1845, Key performed this operation successfully on account of tetanus following unreduced disloca-

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[1] Med. Times and Gazette, Feb. 18, 1871.

[2] Dr. W. W. Keen (Phila. Med. Times, March 1, 1871) gave the tincture of Calabar bean (physostigma venenosum) in doses of *one or two hundred minims*, in a case in which recovery occurred. Of 18 cases (collected by Dr. E. Watson) in which physostigma was used, 10 recovered.—*Practitioner*, September, 1869.

[3] Am. Journal Med. Sciences, October, 1877, p. 420.

[4] Gaz. Med. Ital. Lombard., January, 1875.

tion of the astragalus. Several other cases seem to justify the practice in analogous instances.

Vogt, of Greifswald, reported[1] the cure of a case of traumatic tetanus by division and stretching of the median and radial nerves; the disease having its origin in a severe wound of the hand. Relaxation of muscular rigidity followed the operation almost immediately. Other cases[2] have occurred, in which division of nerves connected with the seat of peripheral irritation has been followed by recovery.

Tetanus has been treated successfully in India (Khastagir) by inhalation of cannabis Indica. A *hookah* (native pipe) is charged with leaves of hemp, alone or mixed with tobacco, and is given to the patient whenever spasms of rigidity begin. He soon becomes drowsy, perhaps falls asleep; when the pipe is withdrawn. Being refilled by an attendant, it is used again and again as required, keeping him constantly under its influence.[3]

Corry, of Dublin,[4] and C. Johnston, of Baltimore, have had cures of tetanus under the use of *conia*. Of six cases of traumatic tetanus treated with it by Dr. Johnston,[5] three recovered.

Dr. W. S. Forbes,[6] of Philadelphia, cured a case of tetanus in 1875 by *inhalation of nitrite of amyl*. Tunkel, of Berlin, and others, have reported similar results.

## HYDROPHOBIA.

I have known a physician of distinction and of many years' practice to deny the existence of hydrophobia because he had not seen it; asserting that the cases so called were tetanus. Having seen two cases of it, I feel sure that no one who has observed it can fail to perceive the wide distinction between it and tetanus.

According to the Registrar-General's report, there were in England, in 1874, sixty-one deaths from hydrophobia; in 1875, forty-seven.

**Symptoms.**—A month or more after the bite of a mad dog or other rabid animal, the wound having healed, irritation is felt in it. Nervous restlessness also exists; which increases (in most though not in all cases) to violent, angry delirium. Then difficulty of swallowing occurs, from spasms of the muscles of inspiration (gasping) taking place at the moment of deglutition, making the patient choke. The same spasmodic gasping is brought on by any sudden impression; as of sound, a flash of light, or even a current of air passing over the face. Insomnia exists; the patient grows prostrate, and must die for want of food and drink, even if the affection of the cerebro-spinal axis were not itself fatal. There is intense thirst, and no dread of water, except that the attempt to swallow it causes intolerable distress. Death occurs in from four to eight or ten days.

I have not met with entirely satisfactory evidence that a case of genuine *rabies canina*, or hydrophobia, has ever been cured. By

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[1] Centralblatt für die Chirurgie, No. 40, 1876.
[2] Brain, January, 1880.
[3] Med. Times and Gazette, Feb. 21, 1880.
[4] Dublin Quarterly Journal of Med., November, 1860.
[5] Am. Journal of Med. Sciences, July, 1870.
[6] Phila. Med. Times, June 12, 1875, p. 590.

statistics, however, only one in eleven (some say one in five[1]) of those bitten by mad dogs have the disease, even when no precaution is taken.

**Morbid Anatomy.**—Dr. C. Allbutt[2] has recorded the *post-mortem* appearances in two cases. There were evidences of vascular congestion, serous infiltration, and granular degeneration in the great nervous centres: worst, in the medulla oblongata; next, in the spinal cord; thirdly, in the cerebral convolutions; lastly, in the central cephalic ganglia. The poison causing the disease appears to act primarily upon the cerebro-spinal system. Dr. Hammond made a similar observation in a fatal case in New York, in 1874. Bruckmüller, of Vienna, discovered *œdema* of the brain in a number of cases; cerebral hyperæmia in all.

In dogs, Rudnew, of St. Petersburg, found the *kidneys* always severely affected; affording the conditions favoring *urœmia.*

**Treatment.**—If we cannot cure, what can or should we do? We may certainly promote at least *euthanasia*, by allaying the wretched sufferings of the patient. In the case of a boy of eight years of age, under my own care, I administered chloroform freely by inhalation, continuing it nearly all the time (with short intervals and equally short applications) for two days and nights. It mitigated the spasms and quieted the delirium. That it did not itself cause death (as might have been suspected from the quantity used) was proved to my satisfaction by the fact that after the chloroform was finally withdrawn, the boy was made to gasp spasmodically by waving the hand to and fro over his face. Reflex excitability of the medulla oblongata was thus shown still to exist.

Hypodermic injection of atropia or morphia might, perhaps, more effectually quiet the suffering, and even afford a possibility of cure, than inhalation of anæsthetics. The hot-air bath, prolonged or repeated, has lately been proposed for the treatment of hydrophobia. Haschisch (cannabis indica) is asserted by Polli, of Milan, to be its best palliative, although not curative. *Curara* is reported to have cured at least one case.[3] The unique character of this result compels me to doubt the correctness of the diagnosis. One or two other recoveries, under the same treatment, are spoken of by authors, but I have not been satisfied of their authentication. In the Lombardy Medical Gazette, June, 1878, a case is said to have recovered under the care of two Russian physicians, the treatment being the inhalation of oxygen.

**Prophylaxis.**—The only perfect safety to one who is bitten by a rabid animal (and the bite of a much *enraged*[4] dog, not rabid, is said to have also caused *hydrophobia*) is in immediate and total excision of the part. While awaiting this, forcible suction will

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[1] Bouley (Arch. Générales de Méd., June, 1870) found that of 320 persons bitten, 129, or 40.31 per cent., had fatal hydrophobia.

[2] Trans. of Pathological Society, 1872.

[3] Offenberg, 1874. See, for translation of full report of this case, N. Y. Med. Record, Aug. 9, 1879, p. 124. See also B. A. Watson, case treated with strychnia and woorara, Amer. Journal of Med. Sciences, July, 1876, p. 80. Broadbent, of St. Mary's Hospital, London, is reported to have cured a case of rabies in a boy, in 1876, by injections of *hydrate of chloral.* In all these cases the possibility of *error* in *diagnosis* must be remembered.

[4] Fleming, an authority upon hydrophobia, denies that this ever occurs.

aid in removing the poison, and ligation with any kind of bandage above the part will retard the absorption of it. When excision cannot be safely performed or is refused, cauterization is the next best thing. Free application of lunar caustic, or of a red-hot wire, or the explosion on the part of a small quantity of gunpowder, is recommended. Even if the person bitten is not seen until a day or two afterwards, excision or the use of the caustic is to be recommended, as lessening the danger of this horrible disease. Marochetti and others have asserted the presence, during the incubation, of vesicles or pustules near the frænum of the tongue (*lyssi*), the cauterization of which will prevent the disease. This requires confirmation, however. The saliva of a human subject of hydrophobia (as well as that of rabid animals) has been shown by experiments upon animals (Raynaud, 1879) to be virulent.

In regard to the detection of rabies in animals, the following lucid instructions have been issued by the Council of Hygiene of Bordeaux:—

"A short time, sometimes two days, after madness has seized a dog, it creates symptoms in the animal which it is indispensable to recognize:

"1. There is agitation and restlessness, and the dog turns himself continually in his kennel. If he be at liberty, he goes and comes, and seems to be seeking something; then he remains motionless, as if waiting; then starts, bites the air, as if he would catch a fly, and dashes himself howling and barking against the wall. The voice of his master dissipates these hallucinations; the dog obeys, but slowly, with hesitation, as if with regret.

"2. He does not try to bite; he is gentle, even affectionate, and he eats and drinks, but gnaws his litter, the ends of curtains, the padding of cushions, the coverlets of the beds, carpets, etc.

"3. By the movement of his paws about the sides of his open mouth, one might think he was trying to free his throat of a bone.

"4. His voice undergoes such a change that it is impossible not to be struck by it.

"5. The dog begins to fight with other dogs; this is a decidedly characteristic sign, if the dog be generally peaceful.

"The three symptoms last mentioned indicate an advanced period of the disease, and that the dog may become dangerous at any moment if immediate measures are not taken. It is best to chain him up at once, or better still, to kill him."

If not killed, a rabid dog will die of the disease in from five to eight days.

H. C. Hovey (Am. Journal of Sciences and Arts, May, 1874) states that the bite of the American skunk produces a form of *rabies* (*rabies mephitica*) as fatal as hydrophobia.

Burrel's proposal to prevent danger from canine rabies, by filing or nipping the edges of the incisor and canine teeth of all dogs left at large, does not seem likely to be extensively carried out.

It is a mistake to suppose that madness is more common in dogs during hot weather (the "dog days"). Statistics[1] show that at least as many cases occur in winter as in summer.

[1] Transactions of Am. Medical Association.

## HYSTERIA.

From its occurring nearly always in females, and from a supposition of its originating in some affection of the womb, this name has been given to a variable disorder, of which the main characteristic is *morbid excitability of the whole nervous system.* Dr. Todd believes it always to depend on disorders of the blood. Dr. Tilt insists[1] that uterine disorders are its most frequent exciting causes.

I would suggest **neurataxia** as a term synonymous with hysteria, and more descriptive of its true pathology. *Neurasthenia* may generally be at the bottom of it, but not universally; and that is not the whole of it, in any case. I mean by neurataxia, a *loss of* **balance** *in the functional action of the nervous centres*, both of animal and of organic life. Sometimes the symptoms affect the muscular, sensorial and psychical apparatus, and sometimes the organs of digestion, circulation, respiration, reproduction, etc.

A "fit of hysterics" is a paroxysm whose nature may vary, from mere uncontrollable laughter or crying to a severe epileptiform convulsion. This last, however, differs from epilepsy, in there being less complete loss of consciousness, and in the curability of the disorder. It is often preceded by a sensation (globus hystericus) like that of a ball rising toward the throat. Charcot's assertion, that hysterical convulsions are *always* announced by definite premonitory symptoms, I can controvert from actual observation. The same author refers to the decided rise of temperature in epileptic attacks as usually distinctive; and states that, in hysterical convulsions, compression over the region of the ovaries will arrest or modify the attack.

Simulation of other diseases, indeed the assumption of severe functional disorders of different organs, is a common trait of hysteria. I have seen complete hysterical amaurosis; hysterical insanity is not uncommon, nor is hysterical paraplegia or coma rare. Retention of urine, cough, aphonia, etc., are often thus produced. "Phantom tumor" is among the most curious of such things. I had under my care a woman who had been laid out by a surgeon in another city for exploratory gastrotomy, under the supposition that she had ovarian tumor. When she was etherized, however, the tumor altogether disappeared! "*Bed case*" is the name given (Laycock) to the complaint of an hysterical valetudinarian, who believes herself to be ill or powerless, while there is really nothing the matter, except the morbid *neurosis* itself.

*Hysterical hemianæsthesia* has attracted much attention latterly (1878–80), especially in the clinics of Charcot at the Salpétrière, near Paris. One-half of the whole body, in these cases, is almost or quite without tactile sensibility. Sometimes the sense of pain, or that of temperature, may be alone abolished. Charcot points out the usual attendance upon this condition of *ovarian hyperæsthesia* upon the *opposite side.*

Burq, in 1876, announced that this disorder is capable of modification or relief by the external application and internal use of certain metals, as well as by solenoids (galvano-electric spirals)

[1] London Lancet, Aug. 12, 1871.

and magnets. Charcot, Regnard, Magnan, Westphal and others have confirmed these results.[1] Of course there is a *presumption*, to be removed only by careful and prolonged observation, that *mental* influences have much to do with the explanation of such phenomena.

**Treatment.**—Much skill and care will often be required in the management of hysteria, as each case has peculiarities of its own. Generally a tonic regimen is demanded. Dr. Blandford is no doubt right in estimating very highly the importance of *good feeding* in hysterical and other forms of nervous debility.[2] Dr. S. Weir Mitchell advises, in some cases, rest, *massage*, and "excessive" feeding.[3] Iron and cod-liver oil are most often the appropriate medicines. Bromide of potassium is sometimes quite useful. For a paroxysm of "hysterics" assafœtida [F. 143] is universally safe and suitable, in pills of 3 grains each, *pro re nata*. Sinapisms and pediluvia are also proper. Guillemin recommends inhalation of the ethereal tincture of valerian. The preparations of valerian, taken internally, may be useful; the fluid extract, tincture, or valerianate of ammonium; and so also may be chloral. Mono-bromated camphor has been given with asserted advantage, by Hammond[4] and others; two to five grain doses, in pill. A limited trial with it has disappointed me. Menstruation is often irregular in hysterical women; it should be regulated as far as possible. Exercise in the open air is, as a rule, very important for such persons. Mental and emotional excitement should be avoided; but tranquil, even engrossing *occupation* will be beneficial. For hysterical paralysis, electricity is said to be generally useful. De Watteville[5] and Vigoureux[6] recommend *statical* (friction) electricity in hysteria generally. Cold bathing, especially the shower-bath or sea-bathing, when followed by reaction, will do good. Feeble and delicate persons should, however, be careful not to remain in the bath too long. In the surf, for example, a bath of five, ten, or fifteen minutes may be of great service, when a longer time would do real harm.

## HYSTERO-EPILEPSY.

Under this name are described a number of remarkable cases, especially reported upon by Charcot, Briquet, and Bourneville, in which the characters of hysteria and epilepsy appear to be combined. A few cases[7] only have been studied outside of Salpétrière. The typical history of the disorder is connected with some famous examples in that institution. Retrospectively, however, resemblance may be believed to exist between them and the epidermic nervous disturbances of the 16th, 17th, and 18th centuries; particularly the "convulsionnaires de St. Medard."

The subjects of hystero-epilepsy are all women. Most of them

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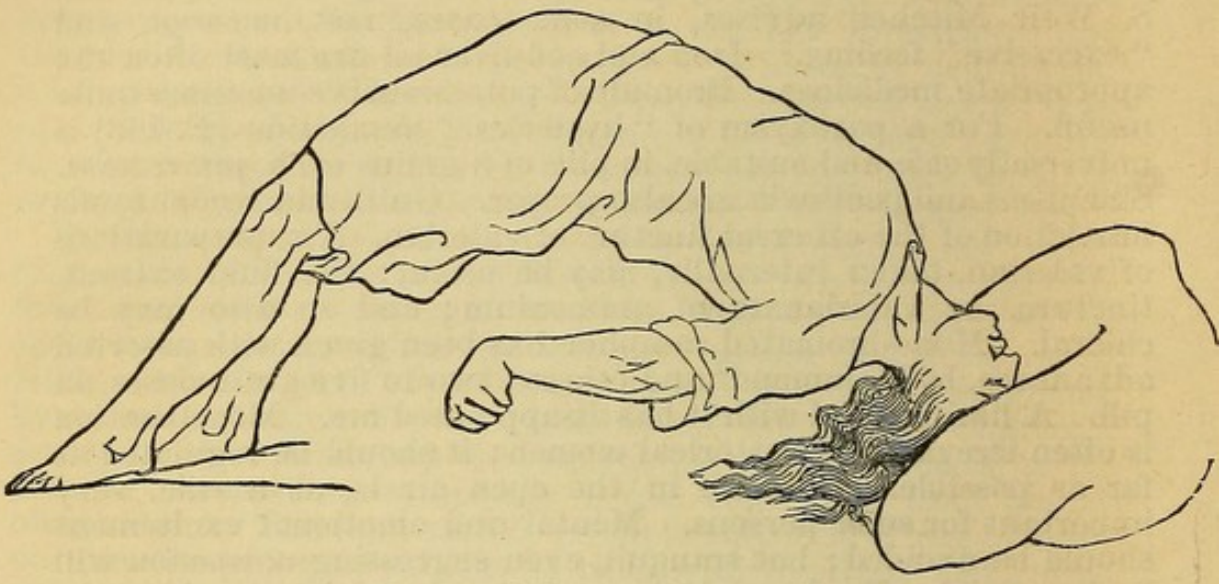
[1] See an account by a medical eye-witness at Salpétrière, Brit. Med. Journal, Oct. 12, 1878.
[2] N. Y. Medical Journal, May, 1872.
[3] Fat and Blood, and How to Make Them. Phila., 1877.
[4] Practitioner, June, 1870.
[5] Brain, July, 1879.
[6] Progrès Médical, No. 8, 1879.
[7] By Landouzy, Saunders, Anderson, McLane Hamilton, Morton and others.

have passed through lives of great disturbance,—as prostitutes or otherwise. Their attacks may be frequent, and of various duration; and they may be voluntarily induced in many cases. In several, pressure of moderate degree upon one of the ovaries will at once bring on a paroxysm. Three stages are mentioned; 1st, of rigidity; 2d, of violent convulsive movements (often *opisthotonos*); 3d, of "emotional attitudes." During the latter, exhibitions of anger, terror, joy, grief, etc., succeed each other.

FIG. 118.



Hystero-Epilepsy. (Bourneville.)

Very *firm* pressure upon an ovary, which appears to be in some cases at least, the main source of reflex irritation, will often terminate the attack. The *temperature* in hystero-epilepsy is never so high as it often is in true epilepsy.

As has been already observed in regard to hysterical *hemianæsthesia*, it yet remains to be placed beyond doubt how much of these phenomena may be due to physical, and how much to mental impressions and communications. In any case, however, they form a remarkable chapter of medical history.

## NEURALGIA.

**Definition.**—Pain, without inflammation or other disorder, except that of the nerve or nerve-centre involved; literally, *nerve-pain.*

This may affect any of the sensitive nerves. It is also sometimes referred to parts which have in health no sensibility, as the heart, stomach, etc. Different names are given according to its site. Thus, *tic douloureux* is facial neuralgia; *hemicrania* (migraine), that affecting one side of the head; *sciatica*, that of the hip; *gastrodynia*, neuralgic pain in the stomach; *pleurodynia*, in the side. Angina pectoris is chiefly a neuralgic affection of the heart.

The pain is generally acute, shooting or darting, with tenderness of the part upon pressure. There is, however, no heat nor

swelling, nor throbbing of the blood-vessels in pure neuralgia. Complicated cases occur, in which inflammation and neuralgia exist together; and inflammation of the fibrous neurilemma may be the immediate cause of the neuralgic pain. The periodical cephalalgia (sick headache), which some persons are subject to nearly all their lives, and the tendency to which may be hereditary, is not a *pure* neuralgia; but the pain in it is probably seated in the cranial nerves, not in the brain.

**Pathology.**—At least three sources of this sort of pain are possible. 1. Local disease affecting a *nerve;* 2. A morbid state of a sensorial *nerve-centre;* 3. A morbid condition of the *blood.* Neuralgia always fixed or returning in the same spot is likely, although not certain, to depend upon a fault in the nerve itself; as, *e. g.*, *neuroma* (tumor of a nerve). Radiating pain (although possibly of reflex origin) must involve at least part of a nerve-centre. Flying pains, never long-seated in one part of the body, mostly are due to a defect or morbid poison (as that of gout or malaria) in the blood.

**Treatment.**—This must, of course, depend upon the cause or nature of the case. *Tic douloureux* often depends upon decay of the teeth; if so, they must be attended to. Other purely local neuralgias require local treatment. *Electricity* has often been used with advantage. Laudanum or paregoric, applied by saturating a rag and laying it upon the part, covered by oiled silk to prevent evaporation, is an efficient local anodyne. So is chloroform, similarly applied; it is very pungent, burning like mustard. Sinapisms will in some instances relieve promptly. Mere warmth, as of flannel steeped in hot water, will not unfrequently do so. I have heard of the pain disappearing upon the application of half of a cut lemon to the part affected. The Chinese use oil of peppermint, locally applied. Dr. Wright asserts[1] that this oil is a good local anæsthetic. Drs. Buzzard and Anstie have found great benefit from the constant galvanic current.[2] On some portions of the body, the locally anæsthetic action of carbolic acid[3] may be available. I prefer it to be diluted more or less with *camphorated oil.* Dr. Kennion[4] asserts that neuralgic (and other) headaches may be relieved by the application to the temple or behind the ear of a solution of bisulphide of carbon. Dr. Horvath's observations[5] on the production of local anæsthesia by alcohol at a very low temperature (—5° C.) may probably be utilized for the treatment of some neuralgias. Equal parts of chloral hydrate and camphor, intimately mixed (Lenox Browne),[6] make a fluid reported to be useful as an anodyne application. It may be painted on the part, and allowed to evaporate. Winternitz and others have relieved *tic douloureux* by the local application of *ice.* Rubbing for a few minutes with saturated tincture of aconite root, until the skin tingles; or the application of ointment of

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[1] Lancet, Nov. 19, 1870.
[2] The Practitioner, June, 1871. Dr. Buzzard used a constant current, from ten or fifteen cells of a Weiss' battery.
[3] Bill, Am. Journ. Med. Sciences, Oct. 1870, p. 573.
[4] Brit. Med. Journal, June 13, 1863.
[5] Centralblatt für die Medicinischen Wissenschaften, 1873.
[6] Brit. Med. Journal, March 7, 1874.

veratria (gr. xx in ℥j of lard) may be used in severe cases. In obstinate ones, a blister may be applied, dressed, after removal of the cuticle, with two grains of acetate of morphia, diluted with ten grains of gum Arabic. Or, most prompt usually of all, solution of morphia may be hypodermically injected, to the amount of one-fourth drachm to one drachm at once. Lélut[1] declares that, in a number of cases, subcutaneous injection of *water* has answered as well as that of solution of morphia. Drs. Bartholow and Mattison (after Besnier, 1878) treat sciatica by deeply injecting chloroform (a few minims) near the affected nerve-trunk. Bartholow also affirms that much relief may be given by the local injection of *pure alcohol*. Smith[2] speaks of atropia, subcutaneously used ($\frac{1}{24}$ to $\frac{1}{12}$ grain) as a specific for sciatica. Dr. W. J. Morton[3] affirms that the *spark* of a Holtz electric machine will often cure neuralgic pains in from ten to twenty minutes. Sometimes the inhalation of ether, nitrous oxide, or chloroform is resorted to, for the relief of intense neuralgic pain. Debility predisposing to it, in some cases warm food or moderate doses of an alcoholic stimulant will give relief. On the other hand, *hemicrania* has sometimes been cured by the local application of leeches; and facile neuralgia by pressure upon the primitive carotid of the affected side.

Of anodynes internally used, belladonna has, for neuralgia, the greatest reputation. It will not quell suffering so directly as opium or morphia, but it has been thought more entirely to do away with the neuralgic state. For this, however, *iron*, especially in combination with quinia or strychnia, is the most effective medicine. Cases of neuralgia which will not be benefited by iron are decidedly exceptional. Larger doses of it are generally recommended for this than for other diseases requiring chalybeates. *Quinine* is particularly wanted in neuralgias of malarial origin (very common); and strychnia or nux vomica in those whose obstinate persistence depends upon great loss of nervous energy. *Chloride of ammonium* is recommended by Anstie and others. *Aconite* may be very effective, but requires care in its employment. Five-drop doses of the tincture have been given safely in severe cases. *Hydrate of chloral*, in doses of from five to fifteen grains or more, is a useful anodyne; more powerful, however, in producing sleep than in relieving pain. *Croton chloral hydrate* has been given, in one or two grain doses (Liebreich, Falconer) beneficially in sciatica. Oil of turpentine is said (Begbie)[4] to be especially remedial in periodical *cephalalgia*. Dr. S. M. Bradley,[5] of Manchester, England, recommends, in feeble cases, phosphorus, in $\frac{1}{60}$ grain doses, dissolved in ether. It will be safer to begin with smaller doses, watching the effect. *Tonga* is one of the newer anti-neuralgic remedies, reported well of by S. Ringer and others.[6] Everything that recuperates, as generous diet, change of air, sea-bathing, etc., will assist in curing neuralgia, when it

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[1] L' Union Médicale, Oct. 5, 1875.
[2] Allgemeine Med.-Cent. Zeitung, Feb. 16, 1881.
[3] N. Y. Medical Record, April 2, 1881, p. 371.
[4] Edinburgh Med. Journal, July, 1871.
[5] British Med. Journal, Feb. 28, 1874.
[6] Lancet, March 6, 1880. Half-ounce doses of the liquid extract have been given.

is connected, as it so often is, with anæmia, and broken health. *Intractable* neuralgia has sometimes been treated by *division*, *excision*, or *stretching* of the nerve involved. Simple division often fails to cure. Excision of a portion of the nerve is more likely to succeed. Nerve-stretching (Billroth, 1869) has been performed a good many times, for neuralgia, epilepsy, tetanus, etc.[1] Von Nussbaum, Callender, Petersen and others have reported several cures of neuralgia by it. More favor has been shown to it of late than to neurotomy; but neither is to be thought of unless all other remedial measures fail. The same may be said, of course, of tying the primitive carotid artery; which was practised successfully in an obstinate case by Dr. F. H. Gross, in 1880.[2]

Of less severe measures in treatment of neuralgia, the direct application of high heat may be mentioned; and also (McLane Hamilton)[3] the rapidly alternating application of heat and cold. I have known an attack of severe facial neuralgia to be relieved by the patient sitting or lying in the sunshine for half an hour.

*Sick headache* is evidently mainly a *neurosis*, and yet the pain is not always of a neuralgic character. In some persons a hereditary proclivity to it appears. Certain women, especially, are subject to attacks every one, two, or three weeks (though seldom at regular intervals) from puberty to the cessation of the menses. Relief of such attacks by treatment is often difficult to obtain. Early retirement to bed is mostly requisite. If acidity of stomach, or nausea, be present, magnesia, or bicarbonate of sodium, or blue pill, may be useful. As nervine remedies for sick headache, quinine, *guarana* (10 to 15 grains at once), *citrate of caffein* (3 to 6 grains), *chloride of ammonium* (10 to 20 grains), and *monobromated camphor* (from 2 to 5 grains) have been much lauded; but they will often fail of the desired effect.

**Odontalgia**, toothache, is sometimes purely neuralgic. More often, it results from exposure of the nerve by the decay of the tooth. Again, it may attend *inflammation* of the jaw, or abscess at the root of the tooth affected. For toothache from *exposed nerve*, *creasote* is a certain remedy. Insert carefully into the hollow a plug of cotton, wrapped over the end of a knitting-needle and dipped in pure creasote. If the latter run out into the mouth (which should be avoided if possible) rinse it at once with cold water. Oil of cloves, laudanum, chloroform, tobacco smoke, raw whisky, and acetate of lead, introduced into the hollow of the tooth, will also generally give relief.

## DELIRIUM TREMENS.

**Synonym.**—*Mania a potû.*

**Symptoms.**—Sleeplessness, debility, tremors, horror, hallucinations; often with loss of digestive power. The *insomnia* is a cardinal symptom; if the patient sleeps a whole night he recovers. Debility varies in degree in different cases; in a first attack it is not always great. Tremor is nearly always present. The illu-

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[1] Vogt, Die Nerven Dehnung, etc. Leipzig, 1877.
[2] N. Y. Medical Record, Dec. 25, 1880, p. 727.
[3] Phila. Med. Times, Sept. 4, 1875, p. 771.

sions of the patient are wonderfully real, and usually dreadful. He is pursued by demons or beset by mortal enemies; he cannot bear to be alone, especially in the dark. Sometimes, however, the visions are indifferent, or even amusing. The patient may suppose himself to be well, and engaged about his usual avocation; going through all its movements in pantomime, though with empty hands.

After several days and nights of sleeplessness, prostration usually increases; the skin grows cold and clammy, the pulse weak and rapid, the voice feeble, and the patient no longer inclines to move about. Death must result if sleep be not obtained within a week, or, at the most, two weeks. In favorable cases, a sound sleep of many hours comes on within three or four days; the patient then wakes up rational and well.

**Causes.**—There is no room for doubt that this affection may come on under two different conditions or circumstances; 1, where stimulants are suddenly withdrawn from one accustomed to them; and 2, while their use in excess is continued. The second class, according to my observation, furnishes the most dangerous cases.

**Treatment.**—Old as this disease is, it is yet the subject of great difference of opinion. The practice which early training led me to adopt, consisted in the *moderate* use of stimulants ("tapering off") and of opium, with concentrated liquid nourishment. If the patient were not much prostrated, I would give only ale or porter, a bottle or two in the day; with hop-tea *ad libitum*, and a grain of opium every three or four hours. The latter would be increased, if sleep were delayed, to a grain every two hours; or, as a maximum, a grain every hour. Very weak cases, accustomed to spirits, might have for a time a tablespoonful of whisky or brandy every four, three, or two hours, according to their condition. Beef-tea and mutton-broth, etc., seasoned with red pepper, are preferred as diet. In an obstinate case, I have seen sleep follow the raising of a blister upon the back of the neck. Substituting valerian for opium, or combining the fluid extract or tincture of valerian with morphia solution, has answered well in some cases. [F. 144, 145.] Injection of laudanum into the rectum is occasionally resorted to.

Other modes of treatment have recently been urged.[1] 1. The *expectant* treatment of Drs. Dunglison and Laycock; giving only strong food without stimulants or opium. 2. The treatment of Jones of Jersey, by tablespoonful doses of tincture of digitalis. 3. That by the internal use of chloroform, in one or two drachm doses; or equivalent amounts of hydrate of chloral.

The expectant treatment will no doubt do very well in mild or moderate cases. From what I have seen, I should fear to trust to it in severe or threatening ones.

The digitalis treatment, bold as it seems, has a good deal of positive testimony in its favor. Dr. A. Wiltshire, for instance, reports[2] five cases cured by half-ounce doses of the tincture of digi-

[1] Dr. Sutton is the supposed author of the opium dogma (sleep or die) in delirium tremens. Dr. Ware, of Boston, N. E., first protested against its necessity, 1825–30.

[2] Lancet, Aug. 27, 1870.

talis. Why not try, as some do, less immense and yet large doses; as, half a drachm or a drachm, instead of half an ounce, of the tincture every three or four hours? Dr. Sanders, of the Royal Infirmary, Edinburgh, has found half-drachm doses to do very well in severe cases.

Dr. E. McClellan and others have reported excellent success with one or two drachm doses of undiluted chloroform. The corrugated stomach of a spirit-drinker will probably bear the pungency of chloroform better than another's. Generally only one or two such doses of it are said to be required. My experience with the internal use of chloroform leads me to believe such practice perfectly safe at least; although I prefer dilution of the chloroform. It is worthy of further trial.

Dr. Peacock, of St. Thomas's Hospital, London, reports well of bromide of potassium in delirium tremens. Dr. A. Flint, also, uses it with confidence.

*Hydrate of Chloral*, from its great power as a hypnotic, deserves careful trial in this disorder. It has been very favorably reported upon by a number of physicians both in Europe and in this country. Its dose in delirium tremens should be usually from 30 to 40 grains, repeated, if necessary, every hour for three or four times. Dr. Anstie expressed (Reynolds' System of Medicine, article *Alcoholism*) the decided opinion that "bromide of potassium and chloral are practically the only drugs we need ever employ in delirium tremens." Dr. Balfour, of Edinburgh, gives[1] forty or fifty grain doses of chloral-hydrate; sometimes administering from 100 to 120 grains of the drug in all. I should fear going much beyond this, in view of the proved possibility of very large doses of chloral having fatal effects.

Dr. Lyons and others speak highly of the effects of *capsicum*, in 30-grain doses. Hewitt, of Dublin, has cured one case by the application of the ice-bag to the spine.[2] Packing in a wet sheet is sometimes followed promptly by sleep and recovery.

The large majority of first attacks of mania a potû are curable. Third and fourth attacks are often fatal, or are followed by permanent insanity.

## METHOMANIA.

**Definition.**—The disease of uncontrollable or irresistible intemperance.

**Synonyms.**—*Dipsomania; Oinomania.*

**Varieties.**—*Periodical* or paroxysmal, and *chronic* or persistent methomania. The subject of the first may be temperate for weeks or months, and then will abandon himself to violent excess for some days or for a week or two. The persistent methomaniac is constantly intemperate, so long as the opportunity exists.

**Causes.**—Hereditary proclivity exists in many cases. Wilful or unwise excess is the cause, of course, of intemperance in every case. To designate it as a disease is not at all to deny the accountability of those who voluntarily incur it; only, thus,

[1] Lancet, Feb. 1, 1879.
[2] Dublin Med. Press and Circular, April 22, 1868.

its true acquired character of *uncontrollableness* (in many instances) by the will is indicated. That any intrinsic power exists in alcohol employed for its *proper needs* as a medicine; and in proper quantities, to bring on intemperance, I do not believe. I have known too much of its use in practice in low fevers, in phthisis, and many other conditions of debility, not to be sure that it is only when used in *excess*, or out of place, that any hankering or slavish demand for it is begotten; unless in those who inherit a morbid proclivity towards it.

**Treatment.**—No safety exists except in *seclusion for a year or two*, where the individual cannot obtain stimulus, and is not made by company or opportunity to desire it. Laws should be passed (in Pennsylvania, and in some other places, such laws do exist) by which every person, proved upon inquiry before a commission to be habitually intemperate, should (like a lunatic) be deprived of the control of his liberty and property. Then, in every community there ought to be institutions where a safe and homelike retreat could be had for a sufficient time to restore self-control; which, I repeat, ought to be never less than a year; better two years. Several such institutions have now been in operation for a considerable number of years. The success so far obtained in these retreats has been quite enough to justify fully their establishment and support near every large city.

Medicinally, bromide of potassium is likely to lessen the nervousness of those from whom accustomed stimulus has been withdrawn. Quinine, iron and other tonics, as well as pepper or other stomachics, may be required, with nourishing and easily digestible diet. The best situation for an "inebriates' retreat" must be in the country, where rural enjoyments may be had, with but little abridgment of personal liberty.

## INSANITY.

**Definition.**—Loss of control of the will over the mental faculties or impulses; intellectual, emotional, or sensorial derangement.

**Varieties.**—1. **Mania**; acute[1] and chronic; also divisible into intellectual insanity or *delusion*, emotional, impulsive, or *moral* insanity, and illusional derangement or *hallucination*. 2. **Monomania**, or partial insanity; *e. g.*, homicidal and suicidal; *kleptomania*, or insane propensity to steal; *erotomania* (satyriasis, nymphomania) or uncontrollable amatory desire; *pyromania*, morbid propensity to commit arson, etc. 3. **Melancholia**. 4. **Dementia**; *i. e.*, total wreck of the faculties, or imbecility. **Idiocy** is congenital imbecility.

**Premonitions.**—By noticing these, often *prevention* may be suggested and effected. Hardly any of them *alone* may be sufficient, while altogether they become so. 1. Headache, not accounted for by ordinary causes, and continuing for days or weeks together. 2. Irritability of temper, not previously habitual. 3. Unnatural hilarity without occasion. 4. Depression or gloom, not justified by any event. 5. Alternations of excitement and despondency,

[1] Puerperal insanity is one form of acute mania.

both extreme. 6. Any great modification of the natural temper or habit of mind, so that the individual becomes the opposite of his usual self. 7. Dislike or distrust of near friends and family, without any reason for it.

**Diagnosis.**—Alienation from his own accustomed character and disruption from rational and harmonious relations with persons and things around him—these are the cardinal elements of the insane state. This, all authorities admit to be more easily detected or discriminated than defined. The old legal test, that the lunatic must be incapable of knowing right from wrong, has been given up; as very many cases of emotional or "moral" insanity are proved to exist, in which, with full knowledge of right and wrong, the morbid impulse is irresistible by the will. There is no *physical* test of insanity, by the pulse or otherwise; as in chronic mania, etc., all the organic functions may go on normally. The expression of the face is, it is true, nearly always unnatural. Perhaps the greatest difficulty exists in monomania, unless one knows the peculiar delusion or morbid tendency of the patient, as upon all other matters he may be sound. *Feigned* insanity is generally overacted; sometimes it may require the skill of experts to expose it. Not unfrequently *anæsthesia* may be used to advantage in effecting this exposure; on coming out of the state of unconsciousness the impostor or malingerer will betray himself.

**Prognosis.**—More than half of first attacks of insanity, under good management, are recovered from. With each repetition, the hope grows less; and so it does, also, in proportion to the *duration* of chronic mania. Sometimes, however, cures occur of those who have been insane for years. Dementia is a common, and generally hopeless, termination of prolonged chronic mania or melancholia. Puerperal mania is curable in a large majority of cases. Ordinary acute mania varies in duration from a week or two to several months. Its worst form is the "acute delirious mania" (Bell's disease) of authors; sudden, chaotic, and prostrating. It may end either in recovery, in lapsing into chronic mania, in dementia, or even in death during the attack. *Periodical* insanity is occasionally met with, especially in females.

**Causes.**—These are numerous. The principal ones are hereditary predisposition, injuries of the head, intemperance, reverses of fortune, loss of friends, and domestic troubles.

**Pathology.**—Much yet remains to be learned of this. Subtle alterations of brain-structure are still to a considerable extent unrecognizable, even with the aid of the microscope. Two elements in the pathology of insanity have been distinctly made out: cerebral *hyperæmia*, which predominates in the more acute cases, and *atrophy*, which is (either quantitative or qualitative) present in nearly all those which are chronic.

Dr. J. B. Tuke[1] asserts that, of all portions of the brain found altered after death in those dying insane, the *corpora striata* are most frequently, and the cerebellum the least often, affected.

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[1] Medical Press and Circular, Aug. 16, 1871.

For the **treatment** of insanity it is proper to refer to special treatises upon the subject. (*See* Bucknill and Tuke, Blanford, or Maudsley on Insanity.) The advice of a physician in nearly every case ought to be, early removal to a well-conducted asylum or hospital for the insane. There, security and the prospect of recovery will be much better than at home amongst the kindest of friends. In the treatment of insanity, in recent times, while the use of medicine (especially tonics and hypnotics) is not neglected, the tendency is to confide a great deal in moral or mental treatment; *i. e.*, the aggregate of personal, local, and circumstantial influences, which in an asylum can be arranged especially with a view to the most favorable effect upon its inmates. The placing of insane patients, not violent, under the care of private families (as at Gheel and Clairmont) has been found sometimes productive of beneficial results. But the abandonment of the hospital plan (with which the other can be combined) altogether, in favor of this, would be, no doubt, as great a mistake as the often urged (Gardiner Hill, Conolly) *total* abolition of mechanical *restraint*.

## HEMORRHAGES.

**Varieties.**—1. Active; 2. Passive; 3. Traumatic; 4. Symptomatic; 5. Critical; 6. Vicarious. Local hemorrhages are also classified according to the organ from which the blood escapes.

**Active** hemorrhages are those in which determination of blood in excess to the part precedes the bleeding. **Passive** hemorrhages, those in which from inaction of the circulation, or passive dilatation of blood-vessels, congestion occurs; or in which the coats of the vessels give way, partly from the blood itself being incapable of maintaining properly their nutrition. The idea of bleeding by "exhalation" without rupture at least of capillaries, is now abandoned. Occasional escape (Cohnheim) and migration (Recklinghausen) of leucocytes, is admitted.

Certain persons (sometimes by inheritance) have a constitutional tendency to hemorrhages. This has been called **hæmophilia** by authors (J. W. Legg). A slight wound, as the extraction of a tooth, vaccination, or the removal of a wen, may in such persons be followed by bleeding to death; or they may die from epistaxis or some other spontaneous hemorrhage. It has not been shown whether the peculiarity in these cases consists in a deficiency of coagulability in the blood, a defective contractility in the small arteries, or (as some German writers have asserted) an excessive violence in the propulsion of the blood by the heart. Probably abnormal thinness of the walls of the blood-vessels has the most to do with it. One of the not uncommon accompaniments of the hæmophilia is an affection of the larger joints, with pain, swelling, and fever, somewhat resembling articular rheumatism. Immerman[1] asserts that members of the Jewish race are particularly liable to this diathesis; also, that it is more often met with in Great Britain and Germany than elsewhere. Authors have commonly stated that women who are "bleeders" are not especially liable to hemorrhage after delivery.

[1] Ziemssen's Cyclopædia of Medicine, vol. xvii.

Börner[1] and Kehrer,[2] however, have brought to light facts showing that dangerous *post-partum* hemorrhages do occur in women of such families. Abortion in such subjects, also, is attended by more than usual peril.

Brown-Séquard and Nothnagel, on the basis of experimentation upon animals, assert that mechanical injuries of the brain predispose to pulmonary hemorrhage; and Barćty (*Lancet*, May 23, 1874) has confirmed this by observation in one accidental case in a human subject.

**Traumatic** hemorrhages are, of course, all produced by wounds; coming thus under the department of surgery.

**Symptomatic** hemorrhages are met with in many diseases; *e. g.*, epistaxis in typhoid fever; hæmoptysis in consumption; vomiting of blood in ulcer of the stomach; bleeding from the bowels in piles, etc.

**Critical** hemorrhages are occasional terminations of febrile disorders; as, yellow fever, remittent fever. **Vicarious** hemorrhage is that which substitutes one which is normal or habitual; *e. g.*, spitting of blood when the menses have been suppressed; or bleeding at the nose following the arrest of the habitual bleeding of hemorrhoids.

**Epistaxis.**—By usage, this term is applied only to bleeding from the nose. In young persons, especially from ten to fifteen years of age, it is common, and if moderate, harmless; seeming often to relieve a temporary congestion and prevent a headache. It is more often seriously troublesome when it occurs in older persons. Generally it is from one nostril only, but not always.

**Treatment.**—When slight, it may be allowed to stop of itself; only not blowing away the clot that forms as a natural plug. If it continue so as to threaten an injurious loss of blood, applying cold water to the forehead and nose, or *ice*, there or to the back of the neck, or to the roof of the mouth, will generally stop it. If not, a plug of dry cotton may be introduced and left in the bleeding nostril. Wetting the cotton first in strong alum-water, or dilute tincture of chloride of iron, or dipping it in powder of tannin or matico may make it more effective. When these measures fail, the posterior nares must be plugged. Either the watch-spring canula may be used, or an elastic catheter, having a piece of waxed ligature or twine passed through its eyelet-hole, may be carried back through the nostril to the pharynx. Then one end of the string should be drawn out of the mouth with forceps, a plug of cotton fastened to it, and the other end drawn through the end of the catheter till it forces the plug against the posterior orifice of the nares. Raising the arms high above the head is a popular mode of endeavoring to stop nose-bleeding. Dr. Marvin,[3] of Geneva, asserts that pressure upon the facial artery, where it passes over the lower jaw, will have the desired effect, by lessening the supply of blood to the nose.[4] Hypoder-

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[1] Wiener Medicinische Wochenschrift, Aug. 17, 1878.
[2] Archiv für Gynäkologie, Band x.
[3] Gaz. Med. d'Ital. Lomb., May 17, 1873.
[4] Tiemann, of New York, makes Malavasi's dilatable *india-rubber bag* for the nostril. See *N. Y. Med. Record*, Aug. 15, 1874.

mic injection of ergotin has been used with success (Porak) in serious epistaxis.

**Bleeding from the Mouth.**—This, unless when ulcerative, is generally from the gums; as in scurvy. It is, in itself, scarcely ever serious in amount. Considerable bleeding, sometimes hard to stop, may occasionally follow the extraction of a tooth.

**Treatment.**—Borax in solution, or tannic acid, or myrrh and rose-water, will be suitable washes for the bleeding and spongy gums of scurvy. For hemorrhage after the removal of a tooth, it may be necessary to plug the cavity with lint or cotton dipped in tincture of chloride of iron, or creasote.

**Hæmoptysis.**—This term (spitting of blood) is generally applied to hemorrhage from the lungs, bronchial tubes, trachea, or larynx. Ulceration of the larynx, trachea, or bronchi may produce it, not often dangerously. I remember one case, in which ulceration of the larynx extended so as to open the carotid artery, with fatal result. More often the source of the blood is the lungs. The diagnosis of this is of great consequence. Much alarm may be produced by the spitting of blood, whose source examination proves to be the posterior nares. This may not be supposed by the patient, because there is no bleeding anteriorly from the nose. Between pulmonary hemorrhage and that from the stomach, the following contrast of signs exists :—

| *From the Lungs.* | *From the Stomach.* |
|---|---|
| Dyspnœa. | Nausea. |
| Blood coughed up. | Blood vomited. |
| " florid, sometimes frothy. | " dark, not frothy. |
| " mixed with sputa. | " mixed with food. |

In a majority of instances, spitting of blood from the lungs is a symptom of phthisis. Cases occur, however, sometimes, especially during adolescence and early maturity (from 18 to 30 years of age), of more or less active pulmonary hemorrhage, whose subsequent history disproves a tuberculous origin for it. In these cases there may be immediate danger to life, more probably than in the frequent bleedings of consumption. Aneurism of the aorta may also cause hæmoptysis by rupture of the tumor, which must cause death. This, of course, is comparatively rare, and is made known by signs already considered.

Prof. Baelz, of Tokio, has reported (1880) the prevalence in Japan of a form of hæmoptysis, unaccompanied by other symptoms, ascribed to a *gregarinoid parasite*, infesting the lungs. He designates the affection as *gregarinosis pulmonum*.

**Treatment.**—For active, congestive pulmonary hemorrhage, in a young and robust person, it was formerly a common practice to take blood from the arm, as a *derivant* measure. I have known this to succeed perfectly, with no subsequent disadvantage. But dry cupping over the chest and back, with sinapisms to the legs, and ice, salt, or alum, swallowed slowly, the patient being at perfect rest in bed, with the head and shoulders raised, will be sufficient treatment at the start for most cases. Then we may prescribe, if the bleeding continue after the first gush, acetate of

lead with opium, in pill; say a grain or two of the former with half a grain of the latter, every four, three, or two hours, as the case needs, for a day or two; or wine of ergot, half a fluidrachm every two hours for several doses. Applying a tourniquet, or some other mode of ligation, around one or more of the limbs, so as to retard the venous flow of blood towards the heart, has sometimes had a good effect in serious hemorrhages.

In passive or tuberculous hæmoptysis, rest, with the head and shoulders propped, is necessary. Ice, salt, and alum, alone or together, may be held in the mouth, and swallowed very slowly, till the bleeding has stopped for the time. For medicines, in the anæmic, gallic acid (gr. x to gr. xxx, in solution with aromatic sulphuric acid) [F. 146], oil of turpentine (gtt. x to gtt. xx in mucilage) [F. 147], and ammonio-ferric alum (gr. v to gr. x), or tincture of chloride of iron, are most recommended. Dr. Anstie[1] and others have preferred ergot, or ergotin, hypodermically or by the stomach, as most efficacious. Drasche, of Vienna, introduced the *hypodermic use of ergotin* for internal hemorrhages, in 1868; reporting several successful cases. *Quinine* is employed by some physicians (Caro[2]) to "quiet the action of the heart" in obstinate cases of hemorrhage. But dosing with styptics in consumption is not proper for every trifling discharge of blood. They are suitable only when the hemorrhage itself is, or threatens to be, a source of additional debility.

**Pulmonary Apoplexy.**—This is the extremest degree or result of congestion of the lungs; hemorrhage occurring into the air-cells, and obstructing respiration, sometimes to a fatal degree. Disease of the heart predisposes to this. Its attack is apt to be somewhat sudden; there is great dyspnœa, with a purple countenance, and skin rather cold. Percussion-resonance is dull. On auscultation, at first, a bubbling or mucous râle is heard; after the blood coagulates, no respiratory sound at all.

**Treatment.**—If diagnosticated early, in a person of tolerable strength, venesection should be performed at once. Then (or instead in a feebler subject) dry or cut cups should be applied extensively between the shoulders; followed by a large sinapism over the anterior part of the chest, and a hot pediluvium. At the same time the reaction which should aid in unloading the oppressed lungs (the object of venesection, cupping, etc.), may need to be favored by hot drinks, as hot lemonade, carbonate of ammonium, or, if coldness be decided, whisky punch.

**Hæmatemesis.**—Vomiting of blood may result from cancer, or ulcer of the stomach, congestion of the liver, aneurism of the abdominal aorta, hysterical disorder, vicarious menstruation, etc. We have given, above, the distinguishing signs between it and hæmoptysis.

**Treatment.**—This must be varied according to the cause. Slight ejections of blood from the stomach may not of themselves require treatment—having only a diagnostic importance. In ulcer of the stomach the greatest danger may occur, except from rupture of an aneurism. In copious hæmatemesis, with

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[1] Practitioner, February, April, and May, 1873.
[2] N. Y. Med. Record, June 1, 1874.

absolute rest in the horizontal position, ice, creasote (one or two drops, *pro re nata*) in solution or pill [F. 81], gallic acid [F. 146], oil of turpentine [F. 147], ammonio-ferric alum, or tincture of chloride of iron, may be prescribed. Food must be given in small quantities, and concentrated.

**Hæmaturia.**—This may be either from the kidneys or from the bladder. If the blood is thoroughly mixed with the urine, it is probably renal. If the water flows off nearly pure, and the blood follows or accompanies the last portion, it is vesical. When it follows the use of a catheter or bougie, independently of urination, and flows in a stream or in fresh drops, it is urethral and traumatic.

Renal hemorrhage may attend congestion or inflammation of the kidney; or cancer; or scarlet fever (generally a late stage); or the irritation of a calculus; or that of cantharides or turpentine; or, in old persons, it may be passive. In Egypt a parasite sometimes produces it, the *distoma* (Bilharzia) *hæmatobium*.

**Treatment.**—For hemorrhage from the kidney sufficient to deplete at all seriously, astringents, as gallic acid, tincture of chloride of iron, alum, or acetate of lead may be used. Dr. Upshur, of Richmond, Va.,[1] has recorded the success of *tincture of guaiacum* (1 drachm thrice daily) in the treatment of several cases of hæmaturia. Rest is important, in this as in all hemorrhages, during the attack. Bleeding from the bladder may be treated by the injection, through a catheter, of solution of alum or dilute solution of creasote (gtt. j in f℥j of water) or tannic acid (gr. x in f℥j).

**Intestinal Hemorrhage.**—A frequent cause of this is typhoid fever, of which it is sometimes symptomatic, and occasionally critical; *i. e.*, the commencement of convalescence. The same may occur in yellow fever, or in remittent fever (less often). Aneurism of the aorta, congestion of the liver, abdominal cancer, may cause it. Blood is passed, commonly in small quantity, with the discharges of dysentery. Aged persons not unfrequently have passive hemorrhage from the intestines. Internal piles are very often productive of it. The blood from the latter is bright red; other bleeding from the bowels is darker and more mixed.

**Treatment.**—Acetate of lead, by the mouth, with opium, or by enema; tannic or gallic acid, in pill or by injection, in solution; oil of turpentine; creasote and tincture of chloride of iron, or ammonio-ferric alum, are here, as in the other hemorrhages mentioned, the most reliable astringents. For bleeding piles special treatment has been already alluded to. (See *Hemorrhoids.*)

**Vicarious Hemorrhage.**—The most frequent instances of this are in connection with suppressed menstruation. Epistaxis, hæmoptysis, hæmatemesis, renal or intestinal hemorrhage may occur, but it is most apt to be from the stomach or lungs. The **prognosis** in this form of hemorrhage is much less serious than in the same of other origin. Its treatment should be addressed mainly to the regulation of the disturbed or interrupted uter-

[1] N. Y. Med. Record, Dec. 13, 1879.

ine function. Warmth to the lower extremities and back with such *emmenagogues* as each case may indicate, will generally be required. Astringents are to be avoided in vicarious hemorrhage, unless it be in excess of the ordinary menstrual or other suppressed discharge.

**Uterine Hemorrhage.**—Besides simply excessive menstruation, uterine hemorrhage may be from placenta prævia ("unavoidable hemorrhage"); abortion; subsequent to delivery; uterine cancer; ulceration of the os and cervix uteri; tumors within, or in the walls of the womb.

**Treatment.**—In considerable uterine hemorrhage of either variety, ergot, in substance, fluid extract, or wine, is likely to be of use by promoting contraction of the womb. Ammonio-ferric alum is also a good medicine to give by the mouth in the same case. Dr. Robert Lee has recommended *digitalis* in menorrhagia; using rather large doses, but not continuing them long. Hypodermic injection of *atropia* (Tacke[1]), gr. $\frac{1}{200}$ twice daily, has been used with success. Locally, ice or iced water may be (with care not to chill too much) applied for a short time over the hypogastric region, or thrown into the vagina. Tincture of chloride of iron, in solution, will have a powerful effect. Tannic acid or matico may be likewise applied, or the "styptic rod" of tannic acid and cocoa-butter, shaped to fill the vagina. But threatening cases (except *post-partum*) may require the actual *tampon*, or plug of lint for the whole vagina, or the sponge-tent inserted into the os uteri itself. Stimulants may at times be called for, to prevent fatal exhaustion under large hemorrhage, either from the uterus or from any other organ. Pressure upon the aorta has sometimes been resorted to, through the abdominal walls, in uterine hemorrhage. Many practitioners now depend most upon injections of *hot* water (115° to 120° F.). Other measures, suitable after delivery, belong to the department of obstetrics.

Habitually excessive menstruation requires that the patient so affected should maintain absolute rest from the beginning of the flow till its cessation. Iron is nearly (not quite) always indicated in such cases through the interval; particularly the tincture of the chloride of iron.

**Internal Hemorrhages** *of obscure origin* may sometimes produce sudden death. A remarkable instance of this occurred in the case of Adelaide Neilson, the actress, in 1880. Writhing with pain from a gastralgic attack, she suddenly went into a state of syncope, and died. Post-mortem inspection, by Brouardel, showed that death was caused by the *rupture of a varicose vein* in the left Fallopian tube; from which two quarts and a half of blood had passed into the peritoneal cavity.[2]

## DROPSICAL AFFECTIONS.

**Varieties.**—1. *Œdema*, local infiltration of connective tissue with serum. 2. *Anasarca*, general cellular dropsy. 3. *Hydro-*

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[1] Berlin Klin. Wochenschr., No. 6, 1881.
[2] London Times, Aug. 26, 1880.

*cephalus.* 4. *Hydrothorax.* 5. *Hydropericardium.* 6. *Ascites.* 7. Other local dropsies; as *Ovarian* dropsy, *Hydronephrosis*, *Hydrocele* of the testis, etc.

**Causation and Pathology.**—Obstruction to the venous circulation, arrest of excretion, and excess of water in the blood, are the three cardinal elements of the pathological causation of dropsy. Either one may induce it. Disease of the heart, or of the liver, brings on dropsy by venous obstruction. Disease of the kidney, or the action of cold and wet upon the skin, may produce it by checking excretion. Wasting diseases are liable in their advanced stages to œdema and anasarca, on account of the watery state of the blood.

**Acute general dropsy** results from the powerful impression of cold and wet, or of the scarlet-fever poison, upon the system, suppressing both the action of the kidneys and that of the skin at once. Its most common form is anasarca; but it may take the form of ascites, hydrothorax, or even hydrocephalus. When from cold and wet, it is much more curable (especially anasarca or ascites) than similar dropsy of *visceral* origin, *e. g.*, from disease of the heart. Albuminous urine is quite common in acute general dropsy.

*Hydrocephalus*, *Hydropericardium*, and *Hydrothorax* have been already sufficiently considered.

**Ascites** is peritoneal dropsy; accumulation of water in the abdomen. The **causes** of this, of greatest frequency, are cirrhosis of the liver and disease of the kidney. It may also follow obstruction of the portal vein by cancer, or general obstruction of the circulation from disease of the heart, aorta, or spleen; and it is sometimes ascribed to chronic peritonitis.

**Symptoms and Diagnosis.**—Often with emaciation of the face, neck, and arms, there is great enlargement of the abdomen. When this is far advanced, *orthopnœa* exists, from pressure upon the diaphragm. The patient is generally weak, with poor appetite and deficient rest at night.

On *inspection*, in the upright posture, the fulness is greatest in the lower part of the abdomen; when recumbent, it spreads evenly; on one side, it falls over that way. *Palpation* will make evident *fluctuation*, especially when one hand is placed on one side of the abdomen and the other strikes gently, at a distance of a few inches. *Percussion* discovers resonance above and about the umbilicus, the intestines rising there upon the fluid to the surface under the abdominal walls. Elsewhere the sound is dull, even flat.

The amount of fluid in ascites is sometimes immense; as much as twenty-five pints have been withdrawn at once by tapping. It is generally clear, pale yellow or colorless, albuminous and alkaline.

**Ovarian Dropsy.**—Leaving the *history* of this, as belonging to the special department of diseases of women, it is right to state that its diagnosis is important, but not always easy. Like ascites, it produces abdominal enlargement, with dulness on percussion and fluctuation. The most nearly constant points of distinction are, that the ovarian tumor begins somewhat on one side, and only by degrees becomes symmetrical; its shape is, throughout,

more globular and coherent, and altered less by changes of position; and the intestines do not float up above the umbilicus so as to make a clearness of percussion-resonance there. The progress of ovarian dropsy is usually slower, and is attended by less proportionate depression of the general health. The *fluid* of ovarian cysts is peculiar, and different from that of ascites; even when not clear, it lacks the light straw color of the latter. Dr. T. M. Drysdale, of Philadelphia, has pointed out the existence in it of certain *granular, non-nucleated cells*, which are characteristic. Acetic acid causes the granules to become more distinct, and the cell to become more transparent. Such cells may be found in other *cysts*, elsewhere in the body; but not in ordinary ascites.[1]

**Treatment of Dropsy.**—Acute general dropsy, from suppression of the action of the skin and kidneys, should be treated by active purgation and the use of diuretics. Jalap and cream of tartar (gr. x of the former with ℥ij to ℥iv of the latter) every day or two, will answer well for catharsis. The diuretics most satisfactory are the infusion of juniper berries (a pint daily), acetate of potassium, citrate of potassium, squills, and sweet spirits of nitre [F. 37, 38, 39, 40]. Infusion of buchu is a favorite adjuvant vehicle for the stronger diuretics. Citrate of caffein (Gubler)[2] has acted well in several cases of cardiac dropsy, in 4 to 6 grain doses. In too large dose, it may cause vomiting. When the patient is hard to purge, elaterium may be given, in ¼ gr. doses, every four hours till it operates.

Murchison reports favorably of the use of digitalis both internally and *externally*,[3] in ascites. Jaborandi (or pilocarpin) by inducing copious perspiration, gives promise of being an important remedy in dropsy.

Ascites, or other dropsy, from disease of any of the great organs, kidneys, liver, or heart, being less curable, and attended by greater general debility, needs more economy of strength. No doubt exists that real harm may be done by the routine of repeated severe purging and plying with diuretics. The one may render the blood thinner and aggravate the constitutional disease, while the others, failing to remove the fluid by secretion, may even irritate the kidneys to the point of suppression of their action. Nourishing concentrated food, tonics, anodynes, etc., may, in visceral dropsy, be of more importance than diuretics. Of course it is desirable to lessen the accumulation of fluid; but the effects of the remedies used must be observed, and one symptom must not be allowed to overshadow the rest. Sigrist and Popoff, Russian physicians, have found *faradization of the abdominal walls* to produce diuresis to a sufficient amount to cause great relief in ascites.[4]

When enormous distention makes rest impossible, almost preventing breathing, it is necessary to relieve it by any possible means. Then purging, as by elaterium, should diuretics fail, must be resorted to. Or, if the patient's stomach or general

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[1] Foulis and Knowsley Thornton have described a different kind of granulated and nucleated cell as observed in *malignant* ovarian tumors.
[2] Practitioner, Jan., 1879, p. 24.
[3] Brit. Med. Journal, July 17, 1872.
[4] N. Y. Med. Record, from Vratch, No. 9, 1880.

strength will not bear that, tapping is called for. Some patients require this many times.

The operation is best performed while the patient is lying down, upon the side, near the edge of the bed. A trocar and canula are introduced half way between the pubes and the umbilicus, and the fluid is drawn out through the canula. Dr. T. G. Morton,[1] of Philadelphia, has designed an improvement of the ordinary canula, by adding near its upper end a short silver tube, upon which india-rubber tubing may be attached. Thus fluid may be conveyed away in any desired direction; the extremity of the canula being closed with a plug. Lastly a bandage (with a compress) is applied firmly around the abdomen. Some practitioners favor keeping open the orifice with a slip of lint, to maintain drainage. If no local irritation occur, threatening peritonitis in consequence, this may be a serviceable measure. If the bolder practice of injecting iodine after tapping (as in hydrocele) should be thought of in any instance, it must be in that of simple peritoneal dropsy, uncomplicated by serious visceral disease. Dr. Reginald Southey[2] has reported success with the insertion of a fine canula for gradual drainage, after puncturing the abdomen with a needle-trocar. From ten to twenty ounces of fluid passing away through the canula per hour, the abdominal walls and viscera adjust themselves safely to the diminution of pressure, without needing the application of a bandage.

Sometimes œdema of the lower limbs and scrotum becomes so great as to cause great inconvenience. Then the fluid may be let out by making a number of small punctures with an abscess lancet or small pointed bistoury. Dr. Handfield Jones recommends[3] a single puncture in each leg, with a trocar, leaving the canulas in to drain for several hours. The only drawback to this practice is the possibility of erysipelatous inflammation about the punctures. Such danger will not be at all great if, immediately after the operation, the parts be soothed by bathing or anointing the skin with diluted glycerin (f℥j in f℥j of rose-water), or cold cream (ung. aq. ros.), or glyceramyl (glycerin and starch) [F. 148].

For the treatment of ovarian dropsy, the reader is referred to works upon gynæcology and surgery. I may only state my conviction that preliminary *tapping* is advantageous in many cases for which ovariotomy is anticipated. Reasons for this are: 1. It is a partial test of the endurance of the patient's system. Should peritonitis follow tapping, we may be sure that the prognosis of the larger operation would have been unfavorable. 2. It furnishes a sort of preparation for ovariotomy; by accustoming the abdominal contents, including the peritoneum, to a change of bulk and pressure. Moreover, in a few instances, the *cure* of ovarian dropsy has followed the operation of tapping alone. Yet it is right to add, that several of the most eminent ovariotomists have pronounced their judgment very decidedly *against* tapping, as a rule.[4] When there is reason to believe a compound or

[1] Philada. Medical Times, May 30, 1874.
[2] Lancet, Aug. 10, 1878.
[3] Practitioner, April, 1871.
[4] See an interesting discussion (from the *Lancet*, Jan. 15, 1881) in the Am. Journal of Med. Sciences, April, 1881, p. 579.

multilocular tumor (polycyst) to be present, it certainly ought never to be tapped unless ovariotomy is immediately to follow (Goodell).

## ZYMOTIC DISEASES.

### VARIOLA.

**Synonym.** — *Small-pox.* **Varieties.** — Discrete and confluent;[1] also, *varioloid*, or modified small-pox, after vaccination.

**Symptoms and Course.**—*Stages:* These are, *incubation*, *primary fever*, *eruption*, *secondary fever*, and *desquamation*. The incubation (period between exposure to the contagion and beginning of the attack) lasts about twelve days. The first symptoms are languor, headache, vomiting, and severe pain in the back; soon developing into fever. On the third day of this, pimples, at first small and red, appear, first on the face, then on the neck, arms, trunk and lower limbs. These papules become vesicles, and then pustules; suppurating perfectly by the ninth day of the fever. Then they flatten and scab. Four or five days later, about the fourteenth day of the fever, these scabs begin to fall off. Desquamation is commonly completed by the end of the third week of the attack. To recapitulate: there are, after about twelve days of incubation, three of primary fever, six or seven for the coming out and maturing of the eruption, four or five for its scabbing, and six or seven for desquamation.

These periods vary somewhat; and the severity of the disease depends mostly upon the amount of the eruption. This makes the difference between the discrete (scattered, separate) and confluent small-pox. Even the primary symptoms are generally worse in the latter. The secondary fever, connected with the full development of the eruption (about the eleventh day of the disease), is much the most severe in the confluent. The suffering of the patient is great, even extreme, in this form, the whole surface of the body being covered with inflamed pustules. Even the eyes, mouth, and throat may be invaded. Blindness sometimes follows; and I knew of one case in which the eruption in the throat proved fatal by obstruction of the breathing and swallowing. A peculiar and disagreeable odor emanates from the body in confluent cases.

**Malignant** small-pox is simply a violent form of it characterized by rapidity and extreme prostration, with or without extensive pustulation. The eruption in it is sometimes attended by lividity of the skin. Delirium is common, and a typhoid stupor may exist.

After small-pox, abscesses in various parts of the body, hard glandular enlargements, ulceration of the cornea, suppuration of the ear, pneumonia, or pyæmia may occur.

The danger to life in this disease is always serious. Before vaccination was introduced, thousands died annually from small-pox.

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[1] *Hemorrhagic* small-pox has been occasionally described; it must be very uncommon.

Of those attacked, 1 in 8 died; in infancy, 1 in 3. Dr. Lettsom, of London, estimated that 210,000 died every year from it in Europe before the time of Jenner; 45,000 annually in Great Britain and Ireland alone.

In Audubon's biography it is stated that in 1837 150,000 Mandan Indians died of small-pox; leaving only 27 of the tribe. Catlin asserts that of 12 million American Indians 6 million have been destroyed by small-pox. In Philadelphia, between 1860 and 1870, the mortality was 1 death in 6.6 cases of the disease. In the year from August 1871 to August 1872, 4417 deaths occurred in Philadelphia from small-pox. In the year 1879, not a single death from it was reported.

**Causation.**—There is no disease more certainly contagious than variola. Generally either contact or approach within a few feet seems necessary for its conveyance; but I have met with one instance in which it must have traversed the high walls of an inclosed public institution, attacking an inmate who had not left the house for ten years, and without the admission of any one who could have brought it. In the large majority of cases, small-pox occurs but once in a lifetime. Exceptions are well known, however; some in which the same person has had it three—it is *said* even five times. Louis XV. died of a second attack.

**Treatment.**—The *preliminary* symptoms of small-pox do not differ from those of most other acute disorders, except that the headache, pain in the back, and vomiting are apt to be more severe. In that stage, rest in bed, after a warm mustard foot-bath, and drinking hot lemonade to promote full reaction, will be enough. The *fever* calls, first, for a cooling laxative dose, as Rochelle salt or citrate of magnesium. Then, refrigerant diaphoretics will be in place; as, *neutral mixture* [F. 149, 150], *effervescing draught*, or *liquor ammonii acetatis;* the first, if the stomach be good and the bowels slow to act; the second, if nausea or vomiting continue; the third, if the bowels be free and the fever low in type. No *cutting short* of small-pox is possible; it is a self-limited disease. There is no specific remedy for it; we can palliate it only, and conduct the patient through it.[1]

So decided is the tendency to exhaustion of the system in severe small-pox, that early support by concentrated liquid nourishment must be the general rule. As in other acute illness, appetite and digestive power are almost lost. Milk, however, in small quantities often (one or two tablespoonfuls every two or three hours) and chicken or mutton broth or beef-tea may be given. Other sick diet, as gruel, arrowroot, toast-water, etc., may do during the primary fever. But a good many cases will require even wine-whey or brandy punch in the second and third weeks; malignant cases, perhaps, in the first week. Quinine should go with these, in tonic doses; *e. g.*, one or two grains every three or four hours. An opiate at night is often serviceable, especially in the confluent form. *Saracenia purpurea* is of no use whatever in small-pox.

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[1] Dr. Schwenniger (Berlin Klin. Wochenschrift, 25 Nov., 1872) asserts that large doses of quinine in the premonitory stage lighten the attack.

Drs. Zuelzer and Nagel recommend highly *xylol*, in ten or fifteen drop doses, four times daily. The latter reports, under its use, only four deaths among thirty-four very bad cases. Where the throat is much affected, tincture of chloride of iron, in glycerin, has been found to do good.

An important object often is to prevent the *pitting* of the face. Three plans are resorted to: 1. To abort the vesicles. 2. To soothe and mitigate the inflammation connected with them. 3. To exclude air and light during the scabbing and desquamation. The first of these ends is sought by touching each pimple on the face, on the fourth or fifth day of the attack, with a point of lunar caustic. Soothing inflammation is aimed at by covering the whole face during the first week with a soft poultice of bread and milk, flaxseed meal, or slippery elm bark. Exclusion of the light may be attained by gold leaf; of air, by mercurial ointment or collodion, softened by adding $\frac{1}{50}$th part of glycerin before it is painted upon the face. Dr. Leach,[1] of Philadelphia, employs *white-lead paint*, thinned with linseed oil, and applied early with a camel's-hair pencil.

How are we to choose? I would begin by touching the *worst* papules, on their second day, with nitrate of silver. Then poultice the whole face for four or five days, till the pustules flatten and umbilicate. Lastly, apply the collodion, softened by the addition of glycerin, with a camel's-hair pencil, over each pustule, thickly enough to make an artificial cuticle; which may be renewed every day or two, until desquamation has been completed.

The *sequelæ* of small-pox must be treated as they arise; by the opening of abscesses, improving the tone of the system by iron, etc. Great care is needed in convalescence from this, as from other acute (especially eruptive) diseases, not to allow exposure to sudden changes or extremes of temperature. The danger of contracting pneumonia, pleurisy, or bronchitis is, at such times, much greater than usual.

**Varioloid: Modified Small-pox.**—In those who have been vaccinated, while the liability to be affected by the virus of small-pox is in most cases removed, in a few the disease is taken, on exposure, in a milder form. The primary fever is rather less severe, the eruption is more scattered, the pustules are not so deep nor so much inflamed, they scab sooner and very rarely *pit;* and there is no secondary fever. Varioloid is seldom fatal. Its treatment should be essentially the same as that of small-pox; only there is less often need of special measures to prevent marking of the face.

## VACCINATION.

The ancient practice of inoculation[2] with small-pox, while it

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[1] Philada. Med. Times, 1872.

[2] Inoculation was introduced into England from the East by Lady Mary Wortley Montagu in 1718. An account of it had been published in England, in 1714, by Dr. Timoni, of Constantinople. Dr. Boylston, of Boston, brought it into practice in this country in 1721. Dr. Jenner's first vaccination from arm to arm was performed in 1796. Vaccination was first performed in America and Austria in 1799; in France and Spain in 1800; in Italy, Russia, Denmark, and Sweden, 1801; in India, 1802.

was, by the mildness of the attack, nearly always protective of the individual, at the same time propagated the disease, multiplying the amount of its virus. Jenner's introduction into professional practice of inoculation with the virus of cow-pox, known before his time among dairymen, has greatly abridged not only the destructiveness, but the prevalence of variola.

Whether "vaccinia," or cow-pox, is small-pox affecting the cow, or is a different disease whose virus is protective against small-pox, is not yet determined to the satisfaction of all investigators.[1] Experiments have been tried repeatedly, with conflicting results. Pasteur's view is, that vaccine virus is merely diluted virus of variola. Either way the fact is plain that most persons are, by one good vaccination, protected for life; that modified small-pox, occurring in the vaccinated, is very seldom indeed fatal, and hardly ever pits; and that repeated vaccination, after an interval of years, will make protection almost always complete. An altogether unjustified distrust of vaccination has within a few years done harm in some places. Besides the abundant proof of its value afforded in Jenner's time in Europe, recent facts confirm the opinion that small-pox might be *extirpated* by its universal use. Dr. Cameron (Lectures on Health, 1868) declares that this has been almost entirely effected in Ireland; where, on some accounts, we might expect small-pox to abound. In Paris, 1870, an alarm about "vaccinal syphilis" was the cause of a very destructive variolous epidemic.

Vaccination may be performed either with the fresh lymph, the same dried by keeping, or the scab, and either directly from the udder of the cow, or from a human being inoculated with cow-pox. In Europe the lymph of the vesicle, before maturation, is generally preferred, In this country the scab is much used, and is found reliable when fresh enough. No matter how it is kept, after a month it is uncertain; although it has sometimes been found efficient after being sealed up for a year.[2] When kept in hermetically sealed glass tubes, the fresh lymph, dried upon fragments of quill, will keep nearly as long as the scab. Lymph is to be obtained on the eighth or ninth day after the vaccination; by puncturing the sore with a small lancet held *parallel to the arm*, to avoid drawing blood. Several small punctures may be made. The quill-pieces do best to be nearly a quarter of an inch wide at the end, and slightly roughened by scraping with a knife, to increase absorption of the lymph.

Direct inoculation from the cow often makes a very sore arm, without any certain increase of security. The cause of the severity of the inflammation appears to be, usually, some impurity contaminating the virus. Dr. Loines, upon extensive experience,

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[1] M. Danet of Paris, after many experiments, pronounced that vaccinia and variola are distinct diseases. (Med. Times and Gazette, Feb. 23, 1867.) Jenner's opinion was that they are the same, and identical also with the *grease* of the horse.

[2] Recent observation, authentically reported, seems to show that *glycerin*, first suggested by Muller, of Berlin, will preserve vaccine virus for several months. The method used in England is, to take matter from the sore on the eighth day of the vaccination, on quill points, and mix it with ten times its bulk of glycerin diluted with an equal quantity of water. In Germany the proportions are, lymph one part, glycerin and distilled water each two parts; well mixed together.

declared vaccination from the heifer to be *less certain* than that from arm to arm. Dr. Seaton, author of an excellent work on vaccination, in an official report testifies against animal vaccination as a substitute for the human.[1] Dr. Ballard, of London, has given[2] statistics showing that while humanized virus affords 978 successes for 1000 insertions, the best results with animal virus do not exceed 700 per 1000 insertions. Dr. H. Stevens, of the English Local Government Board, who has probably vaccinated as many children as any one, declares that he has seen no ground for the opinion that humanized lymph has lost its true and original Jennerian character. It is at the same time possible that many transits through human bodies may somewhat modify the virus. Renewal by inoculating healthy children, not too young, every now and then, from the udder of the cow, is to be recommended. Cattle with the cow-pox may be found in almost any agricultural neighborhood. As Dr. B. Lee[3] has well pointed out, the most reliable, often the most active virus, is that which has been *recently humanized;* especially if it be but one or a few removes from the cow-pock.

In the absence of small-pox the second month of infancy will be time enough for vaccination. But under danger of exposure, a babe should be vaccinated at any time after birth. Matter only from healthy children ought ever to be used. While it is unlikely that any constitutional disease (as syphilis[4] or scrofula) will be so introduced, there should, in practice, be no room left for any doubt of the kind; and some cutaneous diseases might certainly be transmitted. Unless on account of risk from exposure, the existence of an eruption of the skin, or any other indisposition of the child itself, may be a reason for postponing the operation. The excitement produced by it may aggravate an existing inflammatory affection. Vaccination has often been blamed for the breaking out of eruptions, supposed to be transmitted, when their cause was really the state of system of the patient.

For the operation, the outside of the arm, near the shoulder, is commonly selected. The exact method used is not important. A small wedge-shaped lancet, or even a sharp-pointed penknife will do. Various slides have been contrived for the purpose. I prefer to cut or push out a very small flap of the cuticle, under which a thick paste, made by pressing and mixing a portion of the scab with a drop of tepid water, may be inserted. Or, instead of the scab, a lancet charged with fresh lymph (arm to arm) may be employed. Or, to use the quill with *dried* lymph, dip it for a

FIG. 119.

[1] Twelfth Report of the Medical Officer of the Privy Council, Appendix No. 7. London, 1870.

[2] The Practitioner. February, 1880.

[3] New York Med. Journal, May, 1872.

[4] At Rivalta, Italy, and Morbihan, in France, and in England, a number of cases of syphilitic disease (primary and secondary), following impure vaccination, have been reported; the best instances by H. Roger and Depaul, and by Jonathan Hutchinson of London. But West, Marson, Seaton, Loines, and others assert the alarm concerning it to be groundless, as the instances of it are excessively rare, and *always preventable.* In North Germany (Auspitz, Wiener Med. Wochenscrift, Jan. 25, 1873), only one or two examples of it occurred in twelve million vaccinations.

moment in tepid water, and apply it to the abraded or incised part. The art of the operation is to pierce the skin without drawing enough blood to flow. Besides the flap it is well to scratch the skin and puncture it at a little distance, giving three chances of taking instead of one; or several small scratches will do (Fig. 119). No disturbance of the arm must be allowed for twenty minutes or half an hour afterwards.

If it be successful, no sign of it is distinctly visible for two or three days. On the fourth day a decided small red pimple is to be seen and felt. This becomes a vesicle of some size on the fifth day; it grows large and cylindrical, or hat-shaped, and by the tenth or eleventh day is fully umbilicated, or depressed like a navel in the centre. Before that, about the eighth day, the bright red ring or *areola* forms around it. This fades after the eleventh day, and the vesicle dries up into a round and flat, but rather thick, mahogany-colored scab, which falls off about the nineteenth day. All of these particulars are important, as showing the genuineness of the vaccination. So is the appearance of the cicatrix left; which should be large in proportion to the vesicle, and *dotted* or marked with subdivisions. This is owing to the vesicle being composed of several small cells or compartments.

Slight fever, with restlessness, is not unfrequently observed during the first few days after the vesicle appears; but there is rarely anything requiring treatment.

**Re-vaccination.**—Experience shows that a number of persons, after several years, reacquire the susceptibility to small-pox.

As the only test of this is exposure either to the latter or *vaccinia*, the renewal of this, at least once after puberty, is always advisable. On the occasion of epidemic small-pox it may be repeated again and again. There is no pain of any consequence in the operation, nor danger, and if a genuine vesicle form, making a sore arm, that discomfort for a few days cheaply purchases immunity from the terrible disease. I have sometimes thought it possible that the system may be protectively affected by re-vaccination, even when no local effect or only a "spurious" sore follows. Certainly small-pox is extremely rare in re-vaccinated persons.[1] M. Danet, in an official report, insists that persons who have had small-pox should also be re-vaccinated.

The virus from a second vaccination should not be relied upon for use.

## VARICELLA.

**Synonym.**—*Chicken-pox.* This is a mild exanthematous disease resembling small-pox or varioloid considerably. Hebra, of Vienna, asserted its identity with variola; but this opinion is not well sustained by facts. After an incubation of four or five days from exposure to the contagion of one having it, pimples form, generally scattered widely. In the second day they become vesicles

[1] According to testimony obtained by a Medical Conference upon the subject of vaccination at Paris, in 1870, the proportion of the re-vaccinated liable to variolous infection is 2.33 per cent. Prof. Corfield, of London, has stated (Nature, Oct. 16, 1873), that, of fifteen thousand cases of small-pox in the London hospitals during the last epidemic, only four presented proof of having been re-vaccinated. In 1880 (Buchanan) the death-rate per million in London from small-pox was 90 among the vaccinated against 3350 among the unvaccinated.

filled with lymph. Two or three days more find them scabbing; they dry and fall off soon, without pitting, except in rare instances. There is little or no fever or other indisposition. The disease is attended with no danger to life, and requires only precautionary treatment, *i. e.*, to avoid exposure to cold and wet, to keep the bowels regular, and, if needful, promote action of the skin by a diaphoretic, as neutral mixture or liq. ammon. acetat.

The eruption of varicella differs from that of variola in coming out in successive crops; in not suppurating or becoming umbilicated; and in not deeply involving the true skin. Inoculation has been found to fail in propagating it, and vaccination has no preventive power over it. Adults are very seldom affected with it, and it is more often epidemic than small-pox.

## SCARLATINA.

**Synonym.**—*Scarlet fever.*

**Varieties.**—Scarlatina *simplex*, *anginosa*, and *maligna*.

**Symptoms and Course.**—After an incubation usually of about five days from exposure to its cause, lassitude, anorexia, headache, pains in the back and limbs, mark the beginning of the attack. Soon these are followed by fever; on the first day, very often, the throat is sore. On the second day, usually, a punctated red eruption appears on the face and neck, and in ten or twelve hours has covered the whole body. It is of a scarlet or, sometimes, a brick-red hue, uniformly diffused, with a swollen appearance and great heat, reaching by the thermometer 105° or 106° Fahr. Occasionally miliary vesicles are seen. There is also a sense of burning and some soreness or irritation of the skin. The tongue has a strawberry-like look, from the projection of enlarged red papillæ through a whitish fur. The throat is very red and swollen, generally, with a hue not unlike that of the skin. Fever runs very high, with an extremely rapid pulse, great thirst, headache, perhaps delirium, costiveness, in some cases vomiting. Bad cases may have stupor. By the fifth day, mild examples of the disease show already an abatement. Most have passed the height of the pyrexia by the ninth; although *sequelæ* may protract the attack much longer. Malignant cases may be fatal in a day or two, or even in less than twenty-four hours. Desquamation of the skin follows the fading of the eruption, often large masses of cuticle coming away at once. At this stage more or less decided albuminuria is common.

**Scarlatina Simplex.**—In this the eruption comes out early and well, with moderate fever, little or moderate inflammation of the throat, and an even course throughout. Sometimes there is hardly any febrile disturbance; the child may even play about without having to go to bed.

**Scarlatina Anginosa.**—Here the violence of the disease falls upon the throat chiefly. The tonsils swell greatly, suppurating either early or late, or they are covered by pseudo-membranous deposit, white, gray, or dark-brown, whose coming away leaves an ulcerous surface, with in some instances an acrid, offensive discharge. The extension of the ulcerative inflammation may

pass the Eustachian tube to the tympanum, and may destroy the auditory apparatus so as to cause permanent deafness. After the rash has disappeared, abscesses in the neck may form and discharge, exhausting the patient.

**Scarlatina Maligna.**—This term designates an overwhelming toxæmic impression of the morbid cause of the disease. Depression in the first stage becomes intense, without reaction; or, after the eruption has partly come out, it recedes, or grows livid in appearance; or the brain is oppressed with coma. Coldness is sometimes present, or unequal temperature of different parts of the body, instead of the usually diffused febrile heat. The throat may be much or little affected. In some instances the patient seems almost as if struck by lightning, so sudden and deep is the general prostration. In this condition death may take place in a few hours. Otherwise, there is continued prostration, and hemorrhage from the stomach or bowels, or vomiting, or diarrhœa threatens an untoward result.

**Sequelæ.**—Abscesses about the throat have been mentioned; similar local affections may take place elsewhere after the attack. Ozæna is not uncommon; neither is suppurative inflammation of one or more of the joints, or of the testicle; nor vaginitis. Endocarditis or pericarditis may occur. So may paralysis; either hemiplegia or paraplegia; generally this is partial, and it is often slowly recovered from.

Dropsy from arrested action of the kidneys, with imperfect action of the skin, is the most common, and in many cases the most serious of the sequelæ of scarlatina. It comes most frequently within a week or two after desquamation has commenced. Mild cases are almost as likely to be followed by it as severe ones. Exposure to cold is the generally observable direct cause; but cases happen in which no such exposure could have existed. Wagner, Biermer, Klein, and Putnam-Jacobi[1] have found post-mortem proof of *interstitial nephritis* in several instances. Anasarca is the least dangerous though most frequent form of this dropsy. There may, instead or in addition, be ascites, hydrothorax, or hydrocephalus. Albuminuria, and often hæmaturia, may accompany either form.

**Diagnosis.**—From measles, scarlet fever is known by the eruption coming out on the second day, without catarrhal symptoms, but with sore throat, and by its being of a brighter red color, and uniformly diffused instead of being in patches.

From roseola, it is distinguished by the fever and sore throat, and by the rash in the latter being in irregular blotches, and of a damask rose color instead of a brick- or scarlet-red hue.

**Prognosis.**—This is proverbially *uncertain* in scarlet fever. The simple form is, however, the least dangerous, and a very large majority of cases get well. The anginose is more threatening and serious. But the malignant variety, as its name indicates, is far the most so; recovery from it is the exception, although it does occur. I have known two cases of such recovery, one in which coma was complete for thirty-six hours.

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[1] N. Y Med. Record, March 26, 1881, pp. 353-5.

Adults are, when affected with scarlet fever, in somewhat greater danger than children, and so, especially, are puerperal women.

**Causation.**—Although most (not all) authorities agree that this disease is contagious, it is certainly very capricious or variable in its manifestation of this quality. That is, many persons who are exposed escape it. It is true that several children in a family often have it in immediate succession. But the escape of all but one is, so far as my observation has gone, as common. It rarely occurs twice in the same person. I remember but one or two instances of this in my own practice. It seldom occurs in infants under three months of age.

**Treatment.**—Mild cases require no medication at all, other than to make sure that the bowels are well opened. If fever is high, after a saline cathartic (citrate or sulphate of magnesium or Rochelle salts), neutral mixture or effervescing draught, or liquor of acetate of ammonium may be given. Sweet spirits of nitre may be added, in small doses (¼ to ½ fluidrachm for an adult, and proportionately less for a child) if the kidneys act slowly. Drinking cold water freely is to be encouraged, as it is demanded by thirst. If the throat be much inflamed, the frequent melting in the mouth of ice, in small pieces, will do good.

Dr. Egbert, of Pennsylvania,[1] uses, instead, an *ice-bag*, applied to the throat. This must require caution, not to allow the local impression of cold to become extreme.

Venesection is prohibited now in scarlatina by nearly all writers. In the early part of my practice, I bled from the arm in six cases, all of which did remarkably well. They were examples of violent fever with abundant eruption, severe sore throat and headache, in children of good constitution. I do not *advocate* the practice, simply in deference to the common opinion of the profession. Certainly it should be always ruled out in asthenic cases, and in all unless at the early stage of the fever. Dr. Squire and others have reported well of the employment of *quinine*, in 5 or 10 grain doses, during the height of the febrile attack in scarlatina.

For the sore throat, which is *specific* in character, besides the use of leeches externally, if the inflammation be great and the case sthenic, local alteratives may be used. An old and popular gargle is one of red pepper, vinegar, and water. More powerful in changing the character of the inflammation, I think, is a strong solution of nitrate of silver (gr. xxx in f℥j) applied with a large hair pencil. When pseudo-membranous patches appear, with a tendency to fetor or ulceration,[2] muriatic acid, with honey, equal parts, may be applied in a similiar way; or, diluted, used as a gargle. Sulphate of zinc (gr. xv to xx in f℥j) is also a good application; and so are solutions of creasote in glycerin; of chlorinated soda; and of permanganate of potassium.

For the irritation of the skin connected with the rash, according to my experience the best relief is to be obtained by sponging with cool or tepid water, two or three times a day. Inunction

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[1] Transactions of Penna. Med. Society, 1872.

[2] Sir W. Jenner considers the danger to be increased by septic infection from absorption of fetid material from the ulcerated throat.

with lard, or glycerin, is preferred by some. Cold *affusion* is unnecessarily violent and troublesome.

The diet in scarlet fever should be, as a rule, liquid, but need not be *low*, generally, in the sense of dilution or exclusion of animal material, unless in the first few days. Sooner than in most diseases, the tendency to debility is manifest. Then, milk, chicken-broth, mutton-tea or beef-tea, etc., will be suitable. At the same stage, some patients will require a tonic treatment, by quinine, or, as some prefer, nitric acid in small doses.

*Malignant* scarlatina is a disease of terrible depression from the outset. Deficiency of reaction is one of its characteristics. To promote this, external stimulation is primarily important. The hot salt or mustard bath is a powerful agent for the purpose. *Urtication*, *i. e.*, the direct application of fresh nettles, has been sometimes employed. Mustard plasters may be applied energetically; and so may hot bottles, or bags of hot salt, etc. Internally, ammonia, quinine, and capsicum are the most prompt and reliable stimulants, although we may add to the same list, Hoffmann's anodyne, and brandy, whisky, or wine. Where a tendency to *stupor* exists *free purging* will be the main hope. Jalap is a convenient article for the purpose [F. 151].

The sulphite of sodium is still under trial in various zymotic diseases, as an antagonistic of morbid blood-changes. The dose for an adult may be about ten grains every two or three hours [F. 152]. Chlorine water, in fluidrachm doses for an adult (ten drops for a child of two years), is sometimes given in scarlet fever with a similar view; and so is chlorate of potassium.[1]

Other modes of treatment for severe cases are, the use of tincture of chloride of iron freely; of infusion of digitalis (L. P. Gebhard); of diluted acetic acid (℥j to ℥iv of the officinal acid in f℥iv of water, the dose of the solution being a tablespoonful, sweetened, every few hours); of bromide of sodium; and of diluted nitric acid. Carbolic acid, in one- or two-grain doses, diluted, has been used by Drs. Kempster, Bissell, Fuller, Shoemaker, and Cleaver, with asserted beneficial effects.[2] Its dose[3] should be always small (1 grain), and given *well* diluted with water. Dr. E. Martin (*Lancet*, Jan. 8, 1876) has suggested the use of *medicated ice*, when children resist local applications to the throat; as very often happens. A large test-tube may be nearly filled with the required solution, and then immersed in a mixture of pounded ice and salt. When it is frozen, a momentary dip of the tube in hot water will enable the cylinder to be turned out; it can then be given to the child as ice.

Of the *sequelæ* of scarlet fever, each has its own indications for treatment. That of dropsy is the most frequently important.

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[1] See Squire, on Temperature Variations in Children, 1871.

[2] Cleaver, in Iowa Med. Journal, 1869. Dr. Kempster, of Utica, and Dr. A. M. Carpenter (Physician and Pharmaceutist, November, 1868), use carbolic acid, with glycerin and water, as a local remedy for the sore throat of scarlatina.

[3] Readwin (Pharmaceutical Journal, Oct., 1869), gives the following quantities as safe: for internal use, 1 grain of pure carbolic acid (crystals) in a fluidounce of water. As a gargle, 1 or 2 grains in an ounce of water. For injection, 1 grain to 4 ounces; lotion, 15 grains to an ounce of water; liniment, 1 part to 20 of olive oil; ointment, 16 grains to an ounce of lard. Some facts of experience, accidental and therapeutic, render it not improbable that carbolic acid may be safe in larger than one-grain doses.

If, during desquamation, the kidneys show any threatening of suppression or inaction, the greatest care of the state of the skin must be maintained. It is, indeed, a good rule of precaution, for fear of some carelessness and exposure, not to allow a patient recovering from scarlet fever to leave his chamber for three or four weeks at least, from the beginning of the attack, nor the house for four or five weeks. Lemonade as a drink, if the urine be scanty, may be freely used. Cream of tartar and acetate of potassium are approved in the same case as diuretics. Digitalis has the confidence of many. *Quinine*, in doses large enough to cinchonize, is reported very favorably of, in scarlatinal dropsy, by some practitioners. *Pilocarpin* may act powerfully, through the skin, but requires much care, for fear of depression. Dry cupping to the lumbar region, and the application there of a large mustard plaster, are measures suggested by the known congested state of the kidneys. Dr. C. West even bleeds from the arm upon the same indication; a practice which I should hesitate to follow, *after* so exhausting a disease as scarlet fever. Purgatives must not be omitted when diuretics fail; the principles governing their use being the same as in other varieties of dropsy.

**Prophylaxis.**—Belladonna has been asserted to have a protective power against the contagion or infection of scarlet fever. But the evidence in its favor does not appear to me to warrant our giving any confidence to it, or to any prophylactic.

## MEASLES.

**Synonym.**—*Morbilli.* Formerly, with all writers, and still with many, *rubeola* is a synonym for measles. Some writers, however, designate by the name of rubeola only a hybrid or blending of measles with scarlatina. (See *Rötheln.*)

**Symptoms and Course.**—After an incubation of from ten to fifteen days from exposure to its contagion, the attack begins with a slight or obscure stage of depression, passing into fever. With this there are all the symptoms of a cold; running at the nose, redness and watering of the eyes, and a cough. On the fourth day of the attack the rash begins on the face, and extends over the body and limbs. It is not so bright in color as the eruption of scarlet fever; and is irregularly distributed in patches more or less crescentic in shape. By about the seventh day the rash begins to fade, and about the same time or before, the fever has begun to decline. Desquamation is much less extensive than after scarlatina.

No such intensity of febrile movement, nor severity of any kind, as is common in the last-named disease, exists, except very rarely, in measles. *Camp* measles, during the late war in this country, sometimes assumed a typhous character, with a considerable mortality; due to the conditions under which it occurred among the soldiers.

Savages have sometimes suffered much from it; as in the Fiji Islands in 1875, when from one-fourth to one-fifth of the population died of it. Under ordinary circumstances, unless in very

young children, measles seldom threatens life. Even in so developed a country as Japan, however, as reported by Dr. D. B. Simmons, in 1861, 75,000 deaths occurred from it.

Occasionally, the bronchitis may become *capillary*, or may be extended into *broncho-pneumonia*. Much less often, *gastro-intestinal inflammation*, with vomiting, abdominal pain, and dysenteric diarrhœa, may complicate the attack. Of 314 cases observed by Meigs and Pepper, 7 were thus affected; but all of these recovered. Others have reported a few deaths resulting from this complication.

The possible **sequelæ** which are of the most consequence are, ophthalmia, diphtheria, chronic bronchitis, and phthisis. Very severe inflammation of the eyes sometimes follows measles; but blindness from this cause is rare. Diphtheritic sore throat is not infrequent, and may be fatal in children. Chronic bronchitis is common, especially when care is not taken during convalescence to avoid exposure. Phthisis, under the same circumstances, is to be apprehended only where the constitution suffers under a predisposition to tubercular disease.

**Causation.**—Measles is one of the most contagious of diseases, beyond all doubt. Singularly enough, however, I once attended with it one of a pair of twins at the same mother's breast, the other escaping it altogether. A second attack is exceptional, but not very rare.[1]

**Treatment.**—Beginning with a moderately active saline cathartic, diaphoretics, expectorants, and demulcents are next in place. On account of the possibility of diarrhœa, it is well to be careful with the use of strong purgative medicines in measles. Yet, on the other hand, the necessity of sufficient *elimination of excretions* must be borne in mind. It is decidedly better, during the first few days, for the bowels to be freely moved than confined; and, in checking excessive discharges, it should be remembered that accumulation of effete material in the blood renders the action of opiates more narcotic, and, in large doses, even dangerous. Syrup of ipecacuanha with neutral mixture (¼ drachm of the former, for an adult, with each tablespoonful of the latter) every two, three, or four hours, would be an average treatment for the first week; flaxseed lemonade being freely used as a drink. After that, the continuance or relief of the bronchial symptoms must determine whether some other expectorant (as squills or wild cherry) shall follow. Debility may require tonics during convalescence.

### RÖTHELN:—HYBRID BETWEEN SCARLATINA AND MEASLES.

**Synonym.**—*German Measles.*

This, called *Rubeola* by some, is not common, but is less rare now than formerly. I have seen a case in which the symptoms of the

[1] Not long since, Dr. Salisbury, of Ohio, produced measles-like symptoms in several persons by exposing them to the influence of fungi growing upon damp straw. The identity of the affection with measles was not, however, shown. Drs. Hammond and Woodward, at Washington, repeated the same experiments without result. Some British writers aver that *rubeola notha* is a distinct disease, and may be ascribed to straw-fungus.

two disorders were so nicely balanced that two physicians of similar experience pronounced it, the one scarlet fever, and the other measles. Dr. Magruder, of Olney, Maryland, has reported a case in which the two kinds of eruption coexisted on different parts of the body of the same patient.[1] Dr. Murchison and others assert "German measles" to be an entirely distinct disease, an attack of which affords no immunity from either measles or scarlet fever.[2] If this be so, such a disease has been in former years little known in this country. Dr. J. Lewis Smith, in the *Sanitarian* for July, 1874, gave a brief account of its prevalence as an epidemic in New York at that date.

In 1875, thirteen cases of it occurred at Haverford College, near Philadelphia. In these cases, the early general symptoms were mild; malaise, headache, slight sore throat, loss of appetite, and debility. In two or three days, with some increase of fever, a rash appeared, having more the color of scarlet fever than that of measles, but dotted or miliary (sub-papular) in form. In some cases it became almost continuous, with a moderate amount of tumefaction of the limbs and general surface. In one instance the fauces exhibited a scarlet hue to the eye, although no feeling of soreness of the throat existed in that case. Catarrhal symptoms were not noticed in any of these patients. In some of them, the glands of the neck were swollen. None had a very high fever. The duration of the attack in each case was about a week; and convalescence was rapid. No sequelæ were observed in any instance.

During the summer of 1878 I saw three cases of rötheln with Dr. Macomber in Germantown, Pa. They closely resembled those above described. An interesting feature concerning them was, that they occurred in a period of transition between a considerable epidemic of scarlet fever and the most extensive prevalence of measles ever known in the locality. In 1880–81, many cases of rötheln or rubeola (often *inaccurately* called *roseola*) were recognized by practitioners in Philadelphia.[3] Dr. I. Minis Hays[4] observed the occurrence of this affection (in an institution) in fifteen persons who, within a year, had been the subjects of ordinary measles. Dr. Forrest,[5] of Charleston, S. C., mentions the occurrence of a widespread epidemic of German measles in that city during the first four months of the year 1880. In the winter of 1880–81, there was a considerable prevalence of it in the city of New York; and a number of cases in Chicago. Dr. D. B. Simmons, of Yokohama, asserts that rötheln or "rubeola Germanica" is quite common, as a mild epidemic, in Japan.

In severity, the hybrid attack is generally more like measles; although dropsy and albuminuria may follow it, as well as bronchitis, etc. Its treatment requires no special consideration, being involved in what has been said of the two diseases of which it really seems to be a combination.

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[1] Med. and Surg. Reporter, July 16, 1881, p. 81.
[2] See a Lecture by Dr. Liveing, March 14, 1874.
[3] See a paper by Dr. L. A. Duhring, March 26, 1881.
[4] Ibid.
[5] Amer. Journal of Med. Sciences, April, 1881.

### MUMPS.

**Synonyms.**—*Parotitis contagiosa; Cynanche parotidea.*

**Symptoms and Course.**—This is generally a mild affection, of a few days' duration. The parotid gland swells and becomes hot, painful, and tender to the touch. Some inconvenience in swallowing may result. There is little or no fever, but some general malaise; and the attack is generally at an end within a week. Once in awhile an attack may be quite severe; with high fever, delirium, etc. One or both parotids may be affected. There seems to be reason to believe that attacks may occur at considerable intervals, even of years, involving first one gland and afterwards the other. Suppuration is rare; I have seen it but in one case. The disease is undoubtedly contagious.

Bouchut, in 1873, in a communication to the French Academy, brought forward the remarkable assertion that parotitis is simply a salivary retention, due to catarrhal inflammation of the parotid duct.

**Diagnosis.**—As the parotid gland, as well as other glands about the neck, may inflame from cold, septicæmia, or scrofula, it becomes sometimes a question whether a swelling in that region be mumps or not. When the parotid alone is affected, it is impossible to decide, unless direct exposure to another case of mumps be known. The parotid is, however, not apt to inflame under other causation, even from salivation by mercury; the submaxillary glands are much more liable to swell from that cause. The suddenness of the attack, and its brief duration, are generally quite diagnostic of mumps, as compared with scrofulous or other inflammations of glands about the neck.

**Complications.**—*Metastasis* of mumps, to the mamma or testicle, or even to the brain, occasionally occurs. Instances of the last-named complication have come to my knowledge. In either of the first two, a somewhat similar inflammation of the gland attacked takes place; usually more protracted than that of the parotid. If the brain be the seat of the transfer of the morbid element or action, meningitis, or coma, may follow; and even death is said thus to have resulted. Otherwise, mumps is free from danger to life.

**Treatment.**—Care to avoid being chilled, lest metastasis or greater severity of the attack be produced, is important. No general treatment is necessary, nor does the patient usually need to remain in bed. Perhaps a mild laxative may be given on the first or second day. A poultice of flaxseed meal is a good local application for the gland. It may also be bathed night and morning with soap or volatile liniment.

### HOOPING-COUGH.

**Synonym.**—*Pertussis.*

**Symptoms and Course.**—After an incubation of about six days, the attack commences with symptoms much like those of acute bronchitis, including fever of variable degree; soon showing its peculiar character. This is, a spasmodic and paroxysmal cough. For hours the patient may be apparently well, and then, often

with a premonitory sensation which leads the child to run to its mother or nurse, or, if at night, to sit up in bed, a fit of coughing begins, and lasts for several seconds or minutes. It consists of a rapid succession of short but violent expiratory efforts, with scarcely any intervals of inspiration ; at the close of which, air is taken in by force through the contracted glottis, making a whooping sound, whence the name of the disease. All who have it do not whoop ; but the paroxysmal character of the cough is pathognomonic.

Expectoration is copious, of thick mucus, sometimes even of lymph and pus. Vomiting occurs often during the spells of coughing. The child may become very much exhausted, even to a fatal end ; but unless from complication or previously feeble constitution, death does not very often occur. I never knew asphyxia to be fatal during the paroxysm, though it is sometimes threatening. One case has come to my knowledge in which death took place with *apoplectic* symptoms. Intense congestion of the eyes, from the violent coughing, is common. There may be many variations of severity in all the symptoms in the course of an attack. Dr. Gibb has found the urine saccharine in this disease. Ulceration under the tongue is common, but not universal.

The *duration* of hooping-cough is seldom less than six weeks, although cases have ended within three weeks. Often it lingers for three or four months ; in one case I knew it to last a year.

**Complications.**—Pneumonia, collapse of the lungs, and (as a sequela) phthisis, are the most likely to occur. Deafness from rupture of the membrana tympani during the violent coughing, has been known. Sometimes the eyes become bloodshot from the same cause. Convulsions occasionally increase greatly the seriousness of the disorder. I have known it (as above mentioned) to terminate with fatal apoplexy.

**Causation and Pathology.**—There is no question of the contagiousness of hooping-cough. Generally it occurs but once in the same person ; but second attacks are not very rare. Like scarlet fever, measles, etc., it is much most often met with in children ; but this is merely from their susceptibility under exposure ; as adults also may 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

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[1] Quarterly Journal of Microscopical Science, April, 1871.

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 assafœtida 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.[1] 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 of the same, oxalate of cerium, and benzoic acid, are among the 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. Dr. De Cailhol, of St. Louis, has reported (1879) a rapid cure under the internal use of *jaborandi*. Dr. Bowles, of Virginia (*Va. Med. Monthly*, March, 1881), asserts the benefit, in a severe case, of inhalation of (a few drops at a time) *nitrite of amyl*.

Binz,[2] 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.[3] Inhalation of the steam of boiling water containing ammonia (f℥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 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 hooping-cough.[4]

## 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 less than sixty years ago, it appears to have been described by Aretæus of Cappadocia as a disease of Egypt, and was mentioned

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[1] Phila. Med. Times, April 25, 1874.
[2] Am. Journal of Obstetrics, May, 1870. See also the same Journal, Feb., 1873.
[3] New York Med. Journal, Aug., 1873.
[4] Phila. Med. and Surg. Reporter, May and June, 1867.

also by Macrobius and Cœlius 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.

Later 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 rather declined in frequency, although still existing, and sometimes attended by great local fatality. New York and Brooklyn have suffered severely with it. In one week in January, 1881, there were 168 cases in New York. During 13 weeks of the last quarter of the year 1880, Brooklyn had 1185 cases of diphtheria, with 483 deaths.[1] It was terribly destructive in some parts of Russia in 1879–80; carrying off, in two or three towns, more than half of the children. Bretonneau, not unreasonably, supposes Washington and the Empress Josephine to have died of diphtheria. Stephanie, the beautiful queen of Portugal, and the Princess Alice, of Hesse (1879), 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 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

[1] Sanitary Engineer, Dec. 15, 1880.

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 paralysis elsewhere in various degrees. In this, 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. Minutely examined, the false membrane is found to vary from $\frac{1}{20}$th to $\frac{1}{8}$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

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

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, yellower, 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 pseudomembranous 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 the name is appropriate and should be reserved. It is a toxæmic or "dyscrasial" affection, in which the morbid change in the blood has its main and characteristic local manifestations in the throat.[2]

Ortel, Letzerich, and others have asserted the constant occurrence of a microscopic organic formation (*bacterium* or *micrococcus*) in the throat in diphtheria. Other competent observers have failed to find any such organisms in well-marked cases, and have found them also in cases not diphtheritic; hence concluding that although the *coincidence* of their presence with that of the disease is frequent, not being universal, it cannot be causative or *pathogenetic*. Drs. H. C. Wood and Formad, in their investigations (1880), found satisfactory evidence against the bacterial origin of diphtheria.

Among those who continue to assert it, Talamon[3] reports success in cultivating spores from diphtheritic membrane, and, with them, producing false membranes by inoculating rabbits and other animals. But the vexed question remains, whether *only* these spores were transferred from the seat of disease; or whether their presence was *coincident* merely, or really causative of the affection.

**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 tenement house, 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 am sure that it sometimes is so, although clearly not dependent upon that mode of propagation in its epidemic migrations. The certain examples

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[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 pseudomembrane.

[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.

[3] See Lancet, April 9, 1881.

of its extending from one person to another are few; but I have known of several such. Valleix, the celebrated French physician, is said to have lost his life in this way. In 1880, Dr. Sanford B. Hunt, of Green Point, N. Y., died in consequence of blowing through a tracheotomy-tube, while operating upon a patient. The instance of the Princess Alice of Hesse, infected by kissing her sick child, has become historical. Such cases suggest precautions, which ought always to be enforced.

Children are much more liable to diphtheria than adults. Climate and season do not seem to affect its prevalence. It often shows very decided preference for unhealthy places, where filth or crowd-poison abounds.

Conveyance of diphtheria by *milk* has appeared to be proved in one or two instances at least. (See *Lancet*, Jan. 11, 1879.) W. H. Powers traced this in an epidemic in North London. It has been suggested that possibly a disease of the cow, called "garget," may have to do with its origination; but this whole subject requires further investigation.

**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 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 sequela 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 perhaps 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]. Such a treatment will not, of course, need to be continued for many days.

Tincture of chloride of iron is relied upon by many; from ten to twenty drops every three hours for an adult; with or without the chlorate of potassium [F. 157]. Prof. Clar[1] uses sesquichloride of iron in glycerin; giving half-teaspoonful doses of a mixture consisting 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 cubebs.[2] Guttmann's[3] treatment, with *pilocarpin*, has attracted considerable attention. Dr. Wendt, of New York, has followed it, with reported success, giving to an adult half a tablespoonful every hour of a mixture containing half a grain of muriate of pilocarpin in four ounces. After each dose the patient also took half an ounce of sherry wine to prevent depression. Copious expectoration resulted, and usually free perspiration. Guttmann's own prescription was from half a grain to a grain in an eight-ounce mixture, which also contained half a drachm of pepsin and a few drops of hydrochloric acid. He insists on the administration of wine after each dose of the pilocarpin, reducing the amount of wine, of course, as well as of the medicine, for children.

It has been reasonably suggested that, for local as well as general effect, medicines should be given, in diphtheria, in small doses frequently repeated, rather than large doses at long intervals.

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[1] Practitioner, July 1, 1871.
[2] Brit. and Foreign Medico-Chirurg. Review, October, 1868, p. 417.
[3] Berlin. Klin. Wochenschr., Oct. 4, 1880.

More heroic modes of treatment have been (1881) proposed and put on trial in diphtheria; *e.g.*, by large doses of oil of turpentine, of bichloride, and of cyanide of mercury. *A priori*, there is much against such practice; but here, as elsewhere, the only required test in medicine is experience.

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 possibly 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,[1] 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 Smith[2] uses the following: Acidi carbolici, gtt. v; Liq. ferri subsulphat., f℥ij; glycerinæ, ℥j; M. This is applied by means of a brush. Dr. Clark, of Oswego, eulogizes the use of the liq. ferri persulph. *alone*. Dr. J. L. Smith favors also the use of *lime-water* with the *atomizer*, *e.g.*, acid. carbol., gtt. xxxij; glycerin., f℥ij; aq. calcis, f℥vj; M. Dr. H. Reynolds[3] has used with success equal parts of carbolic acid and glycerin, locally applied. J. A. E. Stuart, of Edinburgh,[4] reports the curative effect of powdered *sulphur* blown through a quill upon the patches of exudation. Ciattaglia, of Rome, asserts excellent results from the application of a solution of *chloral* in five times its bulk of glycerin. *Iodoform* (local application of the powder) ought to be tried in bad cases of diphtheria, on account of its admirable influence upon indolent ulcerations and inflammations. It might be blown, in small amount (its dose internally is about one grain), into the fauces through a quill or other tube. *Benzoate of sodium* (used internally as well as locally) is reported by Letzerich to have cured twenty-six out of twenty-seven cases of diphtheria.[5] Drs. Jacobi and Billington, of New York, insist on the importance of frequently syringing out the throat, and the nostrils in nasal diphtheria, to wash away the offensive exudation and secretions. Simple tepid salt water will, according to Dr. Billington,[6] answer for this, thrown in by means of a hard-rubber ear-syringe. Dr. W. W. Cleave,[7] of Louisville, recommends, after

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[1] New York Med. Record, Aug. 15, 1871.
[2] Ibid., April 1, 1874.
[3] Medical News, December, 1872.
[4] Practitioner, April, 1879.
[5] Berlin. Klin. Wochens., 1879, No. 7.
[6] New York Med. Record, March 27, 1880, p. 335.
[7] Louisville Medical News, January, 1881.

trial, the local application, with a mop, of *oil of turpentine*, which is said to penetrate the exudation and cause its separation. Dr. I. R. Page,[1] of Baltimore, states that he has found *fresh lemon-juice*, applied upon a camel's-hair probang, the most effective agent to promote the removal of the membrane from the throat in diphtheria. *Chloroform*, similarly applied, is recommended by Dr. Lathrop,[2] of New Hampshire. In a young child ice is sometimes 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 continued 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.

I am convinced that the effort (which I have seen practised) to remove the patches of exudation by force, as by excision or actual cauterization, is to be deprecated, as likely to do harm rather than good.

In treatment of the *paralysis* which sometimes follows diphtheria, strychnia is especially appropriate, but here, as elsewhere, it must be given with caution.

## 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 œdematous. Throughout, fever of a low form continues, with great thirst, delirium or coma, a fetid odor from the skin, and diarrhœa. 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, and benzoate of sodium, with a supporting diet of milk, beef-tea,

[1] New York Med. Record, May 7, 1881, p. 530.
[2] Phila. Med. Times, May 22, 1881, p. 533.

etc. 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 day or two, by giving *quinine*, in four- or five-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 Egypt and the East and West Indies, this disorder has occurred. Some English writers regard it as a variety of scarlet fever; naming it *Scarlatina rheumatica.*

In Charleston (1850) there were 10,000 cases of it; in the summer of 1880, between 2000 and 3000; without any deaths.

**Symptoms and Course.**—Usually after a chill, fever comes on, moderate in degree, but attended by flushed face, bitter taste in the mouth, considerable debility, soreness of the muscles, and severe pains in the head, back, and joints; the latter being somewhat swollen. In about two days, or less (sometimes, however, five or six days), 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 hue, and more in patches; occasionally with sudamina also. The fever often returns 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 sequelæ except debility. Possibly akin to it may be **acrodynia,** described by M. Lannois[1] as occurring epidemically in France in 1828, 1829, and 1830. Its chief symptoms are vomiting, diarrhœa, œdema of the limbs, redness or splotches of the hands and feet, pain and burning sensations or numbness in the palms and soles; sometimes cramps and loss of power.

As *sequelæ* of dengue, Dr. Forrest,[2] of Charleston, mentions excessive and obstinate prostration, sleeplessness, night-sweats, anæmia, hysteria, neuralgia, diarrhœa, boils and carbuncles, conjunctivitis, bronchial catarrh, deafness, aphonia, œdema, icterus, cystitis, rheumatism, and temporary paralysis of the lower limbs.

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 mutual 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

[1] Paralysie Vaso-Motrice des Extrémités, etc., Paris, 1880.
[2] Amer. Journal of Med. Sciences, April, 1881, p. 333.

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.[1]

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 quininization or 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 uncommon. 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. Of this, something will be said upon another page.

**Pathological Nature.**—As to this, it is possible only to speculate at present. It is most probable that ague is a *toxæmic neurosis*. The importance of the blood-change attending it is shown by the (melanæmic) disintegration of the blood-corpuscles

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[1] *Malarial puerperal fever* was described in the Virginia Med. and Surg. Journal, in 1855, by Dr. O. F. Manson.

(Frerichs, Meigs) and deposit of pigment in various organs. Bence Jones, Rhoads and Pepper[1] found the natural *fluorescence* of the blood to be diminished during malarial attacks, and to be restored under the influence of quinine upon the system.

**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 old and 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.[2]
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 breaking or 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 Philadelphia), 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. Klebs and Tommasi-Crudelli assert[3] the discovery, in the soil, water, and air of the malarious Agro Romano, of a peculiar microscopic fungus, capable of producing intermittent fever in animals by inoculation ; to which they give the name *Bacillus malariæ*. 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.[4]

**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, even

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[1] Penna. Hospital Reports, 1868, p. 269.

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

[3] Zeitschrift für Med. etc., July, 1879.

[4] See Am. Journal of Med. Sciences, Oct., 1868, p. 333, for an attempted refutation of Dr. Salisbury's theory, by Prof. H. C. Wood.

at the height of the pyrexia. Nor, as a rule, is any special preparation necessary.

It is well, always, during the chill, to promote speedy reaction by external warmth, and perhaps by hot drinks, of a not too stimulating character. The bowels ought to be opened well; and the fever may be palliated by the free drinking of cold water, made more diaphoretic by the addition, if necessary, of neutral mixture (citrate of potassium) or effervescing draught. Then, as soon as sweating fairly begins, the quinia, cinchonia, quinidia, dextro-quinia, 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 advise 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, dextro-quinine, and other extractives of bark I have not tried. Considerable favorable experience with them is recorded. Dr. Joseph 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. Dr. S. Ashurst,[2] of Philadelphia, reports excellent results with the *alkaloid cinchonia*, given in powder (1 grain of cinchonia, 4 grains of sugar of milk, $\frac{1}{10}$ of a grain of bicarbonate of sodium). Having no water of crystallization, its dose is about the same as that of sulphate of quinia, and its cost is much less.

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

[1] Edinburgh Med. Journal, September, 1873.
[2] Am. Journal of Med. Sciences, April, 1878, p. 579.

analogous 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 ¼-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.[1] Hydrobromate of quinia, subcutaneously injected, was found by Gubler and Raymond (Hôpital Beaujon, Paris) very efficient (1½ grains injected in solution four times daily). Chloroform, taken by the mouth, has been used with success by Dr. Merrill. He gives f℥j at once, at the beginning of the chill. It may be diluted with mucilage.[2] 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,[3] found sulphite of magnesium curative, in 30- to 60-grain doses, taken thrice daily. Dr. Chubb,[4] of Cambridge, Mass., arrested the paroxysm 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. Saunders, of India, found inhalation of 2 drops of nitrate of amyl to abort the chill. 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 *anæmia* 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, Vallet's mass; three grains, with a grain of quinine, in each pill [F. 162].

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[1] British Med. Journal, June, 1870.

[2] 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.*, February, 1867, p. 167.

[3] Annali di Medicina, November, 1870.

[4] Am. Journal of Med. Sciences, April, 1868.

## 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, perhaps cerebral oppression and gastric disorder, may occur.

After this, the febrile condition is developed. The skin becomes 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 morbific 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. Diarrhœa 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 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 *sequelæ*. The average duration of a case of remittent fever may be stated as about fourteen days.

Dr. Maury, of Memphis, Tennessee, asserts,[1] on the basis of large observation, that the typical "bilious remittent" of the Mississippi Valley tends to spontaneous defervescence on the fifth day, and may very often be terminated by treatment by the third day. He also describes cases of "malarial continued fever" (not typhoid), with a self-limited course of twenty-one days. I have not met with such cases (apart from *typho-malarial* fever) in or near Philadelphia. Nor are they commonly referred to by authors conversant with diseases of malarial regions.

**Complications.**—These are usually dependent on *local inflammation*. The *brain* is perhaps the organ most frequently affected, with cerebritis or meningitis. In late autumn, or other cool weather, *pneumonia* is not uncommon. *Gastritis* and *enteritis*—diarrhœa and dysentery of an obstinate character sometimes occur. When any of these affections exist, they partake to some extent of the periodical character of the fever; and are often lessened or removed by the treatment adapted to it. In other cases, however, they remain in a subacute or chronic form; and, when death occurs, in a majority of instances the immediate cause is a phlegmasia of some organ. *Hepatitis* and *splenitis* are more common in the chronic form than in the acute—and as sequelæ rather than complications of the attack.

**The Typhoid State.**—At any time after the fourth or fifth day, but particularly near the end of the second week, a patient suffering with remittent fever may pass into the condition designated by the above term. Its features vary somewhat; but it is usually marked as follows: Pulse 120 to 140, and rather deficient in strength; skin harsh, varying, however, with the slight remissions in dryness and temperature; face dark or flushed; head hot; delirium, active more frequently than comatose; bowels occasionally affected with diarrhœa, but as often costive; tongue heavily coated with sordes, brown or black, and with cracks or fissures across it. Muscular debility is usually great. Hemorrhages from the bowels, lungs, or stomach occasionally increase the danger.

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[1] Amer. Journal of Med. Sciences, April, 1881.

The chief **causes** of this condition are, 1. Neglect of treatment in the early stage. 2. The premature and improper use of stimulants. 3. The existence of cerebral inflammation. 4. In the opinion of some, a particular epidemic tendency to the typhous condition, in all diseases, at certain times. 5. In the view of others, the concurrent existence of a true continued fever, making a sort of hybrid. This last is possible, at least.

**Modes of Termination.**—These are, either, 1. Recovery in a week or two directly from the febrile state; 2. Conversion into a distinctly *intermitting* fever; 3. Cessation of the fever, with remaining organic inflammation or other disease; or, 4. Death during the progress of the attack.

The first of these occurs sometimes even when the onset has been violent, and the circulation much disturbed. How frequent its spontaneous occurrence *might* be, is difficult to determine under ordinary practice in miasmatic regions; where the first intermission is made use of to introduce antiperiodic remedies. But it appears that remittent fever may much oftener recover under palliative treatment alone, than intermittent.

The rule, however, with many historians of the disease is, to consider that favorable cases terminate in curable intermittent. This change is generally accompanied by a discharge from some excretory organ or surface, with propriety termed critical. Copious perspiration; free urination, with a *lateritious* or other thick deposit; the discharge of abundant, dark, offensive stools; one or all of these may precede or accompany the commencing improvement of symptoms.

A local inflammation, as pneumonia, enteritis, cerebritis, or hepatitis, may survive the attack which kindled it, and proceed as if it had been an original malady.

Where death occurs within the first three weeks, it is almost always the result of some inflammatory complication. Remittent fever rarely proceeds to a fatal termination, *in the vicinity of Philadelphia*, by mere exhaustion of the powers of nature. In feeble or aged persons, however, this may occur, even here; and more often, in *intensely malarial* regions.

**Sequelæ.**—A slow and imperfect convalescence not unfrequently follows a violent attack; attended with sallowness of the skin, feeble digestion, muscular and nervous debility. The only organic alterations at all constant are enlargements of the liver and spleen.

**Morbid Anatomy.**—The most striking observation upon this was that made at the Pennsylvania Hospital by Dr. T. Stewardson, in 1841, of the unusual color of the liver; bronzed without and olive-green within. Subsequent confirmation of this has been afforded; although Dr. Drake, of Cincinnati, failed to find it in his autopsies. The spleen is almost always enlarged, congested, and softened. Inflammation of different organs (making fatal complications), especially of the brain, lungs, or bowels, may exhibit its usual results. Such lesions, however, are sometimes absent in the most malignant cases.

**Causation.**—This has been considered already, under the head of intermittent fever.

**Diagnosis.**—Yellow fever has by some physicians been regarded as identical with remittent, differing mainly in the grade of its violence. The correct view is, that they are specifically distinct diseases. To prove this, we might be satisfied with the simple facts of the different localization of the two fevers. Remittent is always a country fever; yellow fever almost invariably a disease of towns and the vicinity of the sea. The latter is restricted much more narrowly, also, in its actual geographical limits.

But there are symptomatic differences also; which may be best pointed out after giving a description of yellow fever. Among the important facts is, that one attack of the latter disease commonly gives immunity from it for life; but this is not at all the case with remittent fever.

When the typhoid state supervenes, there may exist very considerable similarity to the true typhoid fever. It is asserted that a coexistence of the two diseases occurs. Some have held the opinion that they are not specifically different; but that *typhoid fever* is *merely* a protracted remittent of low form. This is, however, contradicted clearly by at least two facts: 1, the comparative rarity of typhoid fever in regions where remittent most abounds; and 2, the frequent prevalence of the typhoid where remittent fever is almost unknown; as in some of the North-eastern States.

The mode of onset in the two, moreover, is usually quite different; in typhoid, insidious and almost imperceptible at first; in bilious fever, after a day or two of malaise, a chill abruptly ushers in the attack. Vomiting is extremely common in the one, quite rare (in adults) in the other; the converse is true of diarrhœa—and still more particularly of tympanites and abdominal tenderness. The *deafness* and *sleeping* stupor, and *livid* countenance of typhoid fever, are almost entirely peculiar. Epistaxis, bronchitis, and the rose-colored eruption, so nearly constant in the latter, are rare in the typhoid remittent; the last mentioned is perhaps never observed. The yellowness of the skin, also, and the *distinct* remissions, mark well the remittent attack. In dissection, we find more *gastric* and *hepatic* change after bilious fever, and more *enteric* and *splenic* alteration in the typhoid.

**Prognosis.**—Recovery may be anticipated in a majority of instances. The writer is of the opinion that the typhoid prolongation of the attack ought scarcely ever to occur, under proper treatment from the beginning. Before the use of cinchona, remittent was quite often fatal. Alexander the Great, Emperor Charles V., James I., and Cromwell are said to have died of it.

Favorable signs are, the earlier occurrence and prolongation of the remission, and its becoming more and more complete; moistening and cleaning of the tongue; copious perspiration; turbidness of the urine, from increase in the amount of its solids; tar-like and offensive stools; and the appearance of vesicles about the lips.

Unfavorable, of course, are the shortening and postponement of the remission, and its indistinctness; dryness and blackness of the tongue; retention, or still worse, suppression of urine; extreme frequency, with weakness, of the pulse; hiccough; and

other important evidences of the victory of disease over the vital functions—not, however, peculiar to the fatal termination of this disorder. The supervention of the usual symptoms of *inflammation of the brain* is always very alarming; *gastritis* may occasionally threaten to wear out the patient's strength; and *pneumonia* is attended with more danger when occurring as a complication of fever than when an original disease.

**Treatment.**—In sections where it is very prevalent, this disease has been subjected to a variety of experimental practice—pushed—in some States, with a boldness and energy characteristic of border populations. At one time, the early use of large doses of tartar emetic to produce vomiting; at another, of calomel, administered by the half-ounce or ounce; and, more recently, of quinine with corresponding extravagance—have been the methods used, until fairly proved to be needless or improper in violence.

The other extreme, however, of trusting all to nature, would meet with more signal disappointment in this than in most other affections. A decided treatment is imperatively required; what then are its best and most promising weapons? It would be interesting and instructive to collate and compare many authorities upon this point; but we will discuss the subject in reference, chiefly, to the experience of our own physicians. It will be proper to state the valuable testimony of Dr. Drake, to the mode of practice which the separate judgment and observation of medical men throughout the great Western Valley now converge upon. "Its fundamental principles," he states, "are—that autumnal fever is the product of a specific cause, and, therefore, consists in a morbid action of a peculiar kind, requiring a specific remedy; that we possess such an antidote for the intermittent variety of the fever; and that we have only to abate all the causes and points of difference between the two varieties, to render the sulphate of quinine as efficacious in one as in the other."

No clearer or more correct expression need be demanded, I believe, for the safest and best plan of management of our own fall fevers. Yet many voices may demur at this assertion.

Some will quarrel with the *terms* of the above paragraph; objecting, and with some force, that we go beyond what is known in proclaiming the specific nature of the cause of these fevers—and still more in awarding the name of *antidote* to the sulphate of quinine or Peruvian bark. But this is a verbal question. We *do* know that malarial fevers are *quite peculiar*—in locality, in periodicity, and in other characters; and we do know that the salts of the alkaloids obtained from cinchona control and arrest them, as few, if any, other remedies can—and with a power which those salts do not exert over other fevers.

This power, however designated or explained, is now fully acknowledged; the danger is, in fact, of its causing us to lose sight of other important points.

In some tropical latitudes, especially, in which depletion is not comparatively well borne—and in districts *poisoned* with malignant miasm—it has been proved that quinine is often required in liberal doses—is borne in very large ones—and acts favorably without any of the preparation of the system, once thought

indispensable. These facts have been fully proved. But the remaining questions to be settled are—is not success greater in remitting fever, even in those regions, if some evacuant treatment at least *accompanies* the use of the great remedy?—and—is not a modified treatment, at least in this respect, necessary in less malignant cases, and different climate? The weight of evidence favors the affirmative of both of these questions.[1]

It remains, then, to state in a few words, what is the plan of treatment proper to be adopted. The physician is rarely called until the febrile condition has fairly set in. In a person of *robust* constitution, if the headache be very severe, skin hot, and pulse full as well as rapid, moderate venesection will be *safe* at least. But it is much more common now to administer *first* a saline cathartic, and decide on the grade and resistance of the fever by its effect. Epsom salts may be best when the stomach is little disturbed, effervescing solution of citrate of magnesium, or the Seidlitz powders in repeated doses, under contrary circumstances will answer. But many commence the treatment with a dose of calomel or blue pill with rhubarb, to be *followed* by a saline purge. If obstinate vomiting prevail, as will frequently happen, no purgative will suit so admirably as the effervescing solution of the citrate of magnesium.

The utility in many cases of *leeches* or *cups* to the nucha, and in some to the epigastrium, is clear. As a refrigerant diaphoretic, the citrate of potassium solution, with or without effervescence, may be given.

Special treatment may often be called for by the great intractability and distress of stomach. Lime-water or *magnesia* in small doses with ammonia and an aromatic will frequently relieve. Sinapisms and pediluvia are often useful adjuvants. *Ice* will answer better to quench thirst than water, where gastric irritability is great; otherwise free dilution by drink is an advantage.

*As soon as the violence of systemic excitement has been moderated*—without waiting for its entire subjugation—if the pulse has *begun to subside*—lowering for instance from 110 or 120 to 90 or 100, and the headache is less intense—*the bowels freely moved*—we may begin with quinine; but it is unnecessary *here* to give large doses generally. Unless where some malignancy is suspected, or the remission is very complete, *a single grain every two hours* will be sufficient at first. Under this we may find the pulse continue to subside, the skin to moisten, and all the symptoms to improve. At all events in the next remission the dose should be increased to *a grain every hour*—not, as a general rule, however, awaking the patient from sleep. Two grains every hour for eighteen hours is the freest administration I have ever seen to be necessary in a case even threatening malignancy. This term, it need hardly be said, is used to express the existence of a state of prostration attended with signs of visceral congestion, increasing dangerously with each paroxysm; reaction being deficient from an unusual intensity of the morbid cause, or from defect of constitution.

[1] Drs. Hammond and Roosa have proved by experiment, aided by ophthalmoscopic and microscopic examination, that the use of quinine produces or promotes cerebral congestion. See Phil. Med. Times, June 27, 1874, p. 619.

Such cases do require a large amount of the special remedy ; and such cases are no doubt much more frequent in warmer Southern States than here. We have no difficulty in believing in the toleration, or even the propriety, of *considerably* larger doses than are here given; but there is a limit even there, to go beyond which is excess. Many Southern practitioners of large experience insist that, as a rule, *no preparation* for quinine is necessary in remittent fever ; and some give larger doses of quinine in remittent than in intermittent,

After two or three days of constant "*quininization*," the amount usually may be diminished to six or eight grains, distributed through the day. In similar quantities it should be continued even through the period of convalescence.

The treatment of inflammatory or other *complications* must of course superadd modifications appropriate to each. We have named in the above sketch all the *main elements* of the plan which is found successful in such cases as ordinarily occur.

The existence of local inflammation in a genuine malarial case does not contraindicate the use of quinine. Being lit up by the fever-poison, and aggravated by its febrile state, the treatment which annuls or removes these will often lower or check the phlegmasia. But this maxim should be applied with caution and some exceptions, in cases particularly of *cerebral inflammation* or great pulmonic oppression.

In slow convalescence, with sallowness and deranged digestion, the daily administration for a few days of minute doses of blue mass may prove useful. And to improve sanguification, as well as lessen the danger of relapse in some form, the *protocarbonate of iron*, in pill with a portion of sulphate of quinine, will make a very valuable termination of the treatment. Arsenic also may sometimes be required in prolonged cases.

## PERNICIOUS FEVER.

**Synonyms.**—*Congestive Fever; Malignant Intermittent; Malignant Remittent.*

**Symptoms and Course.**—Unlike ordinary intermittent, a paroxysm of the pernicious form may commence either in the day or at night. At first, however, in many cases it begins like the common type of chills and fever, or remittent fever; after one, two, or three days becoming more alarming.

Then the skin grows lividly pale, shrunken, and sometimes clammy with cold sweat; the countenance anxious; the tongue either pale, furred, or natural; in the worst cases it is cold. Thirst is intense, with a sense of internal heat. The stomach is excessively irritable, and vomiting very common, of mucus or a muco-serous or even bloody fluid. The bowels are in most cases loose, the dejections resembling bloody water. The pulse is usually small, weak, and rapid or irregular; in a few instances corded. The respiration is interrupted and sighing, with a sense of oppression.

Restlessness is usual; but the mental faculties in many cases are clear. There are, however, many others in which the weight

of the attack falls on the brain. Then the early symptoms are drowsiness and hesitation of speech. Stupor marks the depth of the paroxysm. The breathing may be stertorous, or tetanic spasms may occur. The pulse in the former case may be slower than in the other form described; but it is still weak, and even if the head be somewhat warm, the vessels of the neck and temples are not apt to be swollen, and the skin of the body is cold.

Partial, or, it may be, complete reaction in most instances follows after three or four hours of the above symptoms, though death may instead take place in the collapse. Again the fever may intermit or remit, and at the same, or an earlier hour, the next day another paroxysm occurs. This is more dangerous than the first. If a *third* be allowed to take place, it is generally fatal.

**Morbid Anatomy.**—*Congestion* of the brain, liver, spleen, and alimentary mucous membranes is so prominent an autopsic phenomenon as, with the symptomatic appearances of the same, to have seemed to justify the older and more common name of the disease. We have good reason to believe, however, that the toxæmic impression of malaria, and its effects upon the nerve-centres (either of organic or of animal life), are primary, and the congestion secondary.

**Diagnosis.**—The *intensity* of the symptoms, and the general prostration or coma, will distinguish this from ordinary intermittent or remittent. The condition of a severe case is not unlike an attack of epidemic cholera; but the discharges are different, and the locality and season, unless in the presence of that epidemic, will point directly to malarial causation.

As pernicious fever is rare in the latitude of Philadelphia (much more common farther south, especially near the rice plantations of the Southern States), I have seen but few cases of it. One of them gave me difficulty in diagnosticating it from apoplectic coma, as it occurred in a lady over sixty years of age. The distinctness of the cold stage at the beginning of the attack, and my knowledge of the patient's history, with the possibility of exposure to malaria, led me to prescribe quinine with some freedom; and the result established the nature of the case, as entire recovery followed.

**Prognosis.**—Without appropriate treatment a large majority of cases would be fatal. There are few diseases displaying a greater tendency to death. Under cinchonism and other proper management not more than one in eight, probably, will die.

**Treatment.**—As above implied, quinine is our great reliance in this disease. Larger doses are required than in ordinary intermittent. While opinions differ, the best evidence I can obtain convinces me that from thirty to sixty grains of quinine in twenty-four hours will do all that the remedy can do; more will be wasteful and dangerous.

But in *most* cases other means must be employed, sometimes before quinine can be kept upon the stomach to promote reaction. External stimulation is foremost among these means. Direct heat may be applied by hot-water bottles or tins, hot

bricks, bags of hot salt or sand laid along the spine, or by the *hot bath*. Thirst should at the same time be quenched by cold water, or, if the sense of heat be great and vomiting occur, with ice. Mustard plasters may be placed upon the spine, epigastrium, or limbs; or the extremities may be rubbed with brandy and red pepper.

The opposite of this plan is preferred by some upon asserted favorable experience, viz., the pouring or dashing of cold water quickly upon the naked body. Extensive dry cupping along the spine is recommended by others. From what I have seen of the good effects of dry cupping along the spine in the collapse of cholera, I should have some confidence in it for this analogous condition.

Internal stimulation is demanded under the same circumstances. Most used have been camphor, opium, ether, oil of turpentine, ammonia, and capsicum [F. 163], besides wine and brandy or whisky. The best testimony is in favor of camphor and opium, with quinine [F. 164], in moderate doses, every half hour during the chill, when no comatose symptoms are present. If these exist, oil of turpentine, by the mouth or rectum, has its decided advocates.

Calomel has been largely used in the same cases. My experience in pernicious fever has not afforded me data for an opinion about it; but I respect the evidence of those who think they have seen it to be beneficial.

Alcoholic stimulants seem to be indicated in the collapse. A tablespoonful of brandy or whisky every half hour or hour until *reaction* occurs would be suitable in very feeble cases. Yet the abstraction of blood was formerly a not uncommon remedy in the same condition, and was certainly sometimes followed by recovery.

After reaction has been established, even imperfectly, and an intermission or remission exists, the "sheet anchor" is quinine. Then, if the stomach bears it, five to ten grains may be given every two or three hours, until cinchonism is fully established. When the quinine is rejected by the stomach, hypodermic injection may be resorted to. Ten grains or more may be introduced at once in solution in water, with just sulphuric acid enough to dissolve it perfectly.

In the *cerebral* cases calomel is particularly appropriate. A blister to the nucha may be recommended in the same cases. Purgatives also are apt to be required; and, if the heat of the head be great, iced water may be kept applied over it, while hot bottles or sinapisms are put in contact with the legs or feet.

When the critical period in pernicious fever has passed, it will need treatment like an ordinary case of intermittent or remittent, according to the type which it assumes. A modification of this affection, sometimes called "winter fever" in the South, has been already considered under the head of *typhoid pneumonia*.

## PROPHYLAXIS OF MALARIAL FEVER.

When avoidance of malarial localities is impossible, during the season of fevers (from July until frost in some parts of the United

States, from the first of August at least in this vicinity), exposure should be especially guarded against at night, and about the times of sunrise and sunset. Residents in such places should have a fire burning to dry the house whenever the weather is damp, whatever the season. Going into a marshy place with an empty stomach is very exposing. Long ago, it was believed by many that the growth of the sunflower (helianthus annuus) is preventive of malaria. Lately this opinion has been revived in the Netherlands. Dr. Salisbury, upon his theory of the *palmellar* (minute vegetative) origin of marsh-miasm, advises covering the swampy ground with lime. Sometimes it would be cheaper to drain it.

Quinine may be used as a prophylactic. Livingstone and Du Chaillu have tried it in Africa; the former too sparingly to succeed perfectly, the latter with better results. In the United States army during the civil war it was found useful. Six grains daily is the least amount to be relied upon.

### TYPHO-MALARIAL FEVER.

Although this, having had its principal origin in the circumstances of the late war, may be now almost entirely a matter of past history, it yet requires a place among recognized diseases. It was, during the war, the result of a threefold causation; the elements of which were *malarial influence*, *crowd-poison*, and *scorbutic taint*. According to the predominance of one or the other of these, its character in different cases was determined. During service in a United States General Hospital in the summer and fall of 1862, as well as in the Episcopal Hospital, I saw many cases of this, called, from its local origination, the Chickahominy fever.[1] Of the form in which the **malarial** element predominated, the somewhat abrupt commencement, gastric disturbance, and icteroid skin and tongue, with remissions, tolerably distinct, were predominant features. The lenticular spots of typhoid fever, and the sudamina and tympanites were often wanting together.

A slower onset, less distinct remissions, more cerebral disturbance and diarrhœa, with epistaxis and bronchitis sometimes, but with both less constantly than in civil life, marked the predominance of the **typhoid** pathogenetic element. Deafness, under my observation, was less frequent than in civil life, but was sometimes very well marked. The aspect of the countenance, and the character of the somnolence and delirium, were precisely the same as in ordinary typhoid fever.

The **scorbutic** complication was recognizable, in the third group of cases, by the peculiar mental and bodily prostration which preceded and followed the disease—the remarkable irritability of the heart, the state of the gums, tendency to hemorrhage, discolorations and petechiæ, pallid, large, and smooth tongue, and extremely protracted convalescence.

**Morbid Anatomy.**—Most important was the intestinal lesion,

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[1] A full account of all varieties of typho-malarial fever is given in Dr. J. J. Woodward's "Camp Diseases of the United States Army."

similar to that of typhoid or "enteric" fever, though not identical. The following account of this is from Dr. Woodward.[1]

"In the earlier stages there is little to distinguish the intestinal lesion from the corresponding process of ordinary enteric fever, except perhaps the great tendency to the deposit of black pigment in the enlarged follicles. In the latter stages, certain peculiarities are often distinctive enough to enable the anatomist to recognize typho-malarial fever by the post-mortem appearances alone. The tumefaction in typho-malarial fever rises very gradually from the surrounding mucous membrane, and attains a moderate degree of thickness (three to six lines) on the edges of the ulcer. In this it differs materially from the ordinary typhoid ulcer, in which the enlarged patch rises abruptly from the mucous membrane in such a way that the summit is often larger than the constricted base, giving rise to the comparison made by Rokitansky, who likens the shape of the tumefaction to that of flat sessile fungi. The umbilicated depression, so frequent in the ordinary typhoid patches prior to ulceration, has never been observed in typho-malarial fever. The ulcer itself presents ragged, irregular edges, which are often extensively undermined in consequence of the erosion extending more widely in the submucous connective tissue than in the glandular tissue of the mucous membrane. This characteristic undermining of the edges is much more extensive in these than in ordinary typhous ulcers."

**Pathology.**—Doubting not at all the presence of the malarial element, the question occurs, was the modifying "febrile" cause of the *typhous* or of the *typhoid* character? Granting, that is, that these are pathogenetically distinct, we should expect that the typhous or "crowd-poison" element must result from the circumstances, as from those which have made typhus or "camp fever" the scourge of armies in Europe. Only, against this, we have the local lesion of the glands of Peyer and mucous membrane of the bowels, recalling enteric or typhoid fever.

But—as, where typho-malarial fever occurred, causes of intestinal irritation (bad water, deficient food, etc.) were present—I am not satisfied that such an appearance (not, as we have seen, *identical* with that of typhoid fever) should exclude the idea of the zymotic action being that of the *typhous* cause. In that opinion, as a probability, not, of course, now demonstrable, I rest.

**Treatment.**—From the above view of the hybrid and threefold nature of the disease, came its rational treatment. More *quinine* than in typhus, more *alcohol* than in remittent, more *fresh vegetable food* and fruit than in either. Experience justified this plan. In our hospitals in Philadelphia, few died from fever who were not moribund on their arrival from the seat of war.

## YELLOW FEVER.

Only certain localities have ever been subject to this disease; and of those, most have had it but occasionally. It existed as

[1] Op. cit., pp. 102–3.

far north as Boston in 1693; very rarely since, in any similar latitude. In New York, it occurred in 1668, 1702, 1743, 1795, 1803, and 1822; first in New Orleans, 1769. In Philadelphia, it first appeared in 1699; then in 1741, 1747, 1762, 1793, 1794, 1819, 1820, 1853, 1854, and 1855; the last visitations being to a very moderate extent. The worst epidemic in New Orleans, where it has been frequent (almost annual), was in 1853. Sanitary measures, under General Butler's military rule, in 1862, appeared to avert it, in that city, amid circumstances which might have been expected to promote it. A very severe visitation of yellow fever occurred at Norfolk and Portsmouth, Virginia, in 1855. A still more destructive one devastated Memphis, Tenn., and Shreveport, La., in the summer of 1873. In 1878 many places in the South suffered great mortality from it. In 1879, Memphis was almost ruined by it. Wise and liberal sanitary improvements, however, give a reasonable hope of its future exemption from such devastation, which has been strongly encouraged by its entire freedom from yellow fever in 1880.[1]

All the places which it has ever visited are upon the borders of the Atlantic Ocean, or its tributary waters, the Gulf of Mexico, and the Mediterranean Sea. Although with like climatic conditions, it is common in the West Indies and West Africa, but unknown in the East Indies, the eastern shores of Africa, and the Pacific coast of America.

**Symptoms and Course.**—With an abrupt beginning, or an indistinct cold stage, and pains in the back or limbs, commencing often in the night, a febrile stage occurs, of long average duration; sometimes two or three days without remission. Violent cases have it shorter; it may last only a few hours.

The skin, at this period, is hot and dry. Thirst is extreme, the tongue is generally furred. Nausea and vomiting are common on the second day, with great epigastric tenderness. The bowels are costive; if discharges occur they are very offensive.

A flush of the forehead, with a fiery look of the eyes, is characteristic. Delirium is frequently present. Violent headache is nearly universal.

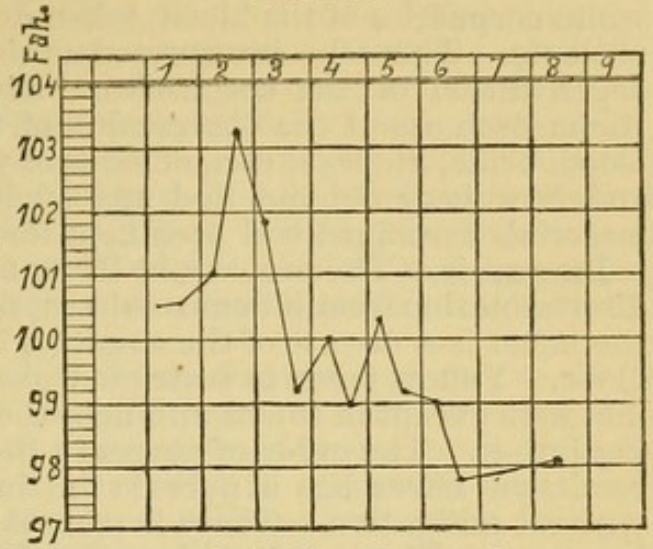
The stage which follows this pyrexia is a sort of remission or intermission. All the symptoms abate except the epigastric tenderness. The flush of the face and other portions of the skin is succeeded by yellowness, which grows deeper as the disease advances. The pulse becomes slower, heat lessens, respiration becomes natural in frequency, the patient sits up and feels better. This state of things lasts for a variable time, averaging about twelve hours.

Sometimes convalescence now takes place. Much more often a third stage succeeds, of prostration or collapse. Muscular debil-

[1] The following places (recorded for possible future reference) in the Southern States were visited by the great yellow fever epidemic of 1878: *Louisiana*, New Orleans, Plaquemine, Baton Rouge, Morgan City, Hudson, Port Hudson; *Alabama*, Mobile, Decatur; *Mississippi*, Vicksburg, Holly Springs, Canton, Ocean Springs, Pass Christian, Water Valley, Port Gibson, Grenada, Bay St. Louis, Friar's Point, Mississippi City, Spring Hill, Crystal Springs, Biloxi, Greenville, Hernando; *Tennessee*, Memphis, Brownsville, Chattanooga, Germantown, Paris, Grand Junction; *Kentucky*, Louisville, Hickman; *Missouri*, St. Louis; *Illinois*, Cairo.

ity becomes great; the pulse is rapid, irregular, and compressible; the capillary circulation sluggish; the skin deep yellow or bronzed; the tongue brown; the stomach excessively irritable. It is at this time that the *black vomit* occurs, which is pathognomonic of this fever. Hemorrhages may also occur from the mouth, throat, or bowels. The mind grows apathetic, or low muttering delirium exists. In bad cases, which are many, hiccough, clammy sweats, convulsions, and involuntary discharges precede dissolution. Death most frequently takes place on the fourth, fifth, or sixth day.

FIG. 120.




Temperature in Yellow Fever. Recovery.

When there is reaction from the collapse, there follows a secondary fever, of very variable duration, which may terminate in a tedious convalescence, an almost equally prolonged typhoid condition, or death by exhaustion.

**Black Vomit.**—This has been found, upon chemical and microscopical examination, to consist essentially of blood, altered by action of the fluids of the stomach. It is usually acid to test-paper.

The *urine*, in yellow fever, is scanty and high-colored at the beginning, and especially deficient in amount from the third to the fifth day. About the fourth day it becomes cloudy and deposits a sediment. Granular tube-casts from the kidneys may be discovered in it on the fifth day. Blood and bile also may appear in it; as well as large amounts of creatin or creatinin. Urea is apt to be below the normal quantity.

**Morbid Anatomy.**—Congestion of the brain is common; inflammation of the stomach also is usual. The liver is most frequently dry, pale yellow, and anæmic; but occasionally it is engorged. Fatty accumulation in the liver has been repeatedly observed; and exudation into its substance is asserted. The spleen is little altered; the kidneys are always congested. Crevaux, Guechet, and Gama Lobo have especially studied the morbid anatomy of yellow fever. During the year 1879, elaborate investigation was made concerning it, microscopically as well as macroscopically, by Drs. Sternberg, H. D. Schmidt, Guiteras, Satterthwaite, and Woodward.[1] Not only did they confirm the previous observations of Alonzo Clark, T. H. Bache, Leidy, and Riddell, of fatty degeneration of the liver, but they found evidences of a similar change also in the brain, sympathetic ganglia, stomach, and kidneys. Probably, in each of these organs, a stage of hyperæmia

[1] Supplement No. 4, National Health Bulletin, 1880.

precedes the fatty alteration. Indeed congestion of most of the internal organs was found by Dr. Schmidt in a number of instances. Dr. Sternberg noticed, besides crenation of the red corpuscles, a marked increase of highly refractive granules in the white corpuscles of the blood, taken during life from yellow fever patients. These he interpreted as showing a commencing fatty degeneration of the corpuscles. Drs. Joseph Jones and J. G. Richardson assert the observation of numbers of bacteria in the blood, urine, kidneys, etc., of cases of yellow fever. Drs. Schmidt and Sternberg did not find any such forms, except when the materials examined had been kept for some time after death.

**Diagnosis.**—The only doubt likely to be entertained is as to its discrimination from bilious remittent fever. As already remarked, the latter is a disease of the country, in any warm quarter of the globe. Yellow fever is restricted geographically, and is seldom met with except in towns and near the sea or large rivers emptying into it. The order of stages in the two diseases is different; remittent never has a pyrexia lasting over twenty-four hours without mitigation. There is more epigastric tenderness in yellow fever. The jaundiced hue of the skin is more commonly met with, and more decided, in that disease. Albuminuria and hemorrhages are usual in yellow fever; not so in remittent. The black vomit, when it occurs, is decisive. Possibly, even probably, in a few localities, the combined causation of the two fevers may produce hybridity between them. Immunity for a lifetime after one attack, is common with yellow fever; not at all with remittent.

**Prognosis.**—This is a very dangerous disease, the deaths from it averaging about one for three cases. A long and moderate febrile paroxysm, without excessive irritation of the stomach, is favorable. So is the occurrence of secondary fever instead of collapse after the remission. Black vomit is almost (not quite) always a fatal sign; suppression of urine is equally unfavorable. Some instances of the disease are called *walking* cases, because their early symptoms are slight, only the countenance and pulse betraying the danger, until near the end.

**Pathology and Causation.**—There seems no room for doubt that yellow fever is a zymotic disease whose cause is generated only under certain local conditions. That cause must be itself material; and, *probably*, being slow and limited in transportation, it is a microscopic vegetation.

The local conditions observed are: 1. Continued high heat; about 80° for one or two months. 2. Excess of moisture in the air; a high dew-point.[1] 3. Vicinity to the sea, or to a large river emptying into the sea. 4. Organic, especially vegetable, matter in a state of decomposition. This is furnished not only by the offal, etc., of cities, but by decaying wharves and causeways (as at Norfolk, Va.), and by newly upturned earth. Mobile was almost relieved of danger from yellow fever by paving the streets of the city with oyster shells.

[1] This is not without exception. Matthew Carey relates that at Philadelphia, in 1793, the months of August and September, and much of October, were *remarkably dry and sultry.*

But it is very remarkable, as already stated, that certain quarters, only, of the globe ever have this disease, though presenting all the above conditions. It *never* visits the Pacific coasts either of America[1] or Asia. Canton, Calcutta, Bombay, Alexandria, Constantinople, and Athens, have never seen it. Nor have any of the interior cities of either continent. It visits *often* the tropical islands of the Atlantic, the north coast of South America, Vera Cruz, the West India Islands, New Orleans, Savannah, Charleston; *occasionally* the western coast of Africa, Rio Janeiro, Buenos Ayres,[2] Bermuda, Natchez, Mobile, and other United States ports and cities, as far north as Boston and Providence; also Gibraltar, Marseilles, and other places on the Mediterranean, as far as Sicily. It was very destructive in 1870 at Barcelona, in Spain.

The *contagiousness* of yellow fever, from person to person, is disproved by the immense preponderance of facts incompatible with it. A very few apparent examples of transmission by individuals, if admitted to have occurred, are otherwise explained. *Transportation by ships* is admitted, because a ship may carry a section, as it were, of a locality, with all its conditions and atmosphere. But, then, the port to which the ship goes must have all the conditions rife for the propagation of the disease, or its "germs" will not be maintained so as to cause an epidemic.[3] Naval surgeons of experience assert that *only a foul ship* can carry yellow fever. More will be said of this under the head of *Prophylaxis*.

**Treatment.**—No specific has been found for yellow fever, and no abortive treatment. All kinds of remedies have been tried for this in vain; especially bleeding, calomel, and quinine. I say in vain as to cutting it short; but in palliating and conducting it through its stages with safety, those and other remedies may be of use. Bleeding is suggested by the relief often attending spontaneous hemorrhages in its course; but, as in other malignant affections, the cases for it must be well selected, the time early, and the amount moderate. Much the greater number will gain only by the application of leeches or cups to the epigastrium or back of the neck.[4]

Many authorities approve of the use of calomel as a cholagogue cathartic, at least in a single dose (say of three or five grains), followed by a saline laxative, as citrate of magnesium, near the beginning of the attack. All the result of the use of *quinine*, of which I feel sure, is, that it is not likely to do good at any early stage, but only when prostration begins to appear; and then in

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[1] A single instance of its occurrence on shipboard off the west coast of South America has been asserted. If so, no doubt it was a case of limited *transportation* by a vessel.

[2] At Buenos Ayres, in 1871, the mortality from yellow fever reached, for a time, over 700 daily.

[3] On the whole subject of yellow fever, see La Roche's exhaustive treatise.

[4] The following may be regarded as a curiosity of medical history. Matthew Carey, in his account of the yellow fever of 1793 in Philadelphia, says: "The efficacy of bleeding in all cases not attended with putridity was great. The quantity of blood taken was, in many cases, astonishing. Dr. Griffiths was bled seven times in five days, and ascribes his recovery principally to that operation. Dr. Mease, in five days, lost seventy-two ounces of blood, by which he was recovered when at the lowest stage of the disorder. Many others were bled still more, and are now as well as ever they were."—*A Short Account*, etc., p. 25.

tonic or supporting, not *cinchonizing*, doses. It is undoubtedly of service during convalescence.

Attention to the *stomach* is demanded by urgent symptoms. Ice, by the mouth, is refreshing and useful; so is mineral water, or iced champagne, a little and often; lime-water, charcoal water, and hot coffee have sometimes done service in arresting vomiting. A mustard or spice plaster over the epigastrium, or a blister dressed with acetate of morphia, may have an important effect upon the same symptom.

During the hot stage, cold sponging to the face, body, and limbs will sometimes promote perspiration better than any other measure. Enemata of cold water (with care not to chill too powerfully) have been used for the same end. Dr. Miller, U.S.N., has found the hot bath (114° Fahr.) especially serviceable.

On the other hand, Dr. F. Peyre Porcher,[1] of Charleston, South Carolina, urges the application of *ice-cold* water to the head, hands, and arms, as long as there is a continuance of abnormal heat.

In the collapse, stimulation will be needed, by wine, brandy, or whisky, etc., along with concentrated liquid food, in small amounts at short intervals. When the stomach is very irritable, nourishment may be given by the rectum.

Experiments with antiseptic substances, as chlorine, the sulphites, and carbolic acid, already made with other affections analogous to yellow fever, may be properly tried with it also. Dr. Fiddes, of Jamaica, reports very favorably of the sulphites.

**Prophylaxis.**—Besides what has been said, the following statements will indicate the principles of prevention of this disorder:—

1. The infection of yellow fever is rarely diffused over regions of great extent; mostly its immediate limits may be measured by fractions of a square mile.

2. The removal of the inhabitants of an infected spot will inevitably put an end to an endemic or epidemic of it.

3. Sanitary police may effectually prevent it (as at New Orleans in 1862 and 1873), and will mitigate it even after its outbreak. The immunity of Nashville in 1879, under good sanitation, but without quarantine, as reported by Dr. J. Berrien Lindsley, and the complete absence of yellow fever at Memphis, following great sanitary improvements, in 1880, are telling facts.

4. The material cause of yellow fever is never generated or multiplied in the bodies of those having the disease; they may be taken anywhere without fear of communicating it, any more than well persons.[2]

5. The germs of the disease are extremely seldom, if ever transported by *fomites; i. e.*, clothing, bedding, merchandise, etc. If they exist in any such material, they are certainly destructible by cleansing and disinfecting measures.

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[1] Trans. of S. Carolina Med. Association, 1872.

[2] This was illustrated in Philadelphia in 1870, when, from local infection from a foul vessel, a number of deaths from yellow fever occurred at the Lazaretto; but none in the city, although several of the patients were ill there, having left the vessel before being taken sick. In other places similar instances, disproving the personal contagiousness of yellow fever, have counted by hundreds, if not thousands.

6. A ship may carry yellow fever on board of it for a length of time (during warm weather), and to a great distance; but the disease will not spread far from the ship; at least unless local conditions add their propagating influence.

7. Thorough airing, cleansing, and disinfection of ships (especially by dry heat or superheated steam) will always deprive them of the power to generate or transport yellow fever.

8. Against yellow fever, the true prophylactic method must be that of sanitary police; a part of which should be, the inspection, near ports liable to it, of all vessels arriving during warm weather.[1]

9. At the place of such inspection all foul vessels should be detained until cleansed, being first emptied of their passengers and cargo. The cargo also should be inspected, and, if unwholesome, destroyed or disinfected.

10. No *personal* detention whatever, other than of those ill, for necessary hospital *treatment*, should be imposed upon the passengers or crews of vessels which have yellow fever on board. There are no facts which give reason for any such detention.

## RELAPSING FEVER.

Prof. Aitken[2] thus defines this disease: "A continued fever, having a very abrupt invasion, marked by rigors, chilliness, and severe headache, vomiting, and often jaundice; a white, moist tongue, epigastric tenderness, confined bowels, enlarged liver and spleen, high-colored urine, a frequent, full, and often bounding, pulse; pains in the back and limbs, restlessness, and, occasionally, delirium. These symptoms abruptly terminate by an exceedingly copious perspiration between the fifth and the eighth day; and after a complete apyrectic interval (during which the patient may be so well as to get up and walk about), an abrupt relapse supervenes on the *fourteenth* day from the first commencement. The relapse runs a similar course to that of the primary paroxysm, and terminates between the third and the eighth day. In some cases a second, third, fourth, and even fifth relapse may occur. Death is apt to happen from sudden syncope, especially after the excessive perspiration; or from suppression of urine and coma. No constant eruption and no specific lesion are associated with the fever."

The temperature generally rises to 104° or 105° F. on the second day, and reaches its maximum the day before the defervescence. Then, as the other symptoms subside, it sinks rapidly to about 98°. When the relapse occurs on or near the fourteenth day, the heat again rises to 104°, 105°, or more; descending afterwards with convalescence.

**History.**—Drs. Christison and Welsh first described relapsing fever in Scotland, 1817–18; Barker and Cheyne in Ireland about the same time. Rutty appears to have given an account of it in Dublin as early as 1739. In 1844, Dr. M. Clymer recognized it in

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[1] The substance of these conclusions was clearly advocated by Dr. G. Milroy, 1867, before the London Epidemiological Society.

[2] Science and Practice of Medicine, Philadelphia ed., vol. i., p. 438. See on Relapsing Fever in Philadelphia, a valuable paper by Dr. J. S. Parry, in Am. Journal of Med. Sciences, October, 1870.

some Irish emigrants coming to the Philadelphia Hospital.[1] Dr. Dubois reported the occurrence of a few cases in New York, mostly among emigrants, in 1847–8. In the same years it was epidemic in Glasgow, Edinburgh, London, and some parts of Germany; in 1855, in the Crimea, during the war; and since that time in Russia, and elsewhere on the European continent. Since 1856 it appears to have almost disappeared from Great Britain. During the summer of 1870, in New York and Philadelphia, hundreds of cases occurred in local "nests" of unsanitary conditions. In the Philadelphia Hospital, from April to November, 1870, 517 cases were admitted, with 80 deaths. Of this mortality (15½ per cent.) the greater part was amongst negroes; of whom 26 per cent., affected with relapsing fever, died; of white patients, only 5 per cent.[2] In Great Britain the deaths have been reported as about 1 in 40; in Russia, 10 or 11 per cent. of the cases.

**Diagnosis.**—The most distinctive features of this fever are, the "crisis," from the fifth to the seventh or eighth day, and the relapse on the fourteenth, or, at all events, between the twelfth and the twentieth day. In its general symptoms it resembles, otherwise, remitting fever; but with less decided daily abatement and exacerbation of the febrile movement, and with greater severity of "rheumatic" pains in the joints and muscles. The convalescence is slow, and is not unfrequently attended by a severe ophthalmia.

**Pathology and Causation.**—It would seem that relapsing fever must be a specific disease. Associated in nearly all cases with circumstances of destitution in large cities, it has been called in Europe, "famine fever." Contagion is asserted of it by Prof. J. Simon, Dr. E. Harris, and others. Carter, Munch and Motschutkoffsky[3] found that it could be inoculated by means of the blood taken during the febrile paroxysm. In the Philadelphia Hospital, in 1870, it did not spread to other inmates.

Anatomically, it has been observed, in fatal cases, that the *spleen* is often enlarged to a greater degree than in any other fever. Dr. Hand, of Philadelphia, has found the red corpuscles granulated and cranated; besides (Cormack, A. Thompson) increase of white corpuscles. Dr. Obermeier, of Berlin, asserted the observation of minute mobile filiform bodies in the blood in this disease, called *spirilla*. They have been found also by others, but not constantly. Dr. J. R. Lewis believes them not to be essential to the disease.[4]

**Treatment.**—After a mild cathartic at the beginning, and, if headache be severe, a few cups or leeches to the back of the neck, cooling diaphoretics may be given, as solution of citrate of potassium or acetate of ammonium. After the crisis, quinine and mineral acids may be used, in moderate doses, at least until the relapse. It has been proved that this (the relapse) will not be *prevented* by any amount of quinine. Many patients will require

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[1] Fevers, etc., by Meredith Clymer, M. D., Philadelphia, 1846, p. 99.
[2] Philadelphia Med. Times, March, 1871. The total number of deaths in the city, reported to the Board of Health, was 162, of which 107 were of colored people.
[3] Centralblatt für die Med. Wissenschaft, 1875, xi., 193.
[4] Lancet, Feb. 28, 1880.

support, especially in the third week, by beef-tea, etc.; some, also, alcoholic stimulation.

## CEREBRO-SPINAL FEVER.

**Synonyms.**—*Cerebro-spinal Meningitis; Spotted Fever; Malignant Purpuric Fever.* The name adopted above is preferred by me, in the absence of sufficient preponderance of authority or reason in favor of either of the other names. The disease is a *fever*, or systemic disorder; not a mere local phlegmasia. It has no more claim to be called cerebro-spinal meningitis[1] than typhoid fever has to be called *enteritis*, or scarlet fever *faucio-pharyngitis*. Yet the term spotted (or petechial, Wood) fever is not fully justified as distinctive—because only in a minority of cases it exhibits any eruption, and something like the same is also at times seen in typhus.

**History.**—Often obscurely described, this disease appears to have been known in France in 1310 and 1482; over Europe, or parts of it, in 1503, '10, '16, '17, '28, '45, '59, (Sicily) '64, '68, (Paris) '69-'74. In 1580, it was at Rome, Venice, and Madrid, with great mortality; again over Europe in 1582; at Trent, 1591, Florence, 1592; at various places, 1616 and 1624. Sydenham described it in 1661. In 1661 and '93 it was in Italy; and in England, 1698, 1710, 1741; in Prussia, 1704. Other years named for it are 1720, '60, '61; 1757 and 1788. A well-known outbreak of it occurred at Geneva, 1805; one in the Prussian army, 1806–7; in Sicily, 1808; at Dantzic, 1811; Brest and Mayence, 1813–14; Grenoble, 1814, and the same year at Paris; 1815 at Metz; elsewhere in 1816 and 1823. Afterwards in Europe its historians (under the names *méningite cérébro-spinale épidemique*, *cerebral typhus*, and *tifo apoplettico tetanico*) speak of it in 1832, '37, '39, '40, and almost every year till 1850, extending over many places in succession as far as Gibraltar and Algiers at the south, and Scotland and Ireland at the north. From 1854 to 1861, in Sweden, Norway, and Holland. In North Germany and Russia, it is said to have prevailed in 1863–4–5; and in Ireland, 1866 and 1867.

In the United States, its first recorded visitation was in 1806, in Massachusetts. Then it gradually spread through the New England States, New York and Canada, from 1807 to 1812, when it had reached Philadelphia. After that it was met with at various places until 1820; but not with great frequency.[2] Between 1840 and 1850 it was epidemic in several of the Middle, Western, and Southern States (Kentucky, Indiana, Illinois, Michigan, Missouri, Tennessee); also in 1852 and 1858. Next we hear of it in 1862–3; most clearly in the descriptions of Dr. Gerhard,[3] in the latter year, as it occurred in the neighborhood of Philadelphia. Since that time (at which cases were seen especially

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[1] I regret being obliged to differ here from so high an authority as Professor A. Stillé. See his "Treatise on Cerebro-spinal Meningitis," Philadelphia, 1867.

[2] Early American writers upon it were, North and Strong, 1811; Gallop, 1815; Miner, 1825.

[3] Transactions of the College of Physicians of Philadelphia, 1863.

at Frankford, Falls of Schuylkill, Manayunk, and Norristown, but only a few in the city) it has been observed in a number of places in Pennsylvania, New York, Ohio, Indiana, Michigan, Missouri, Rhode Island, Vermont, Massachusetts, Maryland, and the District of Columbia.

FIG. 121.

Cerebro-Spinal Fever. (J. Lewis Smith.)

**Symptoms and Course.**—The attack is nearly always sudden. Chilliness, terrible pain in the head, extending to the back of the neck, nausea and vomiting, are the earliest symptoms. Delirium follows; ending not unfrequently in coma. Tetanic spasm or rigidity of the muscles of the back of the neck (and sometimes of the back and limbs), is common. Convulsions are much less so, but do occur, particularly in the young. Painful sensitiveness (hyperæsthesia) of the whole surface of the body is present in most cases, when there is no coma. Loss of sight and hearing may take place during the middle period of the attack. The pulse is at first slow, then accelerated, but diminished in volume and strength. Respiration is slower than natural in most, but not in all cases. The tongue is usually at first white and moist; sometimes natural; in prolonged cases it may become yellow or brown. The bowels are costive or natural.

The skin has almost always at the beginning an abnormally low temperature. When reaction occurs it does not become very hot as a rule. Burdon Sanderson has found it as high as 102° to 104° in children. Near the time of death, Wunderlich has known it to reach 107°, 108°, 110°. Dr. J. Lewis Smith has found the temperature morbidly elevated in the rectum, when it was not so in the axilla. Dryness of the surface is most common, although late in the attack profuse perspiration may occur. Often there is an herpetic eruption about the lips.

In a minority of the cases, though varying in proportion in different epidemics, *spots* (petechiæ) appear, on the second or third day, or later; on the neck, breast, or limbs; seldom on the

face. They are of different dimensions, from the size of a pin's head to three-quarters of an inch in diameter, and distinct; but not elevated nor disappearing on pressure. Their color is red, purple, or black. Sometimes they remain after death. They are either congested portions of the skin, or subcutaneous extravasations of blood.

The *duration* of fatal cases of this disease is generally short. Some die in three or four hours; many within twelve or twenty-four. That period of time overpassed, the danger becomes less, but a fatal result may still occur, even after a number of days. The first four days are the most perilous to life. After recovery, sometimes blindness or deafness may remain; sometimes, without these, a staggering gate is observed.[1]

**Morbid Anatomy.**—The blood, during life, is found to have an excessive proportionate amount of fibrin and corpuscles. After death, when this has taken place on the first or second day, no anatomical changes, even in the brain, have, in several instances, been found. Most generally, however, the brain and spinal cord show some alteration. It is the *pia mater* especially in which congestion, at least, is nearly always present. At the base of the brain most of all, is this, often with serous and plastic exudation, observed. The surface of the hemispheres also may be diseased; and next in frequency, the pia mater of the cervical portion of the cord. The ventricles of the brain have usually an excess of fluid in them; serum, either clear or mingled with blood or pus. The substance of the brain is more or less injected or congested; the spinal cord occasionally so. Softening of the brain is reported in protracted cases.

No other lesion or appearance is shown to be usual in this disease. A few observers record the presence of rather firm fibrinous clots in the heart; a larger number, enlargement of the spleen.

**Diagnosis.**—From typhus fever, this is known by the suddenness of its onset, the early period of danger, and, in favorable cases, the rapid recovery; as well as by the peculiarity of the eruption. From ordinary inflammation of the brain, while the diagnosis may be very difficult, it differs in the unexplained abrupt attack, severe from the start; in the lowness of temperature during the first day or two; in the early tetanic tendency and the eruption in many cases. Malignant scarlet fever resembles it considerably at the onset; and so does the chill of pernicious intermittent. Locality and season will designate the latter; age and exposure, especially the former. Fortunately, the principle of treatment is not essentially different in these affections, at the stage which may present a doubt.

**Prognosis.**—More than half the cases die. Those who survive three days have a fair, though not certain prospect of recovery.

**Causation.**—Of either sex more children, and of adults more males, die of this disease. Coincident with the circumstances of war, or military *régime*, most of its epidemics have been, though not all of them. The analogy which it presents to typhus sug-

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[1] S. W. Mitchell, Phila. Med. Times, Jan. 31, 1874.

gests a probable relation of the disease in causation to local or atmospheric contamination. I can think of only one plausible hypothesis; that it depends upon a peculiar zymotic material, or "morbid poison," generated by a slow change in human or animal emanations, such as, in camp or garrison life, the long unwashed clothing of soldiers may particularly engender. Exposure to *cold* is thought to predispose to it.

According to Hirsch, in central Europe, very much the largest number of epidemics of it have occurred in winter; next, in spring; and the same has been found true in the United States. In 1871–2, a number of cases in New York city were traced by Dr. Moreau Morris to very *unsanitary local conditions.*[1]

There is no proof whatever of personal contagiousness in cerebro-spinal fever.

**Treatment.**—We must lament the unsatisfactory condition of the evidence upon this subject. Almost all agree that *asthenia* characterizes the disease, most of all at the beginning. The resemblance to pernicious fever has suggested the use of quinine; and several very positive statements are made of success with it in large doses, as two to four grains every hour or half hour until cinchonism is produced, or until from thirty to sixty grains have been taken; afterwards a grain or two every two or three hours. Some practitioners, upon trial, have abjured quinine altogether in this disease. Were the diagnosis sure in any case from the commencement, I should feel inclined to continue the trial of it, from what has been reported, in this city particularly, of its success.

Opium has equally enthusiastic (Boudin) advocates and opposers. *Early*, if it be given, must be the time. The idea of those who urge it is to give of it a grain every two or three hours, until an *opiate sleep* is produced; then to withdraw it and give it in much smaller doses.

Bromide of potassium is favored by Dr. J. Lewis Smith[2] and others in the early stage, especially in children. The use of it is justified by the opinion that it tends to produce "contraction of the arterioles of the encephalon," and thus to relieve cerebral congestion. Dr. J. L. Smith has been disappointed with the effects of quinine in this disease. He recommends the application to the head in the early stage, of bladders or bags filled with bran mixed with pounded ice. Dr. Borland, of Boston, has successfully used bromide of potassium, with *ergot.*

Stimulation with brandy or whisky is generally employed in the first stage with freedom. Dr. Stillé considers, however, that general experience does not warrant its being used in all cases, but only when the signs of failure in nervous power occur. External stimulation is of course indicated; by mustard, direct heat, friction with red pepper and brandy, or hot whisky and salt, the *hot bath*, etc. Dry cupping, or in some cases cut cups (when reaction occurs), to the back of the neck, will be proper; followed by a blister at the same place. In Germany, leeching behind the ears is said to have often proved useful.

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[1] See also Clymer, on Cerebro-spinal Meningitis, 1872.
[2] Amer. Journal of Med. Sciences, October, 1873.

Cantharides (20 to 40 drops of the tincture every hour till reaction), camphor, chloroform, sulphite of sodium, ergot, and hydrate of chloral,[1] have each had laudation from some who have used them. Dr. Joseph Klapp, of Philadelphia, informs me that a number of cases, some very severe, have recovered under his care, to whom he administered *tincture of chloride of iron*, in large doses: 25 drops every 2 hours. I have known recovery to follow, in one case, the application of *ice to the spine*. But more positively successful experience is needed to give the profession much confidence in the treatment of this affection.[2]

## TYPHUS FEVER.

**Synonyms.**—*Ship Fever; Camp Fever; Jail Fever.*

**Symptoms and Course.**—For a day or two premonitory weakness, headache, and loss of appetite occur. Then a cold stage, of variable distinctness, begins the attack. In rare instances it is said that death takes place in this stage without reaction. Much more commonly fever follows, with severe headache, great heat of skin, pulse 120 (110 to 130), but compressible, tongue whitish or yellowish, bowels costive. Delirium is common, especially at night. The temperature in the axilla is from 102° to 108°; generally after the third day, 105°–6° in the morning, 106°–7° in the evening. Muscular debility is very decided.

For a number of days this condition lasts; the patient lying in a stupid half-sleep much of the time, muttering to himself, easily roused, but soon relapsing again; the face having a dusky flush of redness. Hardness of hearing is present in most cases. Positive coma is a very bad prognostic, but is not infrequent. Suppression of urine may take place in the worst cases; retention occurs in many severe ones. The tongue grows darker as the attack progresses; brown, even black; often cracked or fissured; and it, as well as the teeth, may be covered with sordes.

Toward the end of the first week, in most cases, a rash appears, of little and numerous red papulæ (miliary eruption), all over the chest, abdomen, and upper parts of the limbs. They are accompanied by *sudamina* (minute vesicles) in many instances; by *petechiæ* in a few. Sometimes a strong odor comes from the body; but I have never noticed this, even in the cases of ship-fever from Ireland in the Pennsylvania Hospital, in 1847–8, at which time, while resident in the Hospital, I took the disease myself from them.

The urine is scanty. Generally it contains an excess of urea and uric acid, with a deficiency of the chlorides. Sometimes there is actually less than the normal amount of urea eliminated; excreta may then be supposed to accumulate in the blood, promoting coma. *Costiveness* is the general rule in typhus.

The *dicrotous* or double pulse, and *subsultus* or twitching of the tendons at the wrist, are common. Weakness of the impulse of

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[1] Patton, Indiana Journal of Medicine, July, 1870.

[2] See J. S. Jewell, M. D., Report on Cerebro-Spinal Meningitis, Chicago, 1866; J. J. Levick, M. D., "Report on Spotted Fever, so called," Trans. Am. Med. Assoc., 1866; A. Stillé, M. D., Treatise on Cerebro-Spinal Meningitis, 1867.

the heart is often noticeable; sometimes so much so as to justify Dr. Stokes's diagnosis of "typhous softening." *Hypostatic* pneumonia (*i. e.*, beginning with passive congestion of the lungs posteriorly) is the most frequent complication of the fever.

The *duration* of an attack of typhus is generally three weeks. The critical period is usually about the eleventh day; after which *defervescence* (the decline of the fever) may be looked for. Occasionally death may take place within five days, or recovery within fifteen from the commencement.

**Morbid Anatomy.**—Absence of lesion of the solids has been repeatedly noticed. The blood is always altered during life; after the early stage it is less coagulable and darker in color than in health. Passive congestion in various organs is observed, as in the lungs, brain, liver, etc., but without anything characteristic.

**Pathology and Causation.**—No disease affords more reason for pronouncing it a disease of the blood than typhus. Its cause, demonstrably in many cases, is *ochlesis* or crowd-poison; the effluvia from human bodies, accumulated, especially in cold weather, in small and ill-built dwellings of the poor, and most of all in filthy towns, ships, jails, or camps. Having been thus generated, it becomes contagious; one patient having, in his morbid emanations, the poisoning power of a whole crowd. Yet the contagion is not very strong; many who are exposed, especially in well-ventilated places, often escaping the disease. In giving this account of it, candor requires me to add that the spontaneous origin of typhus in any case, apart from direct, specific, personal contagion, is denied by such eminent British authorities as Drs. W. Budd, Parkes, and others.

**Diagnosis.**—After the first two or three days (during which there may well be doubt as to its character) the only probable question will be between typhus and typhoid fever. All medical authorities are not yet agreed as to the non-identity of the two forms of slow continued fever.[1] A large majority, however, regard them as quite distinguishable during life, and separated pathologically by the absence in typhus of the morbid alterations of Peyer's glands, and those of the mesentery, characteristic of typhoid fever. I have many times seen typhus and typhoid cases in the same ward, lying side by side, and should feel confident of being generally able to diagnosticate them by the countenance alone. Under the head of *Typhoid Fever* the clinical differences will be enumerated.

**Prognosis.**—Murchison states the mortality in the hospitals of Great Britain, from typhus, to be one death in five cases.

[1] Dr. J. Hughes Bennett, for example, maintained their identity; and some German writers call typhoid "abdominal typhus." The definite history of typhoid or "enteric" fever began with Prost, of Paris, 1804. Louis, 1839, studied it elaborately, showing the constancy of the intestinal lesions. In 1823, Dr. Enoch Hale, of Massachusetts, described two forms of continued fever. Dr. Gerhard, upon careful autopsies in the Philadelphia Hospital, announced evidence of the distinctness of typhus from the typhoid or "dothinenterite" of Louis in 1835. Dr. A. P. Stewart, of Glasgow, published similar conclusions in the same year; and so did D. R. Perry, of Glasgow, and Dr. John Reid, in 1836–7. In 1846, Dr. W. Jenner commenced an investigation into the subject, whose results most physicians have accepted as decisive. He concluded that typhus and typhoid fevers are clinically and anatomically distinct as well as different in causation. Dr. Gairdner has recorded cases in which patients convalescent from typhoid fever have taken typhus upon exposure to its contagion.

Cheyne and others in private practice have found it but one in twenty or more. I have not seen many deaths from it, in private or hospital practice. Probably one in ten or fifteen would be a fair general estimate. Bad signs are, great feebleness or extreme rapidity of the pulse, profound coma, hiccough, suppression of the urine, involuntary defecation. Pneumonia, complicating the attack, increases its danger, though I have known several recoveries notwithstanding this.

**Treatment.**—More than half the cases of typhus, according to my observation, require alcoholic stimulation, as well as concentrated nourishment, after the fourth day. But not all the cases, as my own, among others, proved. I was bled on the second day, the diagnosis not being made out; and leeched on the third day, freely, on the back of the neck; yet no alcoholic stimulus was required, after the typhous nature of the attack was clearly shown; recovery following at the usual time. Drs. Russell and Gairdner[1] have shown (in the Glasgow Fever Hospital) that typhus may be treated, in many cases, *without alcohol*. In nearly a thousand cases their mortality was about nine per cent. Dr. A. L. Loomis,[2] of New York, in 1861–2, treated five hundred cases of typhus, *in tents*, without any alcohol. His mortality was one death in sixteen cases. At the same time, in Bellevue Hospital, under the large use of alcohol then prevalent, the mortality was one death in every six cases.[3]

Dr. Loomis very properly urges the importance of having patients with typhus placed in the purest and freshest *atmosphere* possible. The hospital tent will always be better for them than the hospital ward.

We may begin the treatment of an ordinary case of typhus with a mild laxative—*e. g.*, a *moderate* dose of solution of citrate of magnesium on the second day. The diet at first may be of gruel, etc.; but very soon must milk and beef-tea or chicken or mutton-broth (or an alternation of these) be given in small quantities, at short intervals, to support the strength. Before the first week is out, half the cases will need wine in moderation; some, brandy or whisky. In the second and third week, more than half the cases will require steady support of a positive kind. In such cases, the proper routine is a tablespoonful of brandy or whisky punch (one part of spirit to three, two, or one of milk) every two, three, or four hours, and, the alternate hours, a tablespoonful or two of beef-essence or beef-tea.

Of medicines, quinine has had the most extended trial in typhus. It acts well as a tonic in 1- or 2-grain doses, four or five times daily, after defervescence has begun; *i. e.*, after the tenth or twelfth day, usually. Dr. Dundas's plan of treating typhus early with *large* doses of quinine (renewed of later years with the view of *reducing temperature*) is, I am satisfied, after seeing some trials of it, futile and even unsafe.

*Mineral acids* have acquired much reputation in typhus. Dr.

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[1] British Medical Journal, Aug. 22, 1868.

[2] N. Y. Med. Record, May 21, 1881, p. 563.

[3] At Bellevue Hospital, during the spring of 1881, there were 273 cases of typhus fever, with 64 deaths. N. Y. Med. Record, Aug. 13, 1881, p. 190.

Flint advises dilute sulphuric acid; Huss, phosphoric acid. Nitro-muriatic acid I have known to produce an excellent effect in the depression of the middle stage. Large doses are not required; but the acid should be given several times in the day. Some prefer dilute nitric acid [F. 165, 166]. *Chlorine water* is lauded highly by others. Sulphite of sodium and carbolic acid may be worthy of further trial. *Coffee*, given by Gaillasse in typhoid fever, would seem a reasonable stimulant in a low stage of typhus also.

But the great point of skill will be to determine when and how far to stimulate. Delirium favors the probability of its being needed; especially a low, muttering delirium. Of course a very feeble pulse indicates it. On trial, when the pulse grows slower, the skin more moist, and the restlessness or delirium is quieted, the stimulus has done good, and should be continued. If, on the contrary, a more hurried or a *harder* pulse follow, with heat of head and dryness of skin, and wilder delirium or deeper stupor, it should be stopped, for a while at least, or, if given, be diminished in amount.

Catheterism may be needed for retention of urine. Inquiry and inspection should determine every day the state of the bladder. Constipation, through the attack, may be overcome by enemata, or by small doses of oil, Rochelle salt, or other mild laxative.

When the coma is very deep, a blister to the back of the neck may do good; and so may sinapisms to the extremities. Great heat of the head may possibly, though rarely, render proper, especially in the first week, the application of cold water to the head. Sponging the whole body daily (best at night) with whisky and water, warmed, is extremely comforting and beneficial.

Hypostatic pneumonia in typhus cannot be treated actively. Even abstraction of blood by cups is hardly ever to be ventured upon. *Dry* cups, between the shoulders, and a blister upon the breast, are about all the special treatment allowable. It is, however, possible generally to *prevent* hypostatic pneumonia, by not allowing the patient ever to lie for many hours together upon his back. Let him be turned, once in a while, upon one or the other side.

**Prophylaxis.**—Thorough *ventilation* is the only (but sufficient) security against the generation of typhus fever; and this is capable also of almost disarming its contagion.

## TYPHOID FEVER.

**Synonyms.**—*Slow Nervous Fever; Common Continued Fever; Enteric Fever; Abdominal Typhus* (Pythogenic fever of Murchison).

**Symptoms and Course.**—After a more gradual approach than that of any other fever, with languor and debility, anorexia and headache for several days, bleeding at the nose and a bronchial cough are almost pathognomonic early symptoms. The patient takes to bed, with fever of considerable violence. The face acquires a dark purple flush. He lies dozing, perhaps muttering, unless disturbed, all day; but is more or less wakeful and delirious at night. Hardness of hearing is common from the middle of the

second week. Swelling of the belly (tympanites) comes on towards the end of the first week; diarrhœa about the same time. Rose-colored lenticular spots (*taches rouges*), disappearing on pressure, are discoverable, few in number, and on the abdomen only, toward the end of the second week; they continue a week or two. Tenderness on pressure in the right iliac region, with gurgling under the hand, generally exists. Sudamina over the chest are not unusual. The duration of the typhoid pyrexia is seldom, from the start, much less than two weeks, and it is often more; the whole attack of typhoid fever may be protracted, as I have seen it, to two or three months. One month may be considered the average time, from taking to bed to leaving it convalescent.

Late symptoms in severe cases are, the dicrotous pulse, subsultus tendinum, retention (perhaps suppression) of urine, hemorrhage from the bowels; and, if death be imminent, hiccough, cold sweats, involuntary discharges.

In protracted cases, great emaciation and bed-sores may supervene. Even during convalescence, abscesses in various parts of the body may give trouble. These usually affect the glands or connective tissue, but may occasionally involve the long bones, lungs, liver, or spleen.

Danger of perforation of the intestine, from deep ulceration of the glands of Peyer, exists always after the first week, until late in convalescence. Patients out of bed for a week or two have sometimes died from this cause. Dr. Harlan reports[1] a case in which fatal perforation took place four months after the commencement of an attack of typhoid fever. Dr. Da Costa mentions it as happening after seven months, from error in diet. The occurrence of perforation is recognized by symptoms of severe peritonitis, with collapse. The result of this is almost inevitably fatal; the only recorded exception being reported by Prof. G. B. Wood. I saw a case of suppurative peritonitis, opening externally, which recovered, in the Philadelphia Hospital, several years ago; but I was not able to learn the antecedents of the case.

**Temperature.**—This has been made a special study in typhoid fever. The rise from 98.5° (the normal degree) is gradual, during the first four or five days; reaching 104° on the evening of the fifth day; sometimes 104.5°. An attack of disease in which on the second day the heat in the axilla is as high as 104°, is not typhoid fever; and the same exclusion applies if from the fourth to the eleventh day the temperature falls below 103°. A difference of 1° or 1.5° between morning and evening (greatest heat, the latter) is usual; the reverse is not a good sign. The marked tendency to a morning fall and evening rise of temperature is almost pathognomonic of typhoid fever. Toward the end of the second week, lowering of the heat below 103° is always favorable; persistence at a 104°, 105°, or 106°, shows a severe case; the higher the worse. Sudden increase of temperature indicates a complicating inflammation; as pneumonia.

**Discharges.**—Liquidity of the stools is a characteristic of this disease, even if there be but one daily. Generally, after the mid-

[1] Trans. Philada. Pathol. Soc., 1859.

dle of the first week, there are two or three passages, brownish with a slight yellowish tinge, every day. From the very beginning of the attack, the bowels are usually susceptible to the action of purgatives; a teaspoonful of castor oil operating readily. Excessive diarrhœa, at a middle or late stage, not unfrequently adds to the prostration of the patient. Hemorrhage from the bowels, when it occurs, is most apt to be met with in the second or third week.

The *urine*, through the attack, is commonly scanty, high-colored, excessive in the amount of urea, deficient in the chlorides, and sometimes albuminous in severe cases.

**Complications.**—*Pneumonia*, especially the hypostatic form (as in typhus), is the most frequent. It has been, by some writers, denied that true pneumonitis, anything more than passive congestion, occurs in these cases. But, in the analogous instance of typho-malarial fever, especially when the scorbutic diathesis was also present, I have seen, after death, more than once, suppuration as well as hepatization, confined altogether to the posterior portions of both lungs. I do not doubt the same happening in typhoid as well as in typhus fever.

*Inflammation of the brain* may complicate typhoid, more often than typhus; but it is not common.

*Peritonitis* follows when perforation of the ileum takes place. Examples of its occurrence without that accident are said to have been, though very rarely, observed.

**Relapses.**—Even after seemingly decided convalescence has taken place, a relapse may occur, with return of all the symptoms of the disorder, including (Da Costa) the cutaneous eruption. The temperature "bounds," in a relapse, almost at once to 103° or 104°; returning, as in ordinary cases of the fever, in a zigzag manner to the normal degree, with convalescence. This second attack seldom lasts so long as the original one; and death does not often result from it, unless perforation of the bowel takes place.

**Sequelæ.**—Prolonged debility, or a very slow convalescence, is common. The mental faculties are sometimes enfeebled for weeks or months. Paralysis is an occasional sequela. Abscesses have been mentioned; they may occur in the connective tissue, joints, lungs, liver, or spleen. Periostitis, followed by necrosis, of the tibia, femur, or humerus, may happen, though I have known of but two such cases. Perforation of the bowel may, as already stated, occur after convalescence has seemed to be established.

**Morbid Anatomy.**—Omitting variable and merely occasional appearances, the parts characteristically affected in typhoid fever are, the agminated glands or patches of Peyer in the small intestine, the mesenteric glands, and the spleen. Careful study of Peyer's glands, by many observers, has shown that, at first, the glands thicken and become elevated from one to three lines above the membrane around them. They are generally at this time, reddened; but with variable depth of hue. Sometimes, after this, a sort of induration occurs; in other instances, softening. Later, ulceration affects many, though not all, of the altered glands; and this process may go on until, as above said, it may perforate all the coats of the intestine. This, however, is excep-

tional. The healing of the ulcers by granulation is the general rule. Dr. Murchison has reported fatal cases of *sloughing* of the intestine *without perforation*.[1]

The *solitary closed glands* of the small intestine are also commonly enlarged, and often softened or ulcerated. The *mesenteric* glands are almost uniformly enlarged, congested, and softened; occasionally they suppurate.

The *muscles*, especially the *recti abdominis*, in protracted cases, have been shown to undergo a granular, or sometimes a waxy or amyloid degeneration; resulting, in the rectus, occasionally in rupture of its fibres.

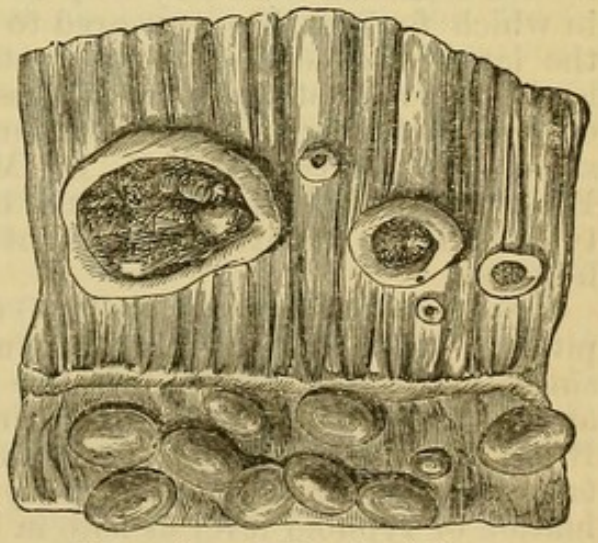
**Pathology.**—Typhoid fever is believed by most authorities to be a general or systemic disorder, with a characteristic secondary local lesion in the intestines. How far the matter deposited in the patches of Peyer before ulceration is *specific*, is a question. Rokitansky and Carl Wedl have believed it to be peculiar—the former comparing it to that of encephaloid cancer, the latter to tubercle. I do not believe that there is anything properly to be called *specific* in its nature.

Latterly, however (1881), under the prevailing tendency to find a "contagium" for almost every disease, it is a very commonly taught doctrine that typhoid fever is eminently a specific disorder. Klebs[2] asserts the discovery of its "microbes" or causative micro-organisms. Eberth, Braulecht, and others have made similar observations.[3] Such discoveries, however, require repeated verification by several observers before they can be accepted in science.

Dr. G. B. Wood held the opinion that an inherent predisposition to the disease exists in many persons, analogous to the tuberculous, gouty, and rheumatic diathesis. This seems very probable. Dr. H. Kennedy, of Dublin, has (1873) advanced a similar opinion.

Another view is, that the affection of the intestine is primary; and that the "typhoid" symptoms result from the absorption into the blood of morbid, putrescent material from the glands of Peyer, producing a *septæmia* or *ichoræmia*. This view does not appear to me to be confirmed by the usual order of events in the disease.

FIG. 122.



Ulceration of Glands of Peyer.

**Causation.**—More room for doubt exists as to this in typhoid fever than in regard to any other common disorder. Depressing causes of all kinds seem to promote it; foul air,

[1] Trans. of Pathol. Soc. of London, 1866, p. 130.
[2] Archiv für Exper. Pathologie, t. xii., p. 231, 1880.
[3] Lancet, May 7, 1881.

removal from home, fatigue, anxiety, etc. Yet it will occur in the entire absence of all such causes. No locality limits it; all climates allow it; from the Arctic regions to those bordering upon the tropical; from the cities of the East to the Rocky Mountains. The "mountain fever" of hunters in the far West was found in the autopsies of Dr. Hammond to present the lesions of Peyer's and the mesenteric glands.

Such universality is very much in the way of the "pythogenic" theory of Murchison (*i. e.*, its reference always to foul air, as that of sewers), or that of Budd, that its only cause is a specific matter, passed from the bowels of those having it, and by water or air, conveyed into the systems of others.

Contagion of this kind is, nevertheless, widely believed in now, especially in England. Some facts asserted (Flint, Canstatt, Budd, Watson) in proof of it are hard to explain without admitting such a mode of propagation (*e. g.*, by the discharges of a patient getting into a well, etc., so as to contaminate drinking-water). Dr. Ballard has reported[1] instances in which it appeared to be propagated by the milk served by dairymen. The pans used for the milk appear to have been washed with water exposed to contamination. A more extensive series of cases in the west end of London, in the summer of 1873, was traced to the same mode of propagation.[2] Prof. I. Buckman asserts the observation of a peculiar "fungoid or confervoid" growth in water, contaminated by sewage or otherwise, and productive of typhoid fever. But the large majority of cases allow of no such explanation; most of all those occurring in the open country.

There is no doubt that typhoid and typhus fevers may *coexist* as epidemics; sometimes affecting the same patient, the one fever shortly after the other (Gairdner); and occasionally together, as a hybrid disease. This may help us to account for some instances in which foul air has appeared to generate typhoid, and where the latter has seemed to be contagious. My own experience leads me to adopt the view expressed by Niemeyer, Anstie, and others, that "typhoid fever is certainly not contagious in the same sense as typhus is." Dr. Murchison[3] states that, in the Fever Hospital, in fourteen and a half years, with 2506 cases of typhoid fever admitted, only eight new cases originated in the hospital.

Liebermeister has stated (1865) that he has never, in the hospitals of three cities visited by him during many years, seen a single patient, physician, or nurse attacked with typhoid fever, although cases of it were placed in the general wards. Dr. R. Bruce Low, of Yorkshire, England, has reported some striking facts showing the great probability, if not certainty, of the origination of typhoid fever *de novo* in isolated localities.[4]

Dr. S. S. Turner, of Dakota,[5] writes thus: "The prairies of Dakota are very healthy. The air is exceptionally pure and invigorating. And yet typhoid fever is not unknown here, as

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[1] British Medical Journal, Nov. 26, 1870; Lancet, April 5, 1873.
[2] Lancet, Aug. 16, 1873.
[3] On Fevers, p. 428.
[4] Philadelphia Med. Times, Dec. 18, 1880, p. 178.
[5] N. Y. Med. Record, April 30, 1881, p. 502.

something entirely distinct from the indigenous mountain malarial remittent so called. An occasional 'sporadic' case is seen at military posts where the sanitary conditions are seemingly the best, and the general health entirely satisfactory. I have seen the same thing in commands living in tents upon the dry prairie, where the natural conditions were perfect, and the privy-sinks remote from the camp. These cases have furnished perfect clinical histories of typhoid, and where they have terminated fatally the pathological conditions were found to be typical, as specimens now in the Army Medical Museum will testify."

Dr. Thorne Thorne's so-called "crucial instance" of the extension of typhoid fever by drinking-water[1] falls decidedly short of that character, since the presumed initial case was by no means certainly one of typhoid fever: all that is made clear in Dr. Thorne's report is, that the man had diarrhœa, but was able to walk about and be at work.

In a number of places in the country, suspicion has fallen, with reason, upon the too close proximity of *privies*, or foul drains, to *drinking wells*, as a promotive cause of typhoid fever. More than twenty cases were thus directly accounted for in Germantown, Philadelphia, in 1880. At Zurich, Switzerland, in 1839 and 1878, epidemics of typhoid fever, with 440 cases in one instance, and about 500 in the other, followed immediately upon a musical festival. Investigation connected the disease with the use of bad veal, furnished by an innkeeper of the place.[2] *All kinds of foulness* no doubt promote typhoid fever. This I believe to be the true solution of the question, in regard to the influence of contamination of water by privies, sewers, etc.; there being no sufficient proof of the now current opinion, that the disease depends upon a "specific infection" or "contagium" passed from the bowels of a typhoid fever patient, which must in some manner get into the body of another to produce the disease. Dr. Austin Flint[3] writes thus: "under ordinary circumstances it is not diffused by contagion;" "facts appear to show conclusively the spontaneous generation of the causative agent in the great majority of cases."

Typhoid fever is rarest in old age; not frequent in childhood; most common between fifteen and thirty years. Few have it under ten or over forty; almost none beyond fifty. It scarcely ever (relapses apart) occurs a second time in the same person.

**Diagnosis.**—From *remittent* fever, typhoid is known by the usual absence of vomiting and of sallowness of the skin, the slower onset, more protracted course, the *hebetude* or mental dulness and drowsiness, and the abdominal symptoms. Vomiting may occur in children.

From *typhus* fever, the distinctive points[4] are as follows:—

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[1] Practitioner, June, 1879.
[2] Journal de Médecine, June, 1879.
[3] Practice of Medicine, 4th edition, 1873, p. 883.
[4] The credit of first establishing the non-identity of typhus and typhoid fever belongs to Dr. W. W. Gerhard, of Philadelphia; 1837. See note on p. 462.

| *In Typhus.* | *In Typhoid.* |
|---|---|
| No epistaxis nor bronchitis; | Epistaxis and bronchitis; |
| Bowels constipated; | Diarrhœa; |
| Belly seldom tympanitic; | Tympanites, gurgling, etc.; |
| Miliary eruption, 5th to 7th day; | Lenticular rose spots; |
| Progress moderately slow; | Progress very slow; |
| Death often within ten days; | Death rarely within 14 days; |
| Countenance dusky red; | Countenance purplish red; |
| Causation mostly obvious; | Origin obscure; |
| Anatomy not peculiar. | Lesions characteristic. |

As Dr. J. W. Miller[1] has pointed out, the duration of elevated temperature is, in typhus, rarely longer than eighteen days; in typhoid, seldom less than twenty-one days, and often more than thirty. In typhus, also, the evening temperature is, not unfrequently, lower than that of the morning; in typhoid, the evening temperature is almost constantly higher than that of the morning.

Cases called "febricula," or "irritative fever" (formerly "synochus") are described by some writers, and met with once in a while in practice, which give a good deal of trouble in diagnosis. Some of these, probably most of them, are mild examples of typhoid fever. A few may be called *walking* cases: the patient being able to keep out of bed.

**Prognosis.**—The mortality from this disease varies greatly under different circumstances. The possibility of perforation of the ulcerated bowel gives an element of uncertainty to every case. Probably one death in twenty cases will represent its average mortality. The favorable and unfavorable symptoms, other than those common to typhus or other febrile affections, have been indicated sufficiently already in our account of the disease. The state of the tongue, especially at the period of defervescence (end of second week, about), should always be noticed, as it aids our observation of the abdominal symptoms in concluding upon the progress of the intestinal lesion. Hemorrhage from the bowels is so far at least an unfavorable sign, that it shows the intestine to be so deeply involved as to make perforation not improbable. Patients before robust may survive a quite large hemorrhage during typhoid fever. If, however, repeated, or occurring in a feeble subject, it presages danger of exhaustion.

**Treatment.**—Self-limited as typhoid fever is, no *cutting short* of it is possible. We must *conduct* the patient through it as safely as we can. For this, very little medication, perhaps none, will suffice, with good nursing, in many cases. I have treated the disease with so little medicine, that it might be said to have been left to nature, supported by regulated liquid nourishment alone. Yet this is not always proper or safe.

The course of treatment learned in the Pennsylvania Hospital many years ago, has been followed throughout my practice with generally successful results. My only deviations from it have

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[1] Brit. and Foreign Medico-Chir. Review, Oct. 1868, p. 464.

been in the direction of diminishing the amount of medicine given. It was, upon the average, as follows :—

In the course of the first few days, if the bowels were costive, a teaspoonful of castor oil was given ; after that, no laxative. During the first week, while the fever was highest, the tongue furred and often dry, skin hot and without perspiration, small doses of blue mass with ipecacuanha were prescribed, with the view of favoring freedom of the secretions. Afterwards, or at the same time, spiritus mindereri (liquor ammonii acetatis) was given, a tablespoonful (diluted) every two or three hours, from noon till near midnight, as a diaphoretic.

Liquid food is necessary from the first. Oatmeal gruel, toast-water, rice-water, the first three or four days ; then milk may be added, one or two tablespoonfuls every two or three hours. *Less than half* the cases of typhoid fever which I have seen have required alcoholic stimulation at any stage ; not more than one-fourth of the cases need it before the middle of the second week, when the fever begins to decline. After that time, many require it, first in wine whey, half a wineglassful about every three hours ; later, when weaker, brandy or whisky punch ;—a tablespoonful of whisky, for instance, every four, three, or two hours, sometimes every hour, with the same or twice as much of milk. Sir W. Jenner's rule is undoubtedly a good one, "in typhoid fever to abstain from giving alcohol if, in the case before me, I *doubt* the wisdom of giving it ; and when there is a question of a larger or a smaller dose, I, as a rule, prescribe the smaller : the reverse of the rule in typhus fever."[1] Beef-tea is indispensable in nearly all cases, from the second week. It may alternate with punch, hour by hour. As in typhus, a patient prostrated with severe typhoid fever should be waked from sleep to take the required nourishment, night and day ; otherwise he may sink for want of it. *Coffee* has been used as a stimulant by Guillasse, with asserted advantage.

Quinine, I am satisfied, has no place as a *curative* of this fever. It is useful as a tonic after the critical period of the passing of the height of the fever ; not more than eight or ten grains (in one or two-grain doses) in twenty-four hours [F. 2]. I am not a believer in the validity of the "antipyretic" action of quinine, in continued fever, in twenty-grain doses ; and am glad to be able to quote the authority of Sir William Jenner to sustain my want of confidence in it.

In the first ten days, headache and heat of the head may call for the application of cold to it ; sometimes for leeches to the temples or back of the neck. Dryness and heat of the surface of the body may be best allayed by sponging all over (one part only uncovered at a time) with tepid whisky and water. This operation, done in the evening, will promote sleep. Dr. Drasche,[2] of Vienna, introduced the systematic use of cold water externally, to lower the temperature, which is morbidly increased in fever. Brand, Liebermeister, Ziemssen, Wilson Fox, and others have applied this remedy extensively, and with reported success.

[1] Lancet, Nov. 15, 1879.
[2] British Medical Journal, Feb. 19, 1870.

Ziemssen's *gradual* method is the best: immersing the patient, when the heat is excessive, in a bath at 95° F., the temperature of which is gradually lowered ten or even twenty or more degrees, according to the effect produced. In this way, morbid heat may be lessened, without shock or undue depression. On the whole, the mortality of typhoid fever does not seem to be lessened by its treatment with cold bathing. Riess (1780) uses, instead, prolonged lukewarm baths. Manassein, of St. Petersburg, prefers cold *enemata*.

Great tenderness of the abdomen may be treated by application of large poultices of hot mush, with which one-fourth or one-fifth part of mustard has been stirred. Diarrhœa being a symptom of the disease, it needs not to be checked unless the passages number more than three or four a day, or are uncommonly copious. Then, a pill of tannic acid and opium (3 grs. of the former to gr. ¼ of the latter), *pro re nata*—or *small* doses of paregoric or laudanum, will generally reduce it. Rarely is it necessary to use laudanum and starch enemata, or to add acetate of lead to opium in pill. Hemorrhage from the bowels is not apt to continue long, or to be often dangerous. If it should be so, astringents, as lead and opium, by enema or by the mouth, must be used.

Shall we attempt to *medicate* the affection of the glands of Peyer? This also being symptomatic, its palliation only appears to be indicated. I am not satisfied that any special treatment for it is demanded in mild ordinary cases. But if, after the tenth or twelfth day, the *defervescence* does not take place, and restlessness is great, with abdominal tenderness, a dry tongue and considerable diarrhœa, oil of turpentine is recommended by authority (Wood) and experience. The dose should be not more than ten drops four times daily in mucilage, with a few drops of laudanum. Nitrate of silver is used instead by some. I have had no experience with it; but I have often seen the good effects of turpentine. This seems to act as a local alterative to the ulcerated surface of the bowel. Pécholier, of Montpellier, gave creasote, 3 drops daily, diluted with lime-water and orange-flower water, to sixty hospital patients, with typhoid fever, as an "anti-zymotic" remedy. He asserts that it lightened and shortened the attack. Dr. W. Pepper[1] decidedly prefers nitrate of silver; ⅙ of a grain three or four times daily for an adult, in pill, or for children, in a mucilaginous mixture.

When hemorrhage from the bowels occurs, it is very important to avoid increasing it by much movement or change of position. *Enemata of cold water*, with, in serious cases, the addition of astringents and opiates, will be likely here to do good service. Of course it is necessary that such enemata should not be of too low a temperature, or be repeated so frequently as to cause depression.

Attention to the state of the bladder, day by day, to prevent or relieve retention of the urine, is important. Long-protracted cases may demand a great deal of care to avoid severe bed-sores. In anticipation of these, when threatened, frequent changes of

[1] Phila. Med. Times, Feb. 12, 1881, p. 299.

position should be made, and the parts should be bathed with whisky, spirits of camphor mixed with olive or lard oil, or soap liniment. The bed-clothes must be kept smooth under the person. Adjustment of pillows, with the addition of small ones made for the purpose, may do much. When a part is unavoidably pressed upon, it may be protected by a piece of kid spread smoothly with soap plaster, or adhesive plaster. Actual excoriations must be treated like ulcers—with simple cerate, lime-water, poultices, adhesive plaster, etc., according to their condition.

## PLAGUE.

Of this oriental disease, now fast being extinguished, little need be said here. It was probably plague of which Thucydides gave account, at Athens during the 2d Peloponnesian war. Livy describes an epidemic, probably of plague, at Rome; Procopius, in Egypt and Palestine, in the 6th century; Boccaccio, at Florence, in the 14th century; and Defoe, in London, near the end of the 17th. Its last outbreak at Marseilles, in 1720, destroyed nearly half of the population. Before that time, it had occasionally reached Paris also, and some of the German cities. In 1828–29, it prevailed with severity amongst the Russian soldiers in Bulgaria. In 1876, it occurred at Bagdad, Hillah and other towns in Mesopotamia; and in 1877–78, in scattered localities in Russia. Early in 1879 it proved very destructive at Vetlianka and a number of other fishing villages extending for a hundred miles on both sides of the river Volga. All of these villages are described as having been in a very filthy condition. Early in 1881, a number of deaths from plague were reported as occurring in and near Bagdad. Plague is a zymotic affection, allied to the fevers, of rapid course and great mortality. Its symptoms are debility, restlessness, fever, delirum, vomiting, hemorrhages, petechiæ, and glandular swellings, especially in the axilla, or carbuncles. Death often takes place in two or three days. Sometimes, however, the case may last for two or even three or four weeks. The characteristic buboes occur in the axilla, neck or groin; always originating in enlarged lymphatic glands. They vary in size from that of a chestnut to that of a goose's egg. Maturing toward the middle of the second week, when the fever has already begun to decline in favorable cases, many of them undergo resolution; others suppurate. Carbuncles are met with in not more than one-fifth of all the cases; their appearance is usually later than that of the buboes. Appearing upon any part of the body, they are most frequent on the legs. They begin as red pimples; the mildest form vesicles which burst and dry up; the worst pass to a gangrenous condition; involving all the surrounding tissues.

While plague is almost entirely a disease of hot or warm climates, its epidemics decline or cease at the height of the tropical summer.

Plague was once thought to be the most contagious of diseases. Excellent reasons are given, however, for believing it not personally contagious at all; but locally infectious. Not quarantine, but sanitary police and hygienic improvements in the great cities (Cairo, in Egypt, for example) have almost put an end to it.

In **treatment** of plague, diaphoretics, opiates, and mineral acids are best reported of. Polli's treatment with the sulphites might be tried in it with propriety; and also that with carbolic acid, benzoate of sodium, etc., in small doses.

### ERYSIPELAS.

**Synonyms.**—*St. Anthony's Fire; Rose.*

**Varieties.**—*Traumatic* and *idiopathic.*[1]

**Symptoms.**—These are both local and general. Sometimes the former and sometimes the latter appear first. *Idiopathic* erysipelas generally begins with an ill-defined cold stage, followed by fever. The eruption most often commences on the face, with soreness to the touch, and redness; which spread like a slow conflagration, from part to part. This character of continuous diffusion or *spreading* is pathognomonic. Heat and moderate swelling attend the eruption. It may extend almost all over the body. It may also be superficial and transient, or the inflammation may involve the subcutaneous cellular tissue (especially on the limbs), causing suppuration and sloughing.

The fever of erysipelas has no special features, nor has the disease any definite period of duration. When the scalp is the seat of the eruption, delirium is common, and inflammation of the brain, or fatal coma, may follow. Otherwise, the danger of the disease seems to be from suppression of the function of the skin, and exhaustion. Traumatic or secondary erysipelas combines the danger of the disease itself with that of the injury, abscess, or other local affection from which it starts. *Sthenic* and *asthenic* forms or types of the disease may be discerned, according to constitution and circumstances.

Erysipelas is often destructive in surgical hospitals, as an endemic or infectious malady. Ventilation and cleanliness will do much towards its prevention. Absolute contagion is not proved of it; but the theory of "continuous molecular change" (Snow) applies very well to it. The immediate promotive cause of it would seem usually to be *accumulation of effete material* thrown off from the human body in connection with *inflammation.* It appears most probable that erysipelas is, pathologically, a *capillary lymphangitis, i. e.*, inflammation of the minutely distributed lymphatic vessels of the skin.

**Treatment.**—As above remarked, erysipelas may be more or less sthenic or asthenic. Thus we may account for the diverse views and results of its treatment. It is very common now to treat erysipelas with free stimulation. Yet I do not remember ever to have lost a case of erysipelas, in which life was not already in serious danger from a previous injury—either in private or hospital practice. Nor have I, in more than a very few out of a large number of cases, found occasion to give any alcoholic stimulant whatever.

I have commonly begun the treatment of an attack of the disease with a mild saline cathartic—as a *small* dose of Epsom

[1] Billroth asserts that erysipelas *always* depends on morbid lymphatic absorption. This is doubtful; since the degree in which the lymphatic vessels are involved varies much in different cases.

salts, or one of Rochelle salt or citrate of magnesium. Then blue pill with ipecac, if the stomach be good (gr. ½ of the former with gr. ½ or gr. ¼ of the latter, every three hours) and neutral mixture or liquor ammonii acetatis. *Asthenic* cases appear to gain by the free use of iron—twenty drops of the tincture of the chloride every three hours. After C. Hamilton Bell, some practitioners use tincture of chloride of iron in *all* cases of erysipelas. I am not convinced of the propriety of this practice. Dr. Da Costa generally gives quinine as well as iron.

Locally, mild emollient applications are the best, unless as *cordons sanitaires*, or lines of demarcation. At the very start, lard, tallow, or cold cream may almost "put out the fire" at once. Mucilage of slippery elm bark, or of flaxseed and diluted lead-water, are all that my experience justifies for application to the eruption itself. I would not try to *suppress* it. I think I have seen one death result in the practice of another physician from the attempt to do this with nitrate of silver over a large surface; cerebral congestion and coma taking place.

Solution of *bisulphite of sodium* has been used, internally and externally, with great asserted advantage. A solution of *camphor in ether* is said to have proved useful in some cases. Cavazzani[1] adds to this combination tannic acid (camphor and tannin, each 15 grains; ether, 2 drachms).

To *head off* the eruption is perhaps only worth while when, from the face, it is spreading to the head. Tincture of iodine, or strong solution of nitrate of silver, may, for this purpose, be painted in a line of half an inch in width; or a narrow strip of fly blister may be put on.

A seemingly heroic practice (Hüter, 1874) is said to have been successful, viz., the hypodermic injection of a two-per-cent. solution of carbolic acid near the inflamed parts; avoiding, however, the most vascular tissues, for fear of carbolic acid poisoning. Rothe,[2] of Altenburg, has made considerable use of the external application of carbolic solutions in erysipelas. Dr. Radcliffe,[3] of Washington, D. C., reports the history of a severe case in which such an application (carbolic acid, ℥ij, with olive oil, ℥iv, put on freely with a feather) appeared to do much good.

When, in traumatic erysipelas, a limb is greatly swollen and inflamed, threatening destruction of the subcutaneous tissues, long incisions through the integument to relieve pressure and congestion may be justifiable.

A milk diet is usually suitable in this disorder.

## FLOOD FEVER OF JAPAN.

This disease is said to prevail in July and August in flooded districts, affecting about eight per cent. of those residing there. Beginning with rigor, fever follows, nearly continuous for about two weeks, with constipation, until the latter part of the attack, when diarrhœa may occur; sometimes deafness and delirium;

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[1] Lond. Med. Record, Nov. 15, 1876.
[2] Deutsch. Med. Wochenschr., Jan. 22, 1881.
[3] Phila. Med. Times, April 23, 1881.

temperature, from 101° to 104°. Characteristic of the disorder are swelling and tenderness of the lymphatic glands of the neck, axilla, and groin, and an eruption of large, flat, dark-red papules, with smaller lichenoid spots between them. The glands become tender about the second day, and the eruption appears on the sixth or seventh day of the attack. Fatal cases have high fever, copious bloody stools, maniacal delirium, and coma. The average mortality is about fifteen per cent. of those affected.[1] I have, so far, met with no account of the *treatment* found best for this disease.

### PUERPERAL FEVER.

In the time succeeding confinement, liability always exists (besides the transient "milk fever" about the third day) to *metritis*, and, more often, *peritonitis;* also, but with much less frequency, to that asthenic febrile affection, to which the designation *puerperal fever* is best given.

As this belongs rather to *obstetric* practice, I propose only a brief allusion to it. Beginning with a chill, its symptoms are fever, with an extremely rapid pulse, pain in the abdomen, and tenderness on pressure, or on motion, as in drawing up the knees; tympanites, often; a day or two later, vomiting, delirium, and tendency to collapse. Death may occur within a week; and more than half the cases are fatal. Sometimes the pain and tenderness of the abdomen are slight or temporary only; the general debility proceeding still to the fatal end.

**Autopsy** shows, in much the larger number of cases, the manifest lesions of peritonitis; serum, lymph, with extensive adhesions, or pus. In a few cases, however, these are absent entirely. Inflammation of the uterine veins *and lymphatics* has been met with.

In **causation,** it is observed that nearly all the cases of this disorder (distinct from simple *peritonitis* of the lying-in room) take place in towns, or in hospitals, especially those which have surgical as well as obstetrical wards. Puerperal fever is many times *endemic* in such localities. Physicians have been beset with it, in some instances, in practice, as a "private pestilence;" every woman attended by one practitioner, for months together, being attacked by it, when others have none of it. Hence we infer two or three things.

One, that this fever has a material zymotic cause, which may be localized. Another, that the *materies morbi* seems to be conveyable by hand from person to person. Although disputed by eminent authorities, the evidence preponderates in favor of this opinion. Some such evidence has come immediately to my own knowledge. Further, several morbid poisons appear, in the peculiarly susceptible, *quasi-traumatic* state of the womb and abdomen after delivery, to promote the disease. *Erysipelas* does so, or at least the conditions productive of erysipelas; also, the typhus poison; perhaps that of small-pox and scarlatina, etc.[2]

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[1] Lancet, Jan. 10, 1880.

[2] Dr. O. F. Manson described *malarial* puerperal fever in the Virginia Medical and Surgical Journal, 1855.

As to erysipelas, it presents a close and striking analogy with puerperal fever. Thus:

*Erysipelas* is an acute febrile disease, occurring most often in surgical hospitals, in which a peculiar diffusive inflammation is a prominent characteristic; the seat of this inflammation being the *skin*, *lymphatics*, and connective tissue.

*Puerperal fever* is an acute febrile disease, most common in lying-in hospitals, in which a peculiar diffusive inflammation is a prominent characteristic; the seat of the inflammation being the uterine veins, *lymphatics*, and *peritoneum*.

**Pathologically,** some questions are not yet entirely decided. Is puerperal fever a special disease, with one specific morbid material cause or virus? or is it a *cachæmia*, which *any* morbid poison has power to produce during the lying-in state? or, again, is it an *ichorhæmia*, from absorption of foul matter from the cavity of the uterus by its semi-patulous sinuses? or a *pyæmia* from inflammation and suppuration of the uterine veins?

I am not ready to answer these questions. Perhaps the *ichorhæmic* theory has the most of evidence at present in its favor; adding to that the hypothesis of "continuous molecular change," alluded to already in another place. Dr. Fordyce Barker believes the disease to be a specific disease, entirely peculiar to the puerperal state.

Practically, sanitary measures of precaution are clearly indicated to *prevent* puerperal fever. One of these is *personal*. It has been well said that "an offensive post-partum vaginal discharge must not be permitted. It must be prevented by skilful management of the third stage of labor, by insuring efficient lochial drainage, and, if necessary, by washing out the utero-vaginal canal with antiseptic fluid." For this latter purpose, Dr. J. M. Duncan[1] prefers a solution of carbolic acid, 1 part in 40 (occasionally 30) of tepid or warm water. Lying-in hospitals, moreover, must be great evils, rather than benefits, unless they have the best possible situation, construction, and administration. And no such hospital, or ward, should ever be under the same roof or in the same inclosure with a surgical ward or hospital. Moreover, in private practice, attendance on delivery by a physician who is visiting at the time a case of puerperal fever or of erysipelas is at the risk of the patient; if the danger of conveyance of the disease be removable, it is only so by the most careful and thorough cleansing and disinfection. The clothes should be changed, and the hands washed in strong solution of chlorinated soda or carbolic acid, before making such a transit from the one patient to the other. Several physicians in Philadelphia always decline confinement cases under the circumstances named.

The **treatment** of puerperal fever has often proved unsatisfactory. I had intimate knowledge of the experimentation to which it was subjected in the wards of the Pennsylvania Hospital by

[1] Lancet, Nov. 6, 1880.

the late eminent Drs. Meigs and Hodge, between 1845 and 1849. Venesection, purging, and mercurials, etc., were tried amply, and failed most signally.

Quinine in tonic doses, with beef-tea, and, if collapse be threatened, alcoholic stimulation, has, though far from always successful, had at least better results. Leeching the abdomen freely, at the beginning of the attack, in the least asthenic cases, does important good. After the leeches, for a day warm poultices may be applied, then a large blister. Sulphites and carbolic acid may be worth trying in this disease. Béhier, Winckel, and Joulin[1] speak well of the application of ice, in a bladder, to the abdomen, continued until a reduction of the temperature has been obtained.

For the personal prophylaxis of puerperal fever, obstetricians of authority confirm from experience the reasonable view, that it is of great importance to empty the womb, and if possible the vagina, thoroughly, after child-birth. Good uterine contraction is indispensable as a safeguard. Washing out the vagina, within a few hours of delivery, with lime-water or solution of glycerin, may also be recommended for a similar end.

## CHOLERA.[2]

**Synonyms.**—*Epidemic, Spasmodic, Malignant, Asiatic, Indian Cholera; Cholera Algida; Cholera Asphyxia; Mordshi.*

**Symptoms and Course.**—Premonitory diarrhœa, mostly painless and watery, occurs in most, but not in all cases. Its duration varies from an hour or less to two or three days. The worst epidemics of cholera have been marked by some cases of fearful rapidity. In India, in a few instances, death has resulted, by collapse, in ten minutes.

Commonly, the diarrhœa increases in frequency and copiousness, and in a few hours vomiting commences. The discharges are colorless or "rice-water" like, and are spirted out with spasmodic force. The skin grows cold by degrees, and great debility comes on, with cramps in all the limbs usually. The temperature in the *rectum* and *vagina* has been several times found to be higher than natural. Dr. D. W. Parsons[3] asserts a constant difference of about 8° between the axilla and the tongue; the latter being the colder.

If not checked, *collapse* arrives; with intense thirst, oppression in breathing, loss of voice, disappearance of the pulse, suppression of urine, cold, *blue*, and shrunken skin, sometimes bathed in sweat, and, at last, cold breath; ending in death. This occurs, on the average, in about eighteen hours.

When reaction takes place, recovery may immediately become complete, or a low fever may supervene. The termination of this may be in death within a few days, or recovery in a week or two.

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[1] Am. Journal of Med. Sciences, April, 1871, p. 504.

[2] See, for the fuller statement of the author's views upon this disease, his essay, entitled "Cholera: Facts and Conclusions as to its Nature, Prevention, and Treatment." Philadelphia, 1866.

[3] Liverpool Medical and Surgical Reports, October, 1871.

**Appearances after Death.**—*Rigidity* occurs *soon;* sometimes in less than an hour; generally within two hours. Startling *movements* of the corpse have been several times noticed; as of a patient, dead with cholera, slowly lifting both hands over the chest and joining them; opening the eyes and rolling them downwards, etc. *Increased heat* of the body, cold during the attack, has been sometimes observed after death. Internally, several of the great organs, the brain, spleen, and kidneys, at least, are commonly gorged with blood. So are the *right* cavities of the heart; but the left side of the heart is empty or with but little blood, and firmly contracted. The lungs are almost bloodless. The liver varies in appearance; but the gall-bladder is almost always *full of bile.* The urinary bladder is, constantly, greatly contracted. The stomach and intestinal canal are congested and swollen; the late Prof. Horner observed the frequent throwing off of the "epithelial" lining of the canal; Böhm, of Germany, confirmed this; Drs. Parkes, Gull, and Lindsay assert it to be a post-mortem occurrence.[1] The intestinal glands are found considerably enlarged. The *blood* has been carefully examined by Drs. Garrod, Schmidt of Dorpat, and others.[2] Its water and salts transude into the alimentary canal, with some of the albumen and fibrin; also *the contents of the blood-cells transude into the serum.* The blood drawn from a vein during life is (as I have seen it) dark, thick, and tarry, scarcely capable of flowing. Schmidt found the amount of oxygen in the blood-corpuscles less than half the normal proportion. The blood is *acid* sometimes in cholera; the reverse of its natural reaction.

The *ganglia* of the "sympathetic" system have been often examined, and are frequently changed in appearance; congested, softened, altered in color; but no *special* change has been shown to belong to them in cholera.

**Diagnosis.**—Common cholera morbus alone, when severe, resembles epidemic cholera so much as to be easily mistaken for it. The *collapsed* stage of the one, preceding death, is almost identical in appearance with the collapse of the other. But cholera morbus is *caused* by some irritant of the stomach and bowels and is clearly an affection of *those organs*, not a *toxæmia* or systemic disorder; it is sporadic, *not epidemic;* in it the discharges are always *bilious* at first, and mostly so to the last; collapse in any degree is *rare*, and death, under judicious treatment, very uncommon. In all these things, it differs greatly from Asiatic cholera.

**History.**—Putting aside some possible resemblance to this disease in descriptions of Aretæus and one or two other ancient authors, probably the epidemic in France, of 1545, "*troussegalant*," came more near to it. The earliest distinct accounts of cholera were given by D'Orta, at Goa, 1563, and Bontius, a Dutch physician of Batavia, 1629. Willis (1684), Morton (1692), and others, described epidemic fluxes and "dysenteries" in England in such terms as strongly to remind us of cholera; and so did Morgagni, in Italy, in 1733; and Degner, of Nymwegen, in the Netherlands

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[1] Edinburgh Med. and Surg. Journal, January, 1855.
[2] Brit. and For. Medico-Chirurgical Review, July, 1854.

(1736). Some British physicians (Greenhow, Aitken) now believe that cholera may have repeatedly visited England. It appears to me more probable, however, that this opinion is due to an overestimate of the resemblance between the autumnal cholera morbus of Great Britain (like our own) and the pestilential disease.

Certainly, cholera must have existed in India for an indefinite time.[1] From 1781–2 dates its extended prevalence, in a most destructive form; at Calcutta, in Madras, on the Coromandel coast, and in Ceylon.

In August, 1817, Jessore was the birthplace of the first great migratory epidemic. Shortly after, in Calcutta, 36,000 were attacked in three months. At many military stations it was very severe. Roads were covered with dead and dying, unable to reach their homes. In November, the grand army of the Marquis of Hastings was devastated by it. Of 90,000 men, in twelve days 9000 had died. On marching the army across a river to dry and elevated ground, the commander was relieved of this otherwise invincible enemy.

In 1818, the Burman empire was invaded by cholera; and there, and elsewhere in Asia, its ravages were fearful. In 1819, 150,000 died of it in the Presidency of Bombay. It also reached Mauritius, 20° S. latitude, three thousand miles from any place before visited by it. The Island of Bourbon was visited in 1820; as well as the Philippine Islands. In 1821, Borneo and Java were affected; and a large Persian army was repulsed by it from before Bagdad, without a battle. In 1822 its limits were much narrowed, and its destructiveness abated.

India almost escaped in 1823, but China was ravaged by it; and it extended northwestward, in that year, to Orenbourg, on the Ural, near the borders of Europe and Asia. In 1826, it passed the great wall of China in its northwest progress; but almost left Western Asia. It reappeared in Persia in 1829.

Orenbourg was revisited in that year, and the epidemic there lasted from August till near the end of February. This city had a population at that time of 11,000, of whom 6000 were soldiers. Those first affected had no communication whatever with any infected place.

1831 saw the cholera in the north of Europe, as far as Archangel, near the Arctic Ocean, more than 64° N. latitude. It reached Warsaw in April, during an insurrection, and was very fatal. Hungary suffered from May to September, losing 100,000 of its population. In June, St. Petersburg, and in September, Moscow, were reached by the pestilence. Berlin had it also for three months and a half, beginning in August. Mecca was attacked during the visitation of throngs of pilgrims, in May; of 50,000, as many as 20,000 are said to have perished. In this year, while Hungary was infected, the Austrians surrounded Vienna by a double *cordon militaire;* but in vain. The disease began there in August, and continued for three months. The

[1] Professor Martin Haug has found some distinct references to it in ancient Sanscrit writings. Paisly (1774), Girdlestone (1782), Causis (1794), and Jameson (1820) were early English authors upon it.

southern provinces of Austria and the Rhineland were exempt. Constantinople was affected by it, but not with very great severity. The Turkish government, that year, maintained no quarantine. Cairo suffered dreadfully in 1830–31; and so did Smyrna.

Attacking Hamburg on the 11th of October, 1831, it was officially announced at Sunderland, England, October 26th. It had occurred in several cases in England months before. Three or four weeks later it appeared at New Castle; and, in December, at Haddington, a Scottish town on the Tyne.

Edinburgh and Glasgow first had cholera in January, 1832; London in February; Dublin and Paris in March. London then suffered moderately; Paris terribly—especially in April and May; 20,000 deaths.

On the 8th of June, it first invaded our continent, at Quebec; and, within a week, at Montreal. In the same month it was in New York and Albany. Philadelphia had its first cases in July. Between the 1st of July and the 18th of August, New York had reported 5337 cases, with 2068 deaths. That city lost 3513 in all.[1] From the 27th of July to August 18th, Philadelphia had 1610 cases, with 615 deaths. Boston and Baltimore were moderately affected in August.

Detroit, Buffalo, Elizabeth City in North Carolina, Wilmington and Newcastle, Delaware, Norfolk and Portsmouth, Virginia, and New Orleans, were the principal of more than fifty towns in the United States reached by cholera in 1832. It had entered twelve different States before September.

Havana and Mexico were attacked in the spring and summer of 1833. The *City* of Mexico, notwithstanding its great elevation above the sea, did not escape.

Portugal was also first visited in that year; Spain but slightly until 1834. Northern Italy was affected in the autumn of the same year. In 1835, Alexandria and Malta; in 1836, Rome, Naples, Egypt, and Central America, especially suffered. North Germany, South France, Rome, Naples, Sicily, Malta, Egypt, and Syria, in 1837. After that, cholera disappeared from Europe and America for nearly ten years. It still existed, with variable violence and extent, in India.

In 1847, it ravaged a Russian army west of the Caucasus; and in September it returned to Moscow. In 1841, Turkey, Russia, Austria, Prussia, Belgium, Holland, Great Britain, and France (though not Paris) were successively attacked. Then the cholera showed its power to traverse the sea, without human aid or agency, by attacking two emigrant ships, a thousand miles apart, one sixteen and the other twenty-seven days out from Havre, when *no cholera was prevailing at that port.*[2] The *cholera-cloud* itself also reached New Orleans about the same time, and progressed up the valley of the Mississippi. New York was not affected by the visit of the infected ship; the disease not occurring again there until May, 1849.

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[1] In 1834, New York lost 971; in 1849, 5071; in 1854, 2509. Dr. A. Clark, Lecture on Cholera.

[2] Report on Cholera in the United States, by Dr. James Wynne; also, Dr. Gavin Milroy, Brit. and For. Medico-Chirurg. Review, October, 1865, p. 444.

Paris was reached by it in February of that year, but suffered the worst in June. Lyons now had it for the first time. Tunis and Algiers were visited toward the end of the year.

In January, 1849, after Memphis, St. Louis, Missouri, was attacked. Chicago, Buffalo, and other towns on the lakes in May, New York and Philadelphia in the same month. Baltimore had this year only a local epidemic, in July, in the almshouse; the restriction of which to one side of the building was very remarkable. As in 1832, the mortality in Philadelphia was much less for the population than in New York: 1022 deaths occurred in the former city; New York had a mortality 450 per cent. greater.[1] Canada was reached this time from the westward.

In 1848–49 the number of deaths from cholera in England and Wales was over fifty-four thousand (54,398); in 1832–33, nearly thirty-one thousand (30,924). In London,[2] probably owing to greater attention to sanitary measures, the mortality was two fifths less the second time than the first. Some parts of Southern Rhineland were visited in 1849; especially the filthy city of Cologne.

Cholera lingered in various places, almost sporadically, in Europe and America, from 1850 to 1854. Canada and the far West (Indiana also had cases every year) suffered the most in this way, on our continent. In the West, emigrants' camps and military stations seemed especially to furnish the required local conditions.

In 1853, Persia had it severely; also some parts of Northern, Central, and Southern Europe (Copenhagen, Hamburg, Berlin, Piedmont, Lyons, Paris, and Southern Portugal). Before the end of the year it was again in New York, New Orleans, and the West Indies. Mexico had been visited in the spring and through the summer.

1854 was still more a cholera year in Europe and in this country. Scarcely any European state or kingdom was exempt. The French, English, and Russian troops suffered from it much in the Crimea. Greece, Italy, Germany, France, Spain, Portugal, in short, all Europe was traversed by it; 150,000 died of it in France alone; in England and Wales about 20,000. Newfoundland, on our side of the ocean, was reached for the first time in 1854. This was the year of the epidemic at Columbia, Lancaster county, Pennsylvania; so remarkable for the absence of some of the usual promotive conditions of cholera. Our great cities, however, did not suffer nearly so much as in 1849.

In 1855 the disease was widely spread in Europe, though not very malignant, except near the seat of war, before Sebastopol. Egypt and Palestine had it also. In Switzerland, which had been slightly touched before, Basle, Geneva, Zurich, and other places now suffered by it. The next year, 1856, still did not witness its withdrawal from Europe.

Since that period until 1865 I have no means at hand for tracing the movements of epidemic cholera. Dr. Galvin Milroy says

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[1] Dr. J. H. Griscom, Medical Record, March 15, 1866, p. 35.

[2] London had 13,098 deaths from cholera in 1849; in 1854, about 10,000.

that the countries hitherto exempted have been as follows: Australia, New Zealand, and other islands in the Pacific; the Cape of Good Hope and adjoining settlements; the coast of Africa from the Cape as far northward as the Gambia, and including the islands of St. Helena and Ascension; the Azores, Bermuda, Iceland, Faroe Islands, and also the Orkney and Shetland; the southern half of the eastern coast of South America, from the Rio Plata inclusive, Cape Horn, and the whole of the western coast of that continent, from the Cape and along the shores of Chili and Peru to Panama.

In 1865 every one was familiar with the accounts of cholera in Arabia and Egypt in the spring, at Constantinople in July,[1] and afterwards in several parts of Europe, extending, though with but moderate violence, as far as England. While its vast migrations seem to be as capricious or incalculable as the flight of birds or insects, two local causes contributed at least to its *severity* in Mecca and on the Nile. These were the crowds of religious pilgrims at the former place in the spring, and, in Egypt, the insalubrious circumstances attending the operations at the new Suez Canal. In both, "crowd-poison" was intensified to the greatest degree; so that the pest-cause might well find strength for the renewal of its flight onward to the north-west. In Paris, in 1865, 6383 deaths occurred.

In 1866, Europe was invaded by cholera from the south. In June it was in Egypt; then in Constantinople, Malta, Valentia, Ancona, Gibraltar, Barcelona, Madrid, Toulon, Paris, Southampton, Liverpool, and London; as well as, on this side of the Atlantic, in New York, Philadelphia, and other places. In 1867 also it existed, though less destructively, in Europe as well as in the West Indies, Central America, and South America. In 1868, in the early part of the year, it continued in South America, especially in Paraguay and the Argentine Confederation; in which it destroyed more than 40,000 people. It was in part of Russia and also in Cuba in the summer of 1870. In the summer of 1871, it is said to have been very destructive in Persia; and considerably so in some parts of the Russian territory in Europe. By August, it had reached Königsberg, in Germany, threatening a renewal of its westward course; by the beginning of September, being reported as present in Dantzig, Leipsic, and Vienna.[2]

In 1872, also, central Europe suffered by it; most of all in Hungary, Poland, and Prussia. In that year more than 80,000 deaths from cholera occurred in Prussia alone. A remarkably localized visitation of cholera occurred in the latter part of the summer of 1873, in a number of towns in several of the United States; especially in Kentucky, Tennessee, Illinois, Indiana, and Ohio.[3]

During the winter of 1873–4, cholera was present in some por-

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[1] The first case occurred in that city on the 28th of June.

[2] August 15, 1871, Dr. Edmunds, in a note to the "Times," reported a "typical case of Asiatic cholera" in London; and 6 cases are said to have occurred in Paris in the week ending August 29.

[3] Although Dr. Peters constructed a sufficiently ingenious hypothesis for explaining this epidemic by "introduction," such a view was, in this instance, signally deficient in locally authenticated evidence.

tions of South America; being especially severe at Buenos Ayres. Central Europe also was not free; 300 deaths at least occurred in Vienna alone, in 1873; in Hungary, more than 100,000 deaths.

China and Japan have suffered much less frequently from cholera than India. Although the earlier accounts are obscure, it appears that it prevailed in China in 1669, 1770, 1817, 1820, and some other years, down to 1867; and again severely in 1877. In Japan, it was present at least as early as 1819; afterwards at intervals till 1862. From that time until 1877, it was absent from Japan. During the last-named year, a visitation of moderate violence occurred; followed by a still milder one in 1878. In 1879, an extremely destructive epidemic broke out in Japan, lasting through the whole summer, and having a mortality of about 100,000.

I take from Dr. Brigham's treatise (published in 1832) the following table, of the deaths from cholera in 1832, and their proportion to population:—

| | Population. | Deaths. | Equal to |
|---|---|---|---|
| Moscow | 350,000 | 4,690 | 1 in 74 |
| Petersburg | 360,000 | 4,757 | 1 " 74 |
| Vienna | 300,000 | 11,896 | 1 " 159 |
| Berlin | 340,000 | 1,401 | 1 " 242 |
| Hamburg | 100,000 | 446 | 1 " 224 |
| London | 1,500,000 | 1,223 | 1 " 1228 |
| Edinburgh | 150,000 | 72 | 1 " 2033 |
| Glasgow | 180,000 | 395 | 1 " 425 |
| Hungary | 8,750,000 | 188,000 | 1 " 46 |
| Paris | 800,000 | 20,000 | 1 " 40 |
| Montreal | 25,000 | 1,250 | 1 " 20 |
| Quebec | 22,000 | 1,790 | 1 " 12 |
| New York | 200,000 | 2,000 | 1 " 100 |
| Albany | 24,000 | 311 | 1 " 77 |

Supposing the population of Philadelphia to have been at that time 150,000, this with a little over 600 deaths, would give a proportion for our city of 1 in 250 of the inhabitants. In 1849 the ratio was considerably less.[1]

It is an important fact in the history of cholera, that before, during, and after the epidemic has visited a place, many cases, greatly exceeding in number those of typical cholera, occur, of diarrhœa, sometimes also with vomiting, not violent, yielding easily to treatment. To these the name of *cholerine* is often given.[2]

**Nature of Cholera.**—Without discussing opinions at length, it may be asserted that cholera is not at all, like our ordinary cholera morbus, a disorder simply of the stomach and bowels. Being clearly an acute *systemic* affection, changes in the blood are *proved* to occur in it, and may well be believed to be primary; that is, the morbid cause acts through the blood. But this is not all.

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[1] Moreau de Jonnes estimates the number *attacked* as, in France, 1 in 300 of the population; Russia, 1 in 20; Austria, 1 in 30; Prussia, 1 in 100; Poland, 1 in 32; Belgium, 1 in 120; Great Britain and Ireland, 1 in 131; Holland, 1 in 144; Germany, 1 in 700.

[2] The coincidence or anticipation of cholera by epidemic *influenza* and the potato blight has been several times noticed. But there is, clearly, no uniformity in any such association.

Cullen placed cholera, in his nosology, in the class *neuroses*, order *spasmi*. Many medical observers (Binaghi, Loder, Orton, Delpech, Lizars, Coste, Favell, C. W. Bell, Greenhow, G. Johnson, etc.) consider its principal effects to be referable to disturbed innervation, involving chiefly the ganglionic centres of organic life. Dr. Charles D. Meigs, years ago, graphically called the attack the "cholera squeeze." Velpeau, of Paris, repeated this, "le mal vous *tortille*." There, I think, is the pathology of cholera, in one word. As Dr. C. W. Bell says, it is not an adynamic, but a dynamic, or sthenic, collapse.

The heart, its left side at least, is, after death, contracted. The pulmonary artery and its branches are narrowed, making the lungs pale and anæmic. The gall-bladder is full of bile, but the duct is spasmodically closed and detains it there. The urinary bladder is shrunken to half its size or less. The blood-vessels of the whole alimentary canal press rigidly upon their contained fluid, and force its serum out into the stomach and bowels; whence it is, by spasmodic ejections, thrown out. The very skin is, by its involuntary muscular fibres, as well as by vascular constriction everywhere, drawn tightly and closely upon the body. The voluntary muscles suffer with cramps. All is cramp, cramp, within and without. The brain is almost in anæsthesia during the collapse—no delirium, but apathy—as from cerebral anæmia. The blood so compressed grows thick as tar—it scarcely flows, is not aerated, and cyanosis follows; it is detained in the capillary and venous networks of the interior organs, in which congestion is found after death.

Cholera is, then, I say, a poison-spasm; a *ganglionic tetanus*.

**Causation.**—As to this, all cannot yet be known. But it is clear that cholera must have a specific material, migratory cause. I agree with Dr. G. B. Wood, Dr. Austin Flint, Dr. Snow, of Providence, and some foreign authorities, for example the late Dr. Southwood Smith, "the father of modern sanitary reform," in believing that cholera is *not personally contagious*.

My theory is as follows: that the cause of cholera is a (yet undiscovered) protozoon or microphyte, of extreme individual minuteness; which on entering the human body, affects it as an organic poison.[1] That the varying quantity or number of these

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[1] Hallier of Jena, Klob of Vienna, and Thomé of Cologne, have asserted the discovery of peculiar fungi in cholera dejections. Thomé gives the name of "cylindro-tænium" to one form. Hallier calls the fungus "urocystis," and ascribes it to the rice-plant. This view is opposed by Berkeley, a distinguished cryptogamic botanist. Prof. H. C. Wood energetically disputes it. See American Journal of Med. Sciences, Oct., 1868, p. 333. Assistant Surgeon T. R. Lewis, of the British army in India, gives important facts against Hallier's theory. See "Report on Microscopic Objects found in Cholera Evacuations. Calcutta, 1870." E. Semmer (Virchow's Archiv., vol. i., part i., pp. 158–160) asserts partial confirmation of Hallier's views, by the production of the *milzbrand* or splenic cattle-disease, upon the injection of fungus-spores and micrococcus-cells, cultivated from the blood of animals having that disease. Loesch, of St. Petersburg, reports the observation of *multitudes of cercomonads* in recent choleraic dejections. Not impossibly, such minute organisms, even though not peculiar to the disease, may exert a morbid influence by their *number*. (St. Petersburg Med. Journal, 1871.) Dr. Cunningham of India, reported (1880) an investigation of the stools of cholera patients, in which he found certain parasitic monads, etc., to which he gives the name *protomyxomyces coprimarius*; but he does not believe them to be *causative* of cholera. They are often present in the intestines of persons not having that disease; as well as in those of other animals.

organisms may in different cases account (along with individual predispositions and exposures) for the unequal violence of different epidemics; as in the case of trichinosis. Choleraic diarrhœa, or cholerine, so frequent *before* as well as during and after the prevalence of cholera, may in some instances at least be explained by the action upon the alimentary canal only, of a minimum quantity of the cause. The dreadful fatality of some Indian seasons, is on the same view referred to an extreme *accumulation* of it.

A most important part of the theory is, further, that which concerns *promotive* causation. What conditions favor and maintain in life, multiplication, and migration, this *ens primalis?*

All the facts answer, I believe, that *animal matter in a state of rapid and foul decomposition*, putrefaction, along with moderately high (not the highest) temperature, and ordinary moisture, will afford those conditions; and that *nothing else* is required to explain the whole history of the propagation and extension of cholera. Nothing, I mean, but the admission of the existence of the protozoon, or protophyton, which in germs or in maturity, or both, may fly "on the wings of the wind;" or be conveyed to less distances by water; and, with these the above-named conditions of its vital maintenance, as its food and "habitation."

It is, in my mind, *obvious* that this theory will explain all the facts. I believe, also, that some well-known facts can be explained by it *alone*. Such are the facts which account, by the annual inundations, the crowding of the great fairs, the throwing of bodies into the river, and the inconceivable filth of the inhabitants, for the persistent residence of cholera in the Gangetic delta, while everywhere else it is only an occasional visitant.

In Europe and the United States, as well as in India, influences belonging to closely aggregated communities have always been observed to display a power to propagate cholera. It comes most often, stays longest, and is most destructive, in the densest and filthiest cities, and in the worst quarters of those cities.

Very important testimony exists as to the influence of the *drinking-water* of localities. Dr. Snow, of England, asserted the theory that this was the almost universal medium of its propagation. This has, to my belief, been shown to be quite insufficient. But all such testimony is still available in regard to the propagating and extending power of *animal contamination*. Thus, Bethlehem Hospital, supplied by an artesian well, had, in 1849, among 400 inmates, no case of cholera. It was the *only* large lunatic hospital in London which escaped; as it was the only one supplied with spring water. In the district of London supplied from the Thames above the entrance of the sewers, the mortality ranged from 8 to 33 in 10,000 of the inhabitants; in those supplied from below the entrance of the sewers, from 28 to 205 of the same number.

In this country, Dr. James Wynne's report[1] affords, upon almost every page, matter of exactly the same purport as the above. In St. Louis, Louisville, Buffalo, New York, Philadelphia, Boston,

[1] Presented to Parliament, and published in 1852.

etc., similar facts were recorded. It is unnecessary to extract them, they are now so familiar and so commonly accepted.

Dr. D. B. Simmons,[1] of Japan, asserts that the occurrence of cholera in that country, much more often and more destructively than in China, may be explained by the use in Japan of *latrines sunk in the ground*, poisoning the ground-water; while in China the excreta are deposited in boxes, whose contents are carried away daily and used as manure.

But the assertion that contamination of drinking-water is the *only* medium for the propagation of cholera cannot be sustained. In India, for example, Dr. Sutherland, statistical officer to the Inspector-General, reports that the statements often made elsewhere concerning drinking-water "cannot be said to apply to the causation of the disease as it appeared in this country in 1867." Dr. Bryden, surgeon in the Bengal army, says, "I have anxiously sought for evidence of the highly poisonous character of cholera evacuations, with an unprejudiced mind. I do not go so far as to say that the evidence is against the presence of cholera germs in the evacuations. I think it highly probable that latrines are occasionally infected, especially hospital latrines."

Prof. Pettenkofer, of Munich, rejects absolutely the (now quite current) theory of the special extension of cholera by means of the stools of patients contaminating drinking-water. Dr. E. M. Estrazulas[2] has presented important testimony showing that an epidemic of cholera in Paraguay, beginning in 1866 (continuing as an endemic for three years), *could* not have been imported by means of human intercourse, through ships or otherwise; the peculiar circumstances of the war with Brazil making this impossible. At least, it is certain that no quarantine, or other system of restrictions, could have done more, if so much, to prevent its conveyance.

The instances of apparent transmission of cholera by persons, which are quite exceptional, even if we admit a hundred or more authentic examples, are, as I believe, to be explained on the principle of *fomites;* of occasional, *very rare*, carrying of the material cause of the disease, the "germs" of it, in clothing, merchandise, or by the person of a human being; as one might carry skippers on a piece of cheese in his pocket, or a paper of seeds in his carpet-bag.

All of Pettenkofer's and Thiersch's observations in regard to subsoil accumulation and transit, and fecal fermentation after discharge, range themselves naturally under the one general fact which they exemplify, viz., that *animal decomposition is the great promotive cause of cholera;* to which heat and moisture, etc., are merely adjuncts.

But that which suggested first to me this opinion was, the singular history of the outbreak at Columbia, Lancaster County, Pennsylvania, in September, 1854. Cholera had never visited that town before. It is not large or populous, has a rural site on the Susquehanna, and is not built densely enough to exclude malarial fevers. Why should it have cholera at all?

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[1] Cholera Epidemics in Japan; Shang-hai, 1879.
[2] Amer. Journal of Med. Sciences, July, 1873.

Visiting the town with other physicians during the epidemic, I learned that an exceeding drought had reduced the channel of the river to an unusually low ebb, and that, in its bed, a short space above the town, a number of carcasses of sheep and other animals, thrown from the railroad trains, etc., were putrefying rankly in the sun. A reservoir, which supplied many of the people with drinking-water, was filled from the river not far from that spot, and the wind blew from it directly over the town. The first subsidence in the disease, we were afterwards told, attended a decided change in the wind.

At Pittsburg, shortly after the above events, a similar epidemic occurred. A gentleman on a visit to that locality not many days before the disease broke out, informed me that the same condition of the river existed there, with a like abundance of accumulated *putrefying animal matter* exposed to the sun.

In Rhode Island, in the autumn of the same year, I was informed that the local existence of cholera, in a few spots otherwise very healthy, might be traced, in coincidence at least, with a practice not uncommon along the shore of the sea or bays, of dragging up fish in quantities by nets, and spreading them out to rot for manure.

**Prevention.**—Quarantine is urged by many, in this country as well as in Europe, to exclude cholera. Is it available? Will it do any good? I say *no.* Theoretically, if the views advocated in the preceding pages are correct, it falls to the ground, of course. But, more than that, it *never has succeeded.*

Dr. Alison, of Edinburgh, wrote thus in 1854: "It is a fact that cholera has made its way, not uniformly, but very generally, *in spite of cordons and quarantine regulations.*"

Dr. Gavin Milroy, one of the ablest and most industrious sanitarians of our time, published, about the same year, an essay with this title: "*The Cholera not to be Arrested by Quarantine.*" M. Cazalas, Inspector of the Sanitary Department of the French army, after full inquiry, has declared that cholera is non-contagious, and that its preventive should be not quarantine, but an international sanitary code. Dr. A. J. Payne, of the Bengal Medical Service, wrote (1869) thus: "In a large majority of the examples in which the efficacy of isolation is affirmed, it is clearly provable that isolation cannot have had any influence on the events, and in no single instance has its necessity or usefulness been demonstrated." Dr. Bryden, of the Sanitary Commission, India,[1] says that "the geographical distribution of the disease would not have been different had no Hurdwar gathering taken place." He also speaks of a "*cholera wave,*" with definite directions of progress, and adds that "experience in India is certainly on the whole opposed to the doctrine that human intercourse is the only, or even a principal, cause of the spread of the disease over any large area of country."

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[1] Report on the Cholera of 1866–68 in Bengal, etc. In a Report published in 1878, Bryden reasserts his conviction thus: "Human intercourse, giving the widest scope to the signification of the term, cannot pretend to account for any fundamental phenomenon displayed during the progress of epidemic cholera; and therefore I assert the theory to be radically untrue as applied to the behavior of cholera in India."

Pettenkofer, the leading advocate of the hypothesis that cholera is diffused by the influence of an organic poison contained in water, has announced his conviction that local sanitary measures are much more reliable for its prevention than quarantine. Sir W. Jenner has expressed the same opinion.[1]

Quarantine, if sound in theory even, could not avail, never has availed in practice. Its infraction for smuggling and other inducements is everywhere constant and notorious; *this cannot be prevented.* Macaulay (History of England, vol. v., p. 52) states that when a contraband trade was, in the time of William III., carried on between France and England on the south-eastern coast, "it was a common saying among the inhabitants, that if the gallows were set up every quarter of a mile along the coast, the trade would still go on briskly."

One might think that the history of *blockade-running* during the late civil war in this country might afford ample illustration and confirmation of this. Vain, indeed, would be the attempt to close our coast against the introduction of cholera, were it as contagious as small-pox, or as plague was once imagined to be.[2]

The *evils* of quarantine are great, almost incalculable. Sir John Bowring, speaking in the House of Commons in 1841, gave it as his belief that the losses from quarantine in the Mediterranean alone were not less than two or three millions sterling a year.

But what if, instead of preserving, quarantine actually involves sacrifice of *life?* No doubt this has many times occurred. With yellow fever the quarantine epidemic in New York harbor, some years ago, exemplified this. In various quarters reports of travellers show the *miseries* and dangers of the lazaretto, and of the confinement on the vessels detained.

What more do we need than the instance of the steamer *England*, at Halifax? Forty passengers, one account says fifty (out of 1202), died on this vessel during the voyage. She was prohibited from entering port; all were detained on board, and by April 14, 1866, 130 *more deaths* occurred! In all, 159 died while in quarantine. If the eleven hundred and fifty passengers had been *landed* and *scattered*, I, for one, doubt the occurrence of the disease in a dozen of their number, especially as it was reported as *altogether confined to the steerage.*

Were such measures sure to preserve from the epidemic the whole people of a continent, a *hecatomb* like this might find excuse. In the face of facts I regard it as a barbarity. Pelissier, in Algiers, was thought a monster for suffocating a band of guerrillas in a cave; but what is this case of the *England* more like, except in motive? It is closing up hundreds of people for death, as though one might lock the doors and bar the windows against all escape of a thousand people from a burning church; such as that of which we read so harrowing an account, some time back, in South America.

But it will be asked, Would you abolish *all* quarantine—abandon

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[1] Address before the Epidemiological Society, 1866; published 1869; p. 53.

[2] The Governor of Eupatoria is said to have wished the British and French troops to undergo quarantine at the opening of the Crimean war.

all *inspection of ships* whatever? No; I would not. But I would abandon altogether the *current theory* of quarantine, as against cholera most particularly.

Ships should be inspected on approaching ports, because they may have unsanitary conditions intensified in them on a scale sufficiently large to be important. This is, or should be, a part of sanitary police. Nor should it (and here is a great point of difference) include *any* restriction of *persons;* at the most, longer than enough for cleansing of the body and of the clothing, and purification of merchandise by fresh air, and possibly by some disinfecting process in certain cases.

I insist that SANITARY POLICE includes the sum total of available measures for the prevention of cholera in any place.

On this ground, the means required are obvious and familiar. The thorough and frequent cleansing of all streets, alleys, courts, wharves, and vessels, private and public buildings, and empty lots; the abatement of all nuisances; daily removal of offal; efficient sewerage; and *conservancy*, *i.e.*, the cleansing, ventilation, and disinfection of cesspools and water-closets. Among all signs of danger of the location of cholera, none is more significant than the *privy odor*. Let it be everywhere annihilated. Lime, charcoal, dry earth, burning sulphur, chloride of lime, Labarraque's chloride of soda, liquid coal-tar, chloride of zinc, and sulphate of iron are the most available of disinfectants.

The fresh white-washing of cellars is useful; thorough ventilation and drying of them, and of all parts of habitations, still more so. Chloride of lime may be placed in a saucer in any suspected room or other locality in a house. The same in the solid form, or solution of green vitriol, may be thrown daily into a foul privy; and, during cholera time, especially in the case of patients with the disease, every water-closet and vessel used may and should be disinfected constantly by a dilute solution of chloride of zinc, chloride of soda, permanganate of potassium, or carbolic acid. The immediate removal of all discharges from the sick-room, their disinfection and transportation to the safest possible place of elimination, are to be imperatively maintained. All foul clothing must be promptly washed, or, if very bad, disinfected or burned.

These precautions have been proved to be capable of essentially limiting and mitigating the prevalence of epidemics.

Clapton, Burq, and some others have asserted a remarkable antagonism between the effects of *copper* on the human system and the susceptibility of cholera. M. Burq states that, during the epidemic of 1865–66 in France, only one in 1270 workers in copper was attacked; of workers in iron and steel, one in 209; and of those engaged on other metals, one in 178.

**Personal Prevention.**—One principle will suffice here: *to keep the system at par;* neither above its level of excitement, nor below that of its due strength.

For this, regularity of life is required in work, diet, mental movements, and all indulgences. The popular errors most common are, one, to suppose that living on rice or rice-water, avoiding fruits or vegetables, etc., will be preventive; another, to think

constant alcoholic stimulation beneficial for that end. *Both are certainly wrong.*

In 1832 and 1849, the late Dr. Joseph Hartshorne, then in very large practice, allowed in his family all its usual variety of food: boiled corn, peaches, watermelons, cantaloupes, etc., everything but cucumbers; and no cholera resulted from the liberty. My own subsequent experience has justified the practice. Of course care is always needed as to *quality* and *quantity*.

Among those most likely to die when attacked by this disease, the drunkard stands first, according to all records. Nor is he one whit less apt to be attacked than others. Temperance *in all things* is essential to safety during epidemics of every kind.

**Treatment.**—To *discuss* all the modes of management proposed for cholera would occupy too much space. I shall merely enumerate those which have attracted the most attention; and then give my view as to what is so well sustained as to be worthy of further trial and confidence.

**1. Bleeding.**—This was largely practised in India, in 1818–1825, by Corbyn, Scot, Annesley, and others. Without entering upon any argument about it, I will simply say that (as Dr. Brigham's quotations show) as many positive facts have been asserted on behalf of the success of bloodletting as of any other remedy in cholera.[1] My father bled in several cases in 1832, and had confidence in the treatment, as "the most effectual *anti-spasmodic*." In 1849 I bled in one case (a boy of twelve years of age) in incipient collapse. The blood at first was thick and black as tar; in a few minutes it flowed more freely, and the patient *recovered*. I confess that the only thing which makes it unlikely that I will ever try or advise the repetition of this practice is the want of courage to stem the overwhelming tide of professional and popular opposition now existing against it. In this timidity I may be wrong; if so, another generation may afford the demonstration of what is right in such a way that no one can gainsay it.

**2. Calomel.**—This, too, was an old East Indian remedy. Suggested by the almost universal absence of bile in the discharges, which was thought to indicate the need of stimulation of the torpid liver, it has been more largely given than any other medicine in cholera.

Unhesitatingly I hold the opinion that calomel is of no earthly use in cholera. The argument in its favor, from the absence of bile in the stools, is rebutted by the fact of its abundance in the gall-bladder; while the clinical experience quoted for its success is accounted for by the addition to it almost always of opium in the prescription. Nor is the amount of success with it, even then, great. Such is Dr. Gull's conclusion, based upon the examination of a great mass of evidence, given in his report.[2]

Dr. Ayre, a British practitioner of some note, gave prominence to a modification of the old calomel treatment (in which twenty

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[1] In 1861, Surgeon G. R. Playfair, at Agra, India, found venesection to about 8 ounces, followed by stimulants (especially chloroform), the most successful treatment. He reports more than 77 per cent. cured of genuine cholera.—*Ind. Med. Journal*, September, 1866, p. 275.

[2] Report, etc., of Drs. Baly and Gull, already cited.

grains were sometimes given at once), by prescribing a grain of calomel every five minutes during the attack.

**3. Saline Treatment.**—Dr. Stevens, of Jamaica, proposed this, upon the view that the main pathological element in cholera is the loss of salts from the blood in the discharges. After the general failure of saline solutions (of common salt, carbonate and phosphate of sodium, etc.), given by the mouth, had been conceded, Dr. Mackintosh, of Edinburgh, and others tried the method of injection into a vein (half an ounce of common salt, and four scruples of bicarbonate of sodium, dissolved in ten pints of water, at 105° to 120° Fahrenheit). Under this plan, resorted to during collapse, of 156 patients in Dr. Mackintosh's hands, only 25 recovered. Remarkable improvement, almost like a resurrection, appeared in several, who afterwards fell again into collapse, and died. The suggestion has been recently made, that it may have been the *temperature* of the injected liquid which produced the benefit, so promising, and yet so transient.

In this place we may mention also the use by Dr. E. M. Hodder,[1] of Toronto, of the *transfusion of milk*, fourteen ounces at a time, into a vein, during the collapse. He reports the recovery of two cases out of three under this practice. The transfusion of blood would appear to be more reasonable for trial. Kalisher[2] has reported two successful cases of transfusion of blood in cholera.

**4. Eliminative Treatment.**—Dr. George Johnson, of London, has urged this with especial vigor. The castor-oil medication of cholera owes its trial to him. His lectures on the pathology and treatment of the disorder give a full and very intelligent exposition of his views. A prominent idea with him is that the general collapse is due especially to anæmia of the lungs, owing to spasmodic contraction of the pulmonary artery and its branches. I regard this as only a *part* of the *universal* arterial (and other) involuntary muscular spasm, belonging to what I have called the *ganglionic tetanus* of the collapse. But the essential feature of Dr. Johnson's pathology is the opinion that, the disease being toxæmic, a morbid poison exists, which must be *eliminated* from the blood; and that the discharges are the *media* of this elimination. Therefore, the vomiting and diarrhœa are salutary or relieving, and ought to be rather encouraged than checked. He goes even so far as to repudiate the commonly accepted belief, that "premonitory diarrhœa" or "cholerine" ought to be checked, considering it a fallacy to assert that those who are relieved of such symptoms by mild treatment are really, or would have been, cases of cholera at all.

I am entirely unable, from observation or reflection, to assent to these views. They have very few advocates or supporters, besides the distinguished physician whose name and ability have commanded for them careful consideration. It is true that patients have died of cholera without vomiting or purging. I saw in 1849 a woman in collapse (from which she recovered) for several

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[1] London Practitioner, January, 1873.
[2] Inaug. Dissertation, Berlin, 1873.

hours without either; and many such cases are on record; though in some, after death, the intestines have been found to be distended with rice-water liquid. But the checking of the discharges is almost always the sign of improvement and recovery of the patient. And we cannot, on Dr. Johnson's dictum, set aside or quash all the accumulated evidence, in Europe and in this country,[1] which shows that it *is* desirable and important to *check all watery diarrhœas in cholera times*—such fluxes having been proved to be often premonitory of cholera attacks.

**5. Ice to the Spine.**—Dr. John Chapman's ice-bags once threatened to become the "pathy" or therapy of the day, with some who are zealous and venturesome in experimental practice. Upon reasons of a physiological nature, not appropriate for discussion here, I disbelieve altogether in the theory of his therapeutics. As ice is useful when internally given in cholera, it *may* be safe and beneficial when applied to the spine. Not having seen it tried, I am not prepared to deny the possibility. It is one of the experiments to consider, in so desperate a disease. But if it *should* prove useful, I should explain that result quite otherwise than Dr. Chapman has done, in part at least.

**6. Sulphuric Acid.**—Dr. Cox, of England, afterwards Mr. Buxton and Dr. Fuller, and Dr. Jules Worms, of Paris, have especially recommended dilute sulphuric acid in all stages of cholera. Many others especially report well of its action in the *premonitory diarrhœa*. Such an action would comport perfectly with the view I have taken of the *organic* nature of the poison of cholera; sulphuric acid being so potent a destroyer of everything organic, except such *mirabilia* as the Acarus Crossii.

Dr. Worms's treatment (based on results in 238 cases of cholera, and 150 of cholerine, in 1865) is as follows: For prodromic diarrhœa, he makes a "mineral lemonade," of about half a drachm of concentrated sulphuric acid to a pint or more of sweetened decoction of salep (arrowroot would do as well). The patient is to take of this every hour a wineglassful till relieved. A similar practice, as I am informed by Dr. Curtin,[2] was found useful among the inmates of the Philadelphia Almshouse, in 1866.

For confirmed cholera, the patient being kept in complete repose, there is administered every half hour a glass of a similar lemonade, of the strength (about) of a drachm to the pint; ice and wine also being allowed *ad libitum*.

**7. Opium in large doses.**—This practice once had many advocates; now they are few. Prof. Austin Flint, of New York, is one of them; at least *morphia* is advised by him, in full dose, repeated if required. A great deal of evidence of the insufficiency of such a plan has been published; although it is *not worse* than several other methods. The *secondary fever* is apt to be more severe and more often fatal after treatment of the attack by large doses either of opiates or stimulants. Large quantities of brandy have been often used, with no good results.

Statistics are given, as follows, of the results of some of the

[1] See Lectures on Cholera, by Prof. A. Clark, of New York; Report to the Royal College of Physicians, 1854; also, Madin, Briquet and Mignot, etc.

[2] See Philada. Med. Times, July 12, 1873.

most common modes of practice in cholera, by practitioners in Great Britain, as reported to the "Treatment Committee of the Medical Council of the Board of Health," 1854–1855.

Taking all grades of the disease, the deaths were—

| | Per cent. |
|---|---|
| With Eliminants | 71.7 |
| Stimulants | 54.0 |
| Calomel and Opium | 36.2 |
| Chalk and Opium | 20.3 |

Of *collapsed* cases, the mortality was—

| | Per cent. |
|---|---|
| With Calomel and Opium | 59.2 |
| Larger doses of Calomel | 60.9 |
| Salines | 62.9 |
| Chalk and Opium | 63.2 |
| Calomel, small doses | 73.9 |
| Castor Oil | 77.6 |
| Sulphuric Acid | 78.9 |

Much is uncertain obviously, in such statistics, without further account of dosage, circumstances, etc. But this seems to follow; that *neither treatment has much to boast of success.*

**8. Treatment by antispasmodics and mild stimulants, in small doses at short intervals; with ice,[1] and external frictions, etc.**— My experience with cholera has led me to give this mode of treatment the preference over all others. I first met with it in the practice of the late Prof. W. E. Horner, in 1849. Dr. Horner gave a mixture of chloroform, camphor, and laudanum, in small doses, every five minutes; each dose being followed by a piece of ice. I altered Prof. Horner's mixture to a tincture, for better preservation; adding some minor adjuvants. This recipe will be given directly. Frictions and sinapisms may at the same time be used with advantage. The great merits of this plan are, its antispasmodic nature, and the administering of small doses at *very short intervals.* This is eminently demanded in cholera. Phthisis may be a complaint of years; hooping-cough, of months; typhus, of weeks; pneumonia, of days; but cholera must be numbered by its hours, half hours, or even minutes.

Having reached, then, this conclusion, I may add, that a *rationale* for such a treatment is discernible. I only follow many good authorities in the opinion that cholera is, symptomatically and pathologically, a poison-spasm, or tetanus of the ganglionic system. Taken early, that condition may be *prevented*, by mild opiates and stimulants, in the *premonitory* stage. Later, while any medicines will act, these will do the most. What is needed in confirmation of this explanation, more than is given by the action of quinine in preventing an anticipated chill, or, of the same, in full quininization, curing the paroxysmal disease (a toxæmic *neurosis*) of intermittent? An antagonistic influence against that which so perturbs innervation throughout the body; such

[1] Ice was used, and lauded, in cholera, by the celebrated Broussais, in 1832.

is the whole definition that we can give of the remedial power shown in either case.

Let me be more specific in reference to treatment. Premonitory diarrhœa is very generally admitted to be present in a majority of cases of cholera.[1] In the East Indies, many writers, of different dates (Lawrie, 1832, Stewart Clark, 1864, etc.), assert such a state to be an exception instead of the rule. But in India, they have a premonitory or incipient stage of another kind; characterized by great languor or depression, with restlessness, and sometimes ringing in the ears, occurring mostly at night. Stewart Clark states[2] that, in this stage, a mild opiate ("with a little calomel or blue pill"), with a cup of warm tea or a small dose of a diffusible stimulant, as a few grains of carbonate of ammonium, or a little weak warm brandy and water, will arrest the attack in a great portion of cases otherwise likely to become serious.

Such symptoms, as well as diarrhœa, should be noticed during a cholera epidemic; and I believe the same treatment will meet either. Rest, warmth, and mild, composing, but gently stimulating draughts; paregoric, aromatic spirit of ammonia, tincture of ginger, lavender, etc., with a mustard-plaster over the abdomen, and a hot mustard foot-bath, if coldness of the body increase, or vomiting begin; such are safe, and I believe will be efficient remedies. The above may be called the first or prodromic stage.[3]

The next has been well called, by Prof. A. Clark, the *rice-water* stage. For that, the treatment I have described as given to me by Prof. Horner is particularly adapted. My recipe, based upon his, is as follows:—

℞.—Chloroform. et
Tinct. Opii et
Sp. Camph. et
Sp. Ammon. Aromat., āā fʒjss;
Creasot., gtt. iij;
Ol. Cinnamom. gtt. viij;
Sp. Vin. Gall., fʒij.—M.

Dissolve a teaspoonful of this in a wineglassful of ice-water; and give of that two teaspoonfuls *every five minutes;* followed each time by a lump of ice.[4] Iced water, or rice-water to which common salt and bicarbonate of sodium have been added, may be given, a little at a time, as a drink. I would also give a tablespoonful of brandy every hour or two.

Friction of the limbs with brandy and red pepper will be, along with large mustard-plasters on the back and pit of the stomach, useful to promote reaction.

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[1] Barraut asserts fixed contraction of the pupil to be the first prodromic sign; M. Worms makes the same statement in regard to albuminuria.

[2] Hygiene of the Army in India, p. 12.

[3] The published experience of Dr. Hamlin, in Constantinople, confirms the importance of the above early treatment.

[4] I take from Dr. Aitken's Practice the following recipe, much used and approved in India and England: ℞.—Ol. Anisi, Ol. Cajuput., Ol. Juniperi, āā ʒss; Æther, ʒss; Liq. Acid. Halleri (*i. e.* one part concentrated sulphuric acid to three parts of rectified spirit), ʒss; Tinct. Cinnam., ʒij.—M. Dose, ten drops every ¼ of an hour, in a tablespoonful of water.

The third stage is that of absolute collapse; blue, pulseless, shrunken, voiceless. Should a case go on, in spite of the above-mentioned treatment, into this state, what else can be done? All now seems to be desperate experimentation.[1] Let the ice-bags be *tried*, and judge them by the trial. I would also try belladonna internally, as an antagonist of vascular spasm. Leclerc, of Tours, introduced it in 1854; Barraut, of Mauritius, used it (¼ grain every half hour), and reported success. He also employed *hypodermic injections of sulphate of atropia.* Drs. Hodges, of St. Louis, and R. Saunders, report[2] success with this last practice. It should be further tried in bad cases. So might be, as was suggested by me in 1855, *warm baths of infusion of stramonium leaves;* on the same indication. Dr. Brunton[3] calls attention to the similarity between the symptoms of cholera and those following poisoning with "poisonous mushrooms" (*e. g.*, Amanita muscaria); and to the experiments of Schmiedeberg, showing atropia to be remedial in such a condition, at least in animals. Drs. A. R. Hall, Higginson,[4] and Blumenthal report the recovery of several severe cases under the use of *hydrate of chloral* (one part in ten of water) by hypodermic injection. Dr. W. Pepper[5] has proposed the injection into a vein of a solution of *bromide of potassium;* about a pint of water, temperature 105° F., containing 50 to 75 grains of the bromide, being introduced at once. Also, the injection of hot liquids into the rectum; the warm bath (*hot* baths, in some cases, at least, which I have seen, cause *distress* in the collapse), with *carbonate of ammonium* added, as usual sometimes in malignant scarlet fever (West) in children; or the warm *mustard* bath. *Hot air*[6] bathing, if practicable, would be worth trying; and so would chlorine water, and the inhalation of nitrous oxide. Chloroform inhalation has been used as a palliative by some British practitioners. Let us confess honestly, for it is wise to do so, our art is here very weak; *fifty per cent. or more of collapsed cases die;* shall we not endeavor to *discover* new resources? All honor to those who, at the risk of their own lives, contend yet, with so forlorn a hope, and so little glory to be won. There is room for, and possibility of obtaining, a final triumph.

Two words remain still to be said, with short comment: *house to house visitation*, and *houses of refuge.* These are measures of great consequence, shown to be of value during cholera epidemics. The latter, especially, is of notable importance; that is, the establishment of Houses of Refuge in *salubrious places*, into which persons from tainted districts most liable to the disease may be received, on the occurrence there of the first cases.

That there *are* such tainted districts has been amply proven. Thus, Dr. Laycock has shown that in York, England, the first death from cholera occurred in the spot where plague had been

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[1] Duchaussoy and Vernois assert the non-absorption of medicines given by the stomach during the collapse; but Magendie proved that very slow absorption does occur.

[2] Amer. Practitioner, July, 1873; and St. Louis Med. Journal, for the same month.

[3] Med. Times and Gazette, Oct. 11, 1873.

[4] Indian Medical Gazette, Nov., 1873, and Jan., 1874.

[5] Philadelphia Med. Times, July 12, and August 23, 1873.

[6] Dr. George Johnson states that he has seen the hot-air bath used without success.

traditionally the worst, in a badly drained district. In Edinburgh, the first case in 1848 occurred in the same house as did the first in 1832. In Holland, at the town of Groningen, in 1832 and 1848 but two houses in the better part of the town were attacked; the same houses exactly in both epidemics.

Dr. Alison reports that in the first three months of the epidemic at Edinburgh, in 1832, 353 persons were taken in at Houses of Refuge, from 70 tainted districts, houses and rooms in which decided cases or deaths had occurred. Of these, only 15 took the disease, and 7 died after removal. Of the 346 thus surviving brief exposure, it is very probable that more than half would have died had they remained in the midst of the infection. At Glasgow, in 1849, 401 persons were taken into Houses of Refuge from tainted districts; only 19 of these took the disease, and but 5 died. At Oxford, England, the same year, of 70 persons so taken in, none died. The London Board of Health, in its "General Report," gives the fact that of 1691 of whom the Board had accounts as taken into Houses of Refuge, but 33 were attacked, with only 10 deaths. These numbers would have been larger, but for the very common unwillingness of poor and ignorant people to leave their homes, chiefly from want of confidence in the greater safety of so doing. Could this be overcome, I have no doubt that an immense saving of life might be produced by Houses of Refuge, allowing also the places which are proved "foci of infection" to be thoroughly purified at once.

House to house visitation, by sanitary inspectors to abate nuisances, small and great, and by medical men to treat premonitory symptoms, might also have great preventive value. The establishment of cholera hospitals may be made necessary when the number of cases is great, especially as the greatest proportion always happens among the poor, who are ill provided for attendance at their homes.

## DIATHESES.

### RHEUMATISM.

Several affections are, in popular language (partly sanctioned by medical usage), included under this term. 1. *Acute articular rheumatism,* or *rheumatic fever.* 2. "Chronic rheumatism," affecting the joints and sheaths of the muscles. 3. Syphilitic rheumatism, of the long and flat bones. 4. "Rheumatoid arthritis." 5. Myalgia. 6. "Gonorrhœal rheumatism."

**Acute Rheumatism.**—Only certain persons and families are liable to this affection upon any exposure. It is characterized by high fever with severe inflammation of several of the larger and smaller joints; which mostly, one after another, become swollen, red, hot, tender, and painful. The shoulders, wrists, knees, and ankles are most frequently so affected. Although with a full and rapid pulse, the skin, after the first week or so of the disorder, is often bathed in perspiration. The duration of an attack under various modes of treatment has averaged nearly three weeks. Sometimes it extends over months; and

the *sequelæ*, or resulting *crippling* of the articulations, may remain for a lifetime.

The *danger* in rheumatic fever consists chiefly in the liability to endocarditis and pericarditis. A singular *complication* of it,[1] occasionally met with at a late stage, is *chorea*. Rheumatism may undergo *metastasis* from the joints to the bronchial tubes (rheumatic bronchitis), or, much more rarely, to the membranes of the brain. The latter, *cerebral rheumatism*, is decidedly dangerous. In feeble persons, the bowels or the womb may occasionally be involved.

The *blood* in acute rheumatism is found to contain an excess of fibrin. *Lactic acid* has, upon some basis of observation and experiment (Richardson), been asserted to be in excess in the blood as the characteristic pathological element in rheumatism.

Apart from the cardiac affections possible in its course, rheumatic fever is not often dangerous to life; but it is very painful and debilitating.

**Treatment.**—Many methods have been and still are in use. *Opium* (Corrigan) alone, or with ipecac, as in Dover's powder; *lemon-juice; quinine; colchicum; alkalies;* and *salicylic acid;* these are the most important. Recoveries under the *alkaline* treatment have taken place many times, *within a week*, where the symptoms indicated a probably long attack. Of 417 cases, Dr. Fuller reports, under alkaline treatment, none fatal, and only nine suffering with cardiac complications. Dr. Dickinson,[2] in St. George's Hospital, in a considerable number of cases, found the proportion of those in which the heart was involved, under non-alkaline treatment, more than one in four; under alkalies, one in forty-eight. Carbonate or bicarbonate of potassium, with the Rochelle salt or nitrate of potassium (in scruple doses of the carbonate, or half-drachm of the bicarbonate, with about the same of either of the other salts), thrice daily, will answer [F. 37, 45, 46]. Opiates, especially Dover's powder, at night, may do great good. Local application of *laudanum* (detained by oiled silk) to the painful joints, gives much relief.

*Lemon-juice* (O. Rees) has seemed to me a useful adjuvant (tablespoonful doses every three hours) in cardiac inflammations of rheumatic origin.

*Quinine* is sometimes very beneficial in enfeebled cases, with *free perspiration*. 10 or 15 grains may be given in a day. Briquet and others in Paris have given 60 grains in a day.

*Colchicum* is of decided service in the presence of the gouty diathesis; sometimes useful at the beginning of other cases.

Dr. Da Costa[3] reports favorable results, especially in the apparent prevention of cardiac affections, with *bromide of ammonium*, in 15- or 20-grain doses.

*Veratrum viride* has been especially praised for its action, in small or moderate doses, in acute rheumatism, by Henser, in Germany.

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[1] First remarked by Sée of Paris and Senhouse in England.

[2] Lancet, Jan. and Feb., 1869. Drs. Gull and Sutton (Lancet, Jan. 16 and 30, 1869) insist that cases treated merely by rest in bed do as well without any medicine as with it. As above shown, I am not ready to accept this as proven.

[3] Pennsylvania Hospital Reports, 1869.

Remarkable success has been reported in the treatment of rheumatism by "flying blisters;" *i. e.*, the successive application, to different affected parts, of small blisters; allowed to produce moderate vesication only. Drs. Davies, Peacock, and other British physicians laud this practice.

Chevallereau (La France Méd., 1880, p. 724) found hypodermic injections of ergotin to give considerable relief.

*Propylamin* I have tried without success. Gaston, Besnier, and Dujardin-Beaumetz report very favorably of it.[1] Dr. J. Russell Reynolds[2] asserts good results in six out of eight cases treated with *tincture of chloride of iron*. Dr. R. Bartholow also approves of this practice.

Dr. Anstie[3] remarks upon the value of the chloride of iron as a *prophylactic* in incipient rheumatism. Stricker introduced (1876) *salicylic acid*, in 7–20 grain doses, with good effects; others also give it praise. (Glycerin and alcohol promote its solubility. See F. 262.) Among those who early employed it were Traube, Broadbent, Maclagan, Sée, Bérard, Beaumetz, Jaccoud, and Lépine. Stricker and Sée gave from a drachm and a half to two drachms or more, daily. Experience shows that it is not always safe in such large doses. Sudden death has, in a few cases, appeared to be thus produced. All needful effect can probably be secured by giving 10 grains every hour for five or six hours, and afterwards the same amount thrice daily. Under such treatment, the duration of the severity of attacks of acute articular rheumatism has been many times reduced to two, three, or four days. Whether cardiac complications are made less frequent or less dangerous by the use of salicylic acid, can hardly yet be considered as finally settled. I fear that, so far, the probabilities are on the side of disappointment. As to the articular symptoms, however, no remedy, not even alkalies, can show so much experimental testimony in its favor.

If salicylic acid produce noises in the ears, or deafness, it should be discontinued. Copious perspiration is also a sign of its taking full effect. *Excessive* doses are unsafe; a few fatal results have been reported. As Dr. A. Flint has urged, the use of salicylic acid need not *supersede* that of alkalies—long proved to be so valuable in articular rheumatism; the two modes of treatment do not conflict with each other, but may be combined.

*Salicylate of sodium* has all the effects of the uncombined acid, while it is less disagreeable and more soluble. Its dose must be about two-thirds larger than that of salicylic acid.

Harley and Bartholow speak well of the use, for severe rheumatic pains, of hypodermic injections of atropia. I have always found relief to follow the local application of laudanum: laying upon the affected joint lint or cotton saturated with laudanum and covered with oiled silk.

Dr. D. MacEwen[4] has found *benzoate of sodium* efficient, in severe cases, in relieving pain and reducing fever in acute rheumatism.

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[1] London Med. Record, Jan. 29, 1873.
[2] Brit. Med. Journal, Aug. 28, 1869.
[3] The Practitioner, September, 1871.
[4] Brit. Med. Journal, vol. i., 1881, p. 336.

He has given it in doses of from 15 to 20 grains every two or three hours, diminishing the amount as the symptoms of the attack decline.

In *cerebral* rheumatism, the use of *cold baths* (H. C. Wood, Woillez[1]) has been reported to produce more beneficial results than, *a priori*, might have been anticipated.

**Chronic Rheumatism.**—Any one may have this affection, which is, however, most common among those advancing in age. It is a sort of slow inflammation of the fibrous tissues investing the joints and muscles, following exposure to cold and wet. The aching pains are apt to be worst at night.

Cold may produce pain, without any inflammation. Five minutes' exposure to a draught of damp air will often thus affect different parts of the body; relief being at once obtained on the application of warmth. This fact, of *cold directly producing pain*, especially in the muscles, ought not to be overlooked. It supports Inman's and Radcliffe's idea, that pain is always a sign of the local or general diminution of vitality. Dr. E. C. Wendt[2] asserts evidence showing that some cases, designated as rheumatism, are to be explained as the secondary effects of *trichinosis*.

The **treatment** of chronic rheumatism has been largely experimental. The medicines most given are iodide of potassium, guaiacum [F. 167], oil of turpentine, and cod-liver oil. Alkalies and colchicum do not signally affect it. *Oil of cajuput* is sometimes very serviceable. Opium is seldom required unless locally. Local treatment generally does more for it than medicine. For this, various liniments are useful. I have found none better than one containing oil of turpentine, oil of sassafras, ammonia, and laudanum, diluted with soap liniment; or, where pain is considerable, chloroform or aconite liniment. Blisters may be applied in bad cases. Guarana (Rawson), internally, has lately been advised. Dr. Franz Heller[3] asserts the positively curative influence of *liquor ammoniæ* (taken internally) in muscular rheumatism.

*Dry cupping to the back*, leaving a number of cups on for twenty or thirty minutes at a time, makes a more pervading favorable impression, sometimes, than might have been expected. For rigidity of the joints, and even for pain in them or in the muscles, *pouring hot water* continuously over the parts does great service. The *hot bath*, or *vapor bath*, or, as some prefer, the hot dry *air* bath (130° to 200°) will be powerful for relief in many cases. Galvanism also will aid in hastening the restoration of use to the stiffened parts. Wrapping rheumatic joints in *cotton*, or covering them with India-rubber cloth, is often very serviceable. Those subject to rheumatism should wear flannel, different in thickness according to the season, through the whole year.

**Syphilitic Rheumatism.**—As stated already, this affects the long and flat bones chiefly, and mostly *between* the joints, not at them. Generally, there is *nodosity* upon the bones affected, or some degree of periosteal inflammation, at least.

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[1] L'Union Médicale, Oct. 14, 1880.
[2] Am. Journal of Med. Sciences, April, 1878.
[3] Wiener Med. Presse, December, 1875.

*The* remedy for syphilitic rheumatism[1] is iodide of potassium. I have never known it to fail to relieve the pains in a very few days. They may return in the course of months or weeks, when the same treatment should be renewed. (Ten to twenty grains of the iodide, thrice daily, will suffice.) [F. 168.]

**Rheumatoid Arthritis.**—This designation is applied by authors (first by Garrod, 1858) to a form of subacute or chronic inflammation of one or more large joints, of greater severity than ordinary chronic rheumatism. Effusion into the joint, with deformity and permanent, or at least long-continued, lameness, may occur. I doubt the influence of the gouty diathesis in this affection; while constitutional debility no doubt often promotes it. Sometimes it extends to nearly all the joints in the body, producing distortion and deformity, and making the patient, especially if elderly, entirely helpless. Even the jaws and neck may be affected; but much rigidity in them, from this cause, is rare. The cartilages of the joints are absorbed, and nodosities or condyloid "lips" occur upon the bones. A grating sound is sometimes heard when they are moved.

Rheumatoid arthritis differs from gout in its attacks being much less acute and violent, and in the continuance and usually steady progress in the swelling and deposit in the joints. Moreover, it is not known to be hereditary, or to have any direct relation to diet or habits of life. It is more common in women than in men, and may occur in patients of any age.

In **treatment**, iron, cod-liver oil, iodide of potassium, and arsenic are the preferred medicines. *Massage*, with very tender handling of the joints, may do good. Locally, *small* blisters sometimes arrest the enlargement, and even dissipate the effusion. Ointment of iodoform (Moleschott), mercurial ointment, and cerate of carbonate of lead, may all be tried by nightly application, persevered in for a week or more at a time. If pain be considerable, belladonna liniment may be recommended. Salt baths, warm or hot (not continued so long as to relax overmuch), are likely to do good, if the patient can be moved without too much inconvenience on account of the rigidity of the articulations. Electricity, also, may promote improvement, and, in young persons, recovery.

Can rheumatism and gout ever be actually combined in the same patient, in a hybrid attack? I am sure that they can, at least, be so far blended together that inflammatory rheumatism, in a patient of gouty constitution, is more affected by the state of the digestive organs, and is more beneficially acted upon by colchicum, than in others. I will consider the diagnostic comparison between rheumatism and gout hereafter.

**Myalgia.**—Dr. Inman, of Liverpool, first gave this name to *muscular pain* without inflammation or other defined disease. It is more often met with in the *back* and *chest* than elsewhere. Debility and fatigue are its principal causes; although, as I have said, muscular pain may follow from the direct impression of cold.

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[1] First thus used by Dr. R. Williams, of St. Thomas's Hospital, London.

*Rest*, *warmth*, and tonics meet the general indications for the treatment of myalgia. Anodyne applications, as aconite liniment or tincture, or veratria ointment, will be required only in a few cases. The hot bath or douche may often give relief.

**Gonorrhœal Rheumatism.**—After Swediaur (1781) and Sir Astley Cooper, several English and French writers have described a peculiar inflammation of one or more joints, mostly of one only, occasionally commencing in the course of gonorrhœa, or even of urethral inflammation from forced catheterism. Follet asserts that it occurs in 1 in 35 cases of gonorrhœa in men; much less often in women. Gonorrhœal *sciatica* is described by Fournier.[1] The local affection may be severe, with suppuration in a few cases, and anchylosis of the joint in many. It appears to be an *ichorhæmic* affection, *i.e.*, the result of absorption into the blood of morbid matter effused into or formed upon the membrane of the urethra.

**Treatment.**—Chambers and Brodhurst, on the ground of experience, recommend *active* treatment for this affection, by moderate bleeding, general in the robust, and local in others, followed by blisters, the hot-air bath, chloride of ammonium, and opiates at night.

## GOUT.

**Synonyms.**—*Podagra; Arthritis.*

Gout is a *diathesis*, or constitutional disorder, more or less persistent, with local affections, mostly inflammatory, occurring in paroxysmal attacks.

**Symptoms.**—Premonition of a gouty spell is often witnessed for some days, with symptoms of indigestion, flatulence, acidity, constipation, palpitation of the heart. Then (or without such warning) a joint becomes very painful, swollen, red, and tender. In a majority of cases the *great toe* is affected. Other toes, the fingers, ankle, wrist, or knee, may be attacked; the large joints least often. Towards the end of the spell, *tophaceous* or chalk-like deposits (chiefly of urate of sodium and calcium, altering with time in part to carbonates) are thrown out about the joint, in some but not in all cases.

The suffering with the gouty inflammation is often very intense; but its duration is not commonly more than a few days at a time. Aptness to return, at intervals shortening with each attack, is an unpleasant feature. When the period of release is so short as to be almost absent, it is called *chronic* gout.

**Retrocedent** or **misplaced** gout is that in which, instead of the small joints, some internal organ is affected, as the stomach or heart. Such attacks are violent and threatening to life, but generally brief. Exposing an inflamed gouty foot to cold may thus "drive in" the disease, or produce a metastasis. Bronchitis, according to some authors (*e.g.*, J. M. Fothergill), is the most common manifestation of gout next to arthritis.

If the *stomach* be so involved, nausea, vomiting, and spasm or cramp of the stomach are experienced, which, unless relieved in

[1] Gazette Hebdomadaire, No. 48, 1868.

a short time, prostrate the patient very much. When the *heart* is the organ seized, its action is interfered with so as to cause distress in breathing, pallor, faintness, and debility.

The *urine*, during the attack of gout, is scanty, with its usual amount of urea, but a deficiency of uric acid until near the close of the spell, when the latter is increased. The *perspiration* not unfrequently contains an excess of uric acid and the urates, particularly urate of sodium.

**Hereditary** gout is sometimes genuine *podagra*, or foot-gout, but more often is of the *wandering* kind. Neuralgia, indigestion, palpitation, and urticaria or eczema upon the skin, are its most common manifestations. In such a system rheumatism and other affections are to a considerable degree modified by "the gouty tendency." I believe this tendency to be too much overlooked in practice.

**Morbid Anatomy.**—Except the deposits of urates about the joints, and the proved excess of uric acid in the blood, the only peculiar alteration belonging to the anatomy of gout is the shrinking and granular degeneration (with some deposit of urate of sodium) of the kidney; the "gouty, contracted kidney" of Todd. This deposit is pathognomonic of gout.

**Pathology.**—Garrod has established the doctrine[1] of the characteristic of gout being *excess of uric acid in the blood*. The *origin* of this excess is still doubtful. The view of Mialhe is plausible, that, urea being more highly oxidized than uric acid, deficiency of oxygenation of the blood may increase the amount of uric acid in it, unchanged.[2] Also, imperfect action of the kidneys may, by their not depurating the blood fully, induce the same accumulation. Cullen, Laycock, Melden, Liveing, and Duckworth[3] have held gout to be essentially a *neurosis*. Duckworth proposes the term "neuro-humoral" for the class of disorders to which it belongs. The fact seems to be that it is as truly *constitutional* as any malady can be, the symptoms affecting the nervous system being no more prominent than those involving the articulations and other parts of the body.

**Causation.**—High living, with indolent habits, generates gout. Even excess of animal food, with scanty exercise, I have known to produce it. But strong wines and malt liquors much increase the tendency. Weak wines do not seem to have the same effect. In the Rhine region gout is rare. Nor do spirits produce it readily; their effects, when abused, are different, though worse in the end. Hereditary transmission of the gouty constitution is very common.

**Diagnosis.**—Between gout and rheumatism there is great resemblance; and, as I have observed, they may be blended together. When clearly exemplified, the following differences exist:

In gout the small joints are chiefly affected; in rheumatism the larger joints. Repetition of attacks is much more frequent in gout; their duration is greater in rheumatism. In gout the heart

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[1] Suggested by Murray Forbes, and afterwards by Prout.
[2] Headland and others advocate a quite different view.
[3] *Brain*, April, 1880.

is seldom attacked, and *spasmodically;* in rheumatism the heart is often subject to *inflammation.* In gout the stomach is sometimes spasmodically affected with violent symptoms; in rheumatism almost never, although the bowels may be. In rheumatism, the fever is much more marked and continued in proportion to the local symptoms, notwithstanding copious perspirations. In gout, and not in rheumatism, uric acid (or urate of sodium) is in excess in the blood. In pure gout colchicum generally does good; in pure rheumatism hardly ever.

**Treatment.**—During the attack, colchicum and the alkalies are the best remedies. Wine of the root (some prefer that of the seeds) of colchicum may be given in ten- to twenty-drop doses several times daily. The stomach and bowels are sometimes irritated by large doses; but for a few days most patients will bear fifteen drops thrice daily. It should be stopped when relief has been obtained. Carbonate of potassium, ten to thirty grains at once, with half-drachm doses of Rochelle salt, will be important in addition [F. 37, 45, 46]. Garrod and Petit speak highly of the anti-arthritic powers of lithia; experiments with the carbonate having shown in it some capacity to dissolve gouty deposits. The urate of lithium is the most soluble of the salts of uric acid. Spectroscopic examination shows that a minute amount of lithia exists ordinarily in human blood. The *citrate* of lithium is preferred by some practitioners.[1] *Opiates* or other anodynes may be craved by the patient during the extremity of his pain.

Shall any local application be made? Not cold to reduce the inflammation. More than one death has occurred from this, by repulsion of the disorder to the heart, stomach, or brain. Leeching is considered to increase the tendency to the deposit of urates in the joints affected. Laudanum may, I believe, be safely applied to the part, as in rheumatism, by wetting a piece of linen or muslin with it, laying it on the painful joint, and covering it with oiled silk. Alkaline washes (not too cold) are sometimes used. *Oil of horse-chestnut* is recommended by some.

Gouty attacks affecting the stomach or heart spasmodically are usually sudden, violent, and prostrating; requiring prompt stimulation, as by brandy, laudanum, Hoffmann's anodyne, chloroform, or Warner's cordial (tinct. rhei et sennæ). Small or moderate doses of one or another of these should be given at *short intervals.* Mustard plasters to the epigastrium, or chest, and back will be important; and the feet may be placed in hot mustard-water for revulsion.

*Breathing oxygen* has been proposed as a remedy for the gouty state of the blood. Its utility has not yet been decided upon by sufficient trial.

The *prevention* of attacks, by the removal of the diathesis and predisposition, is often very difficult, even in the absence of hereditary taint. Regulation of the diet is of primary importance. But it should not be too low, especially when the patient's habits have been those of a free liver. Nourishment must be full, while the digestive power is economized, and positive stimulation

[1] Of the effervescing citrate of lithium, the dose is from three to five grains.

avoided. Exercise, in proportion to strength, should be recommended. In some weak or old cases tonics may be called for; vegetable bitters particularly. The state of the *skin*, as well as of the *bowels*, is important.

Change of air, travelling, and mineral waters are generally useful during the intervals between the paroxysms. Alkaline springs and baths (such as those of Vichy, in France, Ems, in Germany, or Gettysburg, in Pennsylvania) have an especial reputation as prophylactic against gout.

## SCURVY.

**Synonym.**—*Scorbutus.* This affection was once very destructive to voyagers at sea and explorers of barren regions, as well as, sometimes, to large armies. Captain Cook has the credit of proving the preventive value of vegetable food. Dr. Lind, his contemporary, published a work on scurvy in 1757, advocating the antiscorbutic use of oranges and lemons. Still, in their Arctic expeditions, Drs. Kane and Hayes were much incommoded by this disease. In the Crimean war, and during the late civil war in this country, although uncomplicated scurvy was not very frequent, the *scorbutic diathesis* modified other diseases, and increased mortality to a serious extent.

**Symptoms.**—Languor, debility, and lowness of spirits first occur. Then swelling, sponginess, and bleeding of the gums are observed; the teeth loosen, and the breath is offensive. Palpitation of the heart and dyspnœa may be present. An eruption resembling acne, and afterwards petechial spots (from subcutaneous extravasation of blood), appear on the limbs; sometimes the legs swell from fibrinous deposits, especially at the ham. Diarrhœa and dysentery often come on. Death may take place by gradual exhaustion, or by sudden syncope.

**Diagnosis.**—*Purpura hemorrhagica* is undoubtedly not identical with scurvy, although "purpuric" extravasations are common to both. Purpura does not depend, as scurvy does chiefly, upon a fault of diet; nor are the gums affected in purpura.

**Causation and Pathology.**—That the essential cause (*sine quâ non*) of scurvy is deprivation of fresh food, and, in almost all cases, of fresh *vegetable* food, is proved. Fresh meat will retard it, in the absence of vegetables; but neither this nor oranges and lemons will altogether prevent it, through long periods. Additional *promotive* causes are severe cold, fatigue, and exposure, and mental anxiety or home-sickness.

Further than this, the pathology of scurvy has not been determined. The hypothesis that it depends upon *deficient alkalinity* of the blood is disproved by the failure, in many hands, of potassa and its compounds to hasten the cure, or insure prevention.

**Treatment.**—Medicine is here almost valueless. Fresh vegetables alone will restore what is wanting, though chemistry has not detected the nature of the need. Potatoes tomatoes, oranges, and lemonade are the most generally available articles. If any medicine be useful as an adjuvant, it is the tincture of the

chloride of iron, in moderate doses. Sometimes citric acid does good.

For the gums, a wash of solution of tannic acid or tincture of myrrh in diluted glycerin will be useful; or alum, brandy, and water. Salt and whisky rubbing to the skin will aid in dissipating the petechiæ.

**Prophylaxis.**—Medical men in charge of expeditions to a distance from ordinary supplies, should always insist on measures being taken to furnish enough fresh vegetables, or, next best, *desiccated* potatoes. After the latter, onions, tomatoes, turnips, salad, etc., and oranges and lemons rank. *Wine* is also decidedly though not infallibly *anti-scorbutic*. The leaves of the pokeberry plant (*phytolacca*) and of the *cactus opuntia*, are so. Raw meat is better, in the Arctic regions, for the same end, than that which is cooked. During the long voyage of Professor Nordenskjöld around the north coast of Asia, not a single case of scurvy occurred. This was due to the use of a small red berry that springs out of the ice and snow in the short summer. It is dried, mixed with reindeer's milk, and carried in a frozen state. The experience of the army of the Potomac during the late war, in the McClellan campaign, shows that neglect of the means of preventing this disease will sometimes cost far more than those means themselves, whatever difficulties they may seem to present.

### SCORBUTIC DYSENTERY.

This term appears prominently in the sanitary and medical reports of the armies in the Crimea. In the Peninsular Campaign in our late war (just alluded to above), the Chickahominy region was the seat of a great amount of disease, partly febrile (typho-malarial fever) and partly scorbutic. While on duty in the summer of 1862 in two U. S. General Hospitals in Philadelphia, I met with many such cases. A record was kept of thirteen deaths in the Fourth Street Hospital, from what I then designated as "scorbutic marasmus."

These men were brought from the Chickahominy very much emaciated, pale, feeble, without appetite, almost without power of digestion, and with moderate diarrhœa. Vomiting occurred in some. Blue or nearly black purpuric or petechial blotches appeared on their arms and legs; in the *fatal* cases, over the breast and abdomen also. But one of our men recovered in whom the extravasations occurred on the breast; a considerable number in whom only the limbs were so affected.

The diarrhœa was in none of them so great as of itself to threaten life. Several improved under treatment (with vegetable food, fruits, lemonade, etc.) for a while, and then relapsed into a condition not unlike in aspect to the collapse of cholera; in which they died. Two, after seemingly great improvement for a week or more, died *suddenly*. It seemed that, in them, the blood or blood-making power was hopelessly ruined.

Autopsy, in several of these, and in some patients in another ward of the same hospital, under the care of Prof. S. D. Gross, exhibited coincident lesions not often described together. These

were, extensive follicular colitis, and double pneumonia. The latter invariably affected the posterior portions, only, of the lungs. Suppuration had occurred in the lungs in two of our cases; hepatization in three or four more.

The condition of the bowels in those instances was thus recorded in my notes:—

The large intestine, especially the rectum, was extensively inflamed; with large, rugose tumefaction, the ridges covered thickly by an ash-colored granular and diphtheritic deposit; the whole surface reddened underneath this, and the blood-vessels generally enlarged. No pus was found; and only slight, rare, and superficial spots of ulceration. The ileum also was affected with marked hyperæmia and swelling of the mucous membrane without ulceration.

I give these facts and appearances as matters of medical and pathological history. The occasion of their occurrence, we may well trust, will never exist again in this country.

## SYPHILIS.

Few old subjects have been so completely reopened latterly as that of syphilis. Thirty years ago, not many denied the unity of the syphilitic poison (distinct from that of gonorrhœa), while all admitted the multiplicity of its manifestations. Soft chancre, indurated chancre, and phagedænic chancre were all recognized, as well as the specific bubo, and secondary and tertiary syphilis. But now, prominent authorities (*dualists*) urge that at least two poisons exist, productive of venereal diseases, not mutually inoculable or convertible. This I am not satisfied to pronounce proven. The topic is altogether rather surgical than medical; but as the physician must often deal with it, I propose to state (perhaps, for brevity's sake, rather dogmatically) what I conceive to be the most important practical points.

The "Hunterian" chancre is a sore on the male or female genitals, slightly cup-shaped, upon an indurated base. From ten days to a month or more may elapse after infection before the chancre is perceived. Then it begins as a red pimple, often unnoticed until it ulcerates. Its discharge is moderate in amount, and scarcely purulent except under irritation from without.

This is said not to be "auto-inoculable," *i. e.*, matter from it will not, if introduced anywhere on the patient's own body, produce a like sore. The lymphatic glands may become affected, with enlargement and hardening, not suppurating unless disturbed and inflamed. The constitutional disease, called in its manifestations secondary and tertiary syphilis, results from infection by this sort of chancre.

The "simple, soft" chancre or *chancroid* is described as having no period of incubation, and not commencing as a pimple or tubercle, but as an abrasion, which discharges pus. If a bubo follow it, it is of the suppurating kind. The system is said, by recent authorities, not to be involved by this.

*Phagedænic* chancre is characterized by unhealthy purulent discharge and a destructive tendency to erosion. Ulceration of the groin may follow its buboes. *Sloughing* chancre may be regarded

as the extremest degree of this, observed under conditions of depressed vitality.

Now in the above discrimination between "infecting" and "non-infecting" chancre, the former being considered to be only that with indurated base and non-suppurating buboes, I follow late authors,[1] not my own observation. A not inconsiderable experience in the treatment of syphilis, in hospital and private practice, impresses me with a different opinion; viz., that either the hard-based or the simple soft chancre may have a suppurating bubo and a decided constitutional affection. I must assert that I have *seen* those results, repeatedly, follow *both*. Bradley's[2] experiments upon monkeys and other animals confirm this statement. Many confirmed "dualists" admit that it is sometimes impossible to distinguish the infecting from the non-infecting sore. Some (as Neumann, of Vienna), are "unitist" in theory, but admit the importance of the diverse manifestations of the disease. Bumstead (the highest American authority) supposes it possible that "chancroid" may be a derivative of chancre.[3] Bryant[4] uses the following language: "Unfortunately, in a clinical point of view, this great distinction between the two forms of chancre is not always to be made out; and consequently an intermediate class of cases has to be recognized, approaching in its clinical features more the soft sore, which is capable of giving syphilis."

Sturgis gives the following table of comparative diagnosis:—

| CHANCROID. | INITIAL LESION. |
|---|---|
| Little if any period of incubation. | Decided period of incubation. |
| Destructive, with tendency to spread. | Not destructive, tends to heal rapidly. |
| Edges undermined. | Edges sloping, not undermined. |
| Copious, purulent secretions. | Scanty, serous secretions. |
| Contagious and auto-inoculable character of the pus. | Secretion not auto-inoculable. |
| Usually multiple. | Usually single. |
| Not seated upon an indurated base. | Generally indurated; sometimes, rarely however, not. |
| Glands liable to become inflamed; when so, they suppurate and become a chancroid furnishing inoculable pus. | Glands indurated, not inflamed; very rarely suppurate, and then from causes apart from syphilis. Never furnish inoculable pus. |

Jonathan Hutchinson[5] declares the majority of venereal sores to be *abortive inoculations*, analogous to the frequent modified effects of impure or mixed vaccine virus, or those of pure virus upon protected persons.

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[1] Bassereau, Ricord, Fournier, Geigel, etc., advocate the dualist view. Hebra was a *unitist*. Jon. Hutchinson, 1876, asserted that "*dualism is dead*."

[2] Brit. Med. Journal. Aug. 26, 1871.

[3] Pathology and Treatment of Venereal Diseases. Third edition, 1870.

[4] Surgery. p. 627. Philadelphia edition.

[5] Reynolds' System of Medicines, Am. Edition, Vol. I., p. 424.

**Treatment.**—Without claiming opportunity to have put fully to the test all the different ideas, my conviction remains strong, that for all forms of primary syphilis, except the sloughing or the extremely phagedænic variety, mercury is the specific antidote. I have not seen reason to believe in the efficacy, in primary syphilis, of any other medicine, internally administered.

Blue mass, calomel, iodide of mercury, etc., all have the effect. Enough must be given to produce the impression of mercury upon the system; but decided salivation is not necessary. I never positively salivated more than two men; one who had a bad chancre under a *phimosis*, and another peculiarly susceptible to ordinary doses. A grain of blue pill thrice daily, or half a grain of calomel as often, or from half to a grain of iodide of mercury [F. 169] twice a day will do. The *earlier* it is begun with, the better; at least in indurated chancre. Many recent authorities urge that it is not indicated in the absence of induration. I would give it in any case of doubt.

**Local** treatment is also important. The caustic use of nitrate of silver (some prefer the stronger *potassa* caustic), used early, may *kill* the specific disease at the spot. To do so, it must burn out the whole substance of the chancre. After such application, astringent lotions, as lime-water, solution of sulphate of copper (gr. ½ to gr. j in f℥j), etc., may be applied, washing the part gently twice a day with castile soap and water. Many cases thus treated early, will get well without taking any mercury. In obstinate venereal sores, however, sprinkling the part with powder of calomel is one of the most effectual remedies. The calomel air or vapor *bath* has been recommended; as well as inunction with mercurial ointment. Lewin and Bricheteau use *hypodermic injections* of solution of corrosive sublimate. *Iodoform* (Izard, Damon, Petiteau, and Courteau) has come into use latterly, especially as a local application to venereal sores. It may be employed in powder, ointment, or alcoholic solution with glycerin. Ricord (the leading authority in regard to syphilis) is reported[1] to have arrived at the conclusion, that destruction of the infecting chancre does not, even if effected early, prevent constitutional disease. But even if this be so, the local disorder is quite sufficiently serious to be deserving of prompt and energetic measures to deprive it of its specific character.

Buboes, if they *inflame*, may be leeched, and refrigerated with lead-water, or soothed with poultices. When they suppurate, let them be freely opened with a bistoury. When, afterwards, they refuse to heal, the surgical treatment proper for indolent ulcers will be suitable for them; besides the local use of powder of calomel.

## CONSTITUTIONAL SYPHILIS.

Weeks or months after the primary disease, *secondary* syphilis may show itself. Once produced, although sometimes readily curable, it often impairs the constitution for life, and transmits the taint to offspring.

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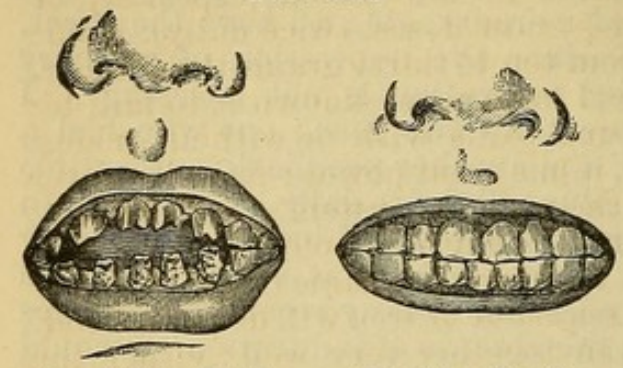
[1] Leloir, Annales de Dermat. et de Syph., No. 1, 1880, p. 69.

The affections belonging to secondary syphilis are, peculiar copper-colored eruptions, rupia especially; warts about the genitals; ulcers of the throat; iritis; loss of hair (alopecia); affections of the testicle or uterus. These *last*, as well as *periostitis* and osseous tumors or *nodes*, cutaneous tubercles, gummata (soft, elastic tumors, found on the skin and the bones, and occasionally in the viscera), and chronic degenerative inflammations of the brain, spinal marrow, liver, spleen, lungs, etc., are often called *tertiary* syphilis. Jonathan Hutchinson regards the *secondary* maladies as due to blood-changes; the *tertiary*, to alterations of tissues. Although long ago suspected, Dr. T. Reade, of Belfast, first proved (1847) the syphilitic origin, in some instances, of certain nervous affections; epilepsy, mania, hemiplegia, amaurosis, loss of memory, cranial neuralgia, paralysis of sphincters; all resulting from syphilitic disease affecting the nerve-centres.[1]

FIG. 123.



Syphilitic Teeth. Healthy Teeth.

General experience and opinion have asserted that constitutional syphilis is not transmissible by inoculation. Some modern experiments (Lee, Walker, Pelizarri) have placed this question again "sub judice." The following statements (Bryant) are now generally accepted:—

"A healthy woman marrying a man who has had syphilis, but who has lost all symptoms of it, may acquire syphilis through a blighted ovum, or a series more or less prolonged of stillborn children, the placental circulation between the fœtal and maternal blood being the infecting medium.

"A healthy woman, giving suck to a child the subject of hereditary syphilis, may acquire the disease through some fissure of the nipple, the disease, locally and constitutionally, manifesting its presence with all the intensity of a primary inoculation.

"Again, the secretion of any true syphilitic sore, chancre, mucous tubercle, whether of the mouth, nose, anus, vulva, or penis, is capable of transferring the disease; and the syphilitic poison may probably be simply absorbed by the vessels of a part—*physiological absorption*—without giving rise to any local affection. Hunter believed this, and Lane, Marston, and Lee have published observations that tend to support the theory." There seems no room to doubt that a child may inherit syphilis from a syphilitic father, even when the mother is perfectly healthy at the time of conception.

In 1872, at Vienna, Dr. A. Lostorfer asserted his discovery of certain small shining bodies in the blood of syphilitic patients (after it had been kept several days) which are not present in the

[1] See a paper by Dr. E. L. Keyes, N. Y. Med. Journal, November, 1870.

blood of other persons. These "syphilitic corpuscles," so called, were, however, afterwards found by Stricker and others in patients suffering with various cachectic affections.

**Treatment.**—Mercury is available in the treatment of secondary as well as of primary syphilis; but its power over it is less absolute. After moderate trial of its impression (especially of the green iodide of mercury in $\frac{1}{4}$ grain doses, twice daily), iodide of potassium may be given; from ten to thirty grains thrice daily. This is an almost certain cure (I have never known it to fail) for syphilitic "*rheumatism*" or bone pains with or without nodes. Over ulcers of the throat, also, it has great power; as well as over purely syphilitic affections of the nervous system. Such things, however, often do not *stay* cured; they break out again, as may also the cutaneous eruptions; requiring the same treatment over and over. In some anæmic cases *iodide of iron* will do great good. Mercury and iron may be given together very well; either the two iodides or the two perchlorides.

*Donovan's solution*,[1] internally, and mercurial ointment locally, are the only additional remedies among many proposed and often used, that I think it worth while to name in our brief consideration of this subject. Dr. F. Bumstead thinks very highly of mercurial inunction, along with the internal use of iodide of potassium. The *oleate* of mercury (Marshall) has become a favorite with some practitioners for external use. Of course, enfeeblement of the constitution of the patient may require the employment of generous diet, salt bathing, change of air, iron, quinine, or cod-liver oil.

*Syphilization.*—Among the most remarkable curiosities of medical history is the attempt made to prevent, and even to cure, syphilis by inoculation with the syphilitic virus. Auzias Turenne, Sperino of Turin, Broeck of Christiania, and J. Z. Hall of St. Louis, Mo., have especially urged their assertions of success with this process. The immunity is said, like that of vaccination, to last for life. Out of place as it would be to discuss it here, it must be said that, after reading a good many pages of the evidence, pro and con, I do not find that positive proof enough has been afforded to overcome the strong *a priori* improbability of its availability.

It has been fairly tried by eminent authorities, such as Hebra, of Vienna,[2] and abandoned. Also those who advocate it admit that it is a slow method of cure, as well as far from agreeable; and as to its *prophylactic* use, few physicians, at all events, in this country, are likely to recommend it to their patients instead of avoidance of the cause of contamination. Jonathan Hutchinson, Rodet, Hardie, and others have recorded instances of the recurrence of syphilis by a second inoculation in the same person. Kœbner, of Berlin, reports forty-five cases of this; thirty-seven witnessed by others, and eight occurring under his own knowledge.

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[1] Liquor Hydrargyri et Arsenici Iodidi. *Dose*, 3 to 5 drops.
[2] See Phila. Med. Times, Oct., 1870, p. 11.

### GONORRHŒA.

Very few words must suffice us upon this topic. Gonorrhœa is a *specific urethritis;* in the female, also, vaginitis; produced by impure sexual congress. Its symptoms are, pain and soreness, redness and swelling of the penis, with early and continued suppurative discharge. Burning pain on passing water, and *chordee*, or painful rigidity of erection, are the principal causes of suffering, while the patient is at rest. Walking about aggravates very much the soreness and pain.

Urethritis, or balanitis (inflammation of the glans penis), may occasionally be brought on by contact with the matter of leucorrhœa or the menstrual discharge. No perceptible difference exists in the symptoms in this case from gonorrhœa; but the latter is more obstinate, and is itself directly contagious. Such non-specific urethritis is, moreover, a very rare disorder.

The period of *incubation* of gonorrhœa is sometimes but a day; seldom many days. Its duration is generally from ten days to three weeks. But a *gleet*, or chronic discharge, more or less muco-purulent without active inflammation, may be left behind, of indefinite continuance.

*Sympathetic* non-suppurating *bubo* may attend gonorrhœa; so may also *orchitis*, or inflammation of the testicle. *Gonorrhœal rheumatism* is sometimes met with, ascribed to a metastasis of the local affection to some of the joints. *Pyæmia* sometimes (P. Hewett) follows gonorrhœa, though very rarely.

**Treatment.**—At first, during the height of the inflammation, rest in bed, low diet, Epsom salts, and free draughts of flaxseed tea, comprise the best treatment. It is true there is a period at the end of incubation, when the symptoms are just *commencing*, when *abortive* treatment may be practised; as by a strong injection of nitrate of silver (gr. vj to gr. x in f℥j) into the urethra. This is a *bold* and uncertain measure, however. Kuchenmeister, of Dresden, asserts (1880) that lime-water (one part to four of water), repeated several times in a day, will safely abort gonorrhœa. Dr. W. W. Cheyne[1] uses *bougies* of cocoa butter, mixed with iodoform and oil of eucalyptus (iodof. gr. v; ol. eucalypt. ♏. x; butyr. cac. gr. xl). Other practitioners also employ bougies of butter of cacao, or gelatin and glycerin, with which different remedies are incorporated; as gallic or tannic acid (gr. j), subnitrate of bismuth (gr. x.), nitrate of silver (gr. ¼ to ½), acetate of lead (gr. ½ to gr. j), sulphate of zinc (gr. ½ to gr. j), extract of belladonna (gr. j to ii).

Bathing the penis frequently in warm water is very soothing to the pain and soreness. *Chordee* may be treated by that means, and by suppositories of opium and cocoa butter. A pill of camphor and belladonna (camphor five grains, ext. belladonnæ half a grain) at bedtime will be useful in preventing chordee.

As soon as the activity of the urethritis has subsided, injections may be used; of nitrate of silver (gr. j to gr. iv in f℥j), acetate or subacetate of lead (subacetate, gr. x in f℥j), sulphate of cop-

[1] Brit. Med. Journal, vol. ii., 1880, p. 124.

per (gr. j in f℥j), sulphate of zinc (gr. ij in f℥j), or chloride of zinc (gr. j in f℥j). Glycerin may be added to the water in either of these solutions with advantage. Glycerole of tannin [F. 205] is also a useful preparation.

Copaiba and cubebs are, time out of mind, medicines for gonorrhœa. Without any *specific* antidotal properties, they come in well, one after the other; first the copaiba, and then the cubebs (in half-fluidrachm doses of the former, in mucilage, and ten to twenty-grain doses of the latter), when the inflammation is subsiding [F. 174, 175].

For *gleet*, which is often very annoying, local treatment, with regulation of the diet (avoiding stimulants and condiments), must be depended on. Injections, of the same character as those above alluded to, may be repeated. Should they fail, a bougie, smeared with an astringent ointment, should be introduced every day or two, and left in the urethra for ten or twenty minutes. Ointment of nitrate of mercury, of carbonate of lead, spermaceti ointment, and ointment of nitrate of silver, are all recommended. A *flexible* bougie, of cacao (cocoa) butter will irritate the least. Very obstinate cases have sometimes been cured by the introduction of solid nitrate of silver by the *porte-caustique*.

Examination with the *endoscope* (introduced for specular examination of the urethra) may detect the exact spot which is the seat of the irritation and discharge. Blistering the perineum is practised by some for gleet. Constitutional treatment by tonics may be called for when general relaxation maintains the complaint.

## SCROFULA.

Prof. Aitken[1] defines (scrofulosis or) tuberculosis as follows: "A particular morbid condition of the system, attended [generally] by a persistent increase of temperature, followed by a continuous wasting of the body and the growth of a substance in various tissues and organs, especially the lungs, to which the name of tubercle or tuberculous matter has been applied. These phenomena are associated with peculiarities of outward appearance during life, and liability to certain diseases termed scrofulous, such as swellings of lymphatic glands and of joints, carious ulcerations of bones, frequent and chronic ulcerations of the cornea, ophthalmia, abscesses and cutaneous pustular eruptions, persistent swelling and catarrh of the mucous membrane of the nose, and characteristic thickening and swelling of the upper lip,—lesions which, while they are distinguished by mildness of symptoms, are peculiarly persistent, and follow the application of exciting causes which would have no effect on a healthy person."

**Scrofula** is the term applied commonly to those of the above-named local affections involving (most frequently in rather early life) the glands, bones, nose, ears, and eyes. The tubercular diathesis has been already sufficiently considered for our purpose

[1] Science and Practice of Medicine, vol. ii., p. 188. As remarked already under *General Pathology*, this identification of tuberculosis with scrofulosis is not assented to by all pathologists. I believe, however, that it is essentially correct.

and space. (See *General Pathology.*) A very few words of a practical bearing must be added.[1]

The **causes** of scrofula are, chiefly, *hereditary transmission*, and *deprivation of pure air.* The former is well known to all. Baudelocque, McCormick, and Greenhow, among others, have proved the latter most thoroughly. All depression of the system by low living, such as insufficiency of food and warmth, dampness, etc., will promote it. It has been imagined, not proved, that the syphilitic taint of constitution may glide into it.

In **treatment** of scrofula in any of its forms, but particularly in chronic enlargements, with or without cheesy softening, of the lymphatic glands (of the neck, armpit, or groin), iodine has had general confidence [F. 176]. It is not, however, infallible. Iodide of ammonium (dose 3 grains) is now coming under trial. *Iodized milk* (Hagar) is said to be very available; one part of iodine dissolved in ten parts of alcohol, and mixed with ninety parts of fresh, warm cow's milk.[2] The external application of iodine to tumors, scrofulous or other, "to produce absorption," will very frequently disappoint. I am not sure that it has, locally, any effect but as a stimulant or irritant. That may sometimes be useful. Mr. Furneaux Jordan asserts[3] that *counter*-irritation by iodine, applied a short distance from the enlarged glands, as at the back of the neck, has, in his hands, never failed to be followed by their reduction.

Dr. J. Lewis Smith advises the application to the enlarged glands of a rather weak ointment of iodine, to allow *absorption* without irritation. Mr. Henry Power, of St. Bartholomew's Hospital, London, has found extract of belladonna, internally, and the local application of atropia, important remedies in strumous *ophthalmia*, in children.

Cod-liver oil is also an anti-strumous remedy of great power; and one more readily taken by the young than by adults, generally. Iron may be serviceable in many debilitated scrofulous cases. Sea bathing and sea air are among the best of remedies. Good diet is indispensable. The *dietetic salt* of Dr. Lankester, prepared by adding to common salt small quantities of phosphoric acid, sulphuric acid, lime, potassium, and iron, may have some advantages, and is worthy of trial. The same may be said of *ferruginous chocolate.*

Moleschott, of Turin (1878), has reported several years' favorable experience with *iodoform* in promoting the removal of scrof-

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[1] *Lymphadenoma*, the *adénie* of Trousseau, *pseudo-leukæmia*, or "Hodgkin's disease" of the glands (*Medico-Chirurg. Transactions*, vol. xvii.), appears not to be identical with scrofula. "Hodgkin observed it first in the mesenteric glands, but any or all may be affected. In it the glands become very much enlarged, even to the size of an egg, and apparently more numerous; they present a smooth external appearance, and have a soft semi-fluctuating elastic feel. On section the surface of the gland presents a smooth, bloodless, semi-transparent, loose, succulent structure; microscopically it is made up of glandular tissue and abundance of fibro-nucleated tissue; it is of a tough, leathery consistence, and exudes a clear serous fluid; the tumors are always free, each being separable from the others." (Bryant's Surgery.)

*Mycosis* is a name given by some pathologists (Malassez, Gilot, Landouzy) to an affection of the glands of a similar nature to this. See a case reported by Debove; *Le Mouvement Médicale*, October, 1872.

[2] Medical Press and Circular, Jan. 15, 1871.

[3] Med. Times and Gaz., Aug. 20, 1870.

ulous glandular enlargements. He prefers its local application (although giving it also internally in one-grain doses), by means of a combination of one part of iodoform with fifteen of elastic collodion; or an ointment of the same strength. This may be brushed over the glandular tumors with a camel's-hair pencil at night, and washed off with soap and water in the morning. I have found *benzoated vaseline* a good vehicle for iodoform, lessening although not destroying its unpleasant odor; which is also said to be removed by the addition to it of balsam of tolu, or by tincture of musk (℥j to ℥j).

*Massage*, especially with oleaginous inunction, is likely to be beneficial in the more torpid scrofulous constitutions. (See *Massage*, in Part I., Section III.)

Kapesser[1] reports the beneficial use of regular periodic inunction with *soft soap* in treatment of glandular enlargements.

The *local* treatment of so-called scrofulous affections is to a great extent surgical. Slowly softening glands may sometimes be cut out. Scrofulous periostitis, threatening caries, I have seen arrested by free application of *cerate of carbonate of lead* over the affected bone. The legs are most frequently the seat of such disease; but it may attack any of the long bones. Removal of diseased or necrosed portions is to be recommended rarely, unless they are *loosened*. Extensive resections should be very exceptional.

## RICKETS.

**Synonym.**—*Rachitis.* Infants upon learning to walk show the cachexia to which this name is given, by yielding of the bones, with muscular debility, and general failure of nutrition. The bones are brittle from imperfect development; the spine is apt to become curved and the limbs crooked. The occipital bone and ribs are apt to undergo irregular enlargement. The teeth are backward in coming, and fall out with early decay. Tenderness of the surface of the body, and irritability of the nervous system, also exist. Laryngismus and convulsions are among the not uncommon symptoms.

Dr. C. C. Ritchie[2] has shown that an important diagnostic sign between rickets and tuberculous disease is, that the increase of temperature, especially in the evening, common in tuberculosis, is absent in rickets.

Rachitis does not appear to be hereditary. Its most frequent cause is *insufficient or unsuitable food.*[3]

English medical authors speak of rickets as a very common disorder in Great Britain. It is certainly not so in America. Practitioners of large experience see very little of it. In nine years, ending with 1870, the mortality records of Philadelphia reported but two deaths from rickets. Meigs and Pepper[4]

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[1] Berliner Klin. Wochenschr., Feb. 11, 1878.

[2] Med. Times and Gazette, Jan. 7, 1871.

[3] See an elaborate paper by Dr. J. S. Parry, Am. Journal of Medical Sciences, April, 1872. See also the article "Rickets" by Professor Aitken, in Reynolds' System of Medicine, American edition, Vol. I.

[4] Treatise on Diseases of Children, p. 631.

remark, "we escape to a great extent the ravages of this fatal disease."

**Treatment.**—*Hygienic* measures are of the first consequence. Well-aired rooms, warm salt bathing, milk or beef-tea diet, cod-liver oil, iron, and phosphate, lacto-phosphate[1] [F. 257], or hypophosphite of calcium, all have their value.

## CARIES OF THE SPINE.

**Synonym.**—*Pott's Disease.*

In scrofulous children of either sex, between two and fifteen years of age, sometimes without, but oftener after, a fall, blow, or other mechanical injury, caries of the body of one, or occasionally two or three of the vertebræ may occur. The *dorsal* region is most frequently attacked.

**Symptoms.**—Pallor, debility, pain in the abdomen,[2] in sudden and severe paroxysms; irritability of temper, stooping forward in walking, rigidity of muscles, a cautious, gliding gait, to avoid concussion of the spine; loss of appetite, swelling of the belly, uneasy sleep, hurried or impeded respiration; tenderness of the spine on pressure; an *angular deformity* or backward projection of a portion of the spine; paralysis in various degrees, abscesses of the back, discharging externally or by the lungs, bowels, vagina; or, the pus entering the hip-joint.

**Treatment.**—Dr. Henry G. Davis,[3] of New York, claims, and I believe with reason, to have introduced an important improvement into the treatment of caries of the spine. Of the older methods, the best idea was *rest* to the back, with careful efforts at extension; and, especially in this country by the late Dr. John K. Mitchell, support (by means of corsets) dependent upon attachments quite outside of the body. Dr. Davis, reasoning upon the fact that the *bodies* of the vertebræ are the seats of the destructive process, aims at *separating* these, throwing all the weight upon the oblique processes. The spine is relieved then by *strengthening* rather than extending it.

An apparatus of Dr. C. F. Taylor carries out this and other rational principles of treatment very well. It is thus described:[4] "A broad band passes around the trunk low down, so low that in front it almost touches the thighs in sitting. It passes just above the pubes and entirely below the abdomen, so that the abdomen is sustained upward, instead of being, as in most instruments, pressed downward. There are two pieces or levers passing up the back, not over the spine, but each side of it, so that it is firmly held from lateral deviations. At the top is a cross-piece in the form of two T's with the small ends united. The object of this arrangement is that the straps may pass directly forward and around the arms, and thus prevent a great loss of force by

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[1] Dusart and Blache, Bull. Gén. de Thérapeutique, July, 30, 1868; also, a paper by Dr. B. W. MacCready, New York Med. Journal, June, 1871.

[2] Dr. B. Lee (Angular Curvature of the Spine, 1867) speaks of gastralgia as an *initial symptom.*

[3] Conservative Surgery, 1867. Dr. Davis's first publication on the subject was in the Boston Medical and Surgical Journal, August, 1852.

[4] Angular Curvature of the Spine, by Dr. B. Lee, p. 70.

diagonal action; and also that they shall touch the person only where the pressure is needed, namely, on the forward part of the shoulders. At a part of the instrument opposite the seat of the disease, the point where we make our fulcrum, the pads are placed. These are made of chamois skin, or Canton flannel, and are filled, not with cotton, which soon packs and becomes hard, but with long, elastic African or East Indian wool, which has no felting qualities. These pads are removable when they become compacted. The shoulder-straps and bands around the hips are likewise provided with removable pads to protect the skin against pressure and abrasion.

"It will be seen that the instrument, like the spine itself, acts like a double lever with a common fulcrum at the curvature; this action is directly backward at the hips and shoulders, and directly forward at the middle of the back, or wherever the diseased part is located. . . . The instrument is provided with several hinges, *stop* hinges in *front*, but free to bend *backwards*, which allows the most unrestrained use of the muscles of the back . . . useful in causing the development of the spinal muscles instead of binding them up and causing their atrophy, as results from the use of instruments which prevent muscular action."

Dr. Sayre's name has become especially connected with the use of the *jacket*, made of bandages soaked in plaster of Paris, and fitted to the body by their application while the patient is *suspended* (so as to *extend* the spinal column) by the axilla and head in a framework constructed for the purpose. W. Adams, of London, Dr. B. Lee, and others have used, instead, a porous felt jacket, similarly applied. Dr. D. H. Agnew[1] prefers a jacket made of leather, strengthened by thin strips of steel.

Constitutional treatment, by fresh air and sunshine, nourishing diet and cod-liver oil, iron, or other tonics, as well as purgatives (if required, as they are in most cases) must be added, of course, to mechanical means. Cures are thus sometimes effected in cases once thought hopeless.

**Lateral** curvature of the spine is very different, mostly depending upon muscular weakness or inequality of development. Bad habitual positions often cause it. Training the subject of it to *use his muscles properly*, and thus develop and strengthen them, must be the leading idea in its treatment, apparatus here being quite secondary, though perhaps sometimes temporarily needful.

## COXALGIA.

**Synonyms.**—*Morbus Coxarius; Hip-Disease.*

Though regarded, like spinal caries, as rather a "surgical" subject, a few words may not be out of place upon this theme also. Its *etiology* appears to be like that of disease of the spine; a constitutional tendency, tubercular or scrofulous, acted upon in many, though far from all cases, by a local injury. Inflammation of the hip-joint occurs, in some instances acute and vio-

[1] Principles and Practice of Surgery, Vol. [illegible].

lent, oftener active only at first and to a moderate degree; not rarely insidious in approach.

**Symptoms** of the most characteristic kind are, pain in the knee, without any other sign of disease about that part; and a limping gait, the knee being bent, the child treading only on the toes of the affected limb. Spasmodic contraction of the muscles causes fixation of the joint. Examining the hip-joint, it is found that pressing the head of the thigh-bone into it gives pain. Atrophy of the muscles over the hip may follow. General weakness and emaciation, with other symptoms of the scrofulous cachexia, usually attend. *Suppuration* in the joint, with chronic abscesses, ulceration of the cartilages, subluxation of the femur, and caries of the bones, with hectic fever and progressive debility, occur in severe cases.

**Treatment.**—Physick's celebrated treatment was, absolute rest of the joint by means of a carved splint, passive exercise in the open air, in a carriage, or, if a young child, in arms—and systematic purgation with jalap and cream of tartar. To this, with less stress upon the not at all necessary purging, Dr. H. G. Davis has added the use of *continued elastic extension* of the limb, so as to relieve the joint of the pressure of the head of the bone in its socket, caused by the contraction of the muscles. This continued elastic extension may be obtained in bed, by adhesive plaster strips, to which is suspended, by a cord and pulley, a *weight*, proportioned to the amount of power which the muscles display, and tested by the comfort secured by it to the patient. Out of bed, a splint may be applied, maintaining elastic extension by a perineal band, best made of adhesive plaster, spread (as proposed by Dr. Davis) upon *twilled* material, and kept for a while before use, so as to lose its unctuous property and remain more securely in place.

Another mode of treatment (J. C. Hutchison)[1] is by *extension* of the joint, without absolute rest. This may be effected by placing a high-soled shoe upon the foot of the *sound* limb, and letting the patient walk about for two or three hours daily *with crutches*. Several practitioners, prefer along with this, to secure the joint from much movement by a posterior splint, or silicate of sodium immovable bandage.

Simple inflammation of the hip-joint may, of course, follow an injury; and may find relief in a comparatively brief time, from rest, with local antiphlogistic measures, as cups, a blister, etc.

## NÆMIA.

Something has been said upon this subject under *General Pathology*.

The **causes** of anæmia are, most often, either, 1. Loss of blood, from disease or injury causing hemorrhage. 2. Excessive suckling in a mother, or wet-nurse. 3. Severe or protracted diarrhœa, or (more rarely) leucorrhœa. 4. Typhoid or some other form of fever. 5. The malarial influence, sustained for a con-

[1] Amer. Journal of Med. Sciences, January, 1879; Phil. Med. Times, May 7, 1881.

siderable time. 6. Deficiency of food, light, warmth, or fresh air.

Anæmic **symptoms** are pallor, slenderness of figure, debility, nervous excitability, cardiac palpitation. Anæmic *murmurs* in the heart and aorta have been mentioned under *Semeiology*.

In the **treatment** of anæmia, *good diet*, *pure air*, and *iron* or cod-liver oil are the essentials. Of the preparations of iron, numerous as they are, I have found the most satisfactory results from the tincture of the chloride, the pill of the carbonate (Vallet's mass), the iodide (syrupus ferri iodidi), the phosphate, and in children, the citrate [F. 202, 203, 204, 205]. Goodhart, Fothergill, and others have observed that, as anæmia promotes dilatation of the heart, care must be taken with anæmic persons, to avoid much exertion; and, if symptoms of weak heart appear, digitalis may be given along with iron. Dr. Aitken speaks very highly of the value of a combination designated as the "syrup of the phosphates of iron, quinine, and strychnia." This formula will be given at the end of the book [see F. 213].

**Progressive Pernicious Anæmia.**—Under this name, Biermer, 1871, described a form of anæmia not accounted for by any of the ordinary causes of such a condition. Otherwise named, the same malady had been before mentioned by Andral (1823), Addison (*idiopathic* anæmia), Wilks, Zenker, and Wagner. Lebert has called it *essential* anæmia.

**Symptoms.**—Mostly with a gradual approach, this affection is marked by extreme pallor, or a dusky yellowness of complexion; debility; impairment of digestion and irritability of the stomach; palpitation of the heart; cardiac systolic murmurs and *fremissement cataire;* dyspnœa and a tendency to fainting on slight exertion. Emaciation is not extreme; it may be very moderate in proportion to the anæmia and debility. Swelling of the feet and legs is common at a late stage. Hemorrhages are apt to occur, from the nose, gums, bronchial mucous membrane, uterus, or under the skin (*petechiæ*, *vibices*, *ecchymoses*). *Retinal* hemorrhages, producing blindness, have been observed (with the aid of the ophthalmoscope) in several cases. Toward the end of the attack, *fever* is almost always present.

**Morbid Anatomy and Pathology.**—Biermer, Immermann,[1] and others have insisted that we should exclude from the list of cases of this disorder all those in which, after death, lesions are discovered such as are ordinarily known to be associated with anæmia; as enlargement of the spleen, disease of the lymphatic glands, and morbid alterations of the marrow of the bones. This appears to me to be too arbitrary an exclusion. The question, hardly yet finally decided, is, whether there is a group of cases of progressive anæmia whose clinical history is sufficiently peculiar and constant for them to receive a distinctive nosological name; and with this question, of course, that of their causation is closely connected.

*Fatty degeneration of the heart* has been (first by Wilks) a number of times observed. Changes in the *marrow of the bones* have

[1] Ziemssen's Cyclopædia of Medicine, article Progressive Pernicious Anæmia.

been found by Eichhorst, Gardner, Osler, Fede, Cohnheim, Pepper,[1] Litten, and others. Eichhorst described as *microcytes* certain minute nucleated red corpuscles in the marrow, sometimes also seen in the blood. Neumann's larger nucleated "embryonic corpuscles" were also seen in the marrow by Gardner and Osler.[2] In some cases of idiopathic anæmia, however, Lepine, Burger, and Quincke have found the bone-marrow free from disease. Enlargement of both the *spleen* and the *liver* were reported in a marked case by Rosenstein.[3]

Changes in the *blood* are, after all, most characteristic. It is, during life, paler and thinner than healthy blood. The number of the red corpuscles is reduced from one-fourth to one-twelfth of their normal proportion; and they vary also in size, and often present irregularity of outline. The *white corpuscles are not abnormally increased;* they may be even diminished. The volume of the blood generally throughout the body is believed to be considerably lessened.

Brigidi,[4] in one case, ascertained that the *cœliac ganglia* were morbidly altered, fatty and pigmentary degeneration having taken place in their nerve-cells.

**Causation.**—No constant relation of this disease to sex has yet been established; although pregnancy (especially rapidly repeated pregnancies) obviously predisposes to it. Nor is it certain that one age is more liable to it than another, except that it has scarcely been met with in persons under twenty years of age, and rarely in those of advanced age. Hemorrhages, exhausting acute or chronic maladies of various kinds, and prolonged mental anxiety or trouble, are among the most notable influences predisposing to it. Yet, in a large number of instances, no such, or any other, sufficient causation can be ascertained for it; especially for the progressive and obstinate character which belongs to it.

**Diagnosis.**—Pernicious anæmia resembles most, *leucocythæmia* (leukæmia), *pseudo-leukæmia* or Hodgkin's disease, *chlorosis*, and *Addison's disease* (melasma supra-renalis).

From leucocythæmia those cases at least are clearly distinguished in which there is enlargement neither of the spleen nor of the lymph-glands, tenderness on pressure of the sternum, ribs, or other bones, or actual increase of the number of the white blood-corpuscles beyond their normal proportion to the quantity of blood. From pseudo-leukæmia we may separate pernicious anæmia by the absence of that general and persistent enlargement of the lymphatic glands which belongs to Hodgkin's disease. Pepper has expressed the opinion that pernicious anæmia is simply "myelogenous pseudo-leukæmia."

Chlorosis is almost always an affection of females near the time of puberty. In it, as a rule, there are no dropsical effusions, no hemorrhages, and no fever. It is, moreover, nearly always susceptible of improvement and cure under appropriate treatment;

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[1] Amer. Jour. Med. Sciences, April, 1877.
[2] Canada Med. and Surg. Journal, March, 1877; and Canada Journal of Med. Sciences, May, 1881.
[3] Berliner Klin. Wochenschrift, Feb. 26, 1877.
[4] Lo Sperimentale, May, 1878.

as pernicious anæmia is not. The latter is distinguished from Addison's disease by the absence of bronze discoloration of the skin, the more extreme anæmia with less emaciation, the hemorrhages, and the fever.

**Prognosis.**—It has been held to be characteristic of this affection to be extremely intractable, if not incurable. While usually *progressive*, with a duration of from six weeks to six months, cases are recorded in which *remissions*, lasting even for months, have given a deceptive hope of recovery.[1] When pregnant women are attacked with pernicious anæmia, abortion is to be anticipated, with death following not long afterwards.

**Treatment.**—As the fatal *perniciousness* of this disease is only absolutely determined by the result, it is reasonable always to employ with perseverance those remedies and hygienic measures which are most available and effective for enrichment of impoverished blood, and renewal of the blood-making function. As already shown, the most important of these are, the administration of iron, arsenic in small doses (Coupland), animal food (concentrated and liquid when digestion is weak), change of air, and, if the strength allows it, sea-bathing. Transfusion of blood has been repeatedly tried in cases of pernicious anæmia, mostly in vain. Dr. Austen Weldon[2] asserts the cure of four cases by the intravenous injection of milk. Dr. C. Cary[3] obtained recovery in a case in which iron, etc., had failed, by transfusion of only f℥ij of human blood, by means of Dieulafoy's aspirator.

**Parasitic** anæmia has been studied by observers in different parts of the world; *e. g.*, amongst laborers in the construction of the St. Gothard tunnel. There the disease was traced to parasites in the intestines.[4] Manson, in Amoy, China, Brisbane in Australia, and Wortabel in Syria, have found anæmia of a very severe degree to be produced by the *filaria sanguinis* and *bilharzia hæmatobia*.[5] *Sprue*, a sort of anæmic affection, with soreness of the mouth and diarrhœa, common in Java and to some extent in India, is probably of a similar pathogenetic nature. No specific treatment can be laid down for such affections until some mode of safe elimination or destruction of the infesting parasites can be devised.

## CHLOROSIS.

**Synonyms.**—*Chloro-anæmia; Green Sickness.*

This affection of girls, about the age of puberty, is by some regarded as simple anæmia; by others as a pathologically distinct affection. Symptomatically, it is characterized by a peculiar waxy, yellowish, or greenish pallor of the face. The lips also are nearly colorless, and (as in common anæmia) the tongue is often pale. Œdema of the feet or of the face may occur, or a dark circle may appear around each eye. Weakness, nervousness, and palpitations exist, with somewhat lowered temperature

[1] J. H. Hutchinson, Med. News and Library, Philadelphia, February, 1879.
[2] Med. Press and Circular, October, 1879.
[3] Buffalo Med. and Surg. Journal, January, 1881.
[4] Meissner, Schmidt's Medicinische Jahrbücher, 1881.
[5] Phila. Med. Times, June 4, 1881, p. 563.

of the body. A murmur (*bruit de diable*) is often heard on auscultation in the region of the heart. Ringing in the ears, lowness of spirits, and disturbed sleep are common. Digestion is impaired, and a *morbid appetite* is sometimes present, as for coal-ashes, slate-pencils, chalk, earth, or, in other cases, strong acids. Neuralgia, affecting especially the *abdominal* parietes, or myalgia may occur. Menstruation is either absent (amenorrhœa), irregular, or painful (dysmenorrhœa).

The *blood* in chlorosis has been found deficient in corpuscles, and containing an excess of fibrin. One of the curiosities of medical history is the fact that crude theory led at one time to the employment of venesection in its treatment, to diminish the amount of fibrin, whose excess was supposed to constitute it an inflammatory disease. Virchow asserts the predisposition to it to depend mostly upon some congenital abnormity of the heart or the aorta; especially often of the latter.

The *duration* of chlorosis is variable. It may be protracted for years. It is perhaps never alone directly fatal.

In **treatment**, measures adapted to anæmia are generally suitable. Good diet, sea-bathing, change of air, *light* gymnastics, iron, bitter tonics, quinine (sometimes even strychnia or nux vomica in small doses) will all have their place. Certain cases do not bear iron well, from tendency to fulness of the head. Some even, chlorotic but not anæmic, need to be relieved of that symptom by the application of a few leeches or cut cups to the back of the neck. It is often best to precede or accompany the administration of iron with moderate doses of a laxative saline medicine, such as cream of tartar, or Hunyadi Janos, or Friederickshall mineral water.[1]

Special attention to the menstrual function will be demanded. Of this a few words will be said in another place. (See *Amenorrhœa.*)

## BERIBERI.

This epidemic disease of Ceylon, a part of Hindostan, Japan, Northern Africa, and Brazil, needs here to be defined. This will be done in the words of Dr. Aitken:[2]

"A constitutional disease, expressed in the first instance by anæmia, culminating in acute œdema, and marked by stiffness of the limbs, numbness, and sometimes paralysis of the lower extremities; oppressed breathing; a swollen and bloated countenance. The urine is secreted in diminished quantity. The œdema is general, not only throughout the connective tissue of the muscles, but the connective tissue of solid and visceral organs in every cavity of the body is bathed in fluid. Effusion of serum into the serous cavities very generally precedes death."

This disease may occur either in the acute or chronic form. Death may follow in a few hours, or be delayed for several weeks.

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[1] Of Hunyadi Janos water, the dose is from half a wineglassful to a wineglassful; of Friederickshall, rather more is usually required to operate. No active purgation, however, is called for in the treatment of chlorosis. The addition of *chloride of ammonium* to the tincture of chloride of iron makes it agree better with some patients. Hayem and Reynauld recommend the *inhalation of oxygen* along with the administration of iron in anæmia and chlorosis.

[1] Science and Practice of Medicine, vol. ii., p. 83.

Intemperance promotes it. But there must be some undiscovered element of *local* causation. Dr. D. B. Simmons,[1] of Yokohama, asserts the occurrence of two forms of the disease; the "dry" and atrophic, and the "wet," accompanied by dropsical effusion. Of these, the dry is rarely fatal; the dropsical is often so. In Japan, it attacks well nourished as well as anæmic subjects; mostly between 20 and 30 years of age; males more frequently than females. Sedentary employments promote it. Foreigners are much less apt to be affected with it than natives of Japan. Few cases occur except in the warmer months of the year, from May to October. Dr. Simmons believes its causation to depend upon a *specific local miasm*, not identical with the malarial cause of autumnal fevers. In treatment, no special antidote having been discovered, he recommends, in the dropsical cases, *cathartics* and *diuretics*, with regulation of the diet. Rice is to be avoided, and wheat, barley, and beans (especially the small red *adzuke* bean) should be used for food.

Tonics, stimulants, and generous diet have been generally thought to be indicated in the treatment of beriberi. Some native medicines have a reputation in India; but the management of the disease does not appear to have been satisfactory. Death is, in India, seldom averted; following either the first attack or relapses.

## MYXŒDEMA.

Ord gave this name to a "cretinoid condition" first described (1874) by Sir William Gull, as occurring in married women between 30 and 50 years of age. Its characteristic is a general increase and mucoid degeneration of the connective tissue throughout the body. "No hereditary influence or special exciting cause has been given.

"The symptoms are characteristic and the disease can be easily differentiated. The patient generally begins to swell and increase in size, the face has a puffy, anæmic look like that of Bright's disease, but there is no œdema, and rarely any albumen in the urine.

"The movements become slow, the mind grows lethargic, and the perception dull; at times the patient has delusions, or becomes of sullen temper; the appetite is lessened, the bowels are often constipated.

"The temperature is very low, toward the close of the disease falling to 92°, 90°, 88° F., and in one case even to 77° just before death. The course of the disease is chronic; it generally lasts ten or twelve years; but the patient gradually becomes more stupid and lethargic, and, though there may be an interval of improvement, death seems to be inevitable.

"No satisfactory treatment has been discovered; iron and cod-liver oil have so far been oftenest given."[2]

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[1] Monograph on Beriberi, or the Kakké of Japan, Shanghai, 1880.
[2] Med. Press and Circular, Oct. 15, 1879.

### LEUCOCYTHÆMIA.

We have defined this affection already. (See *General Pathology.*)

The history of its discovery, which has been subject to controversy, appears to be, in brief, as follows: Velpeau (1827), Barth and Donné (1839) noticed in certain cases a semi-purulent aspect of the blood. Dr. Craigie, of Scotland, reported (*Edin. Med. and Surg. Journal*, vol. lxiv., 1845) a case of disease of the spleen, examined also by Dr. John Reid, in which a peculiar appearance of the blood occurred, supposed by them to be "purulent." Dr. Bennett, of Edinburgh, in 1845, published an account of a similar case, describing it as "suppuration of the blood." A month later Virchow, of Berlin, described a case presenting the same appearances under the microscope, as *leukæmia*, or white blood, asserting the view that excess of the colorless corpuscles, *not* suppuration, was the true nature of the affection. While, then, the first *facts* were Dr. Craigie's, the credit of discerning the pathology which explains them belongs to Prof. Virchow.[1] The first diagnosis of the disease during life was made by Dr. Fuller, of London, in 1845.

The **causes** of leucocythæmia are exposure to cold and wet, prostrating disease, such as typhus, typhoid, or puerperal fever, and affections of the lymphatic glands, or of the spleen, often of undetermined origin.

Its **symptoms** are, debility, swelling of the abdomen, anasarca, often vomiting or diarrhœa, jaundice, and *hemorrhages* from the nose or gums. The spleen and, sometimes, the liver, are enlarged. The lymphatic glands are often so, also. The bones (sternum, ribs, etc.,) are sometimes tender to the touch. Cough may occur; and so may pustular eruptions. The tendency of the disease is towards death, and it is doubtful whether any case, well marked, has been cured. But it is slow, and may extend over many years; average duration, about two years.

As to the *origin* of leucocythæmia, writers generally refer the disease to three varieties: *Splenic*, *lymph-glandular*, and *myelogenic*. The last named indicates the supposed origination (Neumann) of the superabundant white corpuscles in the *marrow of the bones*. It is a hypothesis of some physiologists, that bone-marrow is normally, in early life at least, a blood-cell generating substance. Neumann himself speaks doubtfully on this point; and Pouchet,[2] after considerable investigation, denies it altogether. In any case, however, a morbid excess of corpuscular elements may be contributed by any tissue which is in part cellular; and there is no doubt that marked tenderness of the bones exists in some cases of leucocythæmia, and that alteration in the bone-marrow has in certain instances been observed after death. It is entirely possible, and even probable, that the bone-changes are *secondary* to, not causative of, the leucocythæmia.

**Diagnosis** of leucocythæmia is only possible by microscopic

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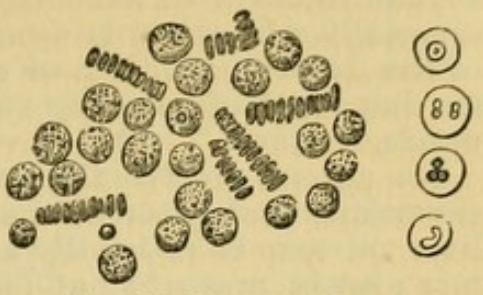
[1] Prof. Bennett's labored defence of his own claim to priority does not, I think, at all contravene the above view. See his "Clinical Lectures, etc.," 2d ed. (N. Y.), p. 892.

[2] La Tribune Médicale, March 30, 1879.

examination of the blood. A drop from a needle-prick of a finger will suffice, placed under a microscope of 250 diameters or more. Instead of being but one to fifty or one or two hundred of the red corpuscles, the white blood-cells may be one to six or four; perhaps even one to two or three. (See Part I., under *Cachexiæ;* also, *Semeiology.*) When a larger quantity of blood is drawn, it has, after heating, a whitish or milky look. Its coagulum is grayish-white on its surface, from excess of the colorless corpuscles. *Crystals* of a peculiar kind (elongated octahedra) have been found in the blood after death, by Charcot, Vulpian, and others (1860). After death, coagula are found in the heart, consisting of white corpuscles almost alone.

FIG. 124.



Blood in Leucocythæmia.

We have said that the *cure* of leucocythæmia has not yet followed any of the many remedies tried for it. No doubt life may be prolonged under it, by hygienic management, and tonics. Nitric and nitro-muriatic acid are recommended; the latter by the bath as well as internally. If the spleen be much enlarged, it may be treated as mentioned under the head of *Diseases of the Spleen.*

## HODGKIN'S DISEASE.

*Adénie* is the name given by Trousseau to an affection (called by others Hodgkin's disease, or *pseudo-leukæmia*) in which the spleen and lymphatic glands are considerably enlarged, with reduction in number of the red, without increase of the white blood corpuscles.

Though before alluded to by several writers, Dr. Hodgkin gave the first clear and full account of this affection (Medico-Chirurgical Transactions, vol. xvii.) in 1832. Not unfrequently most or all of the lymphatic glands of the body, cervical, axillary, inguinal and deeply seated, are involved in enlargement, with fibroid transformation, different from scrofulosis. The caseation and suppuration of the glands, so common in scrofula, do not appear in it. No considerable disorder of the general health occurs, except anæmia, until some of the enlarged glands cause disturbance by pressure upon important organs, as the *trachea*, *œsophagus*, *carotid arteries*, *vena cava*, etc. The *size* of the enlarged glands varies from that of a hickory nut to that of a hen's egg. *Groups* of glands together may attain to a much more considerable magnitude.

The *duration* of this disease averages less than two years. Anæmia and debility increase, general dropsy is apt to come on, and the interruption of various functions at last exhausts the system.

**Treatment.**—Removal of the enlarged glands has often been practised. In a few cases only (Verneuil) does this seem to have had any effect in arresting the disease. The most favorable cases

for such treatment are those in which the glandular growth is confined to a single region of the body; without enlargement of the spleen, or marked general debility. *Fever*, when present, should forbid operative interference; and so should anæmia; especially when that is ascertained by microscopic examination of the blood. Excision of glands in certain parts of the body for the relief of pressing symptoms, may be sometimes appropriate.

No special medicinal treatment has been found to control or essentially modify the diathesis of lymphadenosis. Iron and cod-liver oil may be rationally administered, on account of the anæmia always present; but iodine, arsenic, and many other alteratives have been largely tried, and have usually failed to do any considerable good. Warfyinge,[1] however, reports beneficial effects from arsenic, in four cases.

### PYÆMIA.[2]

"Absorption of *pus*," as such, through the walls of the blood-vessels, being shown to be improbable on account of its cellular nature, the pus-cells, moreover, being too large to pass through the finer capillaries, other views are now advanced. This improbability of cell-migration has been, of course, rendered less, by the investigations of Cohnheim upon the results of inflammation. Yet the *escape* of leucocytes from blood-vessels, under *pressure*, must be supposed to occur much more readily than the reverse process, of *absorption* of pus-cells into the vessels. Under the name pyæmia, indeed, several affections are often included. 1. *Septicæmia* (Guérin) or *ichorhæmia; i. e.*, blood-contamination from the absorption, in a liquid state, of putrescent or otherwise morbific material; 2. Transfer by veins of actual pus, in cases of phlebitis (Lee), and its deposit in new localities; 3. *Thrombosis* (Virchow), or coagulation in a vein during life, followed by *embolism*, or the conveyance of a portion or portions of coagulum to different parts, causing irritation, or obstruction.

That inflammation of a vein (phlebitis) does not very unfrequently occur, there is no doubt. But the external coat and surrounding connective tissue are generally most involved; and suppuration of its internal lining is rare. Coagulation is much more frequent. Embolism, however, as well as thrombosis may, and often does, take place, without any of those general symptoms to which the name of "purulent infection" is given. Most properly, I consider, the name pyæmia should be restricted to cases in which, to cite the words of J. Simon, "some diseased part (which need not be an external wound) so affects the blood circulating through it, that this blood afterwards excites destructive suppuration in parts to which the circulation carries it—namely, commonly first in the lungs, or (in certain cases) liver and lungs, and later generally about the body. Putrid infection, septicæmia or ichorhæmia, may occur without local suppuration, but with symptoms otherwise similiar. Clinical convenience may for the

[1] London Med. Record, March 15, 1881.
[2] First named *pyohæmia*, by Piorry.

present readily excuse the common designation of all such cases by the term pyæmia."

Klebs, Tiegel, and others, in their experimental researches, have identified pyæmia with septicæmia. Birch-Hirschfeld[1] asserts an important distinction, in the presence of *micrococci* in the pus, and in the blood, of the former affection, but not in the latter. Vogt found abundance of monads in a pyæmic abscess. Recklinghausen has asserted the dependence of "multiple metastatic abscesses" upon extra-vascular accretions of fungi.

Prescott Hewett[2] has reported twenty-three cases of pyæmia in *private practice*, seven of which occurred in the country, and all under favorable sanitary conditions. In six of these cases some surgical operation had been performed; in eleven there was a broken surface; in six, not even an abrasion. It appears from such facts that a *constitutional predisposition* to pyæmia must exist in certain individuals; and that some, at least, of the causes of this affection are "still to be worked out."

**Symptoms** of such an affection are, chills, low fever, rapidity and feebleness of the pulse, vomiting, delirium and swelling of the joints. Death may occur in a few days from devitalization of the blood; or, if purulent formations occur, by exhaustion caused by their presence and discharge.

In the **treatment** of pyæmia or septicæmia, support and depuration of the blood are the indications. *Pure air* is not only preventive, but positively curative of such affections. Of medicines, the attention of the profession has been especially called to the sulphites and hyposulphites of sodium, calcium, and magnesium, carbolic acid, and salicylic acid as antiseptic remedies. They are under trial. Several favorable cases of their use are reported; although in the U. S. army, during the late war, disappointment was experienced by a number of those who employed the sulphites. Sulphite of sodium may be given safely to the extent of four or five drachms daily; the bisulphite (Wood), about half as much, or less. It is certainly proper to give these remedies a full and prolonged trial.

Dr. Fordyce Barker[3] emphatically urges the power of quinine to control the tendency to suppuration, and to prevent pyæmia and septicæmia. He gives it, for this purpose, in 10 to 15 grain doses, morning and evening, until constitutional effects are produced. It is not easy to see why quantities somewhat smaller (say 15 grains daily) might not be equally relied upon. Dr. J. S. Holden (*Lancet*, January 31, 1874) reports the recovery of a severe case of pyæmia under the use of half-drachm doses of oil of turpentine.

*Good nursing* is indispensable in pyæmia; and concentrated liquid food is of great consequence. Dr. Joseph Bell (*Edin. Med. Journal*, Jan., 1870) reports three recoveries, in which, with hardly any medicine, he gave milk with lime-water, eggs, and beef-tea at short intervals. Dr. John Wood[4] advises saturating the air around the patient with carbolic acid by hanging materials

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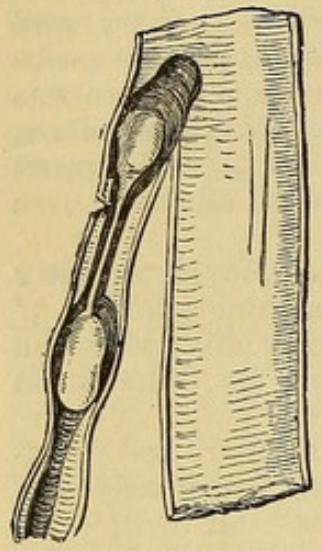
[1] Gaz. Médicale de Paris, No. 20 *et seq.*, 1873.
[2] Brit. Med. Journal, January 31, 1874.
[3] N. Y. Medical Record, July 15, 1873.
[4] Practitioner, Jan., 1871.

containing it near his bed. We can only suppose this to be required when he is necessarily confined to a room in which the atmosphere is not fresh and pure. Abundant ventilation will be much better.

## THROMBOSIS AND EMBOLISM.

Cruveilhier, many years ago, proved that in inflamed veins a clot is formed, principally fibrinous. Gulliver ascertained that a granular degeneration of the central layers of such a coagulum may occur, giving a "puriform" character to their substance. Virchow then demonstrated that portions of such clots may be carried from their first seat in the circulation, and form *plugs* in the pulmonary or some other artery. Afterwards it was shown (Paget, Druitt, Kirkes, Goodfellow, etc.) that not only *thrombosis* in veins, with or without inflammation, but also inflammatory or degenerative deposits on the heart's valves, may give off *emboli* or floating masses, which may obstruct the arteries of the lungs, liver, brain, or other organs, causing atrophy, or irritation and inflammation. The septic degeneration of the débris of such clots may also contaminate the blood—causing septicæmia or ichorhæmia. *Fatty* embolism may thus result (Eberth[1]). Fatty emboli are, moreover, sometimes (E. Wagner, Bergmann[2]) traced to fractures or other injuries involving the medullary canals of bones. Zenker has reported a case of *fungous* embolism, occurring with thrush; mycelium of the *oidium albicans* penetrating the mucous membrane and being conveyed by its small vessels to the brain, producing there numerous small abscesses.

FIG. 125.



Thrombus in Saphenous Vein.

In 300 fatal cases of endocarditis at Berlin, Sperling found embolism to have occurred in 29 per cent.; in 26 of which cases it was upon the left side. When upon the right side, it was always in the lungs. Spalding observed the kidneys to be affected with embolism in the greatest number of cases; next, the spleen; afterwards, the brain and other parts. In practice, the *symptoms* of cerebral embolism have especially brought *it* before the notice of pathologists.

*Multiple* embolism is the term applied when, as a consequence of *ulcerative endocarditis*, many small fragments of plastic exudation upon the heart-valves pass into the circulation and obstruct the smaller arteries of various organs. The kidneys, spleen, and liver are especially apt to be thus affected.

Emboli are, apart from their origin, chiefly *arterial* or *venous* in their *locality* of arrest. *Capillary* embolism is noticed especially in the brain. The arteries most often obstructed are, those at the

[1] Med. Times and Gazette, Oct. 11, 1873. Osmic acid detects fatty embolism, by coloring fatty matter, and not the normal ingredients of the blood.

[2] Berliner Klinische Wochenschrift, Aug. 18, 1873.

base of the brain, the internal carotid, the femoral, brachial, splenic, renal, external carotid, and mesenteric arteries. One obstruction is apt to be the source of others. Cessation of the pulse of the arteries in a limb is an early positive sign. Gangrene is usually the last and fatal event, if an extremity be involved.

When the right half of the heart has received an embolus, and the pulmonary artery is obstructed, collapse of the lungs, partial or entire, follows. Pleurisy, hemorrhage, or bronchitis may occur also. Or the symptoms may be, great anxiety and dyspnœa, with reduction of the temperature of the body. A systolic murmur may be heard on auscultation; the rhythm of the heart becomes irregular; and pulsation of the jugular veins may be noticed. Giddiness may be present, with blueness and œdema of the hands, or feet, or both. Death occurs in much the greater number of cases of embolism.

*Ante-mortem clots* in the heart (denied by some) undoubtedly occur in a few instances. Dr. B. W. Richardson gives as the characters of such a clot: 1st, its filling a cavity; 2d, its being grooved externally by a current of blood, or bored by a current through its centre; 3d, its being firmly adherent to the walls of the heart; 4th, its being deeply indented by the surrounding structures. Such clots are said to be met with in cases of croup, diphtheria, pneumonia, peritonitis, the ovarian operation, child-birth, erysipelas, scarlet fever, and some obscure cases almost without symptoms till near the time of death. Dr. Richardson thinks[1] that the free administration of ammonia (with iodide of potassium) may save life in some such cases.

FIG. 126.

Embolus of Pulmonary Artery.

**Symptoms.**—Where emboli have become broken up and decomposed, septicæmia results—commonly known as pyæmia, as before explained. The temperature in this disorder is commonly high; from 106° to 107° in the evening exacerbation. Dr. Liddell[2] asserts *thrombosis* of the minute arteries of the brain to be not uncommon in aged or enfeebled persons. Occasionally it may originate in erysipelas, or some other *inflammatory attack;* or it may be *traumatic;* or dependent upon constitutional *syphilis*, or on *intemperance*. Oftener, it is *marasmic; i. e.*, attendant upon a general decline of organic force, with weakness of the heart and increased coagulability of the blood. Dizziness, frontal headache, dilatation of pupils, tinnitus aurium, and tendency to lethargy, are early symptoms of such a state of things; later comes paralysis, especially hemiplegia, and often convulsions. Cerebral embolism occurs more suddenly than thrombosis, and frequently in younger subjects. There is, also, generally, in embolism, evidence of disease of the heart, or of some other organ, preceding and accounting for the attack. Several slight attacks of paralysis are apt to accompany

[1] British Med. Journal, Dec. 14, 1872.
[2] Am. Journal of Med. Sciences, April, 1873.

thrombosis; one severe paralytic attack, embolism. Between cerebral embolism and acute meningitis, or phrenitis, Broca has pointed out the distinction that the temperature of the head is commonly *lowered* in the former, but *elevated* in inflammation of the brain.

For **treatment** of embolism without septicæmia, our only resources are *rest*, *support* by food and stimulants, and alleviation of nervous disturbance by opiates.

### MUCOUS DISEASE.

Eustace Smith[1] and others have given this name to an affection, most common in women from thirty to forty years of age, in which an excessive secretion of unhealthy mucus occurs, chiefly in the bowels, with more or less consolidation in shreds or tubular casts, accompanied by symptoms of indigestion, palpitation of the heart, and mental depression. The mucus may be discharged at variable intervals, in membranous or concrete masses. Under the microscope these are found to consist (Whitehead[2]) of layers of an amorphous matrix, with epithelial and spherical cells imbedded, as well as free nuclei, triple phosphate, etc. In treatment, the indications are, constitutional invigoration, removal of the mucus by alkaline injections, and the use of mild astringents to prevent its reformation.

### ANGEIOLEUCITIS.

**Definition.**—Inflammation of a lymphatic vessel.

**Causation.**—Any local irritation or injury may cause a neighboring lymphatic to inflame; but it is especially apt to follow a *poisoned* wound. Erysipelas may be attended by it. Dissecting wounds almost invariably produce it. In my own person this has happened several times; once, the absorbed matter so affected the whole trunk of the lymphatics proceeding from the right thumb, as to cause a large abscess in the axilla, with a severe illness. This experience has enabled me to arrive at a somewhat clear conclusion as to the nature and, consequently, proper *treatment* of "dissecting wounds," which, from want of care in the prevention (by *sucking* and washing the part thoroughly at the moment of the injury), have been allowed to bring on local and lymphatic inflammation.

The pathognomonic *sign* of angeioleucitis is a distinct and somewhat elevated *red line* up the limb or the part, with tenderness well marked throughout its course.

That produced by a dissecting wound is, as I have proved in my own case, an inflammation, which may be quite *sthenic;* not necessarily "typhoid," as some have imagined. I am sure that the free application of leeches to the hand, and a large dose of Epsom salts, aborted one attack, which was threatening to be severe. Of course, some cases may be asthenic or typhoid; but of all that I have seen, with three examples in my own person, none have been so.

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[1] On Wasting Diseases of Infants and Children, London, 1870.
[2] Manchester Medical and Surgical Reports, 1870.

In ordinary angeioleucitis the application of a light muslin or linen rag, wet with lead-water and laudanum, allowed to evaporate, will be suitable. The part must, also, of course, be kept entirely at rest.

### WHITLOW.

**Synonym.**—*Felon.*[1] The frequency with which this comes under every physician's notice makes it a proper topic for brief remark here. A felon or whitlow is a suppurating inflammation of one or more of the fingers. Velpeau's subdivision of its varieties is as good as any; into: 1. Sub-epidermic. 2. Subcutaneous. 3. Fibro-synovial. 4. Periosteal. The first is trifling; the second may be severe for several days; the third may cause great suffering for two or three weeks and lame the hand; the fourth threatens the loss of a phalanx or of the finger.

Many practitioners always divide an inflamed finger down to the bone as soon as it is manifest that the inflammation is sure to progress. Velpeau advised early incision only in that form in which *periostitis* exists. I believe he was right. The only difficulty is in making sure of the diagnosis. But I would, upon experience, lean towards the doubt, and wait for suppuration, unless satisfied of the deep-seated nature of the attack.

Leeching, plunging the finger in spirits of camphor, water-dressing or irrigation, and poultices, comprise the rest of the treatment.

### ONYCHIA.

**Synonym.**—*Paronychia.* Inflammation, followed by suppuration or ulceration about the root of the nail. Injuries generally bring it on, but cachectic constitutions are most liable to it. The nail may become loosened so as to be removable. Much more rarely, the last phalanx of the finger or toe suffers necrosis. Poultices, lime-water, solution of sulphite of sodium, etc., with rest to the part, in bed if it be a toe, comprise the usual means of treatment.

### ONYXIS.

This is commonly, but improperly, called *in-growing* nail. The great toe is its much most frequent seat. It is an inflammation of the soft parts near the nail; their swelling pressing upon the latter; *not* the nail growing toward or into the flesh. The difference is important in reference to the treatment. For this, the patient must remain in bed, or at least avoid walking, until the inflammation of the toe subsides. Then the ulceration may be treated, if extensive, with lime-water, solution of sulphate of copper, persulphate of iron, etc.; and, if fungous protrusion of indolent granulations (proud flesh) exists, with touches of solid nitrate of silver every day or two. After this, or in milder cases from the first, a little strip of lint or cotton smeared with simple cerate, or a thin strip of India-rubber (Ozanam), or a thin plate of silver (Finch), should be carefully worked with the back of a small knife-blade, or the head of a large needle, in *between the flesh and the nail*, to be left there. Adhesive plaster may be put

[1] The term *paronychia* is best restricted to cases occurring near the nail.

on, so as to draw the flesh *away* from the nail, which is first trimmed closely and smoothly at its edge. Then *paint the parts thickly with collodion.* This makes an artificial cuticle; the cure will generally be rapid and complete, unless in malignant disease of the matrix of the nail itself. I do not think that the nail need ever be removed for simple onyxis. I have certainly known many cases to recover without that operation. In *onychia maligna*, MacCormac's treatment, by dusting the part with powdered nitrate of lead, has met with much favor.

**Corns** (clavus) require, in treatment, to be relieved of direct pressure. If inflamed, poultices, cold cream, or lime-water and oil may be required to remove irritation and tenderness. Then the callous portion should be carefully pared away. Cut a hole of the size of the corn in a round piece of adhesive plaster; place this over the corn, and, upon it, one or two thicknesses more of the same plaster. This will usually protect it so that a shoe can be worn. Another method of treatment is to drop upon the corn every night a drop of pure tincture of chloride of iron.

### CARBUNCLE.

**Synonym.**—*Anthrax.* Though approaching or passing the bounds of surgery, the same reasons will excuse a word about this affection also. The causes of it, as well as of *furunculus* or boil, are undetermined. Boils and carbuncles are positive *opprobia medicinæ;* no one knows how to prevent them or to stop their continued recurrence. I have known ten or twenty boils or carbuncles to follow each other, in spite of purgatives, low diet, strong diet, tonics, refrigerants, alteratives, and even the sulphites, all tried in turn. Bullar and Watson report excellent effects from the use of dilute sulphuric acid, in arresting a tendency to these affections. S. Ringer eulogizes, for the same purpose, the sulphites of sodium, potassium, and calcium. Dr. Simon, of Lorraine, strongly commends the local application of *spirits of camphor*, as soon as a boil or carbuncle is threatened. The addition of one-fourth as much carbolic acid will probably render this remedy more effectual.[1] Dr. Planat[2] asserts that he has found *arnica* to have a special effect in aborting boils. He applies to them an unguent, of one part of extract of fresh arnica flowers to two parts of honey, spread on lead plaster or oiled silk. Dr. Sidney Ringer and Dr. F. N. Otis[3] assert that the internal use of *sulphide of calcium* (gr. $\frac{1}{12}$ every two hours through the day) has a decided effect in arresting processes of suppuration, phlegmonous or furuncular.

Carbuncle is a subcutaneous phlegmonous inflammation, more extensive than a boil, and attended by a larger sloughing of connective tissue under the skin, with much more pain and constitutional disturbance. It may even threaten life, especially when it occurs on the face. The swelling is round, and flattened on its

[1] Dr. H. G. Landis, of Ohio (*Philada. Med. Times*, March 8, 1873), asserts, on the basis of observation, a temporary *excess of leucocytes* in the blood in those suffering from boils; suppuration relieving this excess.

[2] Journal de Thérapeutique, Jan. 25, 1878.

[3] N. Y. Med. Journal, May, 1880.

elevated surface. Redness may exist for some distance beyond it.

In the **treatment** of carbuncle, besides emollient poultices or warm-water dressing under oiled silk, almost all surgeons agree that, at an early period, the tense skin must be divided or removed, to allow the extrusion of the slough and detained pus. Many make a *crucial* incision, quite across the tumor each way. Velpeau preferred a *radiated* incision; from the centre in several directions, extending a little beyond the circumference of the tumor. Bryant and others have deprecated this practice of extended incisions. Probably no method is better than to congeal the part with Richardson's or some other spray-producer, with rhigolene or ether, and apply *caustic potassa* freely, until the whole top of the carbuncle is deeply blackened. Poultices, etc., will of course be afterwards required. Zimberlin[1] has found congelation with ether-spray to succeed in effecting cures, without any other local treatment. Paget[2] reports only 4 deaths in about 200 cases of carbuncle, treated *without* incisions, upon general principles, with poultices, good, but not too stimulating diet, quinine, opium, and pure air. He objects to the large use of stimulants in this affection, as well as to confinement in close rooms. O'Ferrall's treatment by *concentric pressure* with adhesive straps has now the advocacy of some good surgeons.[3] Dr. J. C. Nott[4] has procured cures by painting the carbuncle with pure *carbolic acid*. Generally the patient requires to be supported by good diet, and perhaps tonics. Chlorate of potassium is highly recommended by some practitioners.

## ADDISON'S DISEASE.

**Synonym.**—*Melasma Supra-renalis.* Hardly any clinical association of morbid changes is more obscure in its pathology than this. It occurs mostly in young adults, and twice as often in males as in females. A bronze-like discoloration of the skin comes on gradually, preceded and accompanied by symptoms of anæmia and debility (muscular weakness, feebleness of the heart's impulse and pulse at the wrist, short breath upon exercise, impaired digestion, vomiting, sometimes dimness of vision); after lasting from less than one year to four or five years, death occurs by asthenia, and the only characteristic lesions are found to affect the supra-renal capsules. Dr. Wilks has been almost as prominent as the late Dr. Addison (1854) in the study of this disease. Dr. Greenhow has written an excellent monograph (Lectures) upon it. Dr. W. Pepper has suggested the idea of a close relation between this affection and progressive pernicious anæmia.

It is manifestly a *cachexia*. Probably both the supra-renal capsular disease and the affection of the skin (olive-greenish darkening, mulatto-like, or like bronze without the gloss) depend upon the constitutional state. Perhaps caries of the vertebræ (scrofulous), which has been sometimes observed, may, by involv-

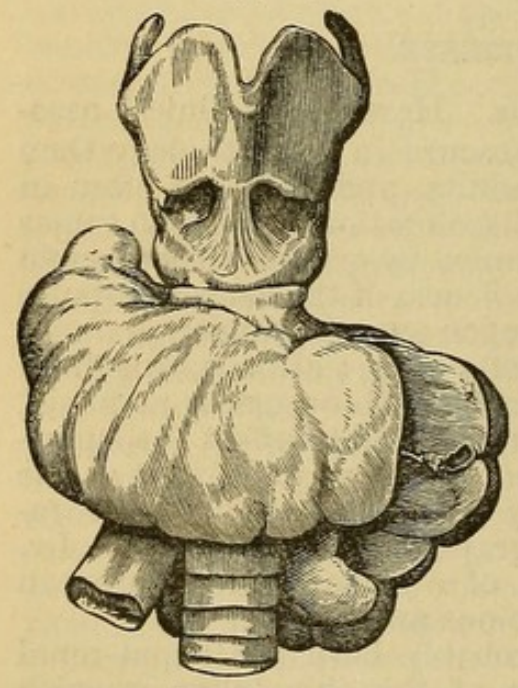
[1] Schmidt's Jahrb., No. 1, 1881.
[2] Lancet, Jan. 16, 1869.
[3] Am. Journal of Med. Sciences, July, 1870, p. 277.
[4] New York Medical Journal, January, 1871.

ing the *ganglia* in disease, thus produce the complex errors of nutrition, superficial and general. Dr. Wilks describes the appearances of the supra-renal capsule as resembling those of scrofulous lymphatic glands; a lardaceous material being deposited, which afterwards softens into a putty-like mass (grayish translucent material with yellow cheesy nodules), or undergoes drying into a chalky concretion. Dr. Austin Flint[1] considers it probable that degenerative disease of the *gastric and intestinal tubules* is the cause of the anæmia so prominent in this affection. Dr. M. Letulle (La France Méd., 1880, No. 40) has pointed out its occasional association with *tuberculous disease* of the spinal column. Wilks and Moxon have found tuberculization of the lungs in 12 out of 15 cases. The disease is fatal always, at last. Its average duration is about 15 months. The termination is usually gradual, though sometimes by diarrhœa, convulsions, or coma. Besides hygienic management, and perhaps iron or other tonics, little treatment is recommended for it. Dr. Greenhow asserts decided advantage to have followed the use of a combination of glycerin, in two-drachm doses, with fifteen or twenty minims each of spirit of chloroform and tincture of chloride of iron.

## GOITRE.

**Synonym.**—*Bronchocele.* In low and narrow valleys of the Alps, Andes, Himalayas, or other mountains, but especially often in Switzerland, whole families and village populations are affected with (congenital or early) enlargement of the thyroid glands, which sometimes becomes enormous. A stranger, after residence for a few months in one of the same localities, may be likewise affected; and then leaving it for a high and open salubrious country, may recover from it. Associated often, but not always, with this affection of the neck, is **cretinism**; a condition of bodily and mental weakness, stunting, and deformity, most lamentable.

FIG. 127.



Bronchocele.

Occasionally, in any locality, a case of goitre or enlargement of the thyroid gland to a slight or moderate degree may be met with. I do not remember having seen more than twenty cases of it in Philadelphia; none of them severe. Michaud (*Gazette Médicale*, Jan. 10 and Feb. 7, 1874) states that goitre has been several times *epidemic* in the French army, while the men were making forced marches with insufficient diet in a mountainous country.

[1] N. Y. Med. Journal, March, 1871.

**Varieties** of thyroid enlargement are, the *soft*, *fibrous*, and *aneurismal* goitre. The first of these may acquire the characters of a cyst or cysts. The second is slow in growth, and troublesome only when large, from pressure. Suppuration of it has occurred in very rare cases. Enlargement *behind the pharynx* (retro-pharyngeal goitre) has sometimes given trouble. Aneurismal goitre (with dilatation of some or all of the blood-vessels of the gland) is the least common, but the most liable to serious accidents, as hemorrhages, etc.

Death resulting immediately from goitre is rare. An instance of it occurred in 1879, in the New York Hospital; asphyxia being produced (in a middle-aged woman) by pressure of the tumor upon the trachea.[1] Rose[2] has shown that sometimes the gradual influence of pressure causes fatty degeneration of some of the rings of the trachea, making it flaccid and yielding to any sudden movement of compression.

The occasional association of goitre, in an acute form, with menstruation, or with pregnancy, has been noticed by several writers (Petit, 1740, Gaillot, Ollivier, Lawson Tait).

[For *Exophthalmic Goitre*, see *ante*, under *Diseases of Organs of Circulation.*]

**Causes** of goitre, among the mountains, are believed to be, 1. Excess of mineral matter, especially magnesia, iron, copper, lead, baryta, and lime, in the drinking-water;[3] 2. Dampness and deficiency of light; 3. Other unfavorable hygienic conditions; among them, frequent intermarriage of near relations in a stationary population.

In the **treatment** of goitre, *iodine* has had the reputation of a specific. It is not, however, infallible. In India, the external application of biniodide of mercury is much employed. Dr. Stevens, of Canada,[4] states that he has found very satisfactory results to attend the use of *chloride of ammonium*, in goitre. Dr. Woakes[5] reports the cure of seventeen cases in twenty under the use of *fluoric acid*, in doses of from 15 minims to a fluidrachm, thrice daily, largely diluted with water. Dr. Güggenbuhl many years since proved that the best management for goitrous and cretin children is to remove them from their valley and village homes, to high, airy, and light situations, and there to give them good food, exercise, and other appliances of a health-producing regimen.

Dr. Warren Greene[6] reports the successful *excision* of the enlarged thyroid gland, in three cases. Desault first performed this operation with success; Dr. C. Harris, of New York, operated successfully, in 1807; Gooch and Dupuytren failed with it; Hedenus, of Dresden, succeeded with it in six cases.[7] Billroth extirpated seven goitres in a single year. It is certainly an operation of much seriousness, to be thought of only in cases of great

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[1] Medical Gazette (New York), Jan. 3, 1880, p. 16.

[2] Brit. Med. Journal, July 20, 1878.

[3] Dr. J. St. Lager asserts, after careful geological exploration, that the soil where goitre prevails always contains iron pyrites; frequently also copper pyrites, galena, and baryta.

[4] Canada Med. Record, February, 1880.

[5] Lancet, Vol. I., 1881, p. 497.

[6] Am. Journal of Med. Sciences, Jan., 1871, p. 80.

[7] Copland, Dictionary of Medicine, art. *Bronchocele*. See also an article on Bronchocele by the author, in Reynolds' System of Medicine, American edition, Vol. III.

and troublesome enlargement. Lücke,[1] of Berne, asserts success with injections of tincture of iodine into the tumor. Injections of *ergotin* are reported very favorably of by others.

## DISEASES OF THE SKIN.

While much has been done within a few years to increase our knowledge of the true pathology and relations of cutaneous diseases, no such *perfection* of classification has yet been reached, as to do away with the practical advantage of the old method of describing them according to their more obvious characters.

As a clinical classification of cutaneous disorders, most convenient both for description and treatment, I prefer the following:—

| | | |
|---|---|---|
| Exanthemata. | Pustulæ. | Tubercula. |
| Papulæ. | Squamæ. | Hæmorreagiæ. |
| Vesiculæ. | Maculæ. | Neuroses. |
| Bullæ. | Hypertrophiæ. | Parasiticæ. |
| | Syphilida. | |

### EXANTHEMATA.

In these there is active congestion, or hyperæmia, of the "derma," or true skin. Besides scarlatina, measles, and erysipelas, already considered, this order contains *erythema*, *urticaria*, and *roseola*.

**Erythema.**—Superficial, circumscribed red patches, of variable shape and size, on the face, trunk, or limbs, not painful, nor very sore, characterize this. Its causes are, all moderate but continued irritants to the skin. Its duration is generally but for a few days or a week or two. No fever attends it; nor is it either contagious or dangerous.

**Varieties**[2] of erythema are *erythema fugax*, or fleeting; *erythema intertrigo*, from friction of two surfaces of the skin, as in not well-cleaned children; *erythema rheumatica*, occurring now and then in rheumatic fever; *erythema pernio*, or unabraded chilblain; *erythema nodosum* (hives), on the legs, with rounded node-like prominent red patches, somewhat more inflamed than in the other forms; and *erythema tumescens*, with a more diffused inflammation of the subcutaneous connective tissue. *Drugs*, as copaiba, quinine, chloral, strychnia, salicylic acid, iodides, bromides, and others, have been often known to produce erythema. *Quinine* is particularly apt to have this effect upon some persons; the rash having a certain degree of resemblance to that of scarlet fever. (Sometimes it is vesicular; approaching the appearance of eczema.)

**Treatment** of erythema must depend upon its cause more than upon its particular form. The stomach and bowels may need attention, with the use of antacids and laxatives; especially magnesia and rhubarb, or Rochelle salts, or the citrate of magnesium.

**Local applications** may be, finely-powdered starch or arrow-

[1] Lancet, Jan. 2, 1869. M. Mackenzie injects solution of perchloride of iron.

[2] Here, as in treating of other affections of the skin, only the *principal* varieties are named. Wilson makes sixteen varieties of erythema.

root, dusted on, dry; cold cream (unguent. aq. ros.); lime-water and oil, equal parts (olive or lard oil); vaseline (unguentum petrolei); glycerin and prepared chalk; ointment or glycerite of zinc [F. 177, 178, 179, 180,]; glycero-cerate of lead; or glyceramyl [F. 148].

For erythema *pernio*, or frost-bite of mild degree, astringents are serviceable; as bathing the feet in tepid infusion or decoction of oak-bark; or solution of alum; or applying cerate or glycerite of carbonate of lead. Some recommend cabbage-leaves.

**Urticaria.**—*Nettle-rash.* Elevated, round or oval, red or white patches or *wheals* characterize this. They may come and go in an hour, over the arms, trunk, or legs. Much burning, stinging, or itching attends them. The affection commonly lasts only a week or two; sometimes it is chronic and tedious.

Disorder of the stomach (as from unwholesome food) is rather more likely to cause nettle-rash than any other kind of eruption. Mild purgatives, especially salines or the antacid magnesia, with or without powdered charcoal, are commonly suitable for it, after a dose (two or three grains) of blue mass. Light diet is necessary. Vinegar and water, glycerin and rose-water, or the starch-powder, etc., mentioned for erythema, will answer for local applications. Much use of *cold* lotions should be avoided, lest the eruption be over-hastily repelled, inducing gastric, hepatic, or other internal disturbance instead.

**Roseola.**—Bright, and yet generally *dark* red, damask rose-colored patches, irregular in shape and of various size, over any part of the body, without much if any fever, belong to this affection. It is generally of but a few days' duration. Sometimes a certain amount of resemblance is presented by it to scarlet fever or measles; but the peculiar sore-throat of the former, and the catarrhal symptoms of the latter, are wanting. (See *Rötheln.*)

Scarcely any treatment is called for in roseola; no local application, as the rash is but slightly irritating; and only such medicine as the general condition of the patient may indicate.

## PAPULÆ.

These, *pimply* eruptions, involve *depositive* inflammation of the skin, which is raised in small, red, round, or conical points or minute tubercles, not very hard, and often, though not always, transitory. Papular affections are *lichen* and *strophulus*. Several dermatologists now classify these as varieties of *eczema papulosum*.

**Lichen.**—Pimples numerous, but of small size; red, and more or less heated and irritated. The principal forms of it are *lichen simplex*, common on the face, neck, etc., *lichen tropicus*, or *prickly heat*, and *lichen agrius*. The last-named is the most inflamed and painful; sometimes quite severe. Lichen *simplex*, though mild, may be obstinate in its persistence; annoying ladies occasionally by remaining long on the face. As with eczema, some authors assert the frequent association of a lichenoid eruption with the gouty diathesis. In lichen *tropicus*, from which children, especially, often suffer in summer-time, the eruption is not prominent, but the sense of irritation is very unpleasant.

Lichen *agrius* may become, in violent or neglected cases, a

scabby, confluent eruption, with cracks or fissures, and a serous, perhaps purulent discharge. This is not, however, very common.

**Treatment.**—Even for the simple form, and still more for l. agrius, constitutional alteratives are likely to be needed, doing more good than local applications. In l. tropicus, starch-powder, glycerin and rose-water, or glyceramyl, or weak lead-water will suffice, without any medicine. But in the other forms rectification of any error of *balance* in the system must first be made. The plethoric must have low diet; the anæmic, lean meat, perhaps bitters, aromatic sulphuric or nitric acid, or iron. Costiveness must be overcome, as by cream of tartar and sulphur, rhubarb and aloes, or other mild but decided laxatives. Blue mass may be given, a grain twice daily for two or three days. Then arsenic may be prescribed; of Fowler's liq. potass. arsenit. three drops twice daily at first, increased every week one drop until ten, twice daily, have been taken; omitting the remedy if headache, nausea, diarrhœa, or puffiness of the face occur.

In lichen agrius, rest in bed may be required; with lime-water and oil dressing, or poultices of bread and milk, or flaxseed meal, or slippery elm bark powder, glyceramyl, etc.

**Strophulus.**—Red gum is a common name for this papular eruption of infancy. Indigestion, reflex irritation from dentition, and over-thick clothing or living in hot rooms, produce it. The eruption is not severe, consisting of many small red pimples, close together, and often nearly all over the body. Attention to the stomach and bowels is necessary. *Lancing the gums is proper* (all authorities to the contrary notwithstanding) if they be swollen, tender, or so tense as evidently to distress the child. To the rash, only very soothing applications should be made, as starch-powder, ointment of oxide of zinc [F. 181], or glyceramyl. Care with the diet, if fed instead of being nursed, is also of great importance.

## VESICULÆ.

These are *effusive* inflammations of the derma; characterized by numerous and small water-blisters; the smallest are *sudamina;* the largest, *herpes; eczema* having vesicles of intermediate size, and scattered. *Sudamina* are met with in low fevers, consumption, etc., mostly when perspiration alternates with the febrile state in an enfeebled system.[1]

**Eczema.**—This has been the subject of much disputation; as to whether it is a *disease per se*, going through stages not only of effusion, but also of incrustation, suppuration, desquamation, etc.; or, only a phase of cutaneous irritation and inflammation, called vesicular, whatever its cause, and eczematous, to distinguish it from the herpetic eruptions. I am satisfied that, while the eczematous vesicular eruption admits of a very distinct description and recognition, it may come from or after a papular rash, and may in the same case be transformed (or progress) into

[1] Von Bärensprung has suggested that sudamina may be owing to the detention of perspiration under the cuticle, from obstruction of the ducts of the sudoriparous glands.

a pustular or scabbing disease. Hebra and many other authorities in dermatology affirm this to be the true account of its common history. In the language of Erasmus Wilson,[1] "It is a superficial and chronic inflammation of the skin, with a tendency to the exudation of an ichorous fluid; the fluid being sometimes detained in minute vesicular elevations of the epidermis, sometimes free, and sometimes infiltrated in the tissues of the skin."

Golding Bird and Mapother have insisted that the *gouty diathesis* has to do with chronic eczema. Routh calls attention to its not infrequent dependence on *nervous exhaustion* (aneuresis, neurasthenia).

Eczema *simplex*, *rubrum*, *infantile*, and *impetiginodes*, are its principal varieties. Besides others named in the books, there are also eczema *solare*, from heat, and eczema *mercurialis*, from the impression of mercury on the system. The *simple* form has but little inflammation; but there is always some soreness, and the vesicles may run together and break, oozing serum or lymph, or scabbing lightly. Eczema *rubrum* is more inflamed, with redness, heat, and some tumefaction. *Crusta lactea*, or milk crust, is a name often given to eczema *infantile*, of the nursing-time. It affects the face, sometimes very unpleasantly; scabbing, running, and cracking all over it. E. impetiginodes appears to be an intermediate stage, or transition, between eczema and impetigo; water-blisters appearing at first, and pustules afterwards.

**Treatment.**—An inflammatory state attends the eczematous eruption, nearly always; especially in *e. rubrum* and advanced *crusta lactea*. Saline laxatives, diuretics, and diaphoretics (Rochelle salts, bitartrate of potassium, citrate, etc.) are often called for, perhaps to be repeated in moderate doses. Light diet is, in like case, proper. In children, small doses of calomel occasionally do good. Locally, weak lead-water when there is no scabbing; lime-water and oil when there is great irritation; decoction of bran; flaxseed infusion with bicarbonate of sodium (℈j in f℥iv); glyceramyl;[2] glycerin with rose-water; solution of sulphite of sodium (℈j in f℥j); carbonate of lead cerate; benzoated vaseline; ointment of oxide of zinc:[3] these are among the many applications used with advantage. McCall Anderson advises, in chronic eczema, a preparation of carbolic acid in glycerin and alcohol.[4] The whole bath, tepid or slightly warm (never hot), two or three times a week, will be beneficial. In chronic eczema, the "Turkish" or dry hot-air bath (130° to 150°) is highly recommended by some. Hardy and Hebra have made considerable use of a covering of India-rubber cloth over the parts affected; removed daily for thorough cleansing. This is thought to be

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[1] Journal of Cutaneous Medicine, April, 1869.

[2] Or the following: Rub together in a mortar four parts of yolk of egg with five parts of Bower's or Price's glycerin. This has the advantage over unguents of being removable by water.

[3] Benzoated ointment of oxide of zinc is regarded by E. Wilson as a "specific" for eczema in its advancing stages.

[4] Crystallized carbolic acid, 2 drachms; glycerin, 6 drachms; rectified spirit, 4 ounces; distilled water, 1 ounce. Sponge with this solution two or three times daily.

especially available for the hands, feet, and scrotum. Martin's elastic rubber *bandage* is preferred by Bruns, of Tübingen. Busquet[1] has especially urged the value of *occlusion* in the treatment of chronic skin diseases. The "Vienna plan" is to strap the affected part with strips of linen spread with lead plaster. *Electricity* is sometimes a useful part of the treatment. Possibly the *jaborandi* (*pilocarpus pinnatus*) of Brazil, a powerful diaphoretic, or its active principle, *pilocarpin*, may be found to have a serviceable alterative action upon the skin in this affection. Piffard[2] and Kaposi recommend an unguent made of equal parts of lead plaster and vaseline, incorporated together with the aid of heat.

Chronic eczema requires alterative treatment internally. Arsenic is *the* alterative, par excellence, in obstinate cutaneous affections. Its peculiar action on the skin tends to displace the morbid process, and thus to restore, after its own transient influence is withdrawn, healthy nutrition and reparation. Five drops of Fowler's solution (or the *liquor arsenici chloridi* of U. S. P., equal in strength to liq. potass. arsenit.) may be given at first, twice daily, increased gradually until the dose amounts to ten drops; sometimes even more. The medicine must be intermitted if the head, stomach, or bowels show its decided action. In case of its failure, particularly where syphilitic taint is possible, Donovan's solution (liq. arsenici et hydrargyri iodidi) may be given; three drops at first, cautiously increased. A combination of *arsenic with iron* has lately been much commended. Scrofulous or otherwise feeble children may need cod-liver oil. In *crusta lactea* or *eczema infantile*, the mother or nurse must be instructed not to burden the child with clothes, nor keep it in an overheated room. Daily bathing is particularly important to an infant suffering with such an eruption. Dr. Bulkley, of New York, speaks highly of the use, in obstinate chronic eczema, of *liquor picis alkalinus* [F. 263]. If a case of chronic eczema is first seen late in the attack, the removal of the scabby crust may be important. In mild cases, poultices of bread or flaxseed meal may suffice for this. If very thick, the scab may be softened by the application, two or three times daily, of a wash of one part of liquor potassæ with ten parts of olive oil. After this, many practitioners apply dry lint; some, thin India-rubber cloth; others, one of the unguents above mentioned.

**Herpes.**—This has larger, more separated, and less numerous vesicles than eczema; it is less apt to become chronic. **Varieties:** *herpes phlyctenodes*, *herpes zoster*, and *herpes circinatus*. The first is the most frequent; receiving also **local** names according to its seat: as *h. labialis*, *præputialis*, etc. *Herpes labialis* is commonly called "fever blisters."

*Herpes zoster* (Shingles) is not very common. Half of the body, about the waist, is covered with vesicles, on an inflamed red surface. Sometimes neuralgic pains, quite severe, attend it. It generally affects the right side. Its duration is but for a week or two; unless in the feeble or old, in whom it may be followed by ulcerations of a tedious, perhaps dangerous character.

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[1] Lyon Médical, April 10, 1881. [2] Archives of Dermatology, 1876.

*Herpes circinatus* is distributed in circular patches or rings. *Minute* vesicles appear around the circumference. By these, and the absence of microscopic vegetation, and less disposition to chronicity, it is distinguished from *tinea tonsurans*, or true contagious ringworm. *Herpes iris*, of writers, is an aborted *h. circinatus;* the rings being incomplete.

Herpes rarely appears in old persons; often in children and adolescents. All causes of irritation of the surface of the body may induce it: as febrile or catarrhal attacks, stimulating diet, violent exercise, etc.

For the **treatment** of herpes, the plan stated for eczema is, in principle, here also suitable. Cucumber ointment may be added to the applications recommended. Herpes *zoster* requires confinement to bed. The severe pains, in this, may call for anodynes. Purdon and others give also for it ergot and iron; viewing it as essentially a neurosis. Belladonna ointment is a good local application for it. Tincture of chloride of iron is locally used for it by Baudon and others. Herpes *labialis* is sometimes very annoying, especially to ladies. Pure *cologne-water*, applied at the very start, may *abort* the vesicles. Magnesia powder is used by some to dust about the lips. Calomel ointment is recommended when the eruption is chronic, coming out in successive crops.

## BULLÆ.

These are eruptions of *large* vesicles. *Pemphigus* and *Rupia* are the most distinct.

**Pemphigus.**—Bullæ of a circular or oval shape, from half an inch to two inches in diameter, and flattened. They may be distributed over any or all parts of the body. Fever, sometimes considerable, precedes and accompanies the eruption. I have seen it as a very serious illness (pemphigus malignus). After the vesicles mature, they burst, or dry away, leaving thin brown scabs. Ulceration may occur, but it is not deep or obstinate, unless in a particularly unhealthy constitution, The duration of pemphigus is from one to three weeks, or more in bad cases. *Pompholyx* is the name given to a rare variety of pemphigus, in which the space continuously covered by bullæ is large, and there is little or no fever. A fly-blister causes artificial pompholyx.

Pemphigus is not usually considered to be contagious. One family came under my notice, however, in which five individuals were attacked by it, partly in succession, after travelling. It was difficult in that case not to suppose contagion.

In the **treatment** of pemphigus, gently refrigerant laxatives at first, diuretics and diaphoretics next, and often quite early tonics and supporting regimen, are called for. English observers assert the good effect of arsenic in pemphigus; some European authorities, as Hebra and Hardy, deny its efficacy. In one acute case I was obliged to stimulate quite freely; the eruption being as confluent as in any case of small-pox, and prostrating, like an extensive burn. Jonathan Hutchinson asserts that *arsenic* exercises a special control over pemphigus. Dr. L. D. Bulkley has reported

a case[1] of malignant pemphigus in which arsenic appeared to save the patient's life. No local applications, other than the mildest lotions or unguents, will be suitable. The early puncture of each bulla with a small needle is recommended; but the raised cuticle must not be removed.

**Rupia** is probably but a modification of pemphigus; with smaller blebs or bullæ, followed by thicker conical scabs of dark color; after whose removal ulcers are left, which may be weeks in healing. Rupia *simplex* is the variety in which the scabs are low and the ulcers slight; rupia *prominens*, in which they are elevated into irregular cones; rupia *escharotica*, when the ulceration is deep and extended. *Syphilitic* rupia is quite common; but every case of rupia is not, by authorities, admitted to be syphilitic. My observation goes to sustain this non-admission.

**Treatment** of rupia requires to be, generally, tonic and alterative. Quinine, cod-liver oil, and iodide of potassium, with good but simple diet, are apt to be wanted for it. In prolonged cases, arsenic and iron may be given at the same time, or in combination.

## PUSTULÆ.

*Suppurative* inflammation of the skin (excluding small-pox, furuncle, and carbuncle, as well as the malignant pustule or *charbon* of the French, a rare affection said to be received from cattle) appears in the two forms *ecthyma* and *impetigo*.

**Ecthyma.**—Large, round, prominent pustules, upon any part of the body, not numerous; ending in thick dark scabs, followed by slight (or in cachectic states, obstinate) ulcerations. Ointment of tartar emetic, or pure croton oil, or other strong cutaneous irritants, will produce it. Often, however, especially in syphilitic persons, or after acute fevers, etc., it occurs without any local exciting cause. Sometimes it is chronic.

In **treatment** the causation is of great importance. If a local irritant produce it, local emollients, perhaps with general refrigerants, are to be used for its relief. Otherwise, diet and *balancive* measures will be more in place; tonics for the feeble, purgatives and light regimen for the plethoric, etc.

As an eliminant and refrigerant in both ecthyma and impetigo (as well as rupia) I have found apparent benefit from the use of a prescription employed by Dr. Anderson, of Scotland; equal parts of *wine of colchicum* and *wine of ipecac.*, say ten drops of each, thrice daily [F. 182]. Arsenic is called for in obstinate cases, as in other diseases of the skin; Fowler's or Donovan's solution, in small doses, carefully increased.

**Impetigo.**—Small and somewhat numerous pustules; varieties, *impetigo figurata* and *impetigo sparsa*. I. *figurata* is most common on the face, in circumscribed clusters of pustules, which may become confluent and scab. To this, in children, as well as to *eczema infantile*, the name of crusta lactea is given by many authors. I. *sparsa* has the pustules scattered over more or less of the whole body. *Impetigo contagiosa* is named and described

[1] Amer. Journal of Med. Sciences, Oct., 1877.

by Tilbury Fox.[1] It is not common, but I have known cases to which the term might well apply. Dr. Fox finds it to be quite curable by the application of a weak ointment of ammoniochloride of mercury to the ulceration that occurs under the scabs. Several leading modern authorities (Hardy, Hebra, Wilson) regard impetigo as only a stage or variety of eczema.

**Treatment.**—When much irritation or inflammation exists, lead-water, glyceramyl, ointment of oxide of zinc, lime-water and olive oil, flaxseed tea and bicarbonate of sodium, light poultices of flaxseed meal, slippery elm bark, or bread crumb, are to be applied. Daily use of castile soap and water is serviceable. Besnier's method is to envelope the whole of the affected parts with India-rubber cloth. This treatment is a good deal used in Paris. Purgatives may be needed. Diet must be according to the general condition of the patient. Impetigo may affect the hairy scalp; if so, the hair must be cut and kept very short. Colchicum and ipecac. may be given in acute cases [F. 182]; arsenic in those which become chronic.

## SQUAMÆ.

Scaly diseases are *Lepra* (*Alphos* of Wilson), *Psoriasis*, *Leprosy of the Hebrews*, *Spedalsked* or Norwegian leprosy, *Pityriasis*, *Pellagra*, and *Ichthyosis*.

**Lepra.**—Always chronic, and very difficult to cure. Not regarded as contagious, though I have seen it occur successively in four persons in immediate contact (an infant at the breast, its wet-nurse, another infant suckled by her, and her husband). It is characterized by red desquamating patches, of various sizes, approximating to a circular shape, on any part of the body, especially on the arms and legs. Besides syphilitic lepra, its varieties are lepra *vulgaris*, with small patches and few thin scales, and lepra *inveterata* (*alphos diffusus* of Wilson), where they are large and desquamate extensively.

In both, the *margin* of the patch is the highest, reddest, and most squamous part.

**Psoriasis.**—Described under the names of ps. *vulgaris*, *gyrata*, and *inveterata*, psoriasis differs mainly from lepra in the irregular and varied forms of the desquamating patches, and in the absence or less degree of depression near their centres. Wilson's view, that psoriasis is only a kind of chronic eczema, does not seem to me to accord with the facts of its ordinary history. It is sometimes hereditary; as is also lepra. Bence Jones has suggested its possessing some relation to the rheumatic diathesis. No disease of the skin is so hard to eradicate, unless it be ichthyosis. Tilbury Fox asserts that it is much more common in England than elsewhere.

**Treatment.**—For lepra and psoriasis alike, all sorts of alterative agencies, local and systemic, are, if cautiously used, suitable for tentative practice. Our object is to obtain the *making of a new skin* unaffected by the morbid habitude of nutrition. Frequent

[1] Journal of Cutaneous Medicine, October, 1869.

bathing should be practised. Tar ointment, citrine ointment, ointment of sulphuret of potassium [F. 183], etc., may be applied. Buck, of Lübeck, uses acetic acid locally. Ointment of *crysophanic acid* has latterly been used, with considerable asserted advantage, in treatment of psoriasis. It is a powerful irritant, and discolors the skin. The strength of twenty grains to the ounce, used by some, is probably too great. From five to ten grains in the ounce of lard or vaseline will be sufficient. *Pyrogallic* acid (Jarisch) also is used in ointment, and more frequently in a ten-per-cent. solution. It requires careful limitation, as a death has been reported[1] from the application of a ten-per-cent. salve of it over *half of the body* of a patient. Arsenic, and the iodide of arsenic and mercury (Donovan's) should be given, carefully, but repeatedly, through long periods. Wilson and others latterly give a combination of arsenic with *iron*. Other medication must depend upon the conditions of each case. Dr. Broadbent[2] has proposed phosphorated oil, in four- to eight-minim doses, for the treatment of psoriasis, as well as for eczema, asserting success in four out of six cases of the former. Hardy, besides phosphorus, uses copaiba internally in the treatment of psoriasis.[3]

**Ichthyosis.** (Fish-skin disease.)—This is rare. I have seen but one case of it. Hard, thick, dry scales form continuously over a part, or, sometimes, nearly the whole surface, of the body, without much redness, soreness, or even itching. It is congenital and incurable. Frequent and thorough ablutions and mild emollient applications (as glyceramyl or benzoated vaseline) are palliative of it. Intermediate between ichthyosis and the normal state of the skin is a condition, somewhat less intractable, to which the term xeroderma (Lailler) has been applied. For this especially, glycerin (Demarquay), externally applied, appears to be useful.

**Pellagra** is a serious constitutional disease, attended by a scaly thickening of the skin, endemic in Northern Italy, France, and Spain. In Italy thousands of cases of it occur every year. Slow fever, diarrhœa, great prostration, and sometimes insanity, are its principal symptoms. They usually subside in the autumn, to recur with increasing severity with spring. Some authors have asserted its dependence upon "zeism," or the effect of the exclusive use of maize as food; but careful investigation shows that its cause is, more probably, a parasitic *disease* of the corn, analogous to the ergot of rye. Pellagra does not appear to be curable, unless, at an early stage, by removal from the influence of its cause.

**Pityriasis.**—This is a chronic affection in which very numerous small white scales (dandriff) form upon the skin, particularly the scalp (p. capitis). *Seborrhœa*, i. e., increased secretion of the sebaceous glands, is its pathological cause. *Kerion* is a parasitic affection of the hair follicles, with derangement of their secretion. It is not common. Some redness, and often a good deal of itching,

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[1] Neisser, in Berliner Klin. Wochenschrift, November 24, 1879.
[2] Lancet, April 22, 1871.
[3] Annales de Dermatologie, etc., No. 6.

may attend it. Dandriff is difficult of cure in many cases. If it be upon the head, keeping the hair short, and washing daily with castile soap, followed by a spirituous lotion, or glycerin and rose-water, will do the best for it. Cleanliness and frequent bathing in tepid, cool, or, if the vigor of the system permit, cold water, are of essential importance in all cases. Pityriasis *rubra* is described by T. Fox as characterized by superficial hyperæmia of the skin, with "hyperplastic growth" of the cuticle, which exfoliates abundantly. It occurs especially in those who have suffered from mental anxiety or overwork. He advises diuretics in its treatment. P. rubra is not common in this country.

The term *pityriasis versicolor* is sometimes applied to an *epiphytic* disease (*i. e.*, one connected with a vegetable parasitic growth), better called *chloasma versicolor*.

**Spedalksed** is a disorder known in Norway and Sweden; especially among the fishermen. It is also met with in Crete. Full accounts of it are given in medical journals and books,[1] but a mere reference to it will suffice here. (See *Elephantiasis Græcorum.*)

**Leprosy of the Bible** (Lepra Hebræorum, Morphœa) is of great historical interest.[2] It is still recognizable in the East, though not very frequently met with. In the Book of Leviticus, three varieties of leprosy are described: dull or darkish white "freckled spots;" dusky or shadowed; and *bright white* (*bahereth lebhana*), the worst of all. *Tsorat* (whence *psora*, and sore), or malignant disease, was applied to the last two only. *Lepra* is an early Greek synonym of this term. Mason Good thus describes the old leprosy: "A glossy, white, and spreading scale upon an elevated base; the elevation depressed in the middle, but without change of color; the black hair on the patches, which is the natural color of the hair in Palestine, participating in the whiteness, and the patches themselves perpetually widening their outline." In favorable cases, after spreading over much of the person, though without ulceration, the disease would die out; the scales would dry up and gradually disappear. In bad cases, ulceration would occur, with extensive sores, as well as desquamation. Then the leper was made an outcast, and treated as one dead; "unclean for life."

Not only the books of Moses, and others of the Bible, but also Hippocrates, Galen, and Celsus (under the names λέυχη, and λέπρα λέυχη) speak of ancient leprosy as a *white scaly* disease. It thus differs decidedly from either kind of elephantiasis.

The report of a Committee of the London College of Physicians[3] states that leprosy now exists in Egypt, Abyssinia, Algeria, Morocco, Senegambia, Cape of Good Hope, Madagascar, Mauritius, Isle of Bourbon, Syria, Arabia, Persia, Bokhara, Cashmere, India, Ceylon, Java, Sumatra, China, Kamskatka, Australia, Ægean Islands, Crete, Cephalonia, Malta, Greece, Russia, Esthonia, Finland, Courland, Sweden, Norway, Iceland, coasts of North Italy and Southeastern France, other shores of the Mediterranean,

[1] See Brit. and For. Medico-Chirurg. Rev., 1850, p. 71.
[2] See Neligan's Treatise on Diseases of the Skin, edited by Dr. Belcher (Philadelphia ed., 1866, p. 289).
[3] Med. Times and Gazette, Feb. 23, 1867.

delta of the Rhone, Spain, Portugal, Mexico, Brazil, West Indies, New Granada, Venezuela, Ecuador. and La Plata. It is said to be on the increase in the West Indies, and has been known recently in New Brunswick.[1] A number of cases have occurred lately in the Sandwich Islands; as well as at Key West, Florida. At New Orleans, a hospital for lepers was established in 1778. The disease exists in two forms: 1. Tubercular; 2. Non-tubercular. Anæsthesia of the skin is frequent in both; and so is enlargement of nerve-trunks.

It is hereditary. It may be congenital; but generally begins about puberty. Bad diet, and other personal unsanitary conditions, are most promotive of it. Hygienic improvements prevent or mitigate it. Medical treatment appears to be generally incapable of curing it.[2] *Gurjun* (dipterocarpus) oil and *chaulmoogra* oil have been much used for it, both externally and internally, in India and elsewhere. Of chaulmoogra oil (gynocardia odorata) the dose at commencement is 5 minims. The bark of the *hoang-nan*, a vine of Cochin China (strychnos Gaultheriana), in 3-grain doses, is also said to be serviceable in the treatment of leprosy. Dr. Simmons, of Yokohama, Japan, uses for it copaiba, internally and externally. E. Wilson[3] gives the duration of tubercular leprosy as from ten to fifteen years; of the anæsthetic, fifteen to twenty years. Life may last under it for five, ten, or twenty years. It has no proved connection with syphilis; nor is there decisive evidence of its contagiousness. Segregation of the leprous does good, by preventing or limiting the marriage of lepers. Climate can have but little to do with its causation, as it prevails in places as remote and unlike as China and Norway; late writers asserting the identity of the Norwegian "spedalsked" with the leprosy of other places.

Jonathan Hutchinson[4] reported to the Royal Medical and Chirurgical Society a well-marked case of leprosy in which recovery took place. He attributed her cure mainly to change of diet, especially the abandonment of fish. The first recorded case of inherited leprosy in the United States is said to have occurred in Nebraska, being reported by Prof. Hyde, of Chicago.[5] Altogether, statistics of the Dermatological Society make it appear that, in 1880, there were between 50 and 100 lepers in the United States. Although not contagious in the ordinary sense, after getting a foothold in a place, it appears to increase in some manner, generally. In 1840, there was no leprosy in the Sandwich Islands;[6] having been brought thither since by the Chinese, in 1880, about one-tenth of the inhabitants were said to be lepers.

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[1] A pamphlet has been written by Dr. Brognat-Landre on its prevalence in Surinam.

[2] Carbolic acid, externally applied, is asserted to have cured some cases. Oil of cashew-nut (Anacardium occidentale) has acquired some reputation in Trinidad, under the hands of Dr. Beauperthuy.

[3] Lectures on Dermatology, Lancet, February and March, 1873.

[4] Lancet, Feb. 15, 1879.

[5] Chicago Med. Journal and Examiner, December, 1879.

[6] This statement, however, has been lately denied by residents of those islands.

### MACULÆ.

*Ephelis*, *Vitiligo*, and *Chloasma* may be included under this term; perhaps better under that of *Decolorationes*.

**Ephelis**; *lentigo*.—Sunburn and freckles best correspond with these names, which, however, are by some authors extended further. Neither are of importance, unless in regard to appearance. For the removal of freckles (which often disappear spontaneously with time) or the yellowish brown spots called *chloasma*, or *melasma*, all applications may fail; dilute nitro-muriatic acid (fifteen to thirty drops in an ounce), left for some time in contact with the discolored spots, is more likely than anything else to take effect. [See F. 373.]

**Vitiligo.**—Literally *veal-skin*. Unnatural whiteness from deficiency of coloring matter. When universal over the body (nearly always then congenital) it is *albinismus*. We see albinoes, sometimes families of them, in all the races of mankind; as well as among the lower animals. *Leucoderma*, white skin, and *leucopathia*, or white disease, are names given by some writers to both the general and the local affection.

When local, vitiligo is seen mostly in rounded patches or spots, which slowly increase in size, though without regularity of shape. The head, chest, back, and thighs are the most frequent seats of them. The hairs on the parts involved become white; or fall out, causing baldness—*calvities* or *alopecia*.

**Treatment** for vitiligo must be, first, general, for improvement of nutrition in the whole system; and then local. Very hard it may be to cure the affection, although its importance is chiefly for appearance; no danger attends it. *Tannic acid* and *oil of turpentine* are the preferred local applications for it. Total *albinismus* is quite incurable.

**Chloasma** (pityriasis) *versicolor* will be spoken of under *Parasiticæ*.

For *alopecia*, baldness, or premature loss of the hair, very many remedies are in vogue. Shaving the head repeatedly (*i. e.*, after an illness) may often save the hair. Stimulating applications sometimes help and sometimes hurt the case [F. 185, 186].

### HYPERTROPHIÆ.

Morbid excesses of development of the skin or tissue connected with it are thus named: *Nævus*, *Clavus*, *Verruca*, *Elephantiasis Arabum*, *Scleroderma*.

**Nævus.**—*Mole*, *mother-mark*. This is always congenital. Discoloration and elevation of the part exists, with abnormal development of the capillaries and small veins of the skin; making a small, commonly flat, vascular enlargement. It is seldom more than an inch in diameter. Erectility sometimes belongs to the vessels of nævus.

Caustic, the ligature, the knife, and vaccination of the part, have all been employed for the removal of such formations. They may leave scars worse than the mole: the operation ought to be exceptional. I have known it, when performed early in infancy, to be quite successful.

**Verruca.**—*Wart.* A hypertrophy of the skin, with great development of the cuticle, upon a small surface; of which no one needs a further description. Some persons and families are especially liable to them; why, we cannot say.

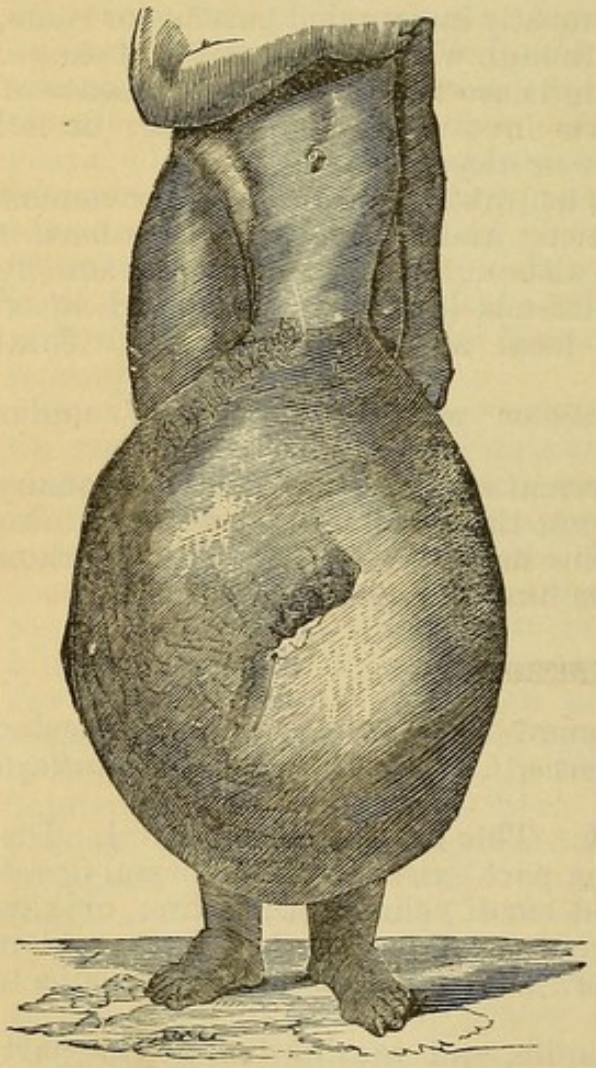
**Treatment.**—Strong nitric acid; acetic acid; chromic acid; caustic potassa; aqua ammoniæ; or, in slight cases, nitrate of silver, carefully applied *only to the wart*, after paring off nearly all the insensitive portion of it, will always, at least after repetitions, remove warts.

**Clavus.**—*Corn.* Most persons are well acquainted with this sort of localized hypertrophy of the skin of the foot, from irritating friction and intermittent pressure. Prevention is more easy, by far, than cure. Corns are either *hard* or *soft;* the latter may become inflamed; the former hurt only under decided pressure.

Pare a hard corn with a sharp knife or razor closely, but *not* so as to hurt or draw blood. Soak the foot then in warm water for five or ten minutes, and pick out carefully the centre or "core." Two thicknesses of adhesive plaster, with the centre cut out (making a ring), should be put over the corn; and a third piece, its centre not cut out, placed upon it and them.

Soft and *inflamed* corns require removal of all pressure for a while, and poulticing, etc., first; then the above treatment.

FIG. 128.



Elephantiasis Arabum.

**Condylomata.**—These are fleshy tumors or outgrowths, more or less hard and wart-like sometimes; in other cases soft; of syphilitic origin often, but not always. Especially apt are they to occur about the anus, prepuce, and vulva.

To remove such formations, if they be small and hard, nitric acid, pure, may be used, with care to limit its contact to the part to be destroyed. When large and soft, if troublesome enough to require destruction, the ligature is generally preferred. It may be, with a needle, passed through the centre of the mass, and then drawn and tied tightly around the base.

**Elephantiasis Arabum.**—*Bucnemia Tropica* of Wilson; "Barbadoes Leg."

Enormous enlargement of the leg, scrotum, or neck, most often met with in warm countries, but occasionally anywhere, is thus named. Hard and nearly immovable the parts become at last. The connective tissue, as well as the dermoid texture proper, is greatly hypertrophied Impediment to the return of surplus material of nutrition by the lymphatics is the probable pathogenetic cause; the nature of the impediment has seldom been discerned. Dr. Manson,[1] of Amoy, China, asserts the discovery of evidence that the presence of *filariæ* (sanguinis hominis) in large numbers in the lymphatic trunks is the cause of the obstruction producing elephantiasis. The filariæ may, at the same time, not pass through the lymphatic glands, and so may not be found in the blood.

This theory would seem to be confirmed by the fact that elephantiasis is *endemic* in several localities. Saville,[2] of the Society Islands, says seven-eighths of the population of those islands are affected with it.

**Treatment.**—Ligature of a large artery is asserted to have arrested the growth of elephantiasis.[3] Vanzetti cured a case by digital compression of the supplying artery.[4] Dr. Olavide,[5] of Madrid, has reported two cases, in which great diminution followed the internal and external use of iodine. Dr. Mackenzie,[6] of London, obtained considerable improvement by the application of *gum-elastic bandages.*

**Scleroderma.**—First described by Curzio, 1755. Forty-six cases only of this affection were on record in 1873.[7] Its characteristic is, general hardening of the skin. It resembles elephantiasis Arabum, except in being less localized. Thirty-three of the cases were in women, thirteen in men. Its invasion is gradual, its course prolonged for months or years. The general health is not always impaired. Seven of the cases had a fatal termination. Hebra divided it into two varieties; *sklerema atrophicum* and *sklerema elevatum;* of which the former is always incurable. No special indications for the treatment of either form have been made out. Armaingaud[8] has reported great advantage in one case from the persistent use of the continued electric current.

## TUBERCULA.

*Acne, Molluscum, Lupus, Elephantiasis Græcorum, Framboesia, Keloid.*

**Acne.**—Tuberculous elevations, from inflammation of the skin around sebaceous follicles, in which the secretion is detained, or is of a morbid character—are called *acne.* Three varieties may include all those named by authors, viz., *acne simplex, acne pustulosa,* and *acne rosacea.*

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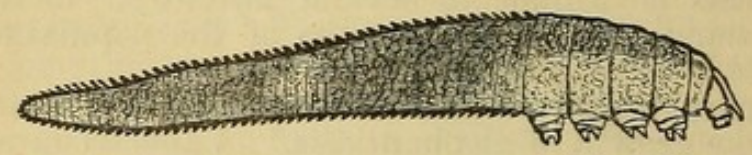
1 British Medical Journal, 1880.
2 Am. Journal of Med. Sciences, October, 1876, p. 553.
3 Carnochan (1856), Stratham, Butcher, and others have reported successful operations. Crosby Leonard (Brit. Med. Journal, June 21, 1879), asserts that 40 cases out of 69 have been cured upon this principle of treatment.
4 Gazette des Hôpitaux, 1867.
5 El Siglo Medico, March 9, 1873. 6 Med. Press and Circular, Oct. 13, 1880.
7 Day, Am. Journal of Med. Sciences, April, 1870; Irish Hospital Gazette, Feb. 15, 1873.
8 Archiv Gén. de Méd., June, 1879.

Acne *simplex* or *punctata* has small and moderately red, rather hard tubercles, on the face principally. When very hard and chronic, it may be called acne indurata. Black points commonly mark the obstructed follicles. Acne *pustulosa* reaches a more mature suppuration, and is often painful, especially if upon the scalp.

Acne *rosacea* always affects the face; usually in adults and most often in high livers. A good deal of soreness attends the eruption. First, the pimples are hard, red, and small; as they mature they grow somewhat larger; finally a little sanguinolent pus escapes, leaving a small scab. Rose-redness around the pimples, or patches of them, has given rise to the name. It is

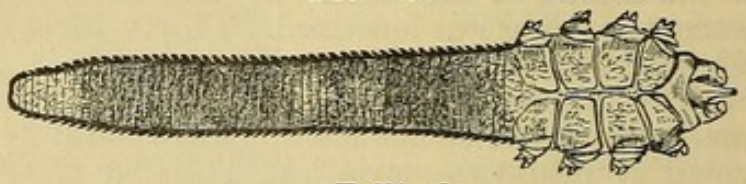
FIG. 129.



Acarus Folliculorum.

generally a difficult disease to cure, and very unsightly. Not unfrequently it is hereditary. Tilbury Fox thinks it prevails most amongst lymphatic persons, and those predisposed to

FIG. 130.



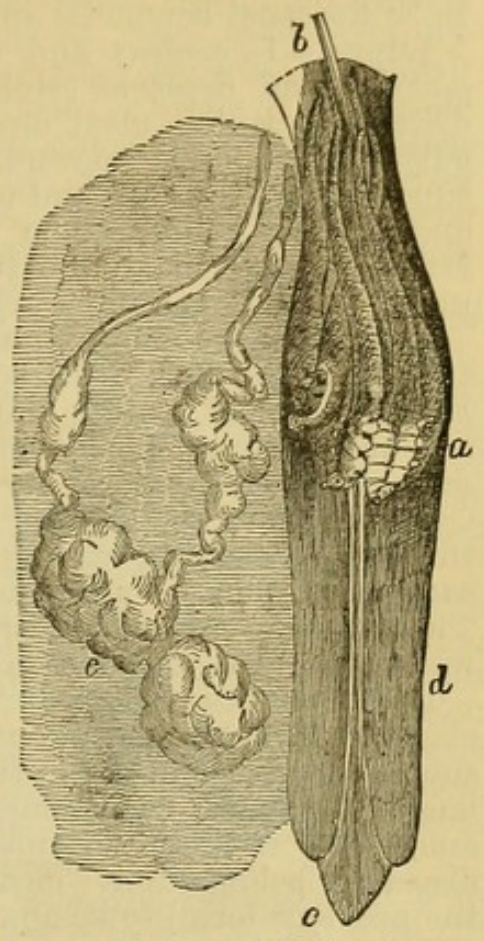
Acarus Folliculorum.

phthisis. Not unfrequently a small parasite, *acarus* (or demodex) *folliculorum*, $\frac{1}{50}$ of an inch in length, is found, from one or two to fifteen or twenty together, in the follicles of the face affected by acne. With the aid of a magnifying-glass, these groups of acari may sometimes be seen and turned out with the point of a large needle.

**Treatment.**—Errors of digestion brought on by gluttony or intemperance, or more moderate imprudence, often cause acne. They must be rectified for its cure. Attention to the state of the bowels, and to the action of the skin generally, is indispensable. Saline cathartics are useful in plethoric cases. Various mineral waters are recommended—saline and sulphurous especially. The pustules, when they mature, should be carefully punctured with a needle, avoiding irritating disturbances. Solution of carbonate or bicarbonate of sodium (℈j in Oj) in water or flaxseed infusion, will be a good wash. Sulphur, or sulphuret of potassium, in lotion or ointment, is also advised; or ointment or glycerole of nitrate or amide of mercury (hydrarg. ammoniat.) [F. 187].

Obstinate cases justify more decided alterative treatment; as, the application, by a cotton tip upon a knitting-kneedle, of a solution of corrosive sublimate, two to five grains to the ounce of water or alcohol, washing it off in a few moments; or, similarly, of pure Goulard's extract (liq. subacetat.) of lead, followed by spermaceti ointment, cold cream, vaseline, or glycerin and rose-water. Iodide of sulphur ointment (gr. xv. to xxx in ℥j of lard) is also much praised. In acne *indurata*, when very ugly, acid nitrate of mercury (mercury and nitric acid each an ounce) may be applied, and, sometimes, blistering the face with cantharidal collodion has been resorted to. Dr. Caro, of New York, prefers *burning* the parts by concentrating the sun's rays upon them by means of a lens.

FIG. 131.




Group of Acarus Folliculorum. *a*, Acarus. *b*, Hair. *c*, Its Root. *d*, Follicle. *e*, Gland. (Cornil and Ranvier.)

**Molluscum.—Acute** molluscum is considered by many to be a somewhat *contagious* tuberculous eruption. The small tumors form without inflammation, increasing slowly, till they have almost the size and form of a currant, but without color, and nearly flat-based or sessile. They last from three to six months, either ulcerating finally and then shrinking away, or inflaming and sloughing off, leaving a pit or mark. Several crops of tubercles may succeed each other on the face and neck, in either adults or children, but especially in the latter.

**Chronic** molluscum is of still longer duration; is not contagious, and the tumors are *pedunculated*, *i. e.*, each has a stem, in many cases at least; they also become larger, and occur over different parts of the body. Neither form of molluscum is common. It is proper to add that some authorities do not admit the contagiousness of the acute variety. Balmanno Squire has asserted the discovery of *parasitic spores* in the sebaceous matter of the tumors.

**Treatment** of acute molluscum seems not to be to any great extent available. In chronic molluscum the tumors may be cut off at the peduncle, the divided point being then touched with lunar caustic.

Somewhat analogous to, though not identical with, molluscum appear to be the cases of "*fungoid cutaneous neoplasm*" described by Hebra, Paget, Coats, and Duhring.[1] A number of tumors sometimes occur, on different parts of the body. A case of a

[1] Archives of Dermatology, October, 1878.

similar kind, with a single tumor, recurrent at intervals for several years, was under my care from 1878 to 1880. It was painless, but attained the diameter of ¾ of an inch, with, at last, a disposition to superficial ulceration. Powder of iodoform appeared to be the most beneficial application to it.

**Lupus.**—L. *exedens* and non-*exedens*,[1] or l. *superficialis*, *serpiginosus*, and *devorans* (Neligan). Lupus *superficialis* is a rare disease, in which, most often on the cheek, a small, soft, slow-gathering tubercle appears, which in time scabs, and ulcerates superficially, the scab and ulcer spreading for an indefinite time, and leaving behind them a permanent whitish seam or scar. Irritation may make the tubercle very painful, and deepen the ulcer. It may last for years.

Lupus *serpiginosus* exhibits one or more livid, red, indolent tumors on the face, head, or elsewhere, sore, heated, and itching. In the course of months they become filled with pus, and suffer an undermining ulceration, which finally becomes an open, unhealthy-looking sore, forming upon it a hard, brown scab. Creeping from the edge of its original seat, in irregular rings, the disease extends, leaving behind it a depressed cicatrix. The same part may be again reached by its meandering progress. This is a very chronic affection, it may be even of years' duration, without injuring the general health.

Lupus *exedens* or *devorans* (noli me tangere, or *rodent ulcer*) is characterized by continuous destructive ulceration of the skin, subcutaneous connective tissue, muscles, and other parts, at length involving even bones; all following tubercles "rounded and dusky red," on the nose, cheek, eyelid, etc. An ichorous discharge belongs to it; cicatrization follows it, sometimes (as in the previous form) to be again attacked.

Young persons, from ten to thirty, are especially liable to lupus. Its progress is generally an affair of years, and it causes less suffering than its appearance would lead us to expect. Scrofula certainly, and probably syphilis, predisposes to it. It is very difficult to cure; sometimes, at least, incurable. The obvious alliance with cancer has induced some authorities to place lupus in a class of affections called *cancroid*. It differs from cancer, however, in not involving the glands, nor contaminating the general system. Lupus is a comparatively rare disease.

Iodine (as in Lugol's solution), cod-liver oil, and iron, internally, are commonly indicated in the treatment of lupus, especially the *exedens*. Fowler's or Donovan's solution may also, or each in its turn, be cautiously given. Chlorate of potassium has been suggested; I do not know of its trial. Sea-bathing is likely to assist in the treatment.

Locally, the animal oil of Dippel (made by dry distillation of hartshorn shavings) has a reputation in Europe for lupus superficialis as well as for l. devorans. So have dilute solutions of chloride of zinc, nitrate of silver, nitric acid, etc. In the superficial variety, *collodion*, softened perhaps by adding $\frac{1}{50}$th of glyc-

[1] It is urged by Jonathan Hutchinson, of London Hospital, that this distinction is of no importance in classification, as the difference depends mainly on the part of the body affected. London Hospital Reports, vol. iv.

erin, may be painted lightly over the ulceration, every day or every few days.

Excision is sometimes practised for the exedent form, to prevent disfiguration; but the success of the operation is uncertain. So is that of strong caustics. Among these, nitrate of silver is preferred by most surgeons. Acetate of zinc, used solid for touching the ulcer, and applied every day or two, was much recommended by Neligan. He used also a lotion of the same salt, from three to five grains to an ounce of distilled water. Broadbent's treatment for cancer, by injection of *acetic acid*, might be worth a fair trial in lupus. Its theory is very plausible. Hebra treats lupus by local caustics. Carbolic acid, locally applied, is worthy of trial in this disease; and so is iodoform.

**Elephantiasis Græcorum.**—Called by this name among the Greeks, because, as the elephant is a great and powerful animal, so is this a formidable disease. It was probably the leprosy of Europe in the middle ages; for whose treatment many hospitals were built, and an order of Christian knighthood (of St. Lazarus) was established. It was most prevalent in France and England in the thirteenth century, and somewhat later in Germany; it rapidly diminished during the fourteenth century.[1]

It is characterized by many round tumors, from the size of a pea to that of an orange, livid, purple, yellowish or brownish, and soft; on the face and other parts of the body. The skin around them thickens irregularly, giving a repulsive aspect. Ulceration occurs, deepening even to the bones; all the organic functions suffer, and finally the mental faculties become enfeebled; diarrhœa, and perhaps tetanus, may precede death. It is hereditary, but probably not contagious.

This disease is possibly identical with the *spedalsked* of Norway, already named. Wilson believes it to correspond with the leprosy of the Hebrews. Allied to it are *radesyge* of Norway, the *morphie* of Brazil, *frambœsia* (raspberry disease), *sibbens* of Scotland, and *Aleppo evil* (button of Aleppo); perhaps also the *ngerengere* of New Zealand. *Pellagra* of Lombardy, Spain, and France, is described by some as having a certain resemblance to it; but tumors do not belong to that disease; in which, with a general cachexia, the skin becomes discolored and somewhat thickened, with arrest of its normal functional action.

**Treatment** of elephantiasis and its allies must be upon the principles laid down for other serious cutaneous affections; viz., to endeavor to *restore the balance of the general functions*, whatever may be wrong; whether that be by tonics, refrigerants, or purgatives, or other remedies acting upon the secretions; also improving the nutrition and repair of the skin, by local and general alteratives. I am not acquainted with any *specific* remedy for either of the forms of disease just named. Carnochan reports a cure of elephantiasis Græcorum by the ligation of an artery (the carotid).

**Keloid.**—(*Kelis*, *Kelois*, *Cheloid*, *Sclerema.*) This is very rare. I saw one case of it, in a medical college *ambulatorium*, in 1860.

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[1] Liveing; Gulstonian Lectures, Lancet, March 22, 1873.

Wilson, some years ago, stated that but twenty-four cases of it were upon record; more have been reported upon since. An irregular, cicatrix-like, smooth, reddish and whitish, corrugated excrescence, painful, with a stinging sensation, sometimes, but not always; nearly in every case forming upon the front of the chest; slow in growth, not ulcerating, and not tender to the touch. It is not unfrequently spontaneously removed by absorption; but has not been shown to be amenable to treatment. Rayer advises constant firm compression.

## HÆMORRHAGIÆ.

**Purpura** is the only affection of the skin belonging under this head. On parts, or often the whole, of the body, appear round red spots, which become gradually of a dark purple color; and then pass as bruise-marks do, through green and yellow, till they disappear. They are extravasations of blood into or upon the true skin, from its capillary vessels. The duration of each spot is about a week or ten days. Actual *hemorrhage* from the skin has been known to occur in a few cases (diapedesis, hæmidrosis). Some of these, however, probably were rather examples of *hæmophilia* (hemorrhagic diathesis). Feverishness may precede, and prostration may accompany purpura. In bad cases, hemorrhages may take place from the mucous membranes, as of the mouth, stomach, bowels, bladder, vagina, etc.; producing sometimes even a fatal result.

Purpura is by some improperly confounded with scurvy. Although extravasation of blood occurs in scorbutus, it may also happen quite independently of it. Deficiency of fresh vegetable food is not at all necessary to engender purpura; the causation and pathology of which, clinical experience and chemical investigation have both failed to show. In rare instances, iodide of potassium has been known to produce a purpuric eruption.

**Treatment.**—Although some assert plethora to be, as often as hydræmia (anæmia), antecedent to purpura, my own experience goes with the ordinary view, that rather a tonic than a depletory treatment is generally called for in it. Excessive stimulation, it is true, will aggravate its symptoms. Mineral acids, as elixir of vitriol, and Huxham's tincture of bark, or quinine, etc., are much given. Oil of turpentine is also recommended. Neligan prescribed it in large doses; even an *ounce* at once, with mucilage and an aromatic. This is beyond my degree of confidence in it; but it is said that it generally acts safely as a cathartic in such doses. Ammonio-ferric alum, tincture of chloride of iron, tannic and gallic acids, etc., are used as styptic medicines in some cases. Sponging the body with alum and brandy or whisky and water, at such temperature as is not chilling and yet is sedative to the circulation, will be the best local measure. Dr. L. D. Bulkley[1] asserts upon experience that *ergot* is the best remedy for purpura. He gives it either or both by the mouth and hypodermically; preferably the latter, injecting from ten to thirty minims of the fluid extract of ergot at each dose.

[1] N. Y. Med. Journal, April, 1877.

## NEUROSES.

Under this head, of affections involving the innervation of the skin, may be classed *Prurigo*, *Anæsthesia*, and *Neuralgia cutis*.

**Prurigo.**—Often placed under *papulæ*, because sometimes minute pimples occur with it—the essence of this disease, really, is intense itching without eruption. It is commonly divided into prurigo *mitas*, *formicans*, and *senilis*. *Pruritus* is the technical name for itching as a symptom. Its *most frequent* cause is the presence of parasites. Dr. R. H. Derby[1] insists that in true prurigo there is always a disease of the hair; with an epithelial growth and serous exudation about each root-sheath of the part affected. Wilson holds to the essentially neurotic nature of prurigo. Tilbury Fox says that "the eruption consists of certain papules, altered by scratching, and accompanied by intense itching, as *primary* and essential phenomena."[2] It appears to be more often seen in Vienna than in England or in this country.

The difference between the first two varieties is one of degree. In the *mitis*, obstinacy rather than severity exists. In p. *formicans*, suffering may be extreme, pervading the body. Heat of a fire or of a bed, rubbing of the clothes, etc., may cause an irritation which drives the patient to rub and tear the skin, yet without relief. Sleep may thus be prevented, and the bodily as well as mental exhaustion so produced may be great. The complaint is occasionally intermittent. Very often it is confined to one or two portions of the body; as the scrotum, vulva, anus (pruritus *scroti*, *vulvæ*, *ani*, vel *podicis*), etc. Pruritus *ani* is often caused by worms, especially ascarides; sometimes by a minute fungous vegetation. It must be carefully distinguished from eczema of the same parts.

**Prurigo senilis** is so named because of its frequency in old people. Lice cause it not unfrequently. Papulæ attend it more often than the other forms. Tilbury Fox, however, denies its identity with true prurigo.

**Treatment.**—This is sometimes a very hard disease to cure, or even to relieve. We must consider and treat the general condition of the body; see that the bowels are regular, the digestion normal, the skin kept clean and open by ablutions and proper change of clothing. Sometimes nervine tonics may be required; as nux vomica, arsenic, or quinine, in small doses. Tincture of aconite is prescribed by some; three or four drops at a time twice or thrice daily. Conium, belladonna, and other narcotics have been advised. The *hypodermic injection of morphia* may be employed to give rest in very distressing cases.

Rothmund[3] asserts the beneficial influence of the internal use, and also the hypodermic administration, of solution of carbolic acid.

Locally, many things may, and should, be tried in succession, in the search for palliatives. Baths of flaxseed tea, with or without carbonate of sodium or of potassium; lathering with castile soap, with a shaving-brush; strong salt water, or whisky and salt;

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[1] Sitzungsberichte der k. Akademie der Wissenschaften, vol. lix., 1869.
[2] Skin Diseases, etc.: 2d American edition, 1873.
[3] London Med. Record, Jan. 22, 1873.

pure vinegar, or hot water, applied with a sponge; dilute sulphuric, nitric, or acetic acid [F. 190, 191, 192, 193]; mercurial ointment; ointment of creasote [F. 224]; solution of carbolic acid; cerate of white lead; laudanum, sp. camphor, aconite, or chloroform, as lotion, or in liniment; spirituous solution of corrosive sublimate [F. 194]; solution (dilute) of hydrocyanic acid [F. 195]; solution of bromide of potassium; equal parts of chloral hydrate and camphor; glyceramyl; pure glycerin; tar ointment, olive oil; benzoated vaseline; ointment of iodoform (gr. x in ℥j); equal parts of chloral and camphor; hypodermic injection of pilocarpin (Simon); tobacco infusion; the "Turkish," or hot-air bath; and the common hot-water bath: these are only a few of the measures which may be resorted to. The diet should be unstimulating. Advice should be given to the patient, also, to refrain as much as possible from violence in rubbing or scratching the parts affected; and not to sleep in a very warm room or under too much cover. *Pruritis ani* may be palliated by *moderate dilatation* of the anus; as by the middle finger of the patient, or a *bougie* of tallow or cacao butter. *Hot* water (not warm) applied with a sponge, is often very relieving to this symptom. Dr. Bulkley[1] gives for it tincture of gelsemium internally; beginning with ten-drop doses, and watching their effects carefully.

*Pruritus vulvæ* is asserted by Friedreich to be often produced by minute fungous organisms, and to be relieved by the application of *parasiticides*. Dr. A. Wiltshire[2] confirms this view; recommending solutions of borax (℥j to f℥v or f℥vj), boracic acid in vaseline, iodine dissolved in elder-flower water (℥ij in f℥x), or corrosive sublimate (gr. ij in f℥x). Anodynes may be added to either of these; as sulphate of morphia (gr. ij in f℥x), atropia (gr. ½ in f℥x), veratria (gr. ½ in f℥x) aconitia (gr. ½ in f℥x), chloroform or dilute hydrocyanic acid (f℥ss to f℥x). Where the affection appears to be part of a general "nervous erethism," the local as well as general administration of bromide of potassium may prove beneficial. [See F. 364–368.]

**Anæsthesia cutis** is only a symptom of a larger affection—involving either the nervous system or the skin itself. It appears in one variety of elephantiasis, called by some *lepra anæsthetica*. Vitiligo also is often attended by it, at the parts which undergo discoloration. Except stimulating frictions, when not contraindicated by the other conditions of the case, and galvanism (faradization) under the same limitations, we have no special remedies to mention for loss of sensibility in the skin.

**Neuralgia** of the skin, temporarily, at least, limited to it, does undoubtedly occur, though seldom. I have experienced it in my own person. Its locality does not, however, so remove it from other forms of neuralgia as to require for it a special consideration.

### PARASITICÆ.[3]

Dermatologists are not all agreed upon the question whether the *microphytes* or *epiphytes* (minute parasitic vegetations) dis-

[1] N. Y. Med. Journal, 1881, p. 30. [2] Brit. Med. Journal, March 5, 1881.
[3] Some writers have proposed the common name of *tinea* or *phytosis*, for this group.

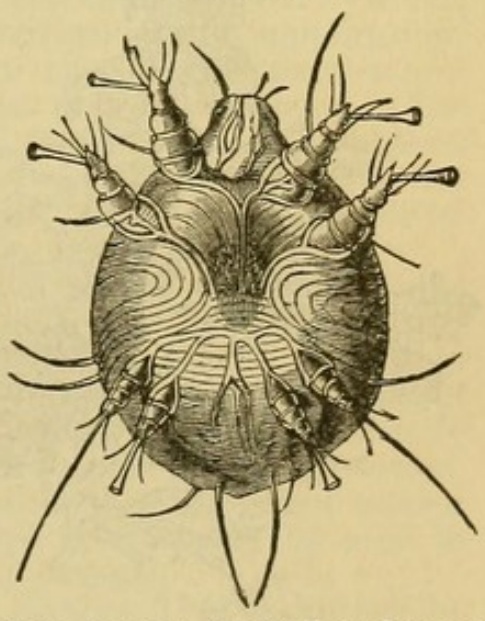
covered by aid of the microscope, in connection with certain skin diseases, are *essential* to those diseases, or accidental and secondary only. Wilson even denies their vegetative nature; asserting them to be results of spontaneous granular degeneration of epithelium. Most authorities hold the opinion, which I fully believe to be correct (especially proved by the results of *treatment*), that the parasites are really the essential *causes* of the disorders they constantly attend; that they may, under favorable circumstances, be *transplanted;* and that, to cure those disorders, destruction of the parasitic forms is necessary. Again, Hebra, a high European authority, believed that all the epiphytes described are merely modifications of one and the same species, in different degrees of development. Tilbury Fox agreed with this opinion. E. Hallier makes three series (Mucor, Achorion, Leptothryx) of forms, all capable of being educed from the same spores under different circumstances. Devergie[1] believes in *spontaneous generation* of the epiphytes, although truly vegetable. Dr. McCall Anderson[2] gives proofs, by separate inoculation, of the non-identity of *three* vegetable parasites at least—*trichophyton*, *achorion*, and *microsporon*. Bazin, T. Fox, and others have observed the transmission or transplantation of trichophyton (tinea carcinatus) from the ox and horse to man.[3]

No doubt exists with the large majority of observers as to the cause of the animal parasitic eruption, *scabies* or itch.

**Scabies.**—Chiefly vesicular, this disease may be papular, scaly, or pustular in some instances. Ordinarily we see—especially between the fingers and on the back of the hand, next often on the arms, legs, and abdomen, occasionally on the scalp, hardly ever on the face—a number of small red elevations with white or watery tops. Extreme itching is always present; often keeping the individual scratching night and day. King James I. is said to have described his experience of it as rather pleasurable; but this is not the common account of it.

Closely looking at almost any of the vesicles one may see a little red line or track, at the end of which may be found a slightly elevated point. In this is, generally, the animalcule—*Sarcoptes hominis* (Acarus scabiei); one of the *Arachnida*—flat-bellied, round-backed, tortoise-shaped, eight-legged; the female larger than the male, which is hard to find.

FIG. 132.



Male Acarus. (McCall Anderson.)

**Treatment.**—Sulphur is not the only, but is the most reliable and convenient parasiticide for itch.

[1] Archiv für Mikroscopische Anatomie, April, 1866.
[2] Brit. and For. Med.-Chirurg. Review, July, 1866, p. 225.
[3] British Medical Journal, March 25, 1871.

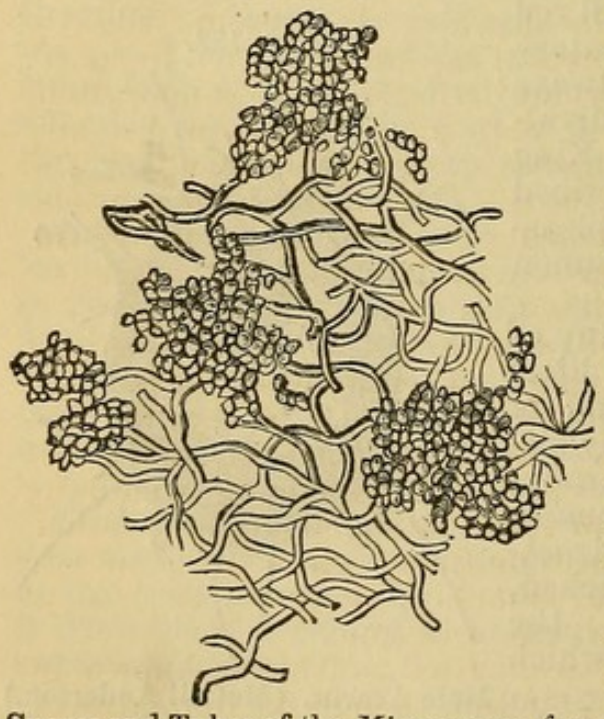
After thorough bathing and washing of the whole body with soap and water, sulphur ointment must be rubbed well into the parts affected. A few applications will usually suffice [F. 197]. Dr. Tilbury Fox advised a weak ointment—half a drachm of sulphur to an ounce of lard. The animalcule is killed, and the cure results. There is evidence, however, that in some cases of long standing, recovery may follow but very slowly. The *habit* of the eruption has then become established in the skin; this must be treated like eczema, or lichen, whichever it most resembles.

Oil of turpentine, kerosene or petroleum (Decaisne), solution of sulphurous acid, ointment of sulphuric acid, carbolate of sodium (Zimmerman), solution of chloride of lime, solution of corrosive sublimate, and other powerful agents, may also be confidently relied upon to destroy the itch animalcule.

**Army-Itch.**—During and since the late war in this country, the inevitable filth of camp life begot, among other evils, a very troublesome contagious skin-disease, called by the above name. Itching, without any eruption except small papulæ, characterized it. Outside of the army it extended to a considerable number of persons. No better remedy for this affection, I believe, has been found than a lotion and ointment, composed of iodide of potassium and glycerin; with water or rose-water for the lotion, and lard or cold cream for the ointment [F. 192, 199]. Mercurial ointment, and sulphuric acid ointment, are also efficacious for it.

The other parasitic affections of the skin depend upon the microphytes already alluded to. They are *Favus*, *Sycosis*, *Tinea circinatus*, *Tinea decalvans*, *Chloasma versicolor*, and *Plica Polonica*.

FIG. 133.



Spores and Tubes of the *Microsporon furfur*, from a case of Pityriasis versicolor. (McCall Anderson.)

**Favus.**—(*Porrigo*, *Tinea Favosa.*) Generally appearing on the scalp, this disease is peculiar in the formation of yellow cup-shaped crusts, in each of which one or two hairs grow. By joining together, these crusts may lose their regularity of shape, in a general scabbing; and a good deal of hair may fall out. A mealy powder is found in the crusts, which, on microscopic examination, is found to contain the formation called *achorion Schönleinii* by Remak.[1] This presents minute tortuous branching tubes, straight or crooked not branching tubes, and spor-

[1] The achorion was discovered in favus by Schönlein in 1839.

ules, free or united in bead-like strings. Granules and cellules of *mycelium*, the generative portion of the plant, are abundant. An offensive discharge occurs from the eruption in bad cases.

Favus is contagious, though seldom conveyed to cleanly persons. It is hard to cure, but not incurable. In its treatment, constitutional and local measures must be combined. Arsenic is, as usual, the most reliable alterative. Neligan has advised the iodide of arsenic, gr. $\frac{1}{12}$ thrice daily; intermitted if headache or dryness of the mouth come on.

For the local treatment, the hair must be *closely cut* with sharp scissors. Apply then a large flaxseed poultice for twelve hours or more—perhaps repeatedly, to soften the crusts. Next, wash the head thoroughly, by means of a soft sponge, with solution of carbonate of potassium (one drachm to a pint of water); after which ointment of carbonate of potassium (potass. carb. ℥j, glycerin f℥j, adipis ℥j) may be applied spread thickly on lint, covered with oiled silk. This may be renewed daily; or, if there be much discharge, twice a day. The crusts will then come away in a few days. Ointment of iodide of lead may follow; washing the head night and morning, still, with the carbonate of potassium lotion; and keeping the hair cropped short all the time. Three or four weeks will generally suffice for a cure. Cleanliness of person and regulated diet are at the same time, of course, essential.

For this and other parasitic affections of the skin, *tar ointment* is a far from contemptible remedy.

**Sycosis** (*Mentagra*).—This occurs in the bearded part of the face, chiefly the chin. It is contagious; sometimes being transmitted by uncleanly barbers in shaving. It presents slightly inflamed elevations about the roots of the hairs, covered by scurf; shaving decapitates these, inducing irritation and suppuration, as well as scabbing. The whole chin may become swollen and inflamed by it; and parts of the beard may be destroyed. The parasitic cause of this disease is the *tricophyton mentagrophytes* (*microsporon mentagrophytes* of Gruby). It is seen under the microscope to consist of minute stems, bifurcated at angles of from 40° to 80°, and granulated within.

Sycosis is not common, at least in America. It is tolerably frequent in France. Acne, impetigo, and ecthyma of the bearded part of the face may be confounded with it. It is very hard to cure. In its treatment, keeping the beard constantly very short by close clipping (not shaving) is essential. Sponging twice daily with castile soap and water, or carbonate of potassium lotion, will be beneficial. Iodide of lead ointment, ointment of nitrate of mercury, and of calomel and camphor, etc., may be used in succession; besides the internal use of arsenic.

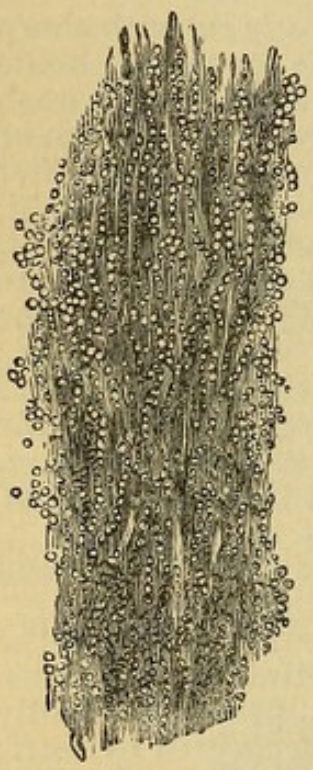
**Tinea circinata** (*Ringworm, Scald Head*).—This is known by its circular form, occurring most often, though far from always, on the head or face. *Herpes circinatus* resembles it; but, in that, minute vesicles are usual; in *tinea*, rare and few. In *tinea* a thin powdery crust exists, whose examination will show the *trichophyton tonsurans*, closely allied to the parasite of sycosis.

**Tinea decalvans** (or *tonsurans*) is marked by the destruction of

the hair in circular patches, making round spots of baldness. Its parasite is considered by many dermatologists as different from the *trichophyton*, and called *microsporon Audouinii*. Its sporules are rounder and smaller than those of the trichophyton.[1]

The **treatment** of both forms of tinea must be, besides cleansing, essentially *parasiticide*. Tar ointment; "huile de cade;" mercurial ointment; solution of corrosive sublimate; oleate of mercury; lotion and ointment of carbonate of potassium; lotion of sulphurous acid; carbolic acid; creasote; ointment of crysophanic acid; pyrogallic acid lotion;[2] solution of boracic acid, ℥j in ℥j; cantharidal collodion, lightly applied; these are among the many applications which may be used for the purpose, with generally successful results.

FIG. 134.



Hairs from a case of Tinea Tonsurans loaded with spores. (McCall Anderson.)

As has been observed, tinea is seldom transmitted to a cleanly person; at least without very close and continued contact.

**Chloasma Versicolor** (*Pityriasis Versicolor*).—The parasite of this is *microsporon furfur*. The disease is recognized by the formation of dull, reddish-yellow spots of various size and shape, seldom numerous, on the front of the chest or abdomen. The same local applications may be used for it as for tinea; besides the internal use of arsenic.

**Plica Polonica.**—This is an affection of the hairy scalp, endemic in Poland, Russia, and Tartary. The hair-follicles become diseased, and the hair is matted and glued together into felt-like masses. *Trichophyton tonsurans* and *trichophyton sporuloides* are the parasitic vegetations described as found connected with it. The disease has not been seen in this country. Some dermatologists assert that it is nothing but *eczema capitis*, with seborrhœa and dirt; but this is not probable.

## SYPHILIDA.

Enough for our purpose and space has already been said of the general history of syphilis. Among its constitutional manifestations cutaneous eruptions are very frequent. These are seldom vesicular, not very often papular; most often squamous or scabbing. Lepra and rupia, particularly the latter, are prominent among syphilitic affections, though both may occur independently of syphilis. All eruptions in persons of this diathesis are marked by a *coppery color*, which remains long, even after their cure; by a disposition to ulcerate, perhaps only superficially; and by preference in locality for the face, shoulders, and back.

In the **treatment** of syphilitic eruptions, the diathesis must be

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[1] Duhring includes *tinea circinata* and *tinea tonsurans* together, as *tinea trichophytina*.

[2] Mention has been made on a previous page to the propriety of caution in the use of chrysophanic and pyrogallic acids. (See *Psoriasis*.)

met by our remedies. Iodide of mercury internally; after that, iodide of potassium, and, in feeble persons, cod-liver oil, perhaps iodide of iron; locally, mercurial ointment (besides palliatives, if required, as in other eruptions) or the calomel vapor bath should be prescribed. Often such affections will seem to be cured, but, after weeks or months, will return again; then the treatment should be renewed, and discontinued when they disappear.

### POISON-VINE ERUPTION.

The common poison-vine[1] (*Rhus toxicodendron*), a species of swamp sumach, and one or two other plants more rarely, cause, by contact, in some persons, an inflamed vesicular eruption of considerable severity. The hands and face are its most common localities; but it may come out on the lower limbs or about the anus and genitals. Its duration, when severe, may be from one to two weeks; but it is often quite limited and of short course.

In the **treatment** of this annoying but not dangerous attack, I have had a good deal of experience in my own person as well as with others. I have found much relief, and great effect in shortening the course of the disease by reducing the inflammation, from *lead-water, early*, freely, and frequently applied with a large camel's-hair pencil. It should not be put upon the *opened* vesicles, which it irritates; but around them, upon the reddened skin. In the practice of Dr. E. Hartshorne, a successful remedy has been the *fluid extract of serpentaria*, painted directly upon the eruption. It seems to kill it at once. Oxide of zinc ointment is sometimes very soothing to the eruption. Dr. Hatch,[2] of California, finds solution of sulphate of iron beneficial in this affection. Late experience with it (1874) has convinced me that the *bicarbonate of sodium*, in strong solution, applied early with a camel's-hair pencil, is especially efficacious. Its action (and that of lime-water, also sometimes useful) is explained by the fact, pointed out by Prof. Maisch, of Philadelphia, that the active principle of the poison-vine is an acid—*toxicodendric acid*. Dr. Brandt,[3] of Indiana, recommends a saturated solution of *sulphite of sodium*, constantly applied. Dr. Brown,[4] U. S. N., asserts that *bromine* exercises a specific control over *rhus* poisoning. He dissolves bromine in olive oil or vaseline, 10 or 20 drops to the ounce, rubs this gently over the parts affected three or four times a day, and washes the parts afterwards with soap. *Lathering* the seat of the eruption, with a soft shaving-brush, is very relieving to the itching and burning which attend it.

### FROST-BITE; CHILBLAIN.

Gangrenous destruction of parts, especially of toes, not unfrequently follows actual congelation. Short of this, exposure to

[1] This somewhat resembles the Virginia Creeper, but is *three-leaved*. One variety of it is erect, not climbing.

[2] California Med. Gazette, 1869; also Butler & Brinton's Half-yearly Compendium, part iv., p. 152.

[3] N. Y. Medical Record, July 12, 1879, p. 46. Dr. Ward (same Journal, Aug. 21, 1879), advises *liquor sodæ chlorinatæ* diluted with from 3 to 6 parts of water.

[4] Boston Med. and Surgical Journal, 1879.

continued cold, especially when *suddenly* warmed again, may cause an erythematous inflammation, **erythema pernio,** already mentioned under that head. When the feet or other parts have been so chilled as to be almost frozen, *gradual* warming—for instance, at first rubbing them with snow—is proper as a *preventive* of frosting. In its **treatment,** cooling unguents, as Goulard's cerate, or lotions, as lead-water, may be first indicated, and then astringents, as alum-water, infusion of oak-bark, solution of chloride of iron, creasote ointment, etc. Cabbage leaves are a popular domestic remedy for chilblains.

### BURNS AND SCALDS.

If half of the body be so burned or scalded as to arrest the functions of the skin over that extent of surface, death will always result. *Collapse* comes on from the terrible shock to the nervous system through the impression on the widely distributed cutaneous nerves. The pulse is then very low, the body cold, and, commonly, thirst is great. Suffering is often, in a few hours, lost in apathy and prostration.

The **treatment** for this prostrated condition must be stimulant as well as anodyne. Opium and whisky, or wine, should be given as freely as in any other condition of positive debility or exhaustion.

For *local* treatment of burns, I believe that nothing is better than *lime-water and oil*, equal parts (either linseed, olive, or lard oil), on cotton wadding, covered with oiled silk. Other remedies often used are, dry cotton (which sticks too close in deep burns), glycerin, rye-meal, starch powder, fresh lard, *fruit jellies* (Marin), carbolic acid,[1] and molasses. To exclude the air seems to be the main indication. I have been disappointed in several trials of a saturated solution of sodium bicarbonate, which was much praised as a remedy for burns a few years ago. *Soap-suds* will do as much or more good.

## UNCLASSIFIED AFFECTIONS.

### AMENORRHŒA.

A few words seem appropriate here upon some of those affections of the sexual system which every practitioner must often meet with. Their full discussion belongs to books of a different kind. Especially at a distance from the large cities, a general practitioner will often have occasion to make his own diagnosis in such cases, and, perhaps, carry out his own treatment. In regard to the more serious *operations* of gynæcological surgery, much caution may very reasonably be exercised by any one whose opportunities have not enabled him to acquire the skill of the specialist. Upon these subjects, the works of Thomas, Barnes, Atlee, and Emmet may be especially recommended for study and reference.

[1] In solution, ʒij in Oj of water; or 1 part to 7 parts of glycerin; or else Lister's "carbolic oil," 1 ounce of carbolic acid in a pint of olive or linseed oil; or carbolized oxide of zinc ointment, 1 part carbolic acid to 32 parts zinc ointment.

**Amenorrhœa,** or suppression of the menstrual discharge in women, may be either an *interruption* of it during its occurrence, or its habitual *non-appearance.* The former is commonly the result of cold and wet, or of some nervous shock, to which the patient is exposed during the menstrual period.

Habitual amenorrhœa may occur with *plethora,* from disturbance of ovarian and uterine functions, or with *anæmia* and debility, or as a secondary effect of chronic disease, *e. g.*, phthisis. The greater number of cases is met with in anæmic females; but the opposite state is not very uncommon. Vicarious hemorrhages from the lungs, stomach, etc., sometimes accompany it.

As bearing upon the **treatment** of amenorrhœa, the question always comes up, is the suppression of the menstrual flow the *cause* of other symptoms or morbid effects, or is the amenorrhœa itself the *effect* of a morbid condition, the removal of which will restore this arrested function? It is to be said in reply, that sometimes the one and sometimes the other may be the case. In amenorrhœa with *plethora,* generally the interruption of menstruation may be found to be a primary, though perhaps not the sole, cause of disturbance of the system. In *anæmic* amenorrhœa, most frequently the constitutional state is primary, and the restoration of general strength will be attended by the spontaneous return of the function.

Practically, then, we must, in any case, inquire into the general condition and history of the patient. If there is headache, increased by stooping, with a flushed face and full, strong pulse, the patient having previously been *vigorous* in health, taking blood from the lumbar region by cups, or, in clear cases, from a vein in the arm by the lancet, is indicated. Also purgatives; at first, in a sudden attack, senna, or, if much heat of the system exist, citrate or sulphate of magnesium; afterwards, when the amenorrhœa is obstinate, aloes. Hot mustard foot-baths, or warm hip-baths, and warm poultices to the breasts, every night, should be used in a case of sudden suppression of menstruation in the midst of its period. Tincture of aloes and myrrh is a favorite domestic emmenagogue; a teaspoonful twice or thrice daily, in hot water. Tincture of rhubarb and senna (Warner's cordial) will, I believe, answer as well. Black hellebore, savin, senega, etc., are also resorted to for similar action; but all emmenagogues are more uncertain even than diuretics.

In many cases of amenorrhœa, a delicate and, in some, a difficult question is, as to the possibility of the (physiologically) normal cause of pregnancy being present to account for it. Most of all may this difficulty present, of course, in young single women, who may, unfortunately, have reason for concealment. Apart from the very clear ethical principle that a physician has no moral right to aid, in any way whatever, in producing an abortion, active emmenagogue treatment in the pregnant state is unsafe for the health of the subject of it herself. *Medicine* will fail to cause abortion in eight or nine cases in ten, unless it be so used as to produce a serious, often dangerous, effect upon the system of the patient.

When we *suspect* pregnancy, then, mild measures only are in place—waiting for time to develop the nature of the case in full.

*Anæmic* amenorrhœa requires tonics; above all, *iron*. Other medicinal and hygienic roborant agencies may also be called in. Aloes, in small doses, repeated daily [F. 201, 202], occasional or periodical hip-baths, foot-baths, and breast-poultices, especially near the time when the menstrual flow should occur—may in many cases be superadded. *Strychnia*, in one-thirtieth of a grain doses, is a favorite tonic in amenorrhœa with some practitioners. *Galvanism*, or *statical electricity* (of the friction-machine) is much resorted to by others. The spinal and pelvic regions should be the seats of application.

### DYSMENORRHŒA.

Painful menstruation is habitual with some women for years together. Pregnancy not unfrequently cures the habit. The affection seems to be of two kinds or origins: 1, functional or **physiological,** and 2, **mechanical** dysmenorrhœa. With the former, disorder of innervation and circulation occurs; even the ovaries may participate in this. Some women suffer attacks of monthly ovarian irritation (ovarian colic), with fever. Ordinarily, before menstruation begins, the subject of functional dysmenorrhœa feels ill, with pain in the back, perhaps headache, followed by pains, almost like labor-pains of the first stage, in the womb. That organ becomes palpably swollen and heavy, its pain being somewhat assuaged by compression by the hand through the abdominal wall. When free discharge comes on, relief is obtained. Sometimes a *membranous cast*, in one or more fragments, of the lining of the uterus, is expelled: constituting *membranous dysmenorrhœa*.

The symptoms of mechanical dysmenorrhœa are not always strikingly different, but it is a more local affection. The direct cause of it is obstruction at the *os* or *cervix* uteri; the external or internal *os* usually, if constriction be the trouble; in the *neck*, when anteversion, retroversion, or lateral flexion produces it. On the indication of this causation, Dr. Simpson, of Edinburgh, some years since introduced the practice of *dilatation* of the os and cervix for the cure not only of dysmenorrhœa, but of sterility, dependent upon the same obstruction. *A sponge-tent* was used [F. 232]; sometimes, more lately, the *sea-tangle* (laminaria digitata) instead. Dr. W. L. Atlee (1861) introduced a *uterine dilator*,[1] which has been found to act well in many cases. Dr. Ellwood Wilson and Dr. Molesworth have made large use of similar instruments. Simpson and others, however, have preferred *incising* the neck of the uterus with a hysterotome. Much discussion on this subject has transpired. I must refer upon it to works on special surgery and gynæcology; particularly the works of Drs. Marion Sims and T. A. Emmet. It is observable, however, that Dr. H. R. Storer, the distinguished obstetrician of Boston, adheres to careful dilatation instead of incision. Drs. Tilt and H. Bennet, of London, and Drs. F. Barker and Emmet, of New York, also object to frequent hysterotomy.

Whatever the cause of dysmenorrhœa in any case, the subject

[1] Amer. Journal of Med. Sciences, April, 1871.

of it should always avoid being much on her feet for a day or two before her monthly time; and should go to bed when the pain begins. Cloths wrung out of hot water, or spirits and hot water, may be placed upon the abdomen, and renewed as they cool. Internally, spirits of camphor, with compound spirit of lavender and hot water (sweetened to taste) may be given [F. 203]; or if not relieved, paregoric in teaspoonful doses. Dr. Emmet advises large vaginal injections of hot water. Dr. Blackwood,[1] of Philadelphia, has found *electricity* to give the best results. The advantage of avoiding much exercise or fatigue just before the time of the expected menses ought to be impressed upon the patient. No medicine appears to have any important *prophylactic* effect; unless it be iron in anæmic patients.

## MENORRHAGIA.

Excessive menstruation may be of two kinds: 1, its occurrence too often; 2, too great an amount or continuance of the discharge. Both very frequently occur together. Causes of menorrhagia are —general relaxation of system; over-excitement of the genital apparatus; thinness of the blood, hemorrhagic diathesis; and over-fatigue, especially on the feet, promoting a descent of blood toward the pelvic organs about the time of menstruation. Ulceration, cancer, or tumors of the uterus, as well as abortion and *placenta prævia*, cause uterine hemorrhage, not properly to be called menorrhagia; but metrorrhagia.

This affection is much most common in the anæmic. Rest, iron, good diet, and astringents, internally and sometimes locally, are then the remedies for it. Tincture of chloride of iron is, here, the favorite chalybeate. It may be given through the interval. During the attack, ammonio-ferric alum, in five-grain doses, may be administered; or tannic or gallic acid, three to five grains several times daily. The indiscriminate use of iron, however, simply because of excessive menstrual discharge, is to be avoided. Sometimes, without anæmia, the disorder is due to *uterine congestion;* and then, by promoting this, iron may increase the flow. For metrorrhagia, ergot may be required; f℥ss of the fluid extract, or f℥j of the wine every half-hour for several doses; or hypodermic injection of ergotin, two or three grains at once, or $\frac{1}{200}$ of a grain of atropia (Tacke). The patient must be kept still upon her back till the flow is controlled. Sometimes cold wet cloths (for a serious hemorrhage) have to be put upon the abdomen; or an ice-water sponge, or half a lemon, or a syringeful of vinegar, or tannic acid solution, or of solution of tinct. ferri chlorid. (f℥ss in f℥viij) may be thrown into the vagina. Dr. Wooster, of California, uses injections of a solution of chromic acid; 15 grains in f℥i of hot water, passed through a gum catheter, carried up to the fundus.[2] Hot water alone is much employed in recent practice. It should be at a temperature not below 110° nor above 120° Fahr. Dr. Matthews Duncan[3] injects tincture of iodine

[1] Phila. Med. Times, Oct. 9, 1880.

[2] Dr. Emmet credits Dr. Sims with the introduction of chromic acid as a local remedy in uterine diseases. Its use requires caution.

[3] Med. Times and Gazette, August 7, 1880.

into the uterus for threatening hemorrhage; regarding it as safer than tincture of the chloride of iron. Dr. Barnes advises that, at the time of an injection into the uterus, an assistant should grasp that organ through the abdomen, to lessen the danger of the escape of the fluid through the Fallopian tubes. Plugging, with a tampon of cotton, lint, or sponge,[1] in a few instances may have to be resorted to. Dr. T. G. Thomas prefers, for the application of a tampon in uterine hemorrhage, the preliminary distension of the vagina with Sims's duck-bill speculum. "Pieces of cotton soaked in water, pressed and flattened out by the fingers, each about the size of a very small biscuit, may be pressed into the vaginal cul-de-sac by means of forceps till this is filled. Then other pieces are packed firmly around the cervix until only the os is visible; a smaller pad is then pressed firmly against or introduced within the cervical canal and the whole vagina is then filled to its lowest portion." In every case of severe or protracted menorrhagia, the practitioner must endeavor to be sure whether or not any malignant or other organic affection of the uterus is present.

### LEUCORRHŒA.

**Synonyms.**—*Fluor Albus; the Whites.* This is quite a common trouble of women. The mucous discharge may be either from the vagina, from the cervix, or from the uterine cavity. When from the glands of the neck of the uterus, it is apt to be glairy, like the white of an egg. Irritation of the organs, followed by relaxation, is its general cause; but, often, relaxation alone seems capable of producing it. Procidentia or prolapsus uteri is a frequent source of it; the descended uterus pressing upon the vaginal walls, causing morbid increase of secretion and exhalation from one or both.

In **treatment** of leucorrhœa, tonics are often required; iron, bitters, etc. Also *astringents*, by the mouth and locally; those mentioned for menorrhagia will apply here also, but usually in less strength, for a longer time [F. 204, 205]. Vaginal, or in some cases uterine, *suppositories* also may be used. They may be made of cacao butter, or gelatin and glycerin, medicated according to each case. A suppository for the uterus should be cylindrical, of about the diameter of a goose-quill, two inches long, and weighing about fifteen grains. For the vagina, of course, it must be larger. If prolapsus or procidentia exist, a well-adapted pessary (gutta percha or India-rubber *ring*, or *double horseshoe* of similar *light* material), will, in a majority of cases, do good service.

### IRRITABLE UTERUS.

This consists of a permanent and painful sensibility of the womb, especially of its neck; often accompanied by increased frequency of pulse, a dry, hot skin, and generally, in protracted cases, gastric and renal derangement. This disease commonly occurs in the middle period of life, though it is sometimes met with in early youth.

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[1] Dr. T. E. Beesley contrived a light *metallic* conical plug or cork for the vagina; to be kept in place by a bandage. Gutta-percha might be adapted to the same purpose.

The *local* symptoms are pain in the lumbar and sacral regions extending down the thigh to the knee, and around the brim of the pelvis to the lowest part of the abdomen. There are also some erratic pains in the thorax and loins. The character of the pain is that of *soreness;* slight pressure relieves it, but it is aggravated by rough handling; sometimes it is spasmodic, like that of abortion.

The pain is increased by excitement of any kind, by exercise, and sometimes by standing. Straining, either in defecation or urination, constipation, flatulence, and diarrhœa will aggravate it.

A vaginal examination may prove the uterus to be either displaced or engorged, but not altered in form, size, or density; extremely painful to the touch in the body as well as in the neck.

**Causes.**—Among the predisposing causes may be placed, injudicious education, fashionable life, prolonged lactation, and temperament. Among the exciting causes, bodily exertion during menstruation, astringent injections, abortions, displacements, and sudden arrest of the menses in any way.

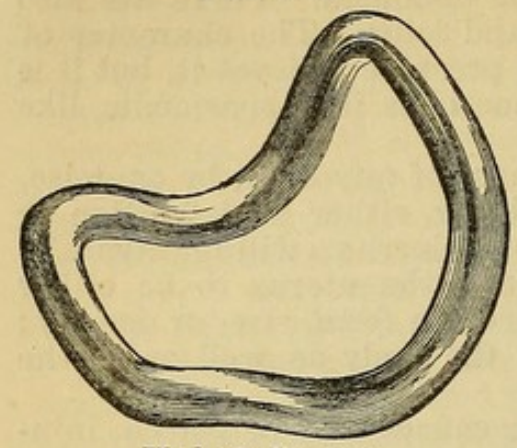
**Diagnosis.**—From neuralgic dysmenorrhœa, by the constancy of the pain. From acute inflammation of the cervix, by the absence of heat, swelling, and throbbing; by the absence also of discharges, and by the slight changes of the cervix compared with the amount of suffering.

**Pathology.**—Gooch considers it a permanently painful condition of the uterus, neither accompanied by nor tending to produce change in structure. Ashwell regards it as a modified inflammation, or, at least, closely allied to inflammation or congestion. Thomas names it "areolar hyperplasia," on account of the increased formation of areolar or connective tissue commonly occurring in its course. This term omits, however, the recognition of the "irritability" which gave occasion for the name preferred for this affection by Hodge and others.

**Treatment.**—Two indications present themselves, viz.: 1. To mitigate local suffering; 2. To sustain and improve the general health. The first indication will be fulfilled by the use of anodynes, either by the mouth or rectum, or applied directly to the uterus itself; by the application of the nitrate of silver, and by anointing the cervix with anodyne unguents. The second indication, by rest, exercise in a recumbent posture, or, in some cases, on foot or horseback; tonics, nutritious food, cold bath or the douche, and cheerful society. Scarifications of the neck of the uterus are highly recommended by some authors, especially when there is congestion. The introduction of a pessary is often followed by marked relief, if there be any descent of the womb. Dr. T. H. Buckler, of Baltimore, asserts advantage from *dilatation of the cervix uteri* by insertion of a male urethral bougie, left in for a number of hours at a time. This practice is founded upon the view that the cervical congestion and hyperplasia are owing to a strangulation of the veins of the uterus by an excessive action of its circular muscular fibres. It must certainly require care to avoid the effects of direct local irritation, endangering inflammation (endometritis).

In regard to pessaries, nearly all the best gynæcologists agree that they are often useful in supporting a prolapsed or displaced uterus. Hodge's horseshoe pessary (of light material) is frequently serviceable; and so is a simple India-rubber ring pessary. The *tact* of the practitioner, as well as his knowledge of pelvic anatomy, must be exercised in selecting and adapting such an instrument for each case. Dr. M. A. Pallen[1] prefers a *soft-clay* pessary or "utero-vaginal rest."

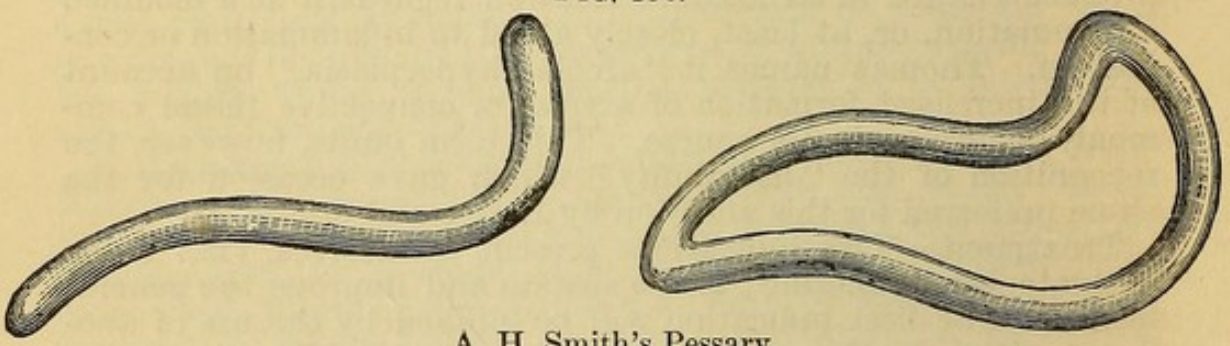
FIG. 135.



Hodge's Pessary.

It is impossible for an *external* application of any kind to replace a dislocated womb; yet there are not a few cases in which the real origin of the trouble is *relaxation of the muscular parietes of the abdomen*, and consequent tendency to descent of all of its contents. For this state of things a well-fitting *abdominal bandage* may afford a very useful support. I have known cases, not only of irritable uterus, but of severe nervous symptoms (in one instance epileptoid convulsions), to be essentially relieved by wearing, for months together, external abdominal supporters.

FIG. 136.



A. H. Smith's Pessary.

**Ulcers of the Uterus.**—Much discussion has occurred as to the fitness of the application of the term *ulcer* to such "granular degenerations, erosions, or abrasions" as are observed about the *os* and *cervix* of the uterus. The term is, however, thus applied by most gynæcologists.[2] Thomas describes six varieties of cervical ulcerations: 1. Granular; 2. Follicular; 3. Inflammatory; 4. Syphilitic; 5. Corroding; 6. Cancerous.

Of these, the *granular* ulceration of the vaginal (exterior) surface of the cervix is the most frequent. Its symptoms are sometimes slight, in other cases quite grave. It is produced by

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[1] N. Y. Med. Record, June 19, 1880, p. 688.

[2] Dr. Reamy, of Cincinnati (1880) in 8000 women examined, found (excluding syphilitic and cancerous cases) but 19 instances of what he regarded as "true ulceration."

all causes of uterine irritation or inflammation, as *displacements; sexual abuses; pressure; injuries during parturition.*

In a serious case the symptoms may be as follows: *leucorrhœa*, sometimes bloody or purulent; *pain* and *bloody discharge after coition; menorrhagia; pain on locomotion;* constant *pain in the back and loins; general debility and hysterical disorder.*

Examination by means of the *vaginal touch* and the *speculum* will make certain the presence or absence of ulceration. "The cervix, more especially near the os, is seen to be covered by a mass of pus, which being removed lays bare an intensely red, granular, hemorrhagic-looking space of greater or less extent, closely resembling the inner surface of the eyelids when affected by granular degeneration. The diseased surface does not appear depressed below, but is sometimes even elevated above the surrounding mucous membrane." (Thomas.)

**Treatment.**—The ulcer of the uterine cervix is to be regarded as the sign and effect of a morbid condition of the uterus itself. *Endometritis* (inflammation of the lining membrane of the uterus) or *congestion* of the body or neck of the womb, may exist and require treatment. Or, a *displacement* may be causing continual irritation, by friction of the os or cervix against the floor of the pelvis.

For the ulcer itself, authorities advise the application of *caustics*, especially the solid nitrate of silver; and *astringents*, as the "styptic colloid" of Richardson. The latter is essentially a strong solution of tannic acid in collodion. The speculum is required for the effectual localization of the effect of caustic, which should not be used without care and observation of its effects. Once a week will usually be sufficient for the application. Confidence in this mode of treatment is less general than it was twenty years ago.

Vaginal *suppositories* are sometimes employed; consisting of *tannin, oxide of zinc, alum, extract of belladonna, iodoform*, or *opium*, made up with starch or gum, glycerin or cacao-butter, to the proper size and shape. Astringent *washes*, also, are serviceable; used once or twice every day, consisting of alum, sulphate of zinc, or tannin, with glycerin and tepid or warm water. A drachm of sulphate of zinc, or two drachms of alum or tannin, with an ounce of glycerin and a gallon of water, will be strong enough.

For the description and treatment of other varieties of ulcer of the uterus, we must refer the student to special works on Gynæcology.

## UTERINE TUMORS.

Morbid growths may occur on the *exterior* or *interior* surfaces of the uterus, or in the substance of its walls. A simple classification of them is into *fibroid* tumors (myo-fibromata), *fibro-cystic* tumors (cysto-fibromata), uterine *polypi*, and *cancers* of the uterus.

**Fibroid** tumors are the most frequent. Generally there is but one developed in the same uterus; commonly in the body or fundus. Occasionally several occur at a time, and attain a great size. The tissue of the tumor is firm and tough, creaking when

cut. Microscopically, it consists of "long, fine fibres, generally united in bundles; of fusiform fibre-cells, analogous to fibroplastic elements; and of round or elliptic granules of small size; the whole being bound together by fine intercellular substance." All of these are derived, by modification, from the normal tissues of the womb; chiefly the connective tissue, but in part the smooth muscular tissue also. The negro race is especially liable to fibroid tumors of the uterus. They occur most frequently between the ages of thirty and forty-five; especially in sterile women.

**Symptoms.**—These vary, on account of the *complications* and *secondary effects* of morbid enlargements or growths of the uterus.

There may be excessive menstrual flow (menorrhagia); intermediate or constant hemorrhage (metrorrhagia); irritability of the bladder and lower bowels; pain in the pelvic region; uterine tenesmus, or bearing-down pains; leucorrhœa; dysmenorrhœa; and signs of pressure on the crural vessels and nerves.

**Physical Signs.**—These may require the use of *vaginal touch*, *bimanual palpation* through the vagina and abdominal walls, *recto-vaginal* palpation, and the *speculum;* sometimes, the dilatation of the os and cervix uteri with tents.

By such means we may discriminate between fibroid tumor of the uterus and anteflexion or retroflexion; ovarian tumors; fecal accumulation in the large intestine; pelvic hæmatocele (bloody tumor from hemorrhage within the pelvis); pelvic cellulitis (inflammation of the areolar or connective tissue around the uterus); and pelvic abscess.

**Treatment.**—Spontaneous cure of fibroid tumors sometimes occurs by *absorption*, *expulsion*, *sloughing*, or *calcareous degeneration*. Much more frequently, when they have obtained a moderate size, they remain stationary until the period of the cessation of the menses; after which they undergo slow atrophy. *Palliation* of their symptomatic effects is, in most cases, the only proper treatment. Sometimes life is threatened by irritation and exhaustion. Then an operation for the removal of the tumor is justified, if it appear practicable. This may also be proper when the enlargement is so situated as to be easily removed without much injury to the parts involved.

The methods of treatment resorted to for the cure of uterine fibroid tumors are these: *absorption; excision; écrasement; enucleation; sloughing; incision; gastrotomy.*

*Absorption* has been attempted by the internal or hypodermic administration of medicines; as chlorate of potassium, iodine, iodide and bromide of potassium, *ergotin* (Hildebrandt) and several mineral waters. Although successful results have been asserted, the dependence of the recovery upon the medicinal agent used remains in doubt. Ergot, or ergotin, is certainly always worth trial.

*Excision*, by means of a knife or scissors, may be practised when a small fibroid projects into the uterine cavity, so as to be within reach after dilatation of the cervix by tents.

*Écrasement*, *i. e.*, cutting away at the base by the écraseur or chain-saw of Chassaignac, is to be preferred in certain cases to excision.

Braxton Hick's *wire-rope* écraseur will sometimes answer still better for the same purpose. A very large tumor, filling the vagina, may be drawn down by obstetric forceps and extruded so as to be cut away by the knife or écraseur; or it may, *in situ*, be cut away piece by piece to the base. It is only when the tumor is small and near the cervix that excision is suitable; and the use of the écraseur requires that the attachment should be smaller than the body of the tumor.

*Enucleation* is an operation including (after dilatation of the cervix by tents) the making of one or more incisions into the body of the tumor, and then, by introducing the finger or a blunt instrument, detaching it forcibly from its base. This is attended by considerable danger, especially of peritonitis and pyæmia. Dr. West reports a mortality of 14 out of 28 cases operated upon in this manner.

*Sloughing* has been sometimes artificially induced by "gouging" the tumor; *i. e.*, cutting a deep circular hole in it, and filling it with oiled lint. This is certainly a dangerous procedure, seldom justifiable in practice.

*Incision* is performed in some cases, where removal is not practicable; with the view of impeding the nutrition and growth of the tumor. A bistoury or scissors may be used; and the operation may be repeated several times. Although blood flows freely at the time, it often happens that the tendency to hemorrhage is diminished by the change produced in the tumor. This is a much less violent and dangerous practice than gouging or enucleation.

*Gastrotomy* is the opening of the abdomen by the knife for the removal of a tumor. It is so serious an operation that few surgeons will undertake it for uterine fibroids. Extirpation of the uterus itself has been performed, with the result of 28 deaths in 35 cases. Gastrotomy for the excision of fibroid tumors from the uterus has met with about 1 success in 4 cases. The method of procedure is the same as in ovariotomy. Its perils are, 1, shock; 2, hemorrhage; 3, peritonitis; 4, septicæmia or pyæmia.

*Oophorectomy* (spaying, removal of both ovaries, Battey's[1] operation) has in some instances been followed by the absorption and disappearance of uterine fibroids. Hegar, Wells, Peaslee and Goodell insist that this operation, performed after maturity, does not impair the feminine attributes of appearance, voice or demeanor. A few deaths, however, have resulted from the operation.[2] Dr. T. G. Thomas considers it more difficult and dangerous than ovariotomy.

*Fibro-cystic* tumors are formed by the degeneration of solid tumors, so as to render their contents partly or wholly fluid. This may occur with malignant as well as benign formations. It is, however, uncommon. The *diagnosis* of such tumors requires their discrimination from *pregnancy*, *ovarian cysts*, and ordinary fibroids of the uterus. Their treatment should be conducted upon precisely the same principles as that of the latter.

**Polypi** are tumors covered by the mucous membrane of the

[1] Kœberle first performed it in 1869; Hegar, of Freiburg, in July, 1872; Lawson Tait, Aug. 1, 1872, and R. Battey, of Georgia, Aug. 17, 1872.

[2] N. Y. Med. Record, April 10, 1880, p. 415.

womb, and attached to it by a stem or *pedicle*. Thomas mentions four kinds; *cellular*, *glandular*, *fibrous*, and *fibrinous* polypi.

The *symptoms* attending uterine polypus are of two kinds; *irritative* to the uterus and thus disturbing to the general system, and *obstructive* to the process of menstruation. The health of the patient is gradually lowered, so that, without violent disturbance, life is apt to be shortened through debility and anæmia.

**Treatment.**—*Palliation* of the symptoms is often possible: through appropriate support of the uterus by means of a pessary; keeping the patient in bed at the time of menstruation, to prevent excessive loss of blood, to which she is rendered liable by the presence of the polypus; strengthening the system by tonics and good diet, and by the avoidance of severe fatigue; and the introduction into the vagina at night (after syringing with tepid water), of a suppository of tannin and cacao-butter; with the addition to it of one or two grains of opium when there is considerable pain.

*Curative* treatment requires a surgical operation; which is not to be resorted to in every case; having danger, even to life, attending it. An intra-uterine polypus, above the *os internum*, is the most serious to interfere with. *Vaginal* polypi may be very safely removed. The methods of operation are—excision, torsion, ligation, écrasement, and galvano-cautery.

*Excision* is performed, according to circumstances, either with a knife, scissors, or curved "polyptome;" *torsion*, by seizing the tumor with forceps and twisting it off at the neck; *ligation* is tedious, and is now seldom resorted to; the *écraseur* and the *galvano-caustic* wire are preferred, for expedition and safety (in skilful hands) in some of the more difficult cases.

*Cancer* of the uterus presents a general resemblance to cancer of other organs. It is more frequent in the uterus than in any other part of the body. Its characteristic is malignancy; *i. e.*, tendency to indefinite growth, destructive changes, involvement of neighboring parts, constitutional depravation, and disposition to return after surgical removal. Some pathologists distinguish *epithelioma* or *cancroid* from *carcinoma* or true cancer; yet the former is not devoid of malignancy, though exhibiting it often in less positive degree. Carcinoma of the uterus is divisible into three kinds: *scirrhous*, *colloid*, and *encephaloid*. The *cervix* is the part of the uterus most often attacked. The *scirrhous* form or hard cancer is rare: the *colloid* or jelly-like form less so; the *encephaloid* or soft cancer is the most frequent. The duration of cancer of the womb, from its beginning until death, varies from a few months to several years; average rather less than two years. It seldom occurs before middle life; the greatest number of cases being met with between 40 and 50 years of age.

**Symptoms.**—These are as follows: pain in the pelvic region; tenderness; menorrhagia; leucorrhœa, with offensive odor; dark, bloody, grumous discharge; progressive general debility; and sallow, cachectic appearance. Pain is not always severe; in a few cases it is absent.

**Physical Signs.**—By vaginal touch, the morbid character or destruction of the uterine tissue may be perceived. If a very small portion can be removed without much disturbance, it may

be examined with the microscope. The characters of the discharge are always very important in the diagnosis. Care is needful to distinguish cancer from *papillary growth* upon the cervix uteri; *polypus; fibroid tumor; bleeding ulcer;* and *syphilitic ulcer.*

**Treatment.**—As stated by Professor Thomas, the indications are—to destroy or remove the cancer; to check hemorrhage; to relieve suffering; to correct fetor; and to improve or support the general strength.

*Amputation* of the neck of the uterus is the only operation that affords much hope; and this only when, at an early stage of the disease, it can be made to include all of the cancerous formation. Caustics have been very often used, but without encouraging success, in any form but that of cancroid or *epithelioma.*

Palliative measures are to be resorted to upon general principles, according to the indications above mentioned. Pain will often require opiates, by the mouth, vagina, or rectum. Fetor may be corrected by the use of washes, containing dilute solutions of carbolic acid, chlorinated soda, permanganate of potassium, etc. All but the last named may be made with glycerin as well as with water. The constitutional strength should be supported by generous diet, milk, beef-tea, and, in appropriate cases, stimulants.

John Clay has lately (1879) asserted the cure of a number of cases of uterine cancer by the use of *Chian turpentine.* Other practitioners have, on triai, not confirmed his report.

**Pelvic Hæmatocele** is a "tumor formed by the extravasation of blood into the pelvic tissues in the immediate neighborhood of the uterus; and generally associated with some derangement of the menstrual function."

**Pelvic Cellulitis.**—*Synonyms: Peri-metritis, Pelvic Peritonitis, Peri-uterine cellulitis* (Thomas), etc. This is inflammation of the connective or cellular tissue and peritoneum surrounding the uterus in the pelvis. It is mostly, but not always, when at all severe, followed by abscess.

These last affections are both uncommon, and are treated of at length in works on Gynæcology; to which we may refer the reader for their treatment.[1]

## PROLAPSUS OF THE OVARIES.

As described by Dr. Goodell,[2] when the abdominal walls are relaxed, and one or both ovaries congested (as by excessive sexual irritation) a descent of one or both may take place; the displaced organ forming a small tumor in "Douglas's pouch," between the uterus and the sacrum. The ovary may sometimes get into the sac of a femoral hernia; or into one of the labia majora. In such cases, it may be felt; and so it may sometimes in Douglas's pouch, when it is swollen during the menstrual period.

Symptoms of ovarian prolapsus are, local *pain*, in walking,

[1] See also excellent articles upon both, by W. O. Priestly, in Reynolds' System of Medicine, Amer. edition, Vol. III.

[2] Med. News and Library. November, 1879.

during coition, when the rectum is loaded, and worst of all, in defecation; also, usually, lowness of spirits. The pain is of a "sickening" character, like that caused in a man by a blow or pressure upon the testicle. On examination per *vaginum*, the ovary may be more or less distinctly felt; and, when pressed with the finger, this sickening pain is at once produced.

**Treatment.**—Besides general measures of invigoration, adapted to each case, in those attended by much pain during locomotion, *rest* is important for a time. Also, the replacement of the ovary (which, if one only be dislocated, is generally the left one) may be promoted by the patient remaining for some minutes once or more every day in the *knee breast* position; atmospheric pressure being, at the same time, made to aid the reduction by the vulva being distended to admit the entrance of air into the vagina. Dr. Goodell advises, in cases giving evidence of ovarian engorgement, the administration of bromide of potassium and tincture of digitalis. Other alteratives may be called for in particular cases.

### SPERMATORRHŒA.

Referring the reader for a full consideration of this subject to Bartholow,[1] Acton, or other authorities, the main facts only will be here stated. In continent men of full health, an involuntary seminal discharge during sleep once in two or three weeks is common; and is then so innocent as to be regarded by many as physiological or normal. More frequent emissions are abnormal, in proportion to their frequency; and may cause much loss of strength. While hemorrhoids, worms in the bowels, etc., may occasionally promote this, the cause of actually excessive spermatorrhœa, in ninety-nine cases (at least) in a hundred, must be believed to be self-abuse. The cure of this habit is, not always at once, but almost certainly in the end, the cure of the resulting spermatorrhœa. The disastrous effects so obvious in many cases are due first to the vicious habit, and secondarily only, to the involuntary discharges.

In pathology, Lallemand was, for a long time, allowed to impose upon the medical mind his opinion that irritation or inflammation of the prostatic portion of the urethra is the general or universal immediate cause of spermatorrhœa. As Bartholow more correctly states, this is quite exceptional. More largely by far, spermatorrhœa shows itself to be a spinal *neurosis*. That is, the error is not in the local structure of the urethra, but in the morbid nervous excitability; which renews too often the sexual orgasm, somewhat after the manner of an eclampsia or convulsion, as a reflex act.

It is to be remembered that, in a relaxed state of the system, especially in those whose genital organs have been more or less abused in natural or unnatural ways, sometimes a *mucous* discharge of small amount may occur from the urethra, like the leucorrhœa of the female. Only the presence of spermatozoa, visible with the microscope, *proves* seminal loss.

What are we to do, then, when consulted by a patient for sper-

[1] On Spermatorrhœa, etc. By Roberts Bartholow, A.M., M.D., etc.

matorrhœa? Ascertain the frequency of the discharges, the state of his general health, and, if possible, his habits. Relieve unwarranted alarm by stating the innocence of *bi-weekly spontaneous* evacuation of the seminal ducts; whose effect is quite different from that of the unnatural violence and mechanical irritation of self-indulgence. Impress upon him, whether the habit be acknowledged or not, that his danger lies in it, and that his cure depends upon entire and permanent abstinence.

To promote this, all *moral* impressions must be brought to bear upon his mind, as well as prudential considerations. Active muscular exercise in the open air (in proportion to strength) should be encouraged, even to fatigue. He should eat very light suppers, sleep under light clothes, rise early, and bathe often in cool or cold water. The shower-bath will do very well. Iron is required in really weak cases, as a tonic. The diet should be nourishing, but not stimulant; avoiding high seasoning, and alcoholic beverages.

Of all drugs said to be anaphrodisiac (*i. e.*, capable of diminishing or quelling sexual appetite) I doubt whether any have available power except lupulin, gelsemium, and bromide of potassium. The dose of lupulin for this purpose is ten grains, at bedtime. Bromide of potassium is, however, the medicine of the day for *reducing excitability* of organs subject to reflex action. Twenty grains at bedtime, every night, will, according to my observation in practice, make a great difference in those who are troubled with frequent nocturnal discharges. *Hydrate of chloral* is reported, by Dr. J. B. Bradbury,[1] to have been curative, in two cases; fifteen grains having been given every night. Trousseau commended *belladonna* for the same indication. Stephanides asserts the advantage of $\frac{1}{100}$-grain dose of atropia at bedtime. Bartholow speaks well of the effect in such cases of *gelsemium*.

Lallemand's *porte-caustique* finds justification only upon his theory of urethral or prostatic disease being the cause of spermatorrhœa. Without feeling warranted in denying the occasional existence of such a lesion, and the possible benefit of limited cauterization in such an exceptional case, I am not able to believe in its frequency or great importance.

Acton,[2] however, has confidence in cauterization in a number of cases. He employs a *solution* of nitrate of silver, ten grains to the ounce of water; which he injects into the urethra by means of an instrument consisting of a glass syringe attached to a tube like a short catheter. The part to be acted upon is the irritable membranous portion of the urethra. Before using the caustic the patient should empty the bladder. The pain of the application is considerable. After the operation, Acton advises a copaiba capsule every eight hours, for two or three days; also, that the patient drink as little water as possible, and avoid passing urine as long as he can. After once urinating, he is allowed to drink watery fluids as usual. The scalding and oozing of blood gradually disappear.

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[1] Brit. Med. Journal, April 8, 1871.
[2] On the Reproductive Organs, Phila. ed., p. 243.

*Mechanical* means are sometimes employed to prevent nocturnal emissions; *e. g.*, a light metallic ring to surround the penis, having teeth projecting inwards; so that erection awakes the patient. In bad cases, where epilepsy, insanity, or extreme general exhaustion has followed a seemingly incurable habit of self-abuse, circumcision would seem to be justifiable; more so, surely, than the more serious and dangerous operation of castration. Baker Brown's analogous operation to remove "peripheral irritation" as a cause of grave nervous maladies in the other sex, by excision of the clitoris, has met with very decided opposition from Dr. Charles West, of London, as well as from others.

As signs of waste of substance and vigor by seminal losses, we find mentioned, pallor, with dark lines under the eyes; inability to look any one in the face; cold, moist hands; frequent flushing of the countenance; aversion to society. But these symptoms of general and nervous debility may all exist without being thus accounted for.

### WORMS—ENTOZOA.

**Helminthology**, the study of worms, has assumed of late a very considerable importance in connection with medicine. About thirty entozoa inhabit different parts of the body of man. They have been generally classified as *Cœlelmintha* or hollow worms, and *Sterelmintha* or solid worms, *i. e.*, without any well defined alimentary cavity. Broad or flat worms, *Platelmia*, and thread-like or cord-shaped worms, *Nematelmia*, constitute another arrangement. Of the flat worms, some are *Cestoid*, or ribbon-like; others *Trematoid*, or fluke-like. The most important ones are enumerated in the following table:—

**Cestoid Worms:**

*Mature:* Tænia solium; Tænia echinococcus; Tænia mediocanellata; Bothriocephalus latus.

*Immature:* Cysticercus cellulosæ; Cysticercus t. mediocanellatæ; Echinococcus hominis.

**Trematoid Worms:**

Distoma hepaticum (fasciola hepatica); Bilharzia hematobia; Distoma ophthalmobium; Tetrastoma renale.

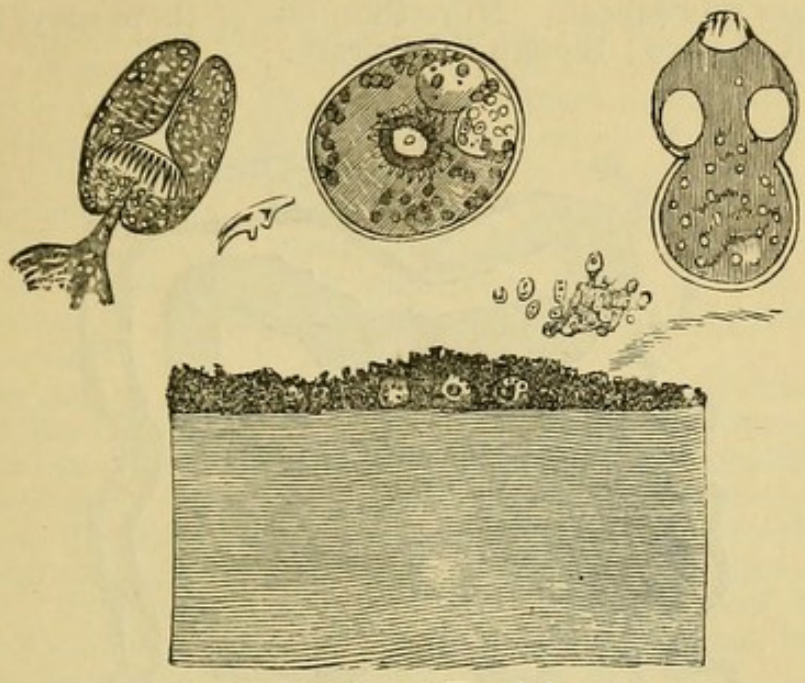
**Nematoid Worms:**

Ascaris lumbricoides; Sclerostoma duodenale; Trichocephalus dispar; Filaria medinensis; Oxyuris (ascaris) vermicularis; Strongylus gigas; Trichina spiralis.

Most curious are the transformations which some of these parasites undergo. Pallas, 1776, stated that all cystic worms were forms of a tapeworm. Steenstrup, in 1842, discovered the "alternation of generations" in some small aquatic worms, *cercariæ*. Küchenmeister and Siebold proved by actual experiment that hydatid parasites are young or immature tapeworms. Humbert, of Geneva, in 1854, swallowed fourteen *cysticerci*, and in three months discharged fragments of *tæniæ*, which had developed within his body. The immature forms are non-sexual;

they may remain, as in hydatids, for a long time, within solid organs, without development. They only become mature and sexual, capable of reproduction, in parts of the body having some communication with the external air, as in the alimentary

FIG. 137.



Echinococcus Hominis.

canal or lungs; generally the former. Migration from one part of the body to another occurs with some; *e. g.*, *trichina spiralis.*

**Tænia solium** and **Tænia mediocanellata** look a good deal alike; but the former is much the smaller. The immature *cysticercus* of the former is $\frac{9}{10}$ths of an inch long; that of the latter, of the size of a pea. The *t. solium* has a circle of hooklets around a convexity of the head; the *mediocanellata* is club-headed, with larger sucking disks than the *solium* has. One is designated as "armed" and the other "unarmed" tapeworm. The former is from the *cysticercus cellulosæ* of the hog; the latter from the "*cysticercus bovis*"[1] (Cobbold), and is the most common. The unarmed is the easiest to drive out.

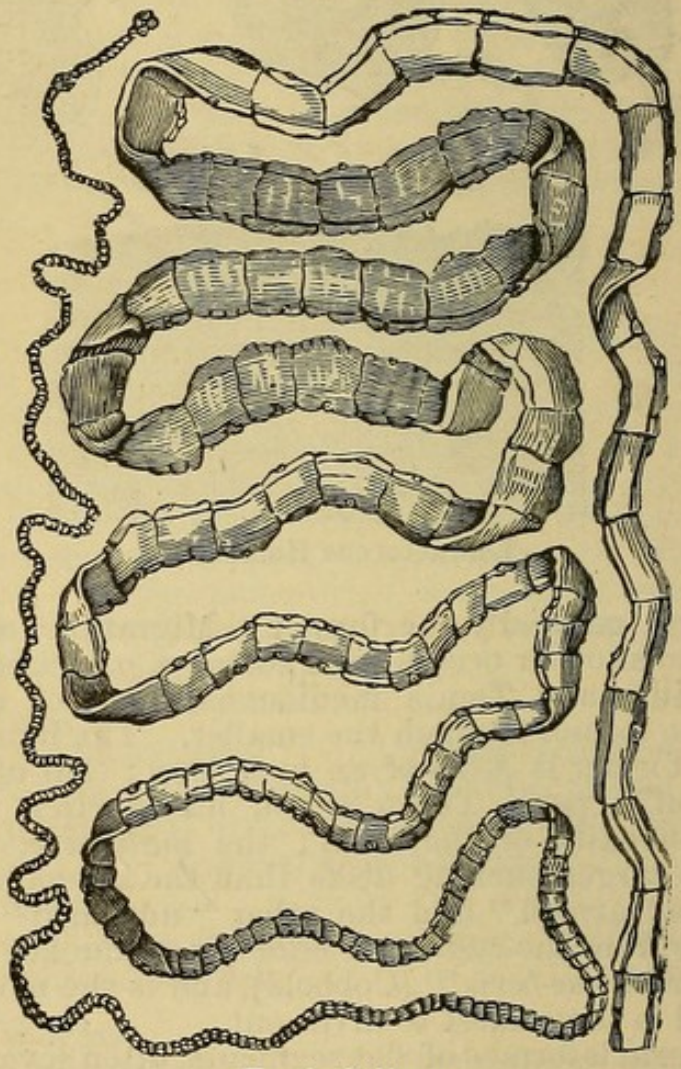
The tapeworm is formed of flat segments, often several hundred in number, connected with the head by a slender neck. Each segment has male and female organs (hermaphrodite); as those at the tail mature, they are cast off. Some patients thus pass six or eight fragments from the bowels in a day. The whole length of the parasite is from ten to thirty feet.

The **symptoms** caused by tapeworm are not very determinate. They resemble those produced by other worms; namely, uneasy sensations in the abdomen, and general nervous irritation; bad sleep, attacks of *faintness*, lowness of spirits, indigestion, irregularity of appetite and of the action of the bowels; itching of the

[1] Cobbold states that the *hydatid* of the cysticercus bovis has never been observed in man. Hydatid or "echinococcus" disease is especially frequent in Iceland; one in fifty of the inhabitants being affected by it.

nose, and sometimes of the anus. Epilepsy and insanity are said to have been sometimes caused by it. The only *proof* of tapeworm is the finding of fragments of it in the stools. It is a common impression that it is never destroyed unless the head is discoverable; but this is only generally, not always, true. Conversely, if the head comes away, the parasite to which it belongs is no longer reproduced. More than one of them may, however, be present at once; though this is rare.

FIG. 138.



Tænia Solium.

The broad tapeworm, **bothriocephalus,** is only known in Central Europe, Russia, Sweden, Norway, Lapland, Finland, Poland, and Switzerland.[1] Its head is elongated, compressed, obtuse; its length from six to twenty or twenty-five feet. It does not give off detached segments. Cobbold says it is indigenous to Ireland; although he has never met with a patient born in that country who has been the subject of it.

**Treatment of Tapeworm.**—*Oil of turpentine*, in half ounce or ounce doses, will generally purge and bring away the worm. It

[1] Frazer (Dublin Quarterly Journal, Nov., 1868) asserts that it has been recognized in some of the Italian cities, and that it probably extends to Northern Africa.

*intoxicates* some persons. In Egypt, *petroleum* is used for the same purpose, in doses of twenty to thirty drops. The *ethereal extract* (commonly called oil) *of male fern*, *extractum filicis liquidum*, U. S. Pharm., in the dose of a drachm and a half to two drachms, is esteemed highly by Cobbold and some other practitioners. *Aspidium marginale*, a fern indigenous in America, is almost or quite as good a vermicide. *Koosso*, the flower of the *Brayera anthelmintica* of Abyssinia, in half-ounce doses, mixed with water, given on an empty stomach, is almost certain to destroy or remove the parasite. So is said to be *Kameela*, the *Rottlera tinctoria* of botanists. Pumpkin-seeds, plentifully taken on an empty stomach, are quite effectual; and so is pomegranate-root bark; or, better, its active principle, *pelletiérine*. Dr. J. H. Bill[1] has reported the cure of a case by carbolic acid, given in five-grain pills with extract of liquorice. Thirty-five such pills were taken without apparent inconvenience. Others have cured cases with 12-grain doses of *salicylic acid*.

**Prevention of Tapeworm.**—As immature tapeworms find residence in the bodies of animals used for food, and thus get opportunity to enter the human alimentary canal, the *avoidance of raw or under-cooked meat* is the precept of prophylaxis suggested, and confirmed by experience. This applies not only to the prevention of tapeworm, but also to that of other parasites, especially *trichina*. Tapeworms are derivable from infested beef, even oftener (Cobbold) than from pork. Mutton has been found occasionally to contain cysticerci.

## TREMATODE WORMS.

These are the *Distomata*, *Bilharzia hæmatobia*, *tetrastoma renale*, and others. They are of a flattened oval shape, soft and smooth. They have a bifurcating alimentary canal, with a mouth, but no anus. Both sexes are upon one individual. They exist in two conditions; mature and encysted, and immature and free. Their methods of reproduction are very curious, but of greater importance in zoological than in pathological science.

**Distoma hepaticum**, found sometimes in the liver and its ducts, measures about an inch in length when mature, and rather less than half an inch in width.

**Distoma ophthalmobium** has been discovered in the eye of a child having congenital cataract. It is about half a line ($\frac{1}{24}$ in.) in length.

**Bilharzia hæmatobia** exists in abundance in Egypt; where it inhabits the *veins* of the *abdominal organs* of the inhabitants, in the proportion of nearly one-third of the population. Hemorrhage from the kidney, and the symptoms of dysentery, may follow from its presence. It is not more than three or four lines ($\frac{1}{4}$ to $\frac{1}{3}$ in.) in length. The sexes are on different individuals.

**Tetrastoma renale** is occasionally found in the substance of the kidney. It is nearly half an inch long.

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[1] N. Y. Medical Record, Nov. 15, 1873.

## NEMATOID, OR ROUND WORMS.

**Ascaris lumbricoides** is the commonest of entozoa, particularly in the Southern United States and the West Indies. It inhabits mostly the small intestines; but may get into the stomach, and, of course, the large intestines. I have repeatedly known it to be vomited from the stomach. It has sometimes even reached the middle ear.[1] This round worm is from five to fifteen inches in length, light-brown in color, tapering to a point at each end. A considerable number of them may exist together; it is only then that their presence in the bowels is likely to do much harm, unless in very susceptible children. Their escape into the stomach may cause nausea, vomiting, and indigestion, sometimes difficult to account for until the throwing up of the worm explains the cause. I have known this to happen in an adult, in whom the symptoms of gastric irritation continued for two or three weeks. These worms probably enter the body chiefly in drinking-water from shallow wells, muddy streams, etc.

**Treatment: Diagnosis.**—Two things are wanted: to expel the worms present, and to prevent their reaccumulation. Evidence of the existence of lumbricoid worms in the bowels is always doubtful unless some of them pass out with the evacuations. Their *ova* may also be seen (Davaine, Leuckart) in the passages with the microscope. Signs of gastro-intestinal and nervous irritation attend them, especially in infants and young children. So, grinding the teeth during sleep, itching of the nose and anus, bad or irregular appetite, and tumidity of the abdomen, are regarded commonly as signs of worms. But other sources of indigestion and disturbance may be thus made known. Convulsions may undoubtedly be caused by worms in children; and so may laryngismus stridulus, and spasmodic croup. Total suffocation has in a few cases resulted from ascarides getting into the air passages.[2]

When there is good reason to believe that they exist in the bowels, anthelmintics may be given, with purgatives, in safe doses, watching their effects. Besides the *vermicides* mentioned in connection with tapeworm, many other drugs have more or less such effect; as santonin (most certain of all), calomel, pink-root (spigelia), bark of pomegranate-root, azedarach, chenopodium, cowhage (mucuna), powder of tin, etc. [F. 206, 207, 208.]

*Infusion of senna and spigelia*, half an ounce of each to a pint; for an adult, a wineglassful every morning before breakfast; this is very popular in this country. Instead, may be given *fluid extract of spigelia and senna*, a teaspoonful or two for a dose. As above said, santonin is the most effectual of the vermicides or vermifuges. It requires care in its use, however; producing serious vomiting, prostration, and nervous symptoms in overdoses. A child should not take more than half a grain of santonin once or twice daily; an adult, from three to six grains.

**Dochmius Duodenalis** is a very small, almost cylindrical, para-

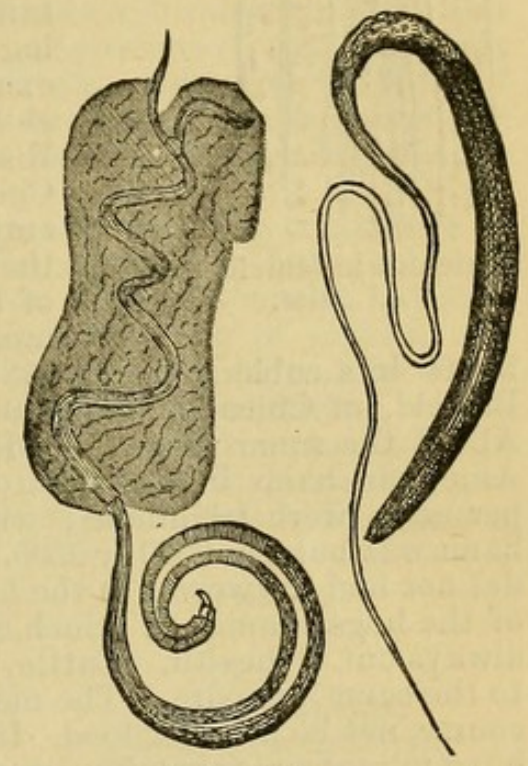
[1] Dr. L. W. Reynolds (Lancet, vol. ii., 1880, p. 653), reports a case in which the membrana tympani was perforated.

[2] Furst, Wiener Med. Wochenschrift, 1879; Brit. Med. Journal, Sept. 27, 1879.

site, met with only in warm countries, as Italy, Brazil, and Egypt. The male is $\frac{4}{10}$ and the female $\frac{7}{10}$ of an inch in length. It has a terminal mouth, furnished with eight teeth. Being taken into the stomach in impure water, it attaches itself to the mucous membrane of the alimentary canal, and lives there on blood, like a leech. Sometimes, when present in large numbers, these worms cause serious hemorrhages from the bowels.

**Trichocephalus dispar.**—This worm inhabits the large intestine. It has a length of an inch and a half to two inches. The head is attenuated or hair-like, whence its name. The sexes are on different individuals. The trichocephalus is much less common than the lumbricoid worm.

FIG. 139.



Trichocephalus Dispar, magnified. (Leuckart.)

**Oxyuris vermicularis** (*Ascaris vermicularis*), *White seat-worm.*—Of this the male is about a line ($\frac{1}{12}$ inch) and a half long; the female, five or six lines. It is found in the rectum,[1] generally of children; sometimes in considerable numbers. They cause a great deal of itching; occasionally, other nervous irritation. Females may have them find their way into the vagina; more rarely, they get into the urethra.

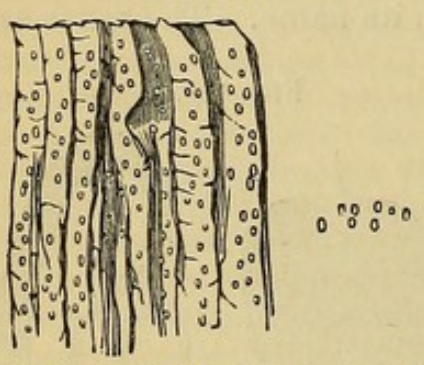
For the **treatment** of seat-worms, I have known nothing superior to *suppositories of santonin;* made with cacao butter, three grains of the drug in each; one to be introduced into the rectum every night [F. 209]. Other common remedies are, injections of lime-water, infusion of aloes, mercurial ointment, etc. Dr. Bond,[2] of Washington, and Dr. Magruder, of Olney, Maryland, have found great benefit from the use of the root of *asarum canadense* (wild ginger or Canada snake-root). The root may be chewed freely, or an infusion may be made (℥j in Oj), and taken in wineglassful doses. The European species of asarum is more irritant and less suitable for this purpose.

**Trichina spiralis.**—Since 1822, when Tiedeman discovered it (Hilton, 1832), and especially since it was described by Paget and Owen in 1835, the dissecting-room has furnished observers with specimens of this parasite, long supposed to be harmless. Zenker, of Dresden, first showed that, although a few *trichinæ* may be innocent, they sometimes abound to such an extent as to cause serious disease, and even to destroy life. Such an affec-

[1] Cobbold says, more often the *cæcum*.
[2] Phila. Med. Times, Sept. 26, 1874.

tion is called trichinous disease, *trichiniasis*, or *trichinosis*. It has occurred particularly often in Germany, where it has been recognized since 1860. In 1863, in a Prussian town, of 103 persons in good health who dined together on a festive occasion, nearly all became ill from eating sausage made of the meat of an ill-conditioned pig; and quite a number died. Another outbreak, at Hedersleben, in 1865, caused 40 deaths in 300 cases. The first cases in America were reported by Dr. Schnetter, of New York.[1] At Marion, Iowa, in 1866, nine cases occurred in one family, under the care of Dr. J. H. Wilson; five died. In the same county, eating raw ham containing trichinæ (as proved afterwards by examination) caused the disease in six children at one time; reported by Dr. Ristine. An examination of pork in Chicago, by a committee of the Academy of Sciences of that city, proved the existence of trichinæ in 1 in 50 of the hogs inspected; some of their muscles containing from 10,000 to 18,000 in a cubic inch. In 1878, H. E. Atwood and Dr. W. T. Belfield, of Chicago,[2] found 8 hogs in 100 to contain trichinæ. About the same time, Prof. Heschl, of Vienna, stated that, of American hams imported into North Germany, from 10 to 20 per cent. were trichinous; while the proportion in Westphalia hams was but 1 in 2000 or 2500. Atwood and Belfield, in Chicago, did not find the worms in the hams, but in muscles of other parts of the hogs examined. Such animals are not themselves nearly always out of health. Cattle, also, are, to a less degree, subject to the same parasite. The meat of those so infested should, of course, not be used for food. In some German cities the butchers have microscopic examination made of the flesh of their animals.

FIG. 140.



Trichina in Muscle, natural size.

Dr. Belfield,[3] after feeding a rat with trichinous pork, ate a portion of the rat's flesh, which had been ascertained by the microscope to contain twelve trichinæ. At the end of more than a month's time he had suffered no inconvenience. This confirms the common belief that a *few* trichinæ may, even in man, be harmless. It is when they multiply to tens and hundreds of thousands that they endanger life.

To the naked eye, the muscles of a trichinous animal present whitish dots, which a lens will show to be the capsules or cysts of immature trichinæ. Those not encysted are invisible without a microscope. The capsule is hard and transparent; the worm is coiled spirally within it. Under the tongue is the preferred place to search for the trichinæ in the living animal; a delicate *harpoon* being used.

The trichina is a minute bisexual worm, reproducing in the

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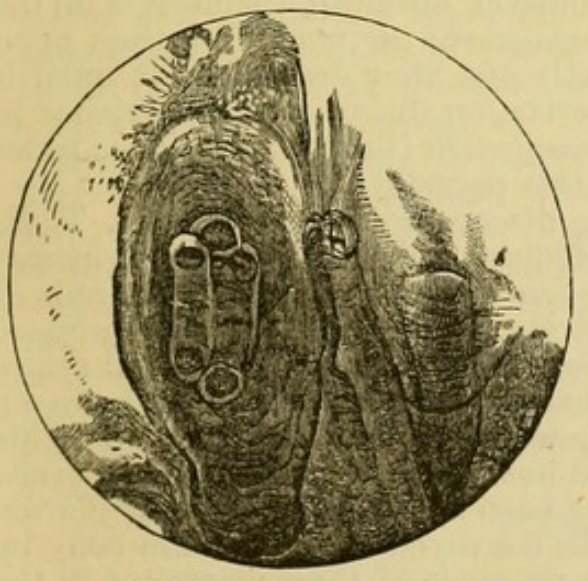
[1] Clymer, in Phila. ed. Aitken's Practice of Medicine, vol. i., p. 858.
[2] Report of Department of Health, Chicago, 1878.
[3] Sanitarian, July, 1879, p. 324.

intestinal canal of animals or men; the offspring then finding their way out through the walls of the intestines to become finally encysted in the muscles. The disease produced by them has two distinct stages: 1. That of the presence of the worms in the alimentary canal, and their multiplication there; 2. That of their migration to and location in the muscles. Of the first period, *malaise*, vomiting, and diarrhœa are the leading symptoms. Of the second, fever, resembling typhoid, severe pains, with stiffness in the muscles, and prostration. As the muscles of the larynx are often attacked, hoarseness is a common symptom. The complication of pneumonia is not infrequent. The first stage above mentioned lasts about a week or less; the second may terminate fatally within six days, but usually has a duration of from two to four or five weeks. A man died, however, in the Middlesex Hospital from phthisis, in 1874, in whose muscles millions of trichinæ were present, believed by the physicians in attendance (perhaps upon doubtful evidence) to have been perpetuated in his system for several years.[1]

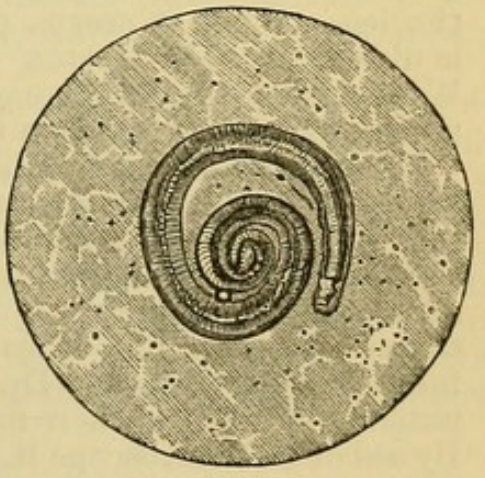
We are not informed of much success with the **treatment** of trichiniasis. Traube,[2] of Berlin, is reported to have obtained recoveries, in hospital, under friction of the limbs with bay salt. Others give carbolic acid internally. Injection of ergotin into the neighborhood of the affected muscles is said to have done good. As salicylic acid has been found (Hœberlein) to dissolve trichinæ in flesh after death, it would be reasonable to try its administration during life. *Glycerin*, in large doses, is reported to have cured several cases of trichinosis.[3] **Prevention**

FIG. 141.



Trichina Encysted in Pork.

FIG. 142.



Trichina, magnified 150 diameters.

is always possible. Besides proper inspection of animals, every piece of meat which may be suspected must be *well cooked*. Per-

[1] Lancet, Jan. 17, 1874. [2] Lancet, July 8, 1871.
[3] I. M. Barton, College and Clinical Record, 1881.

roncito, of Turin, proved that a temperature of 122° F. will kill *uncovered* trichinæ, as well as other parasites of the human body. Fiedler found that it required a heat of 150° to 160° F. to destroy *encapsuled* trichinæ. This temperature is always exceeded in cooking, if the *whole* of the meat is exposed to the fire for a sufficient length of time. Reliance cannot be had upon salting and smoking; at least unless they be very thoroughly done.

**Sclerostoma duodenale** is common in Egypt and in parts of Europe. It exists in the small intestines, and causes a chlorosis-like anæmia. The worm is from a third to a half an inch long. Its *vermicide* is said to be turpentine.

**Strongylus gigas** (*Eustrongylus gigas*) inhabits the kidney. It is rare in man.

**Filaria medinensis** (*Dracunculus*), or Guinea-worm, lives in the subcutaneous tissue. It is common in the tropical regions of the old world. The female worm enters the skin of a human being, and develops, with its contained young, in a whip-cord-like shape, to a length varying from six inches to four, five, or six feet, and a width of about one-twelfth of an inch. A dozen or more of the worms may exist upon the same person. The lower limbs are especially invaded by them; but they can migrate almost all over the body. They evidently get into the legs and feet of those who bathe in shallow streams or ponds, or walk barefooted in damp or muddy places. An incubation of a year or more is required for the development of the worm to a perceptible size.

A characteristic vesicle appears, generally upon the lower part of the leg, when the worm matures. This bursts, emitting the young filariæ; a good deal of itching and irritation ensues, and sometimes ulceration. The natives often rid themselves of the worm by letting a stream of water run or pour for a time upon the leg. When it creeps partly out, they draw upon it until it is dislodged. Dr. Horton[1] asserts, on the basis of experience in West Africa, that *tincture of assafœtida* (thirty drops three times a day) will act as a poison to this parasite.

**Filaria sanguinis hominis,** discovered in 1872 by Dr. T. R. Lewis of the British Army Medical Service, is a minute nematoid worm, whose presence, even to the number of hundreds or thousands, in an individual body, does not appear to produce serious injury to health. *Chylous urine* is the most marked symptomatic result. This worm has an average width of $\frac{1}{3500}$ of an inch; length, $\frac{1}{75}$ inch. Dr. Lewis estimated that in one of his patients in Calcutta there must have been 140,000 of these worms. By aid of the microscope it has been found (Cobbold) that *filariæ*, of this or allied species, can be conveyed to the human body by the bite of the mosquito, the presence of these parasites in the bodies of mosquitos having been demonstrated. Those present in human blood have a length of from $\frac{1}{200}$ to $\frac{1}{250}$, and a thickness of about $\frac{1}{2500}$ of an inch. Lewis, Carter, and Cobbold assert that the mature worm (found in blood-clots and axillar abscesses) is about three and a half inches in length.

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[1] Brit. and Foreign Medico-Chirurg. Review, January, 1869, p. 160.

**Filaria restiformis** is the name given by Dr. J Leidy[1] to a newly observed smooth, cylindrical thread-worm, 26 inches long. It was passed from the urethra of a patient of Dr. Garnett of West Virginia. It appears to be nearly related to the Guinea worm.

### EPIZOA.

Parasitic animals living upon the *surface* of the body are (besides the *sarcoptes*) chiefly **lice, fleas,** and **ticks.** The former are the **head** *louse* (pediculus capitis), **body** *louse* (p. corporis), and **crab** *louse* (p. pubis). These are true insects, without wings. The *preventive* of them is cleanliness, with avoidance of contact with unclean persons. Their *destruction* must be accomplished either by assiduous search and slaughter, or by parasiticide lotions, ointments, or powders; as corrosive sublimate, cinnabar, pyrethrum, cocculus indicus, sulphur, carbolic acid, staphisagria, sabadilla, alcohol, essential oils [F. 210, 211, 212, 362].

Two or three grains of corrosive sublimate dissolved in an ounce of water, with a drachm or so of alcohol, will be as effectual as any of these. Citrine ointment, or white precipitate ointment, will do very well, even if diluted one-half with lard or vaseline. Powder or ointment of cocculus indicus is a good deal employed. The *flea-powder* of the East (quite useful in stupefying fleas in a bed, if sprinkled before lying down) is probably *pyrethrum.*

**Ticks** belong with the *arachnida* of naturalists. People living in the country often have them to enter the skin from other animals or from plants, *e.g.*, the harvest-tick (leptus autumnalis). The irritation is moderate and local only.

**Fleas** in most parts of the world produce only annoying *bites*, larger and somewhat more inflamed than mosquito-bites. In Brazil and other parts of South America the chigoe or jigger (*pulex penetrans*) makes a more permanent lodgment, and causes a very considerable irritation.

**Acarus folliculorum** (demodex or steatozoon (E. Wilson) folliculorum) is a tiny parasite which inhabits the follicles of the skin, especially upon the face in acne. Sometimes ten or twenty of these *acari* may be found in a single sebaceous follicle. The cephalo-thorax constitutes about one-fourth of the whole body, which has a length of $\frac{1}{50}$ of an inch. It is provided with four pairs of short legs. There is no evidence that this parasite is the *cause* of acne. More probably its presence in the diseased follicles is (pathologically speaking) accidental. (See *Acne*, under Diseases of the Skin.)

### POISONS.

A few *memoranda* upon the more common poisons may be convenient here. Toxic agents are: 1. Irritant; 2. Narcotic; 3. Unclassified.

**Irritant or Corrosive Poisons.**—1. **Acids**; *e.g.*, *sulphuric*, *nitric*, *chlorohydric*, *oxalic*. For all but the last any alkaline substance (carbonate or bicarbonate of sodium, potassium, magnesium, or

[1] Proc. of Acad. Nat. Sciences of Philadelphia, March 2, 1880.

calcium (chalk), or magnesia or lime alone), dissolved in or mixed with water, will be suitable as an antidote. *Oxalic acid* should have lime-water freely used as its antidote. 2. **Alkalies**; *e.g.*, caustic potassa, soda, strong solution of ammonia; *earths*, baryta, lime. For these, vinegar or lemon-juice will act antidotally, making neutral salts. Olive or castor oil will *saponify* the alkaline material, and thus render it innocent. 3. **Corrosive Sublimate.**—For this, whites of eggs, or wheat flour mixed with water, will be the best. 4. **Arsenic.**—Hydrated peroxide of iron has the reputation of being an almost certain antidote for the common arsenical compound, arsenious acid or white oxide of arsenic. It may be made fresh by adding *aqua ammoniæ* to *liquor ferri persulphatis*, or *aqua ammoniæ* to tincture of the chloride of iron. It is well for every physician to have a pint of each of the two first-named articles always within reach. The precipitated hydrate should be given promptly and freely. D. C. A. Leale,[1] of New York, has found the common *subcarbonate of iron* to answer satisfactorily in several serious cases of arsenical poisoning. It has the advantage over the hydrated oxide, that it is more commonly to be found on hand in druggists' establishments. Some toxicologists regard *magnesia* as an almost equally reliable antidote for arsenic. 5. **Sulphate of Copper; Salts of Tin.**—Whites of eggs, milk, or flour mixed with water may be given freely. 6. **Tartar Emetic.**—Infusion of galls or oak-bark, or tannic acid in solution, may be administered copiously. If they are not obtainable, strong tea may be substituted. Afterwards opiates, as paregoric, or perhaps an enema of flaxseed tea and laudanum, will help to compose the stomach and bowels. 7. **Acetate of Lead.**—Sulphate of magnesium is antidotal for this, making the insoluble and inert sulphate of lead. 8. **Sulphate of Iron** (green vitriol); **Sulphate of Zinc** (white vitriol): Carbonate of sodium is recommended for these, copiously diluted. Flaxseed tea is a good diluent for any corrosive poison. 9. **Nitrate of Silver.**—Common salt is its antidote, making chloride of silver, inert. Drinking milk freely will also aid in protecting the stomach. 10. **Phosphorus.**—A mustard emetic may be the first thing. In *any* poisoning, not accompanied by vomiting as an effect, this will be proper. Magnesia and mucilaginous infusions may then be given, quickly and largely.[2] 11. **Iodine.**—Starch neutralizes iodine, but it will not neutralize iodide of potassium, for which no strictly chemical antidote is known. 12. **Creasote.**—Whites of eggs, or milk, or flour and water, will combine with it. But while waiting for these, free draughts of water should be given. For *carbolic acid*, which is the creasote of coal-oil, Messrs. Calvert state that olive or castor *oil* is the best antidote. Glycerin and raw eggs will also help to dilute or neutralize it. *Saccharate of lime* is said by Dr. T. Haseman to be an antidote for carbolic acid. According to Baumann, sulphate of sodium (Glauber's salt) is its best chemical antidote, forming an innocuous sulpho-carbolate.

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[1] Am. Journal of Med. Sciences, January, 1880.

[2] Letheby, Audant, and Personne are reported to have shown that *oil of turpentine* is an antidote for phosphorus.

**Narcotic Poisons.—Opium.** When any such poison has been taken, if the patient can swallow, an emetic should be given; ten grains of sulphate of copper, twenty grains of sulphate of zinc, half a teaspoonful of powder of ipecacuanha, or a tablespoonful of mustard, either dissolved or mixed in a large draught of warm water. Vomiting must be insured by repeated doses. If swallowing be impossible, the *stomach-pump* must be used; introducing the flexible tube through the pharynx into the stomach, and washing it out by gently injecting, and then withdrawing, half a pint of water at a time by means of a syringe.

If any antidote for opium or its alkaloids has given reason for confidence, it is belladonna. Facts fully warrant its administration. Twenty minims of tincture of belladonna may, in opiate narcotism, be given every hour; perhaps oftener. Dr. J. Johnson, of Shanghai, after a very large experience with opium poisoning in China, advises hypodermically injecting half a grain of atropia; to be repeated in two hours if it has failed to produce dilatation of the pupils and tranquil breathing.[1] Smaller quantities injected at shorter intervals, watching the effects, are safer. Dilatation of the pupils is a sign of the constitutional influence of belladonna or atropia. Strong coffee is an older remedy, upon a similar indication. To counteract the comatose tendency, also, cold water may be dashed or poured at intervals over the head and face; strong sinapisms may be applied to the back, epigastrium, and limbs; or the patient, if able, may be made to walk about; or flagellation with a hand or wet towel may be used for the same end.

In the extremest cases *faradization* may be used; the interrupted electrical current being applied to the spine and chest. *Galvano-puncture* is justifiable if other means fail; the fine needle being made to penetrate so as to reach the diaphragm, for the immediate stimulation of its muscular power. The needle for such a purpose should be of soft-tempered steel, platinized; fine and sound, well-polished, three or four inches long, with a lance-shaped point. *Artificial respiration* is resorted to in some cases. (See *Asphyxia.*) Dr. Farnsworth, of Iowa, has used successfully the hypodermic injection of diluted *aqua ammoniæ;* C. Paul and Crequy, *inhalation of oxygen.*

**Belladonna** or *atropia* may be antagonized by opium, upon the same kind of evidence as that just alluded to. The antidotal action is not chemical, but physiological. Dr. H. C. Wood, Jr., asserts that there is much less satisfactory evidence of the curative influence of opium in poisoning from belladonna, than there is of the converse antagonism. He doubts the value of the former, while admitting the latter. Grattan[2] has used *pilocarpin* with success. **Stramonium** (Jamestown weed) must also stand in a similar relation to opium; and so may **hyoscyamus,** in a less positive degree. Atropia is also a physiological antidote for **calabar-bean,** and its active principle, *physostigmia.* **Hydrate of chloral** may act poisonously in doses of over 50 grains. No

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[1] London Medical Record, April 9, 1873.
[2] Brit. Med. Journal, April 16, 1881.

*certain* antidote is yet known for it. An emetic or stomach-pump should be used, and strong coffee or tea may then be given, freely, till the respiration becomes normal. Inhalation of nitrate of amyl is said to have power as an antagonist of chloral.

**Unclassified Poisons.—Prussic Acid.** For this no certain antidote exists; and the arrest of life is so sudden as scarcely to allow its use, if we had one. T. and T. C. Smith, English chemists, assert that they have proved the following recipe to be antidotal for it:—

"Take of liquor of perchloride of iron 57 minims; protosulphate of iron in crystals, pure, 25 grains; as much water as will make a solution of a proto-sesquisalt of iron, measuring about half an ounce. Dissolve, on the other hand, 77 grains of crystallized carbonate of soda in about half an ounce of water. These quantities destroy the poisonous action of between 100 and 200 drops of prussic acid, officinal strength, by giving first the one liquid, and then the other. For *cyanide of potassium* the antidote is the same, except that the solution of proto-sesquisalt of iron is to be used without the soda solution; the hydrocyanic acid having been already combined with an alkaline substance. The use of the soda would, however, not be injurious. The quantities given, as above, would decompose 35 grains of cyanide of potassium."

*Cold affusion*, *chlorine water*, and *ammonia*, are the older measures advised for prussic acid poisoning.

*Aconite*, *digitalis*, *hemlock*, *ergot*, *tobacco*, *lobelia*, *veratrum viride*, *aniline*, *strychnia*, *cantharides*, *gelsemium*, *poisonous fungi*, etc., have no known certain antidotes. **Emetics** should be promptly given when any of them are known to have been taken. Castor oil is also recommended, especially for those least depressing in their action. Aconite, lobelia, and tobacco are the most powerfully sedative. Atropia is antagonistic to *muscarin*, the active principle of poisonous mushrooms (toadstools). **Animal charcoal** is advised, to absorb and render innoxious organic poisons in the stomach; teaspoonful doses should be given repeatedly. For the spasms caused by *strychnia* or *nux vomica*, inhalation of chloroform is thought to be beneficial. Hydrate of chloral has sometimes succeeded in relieving them. For *tobacco*, *lobelia*, *aconite*, *digitalis*, or *veratrum viride* taken poisonously, brandy or whisky as a stimulant would seem to be indicated.

*Cantharides*, *gelsemium*, and *poisonous fungi* (toadstools, etc.), all being *irritants*, after vomiting has been produced, besides castor oil, demulcent drinks may be given; as flaxseed tea, infusion of gum arabic, etc.; with moderate doses of some opiate, by the mouth or rectum.

Bromide of potassium has been used successfully as an antidote to strychnia, by Drs. Gillespie, Baird, and Bates. (See Am. Journal of Med. Sciences, October, 1870; and Philada. Med. Times, June 1, 1871.) S. Buckley obtained recovery in one case of strychnia poisoning by the hypodermic injection of atropia. See Edinburgh Med. Journal, September, 1873. Hydrate of chloral and coffee are both antagonistic to strychnia; and so is

digitalis to aconite. Iodine and tannin are both antidotal to strychnia; and pilocarpin to atropia.

*Muriate of apomorphia* was used with success in a case of strychnia poisoning by Dr. Glisan,[1] of Oregon, in 1877. One-third of a grain (a large dose) was injected hypodermically; producing vomiting and relief of the spasms, followed by recovery.

## BITES OF SERPENTS.

When a person is bitten by a venomous serpent, or by a rabid dog or other animal, the part should be, if accessible, *at once sucked* strongly with the mouth, to avoid loss of time. Although it has been shown that the venom of serpents is not (as has generally been asserted) innocuous when swallowed, yet, in the absence of excoriation about the mouth, it may be safely withdrawn by suction and at once ejected. Wash the wound then thoroughly with *hot* water. Apply a cupping-glass for some minutes. Cauterize it with red-hot iron or caustic potassa; or carbolic acid, with one-half its bulk of alcohol; or if practicable, *excise* the part bitten. When this cannot be done, and while waiting for it, in all cases, a tight ligature may be applied to retard absorption. *Aqua ammoniæ* has been thought useful also as a local antidote for snake poison, as it is for that of venomous insects; and so has fluid extract of *serpentaria.*[2] The leaves of *anantherix decumbens* are used with confidence in Mexico as a local application for rattlesnake bites. The careful experiments of Dr. S. Weir Mitchell throw great doubt over the value of all asserted antidotes for the poison of the rattlesnake. He has shown, however, that a small amount of the venom is often introduced, without fatal effect; the danger depending on its quantity.

Should symptoms of poisoning have already followed the bite of a rattlesnake, experience seems to countenance the antagonistic and supporting use of whisky. Cures are said to have occurred in several instances, when the person bitten drank large amounts of this; intoxication not being produced, on account of the counteracting impression of the poison upon the system. One case of recovery after rattlesnake bite has been reported (*Medical Record*, August 1, 1871) under five twenty-grain doses of chloral hydrate.

Prof. Halford, of Melbourne, Australia, reports the recovery of 17 out of 20 cases of venomous snakebite, after the injection of 30 minims of liquor ammoniæ (diluted, 1 part to 3 of water) with a hypodermic syringe, into a superficial vein. Five other Australian physicians confirm his statements;[3] although less success has so far attended the same treatment elsewhere. Dr. Fayrer, with a large experience in India, has found it to fail altogether; possibly because some Indian serpents may be more

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[1] Amer. Journal of Med. Sciences, April, 1878, p. 448.

[2] Bibron's antidote consists of bromine, ℥ijss; iodide of potassium, gr. ij; corrosive sublimate, gr. j; dilute alcohol, f℥xxx. Dose, f℥j, in wine or brandy, p. r. n. *Lime-water* is asserted by Dauverne to give immediate relief to the pain caused by the stings of bees and wasps. *Aqua ammoniæ* will generally arrest the pain of bee-stings at once.

[3] *Nature*, Sept. 8, 1870. The serpents were the very venomous tiger-snake and brown and black snakes of Australia.

fatally venomous than those of Australia.[1] Inspector-General C. J. Smith,[2] of Madras, has recorded the cure of a case of *cobra* poisoning, by the *internal* use of liquor ammoniæ, in half-drachm doses, diluted, taken repeatedly every ten or fifteen minutes. Dr. Fayrer has more confidence in artificial respiration, in bad cases, than in any other remedy; but the cobra bite, especially in vascular parts of the body, is apt to be incurably fatal. So is that of the rattlesnake, and of the moccasin of the Southern States, about the face or neck; as well as that of the *phoorsa* snake.

### ASPHYXIA.

Whether from drowning, breathing coal-gas in an unventilated apartment, or excessive inhalation of chloroform, etc., the treatment for suspended animation must be essentially the same in principle. First loosen everything about the neck. Draw the tongue forward and clear the mouth. Laying the patient upon the back, let both arms be raised (Sylvester) as far as possible above the head, and then brought down again; this should be repeated at least fifteen or twenty times a minute. Pacini's method of drawing the *shoulders* upward, and Bain's of lifting and letting them down alternately, may be combined with Sylvester's. Blowing into the mouth or nostrils, with or without a trachea-tube or a quill in the nostril, is available sometimes, especially in a child; at the same time, when oxygen gas can be obtained (as, of course, it very rarely can), a jet of it may be used.

Dr. Polk,[3] of New York, in 1880, saved a child's life by introducing into its larynx through the glottis a No. 8 silver catheter, and inflating the lungs by blowing through it; an assistant alternating this with pressure upon the chest and abdomen to promote expiration. Le Bon and Goyard[4] have found *immersion in hot water* effective in relieving the asphyxia of new-born infants.

Passing a vial of solution of ammonia at intervals under the nostrils will aid to excite the nerve-centres. Rubbing the limbs and trunk vigorously, and chiefly *towards* the heart, to hurry the venous circulation, is useful. So, also, is the application of mustard, or friction with red pepper and brandy or whisky. Hot bottles may be applied to the feet and legs. Excessive heat will not be expedient before respiration is established; but moderate warmth always promotes vitality. The application of a red-hot iron, momentarily, to the epigastrium or the back of the neck, for intensely stimulant effect, is not unreasonable in idea. Galvanism may be employed in any case of suspended animation. The extraordinary measure has recently been sometimes practised, of forcibly dilating the anus and introducing the hand and forearm into the bowel, as far as the colon. The semi-lunar ganglia, it is believed, may be thus subjected to stimulation by contact. Atropia, hypodermically injected, as a "respiratory

[1] In 1871, Dr. Halford received thanks from the Government of India for the introduction of this treatment; and the republication of his pamphlet, for distribution, was officially ordered. Of 939 cases of snake-bite treated in Bengal by the police, with ammonia, 702 are said to have recovered.

[2] Brit. Med. Journal, Feb. 22, 1868.

[3] N. Y. Medical Record, June 19, 1880, p. 710.

[4] Le Courrier Médical, Jan. 22, 1881.

stimulant" is recommended by some authorities in asphyxia; and digitalis, similarly used, as a "cardiac stimulant."

The Executive Committee of the Life Saving Society of New York, consisting of Prof. Frank H. Hamilton, Prof. C. F. Chandler, and others, have issued the following series of rules for the treatment of persons rescued from the water in an insensible condition:—

"Rule 1.—To drain off water from chest and stomach: Instantly strip the patient to the waist. Place him face downward, the pit of the stomach being raised above the level of the mouth by a large hard roll of clothing placed beneath it. Throw your weight forcibly two or three times, for a moment or two, upon the patient's back, over a roll of clothing, so as to press all fluids in the stomach out of the mouth.[1]

"Rule 2.—To perform artificial breathing: Quickly turn the patient upon his back, the roll of clothing being so placed beneath as to make the breastbone the highest point of the body.

"Kneel beside or astride patient's hips. Grasp the front part of the chest on either side of the pit of the stomach, resting your fingers along the spaces between the short ribs. Brace your elbows against your sides, and steadily grasping and pressing forward and upward, throwing your whole weight upon your chest, and gradually increasing the pressure while you can count one, two, three. Then, suddenly, let go with a final push, which springs you back to your first position. Rest erect upon your knees while you can count one, two; then make pressure again as before, repeating the entire motions at first about four or five times a minute, gradually increasing to about ten or twelve times.

"Use the same regularity as in blowing bellows, and as is seen in natural breathing, which you are imitating.

"If another person be present, let him, with one hand, by means of a dry piece of linen, hold the tip of the tongue out of one corner of the mouth, and, with the other hand, grasp both wrists and pin them to the ground above the patient's head."

Having witnessed, in two cases at Atlantic City, the insufficiency of the above methods of producing artificial respiration, it has occurred to me that *abdominal inspiration* may perhaps be promoted, by vigorous traction upon the walls of the abdomen. I have had made an instrument for such action; consisting of a large syringe or pump, about two inches in diameter and twelve inches long, attached to a metallic cup or bowl, six inches across at its outer edge. It is intended to be applied closely to the uncovered abdomen, so that, by strong traction with the pump, the viscera may be lifted and the diaphragm made to descend. I have not yet had opportunity to make trial of this method; but it appears to me that it ought at least to answer the purpose of *facilitating* the action of the diaphragm. It may be readily combined with Sylvester's method, as above described.[2]

*After-treatment.*—After breathing has become natural, dry the patient briskly. Wrap him in blankets only and let him be kept

[1] Of course *violence* must be avoided in such a procedure.

[2] The same principle, of *abdominal traction*, was applied many years ago by Nuck to the treatment of obstruction of the bowels. My instrument may probably prove useful in that affection, as well as in the reduction of strangulated inguinal hernia, prolapsed ovary, etc.

perfectly quiet. Provide free circulation of air. Give brandy and water—a teaspoonful every five minutes the first half hour, and afterwards occasionally as may seem expedient.

## EYESIGHT: ITS EXAMINATION AND CORRECTION.

Ophthalmic surgery has become, of late years, more and more a specialty. Yet it is desirable for the general practitioner to know at least when, and why, it is best to refer a patient to an oculist for treatment. In some localities, moreover, this cannot well be done, and the physician must then do his best without special assistance.

An outline of the subject may therefore here be proper, referring the reader to extended treatises for fuller information.[1]

Sight may be deficient from many causes: congenital incapacity (a variety of which is *color blindness*); amaurosis (optic nerve-paralysis); cataract (opacity of the lens or its capsule); corneal opacity; turbidity of the vitreous humor; disorganization of the retina, and errors of visual refraction.

Our space does not allow us to dwell here upon any of these except the last. (See *Ophthalmoscope*, under *Semeiology*, in Part I.)

In a **normal**, perfect eye, parallel rays of light are brought to a distinct focus upon the retina. Approximately, the sun's rays may be regarded as parallel; and so, practically, for the purposes of vision, are rays coming from an object at a distance of twenty feet or more. The eyes are *at rest* when looking at anything beyond that distance; most completely so, when we look at the sky or at a far off landscape.

As rays of light from a *near* object *diverge* considerably, in order for them to be focussed upon the retina and make a clear image, the eye must be adjusted to them by increase of the convexity of the crystalline lens. This is effected by the ciliary muscle; and the adjustment resulting is called **accommodation.** Also, in looking at a near object, in order that both eyes may give one image, they must **converge,** so that the visual axes of the two eyes would, if prolonged, meet in the object. This convergence is produced by the joint action of the two *internal recti* muscles. These muscular actions are *sensori-motor;* the efferent or motor nerve, both for accommodation and convergence, being the *third cephalic* nerve. These two changes, normally and usually, occur together; and any disruption of their harmony occasions pain and other symptoms, constituting *muscular asthenopia.*

Near vision always has a limit, beyond which accommodation cannot go. At 10 years of age, this may, in healthy eyes, be somewhat less than 3 inches. Chiefly from diminishing elasticity of the lens, the "**near point**" gradually recedes. At 20 years, it may be scarcely less than 4 inches; at 40, about 7 inches; at 50, 12 inches; and at 60, two feet. For reading ordinary type, good adult eyes have a range of from seven inches to about three feet. For total vision, the range with such eyes is from the near point to the most distant fixed star. A good distance for reading is 18 inches.

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[1] See Lawrence and Moon, R. B. Carter, J. Soelberg Wells, or E. Nettleship, on Ophthalmic Surgery; Browne on the Ophthalmoscope, etc.

**Emmetropia** is the normal condition of the refracting media of the eye; in which parallel rays, or those approximately so, from distant objects, come to a focus upon the retina. Deviations from this are different forms of *ametropia.*

**Hypermetropia** is that form of error of refraction, or ametropia, in which, from too great *flatness* or (antero-posterior) *shortness* of the eye-ball, parallel rays come to a focus *behind* the retina; making thus a confused image, unless the fault be corrected.

**Myopia,** or near-sightedness, is caused by too great convexity of the crystalline lens, or more frequently, *excessive length* of the eye-ball; parallel rays being thus brought to a focus *in front* of the retina. Diverging rays from a near object have their focus thrown farther back, so that at a certain degree of approach they form an image upon the retina, giving distinct vision. High degrees of myopia render it, without artificial aid, impossible to see anything clearly, except within a few inches of the eye. A range, however, generally exists, of a few inches at least, between the myopic **far point** of vision, and a near point, toward and to which accommodation can be effected.

Hypermetropic eyes have to be adjusted (accommodated) even for remote objects; and more and more so as they are nearer. With them, *accommodation* is in excess of convergence.

Myopic eyes, on the contrary, as they only see clearly things which are brought near to them, have their *convergence* in excess, often greatly, of their accommodation. In both of these cases, the want of harmony between the two sets of co-ordinate muscles (ciliaris and internal recti) is a frequent cause of distress. Fatigue of the eyes, pain, dimness of vision, congestion of the eye-ball, and, sometimes, dizziness, headache, and other sympathetic nervous symptoms, are thus produced.

**Presbyopia** is the natural change in the eyesight accompanying advancing years. Between 40 and 45 years of age, usually, the lens grows firmer and flatter; so that accommodation for near objects (as in reading) is difficult and imperfect. Later, or even at about the same period, the ciliary muscle shares the loss of energy of the general muscular system of the body; and, also, the sensitiveness of the retina to visual impressions grows less and less with increasing age. It is to senile *defective accommodation* for near objects, often with little or no change in regard to those at a distance, that the term presbyopia is especially applied.

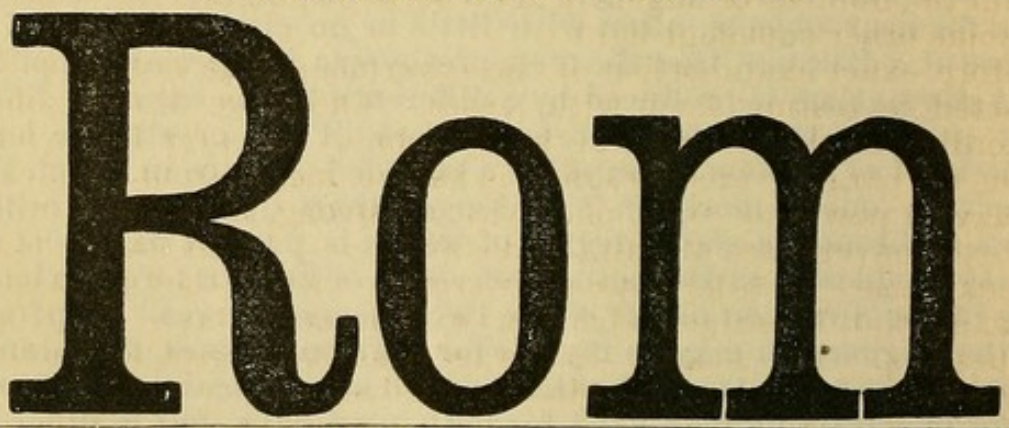
**Astigmatism** is produced by a difference in the curve of different parts of the cornea, or, sometimes, of the crystalline lens. The bowl of a spoon exemplifies a rounded surface in which the curve in one "meridian" is longer than that in the other. This difference (a slight degree of which is present in almost all eyes) produces less distinctness of vision of lines or forms extending in the direction of one of the two unequal curves. A person with astigmatism may be myopic for horizontal lines, and emmetropic or hypermetropic for those which are vertical; or the same error of refraction may exist for both meridians, but in different degrees. Sometimes the axes of the unlike curvatures are *oblique*, instead of horizontal and vertical; but they are always at right angles to each other.

**Asthenopia** is, literally, weakness of sight. It is of two kinds or origins, often combined: muscular (*myasthenopia*) and nervous (*neurasthenopia*). The attention of oculists has been almost exclusively devoted to the former; but the latter also is important.[1] Muscular asthenopia results mainly from discordant action (above alluded to) between the two acts of *accommodation* and *convergence*. A near-sighted person, for example, requires a great deal of convergence of the eyes, to look at an object close to his face; while his accommodation, at the far point, is, or may be, *nil;* and it is, at any point, much less than his convergence. The reverse occasion of discord exists in hypermetropic eyes; accommodation being, with them, in excess of convergence. Either way, uncorrected vision, especially when attempting continued reading, or fine work of any kind, causes distress, fatigue, and dimness of vision. Not very rarely, symptoms of general indisposition, perhaps simulating brain disease, are thus originated; their source in the eyes being shown by the relief at once afforded by properly adjusted glasses. In nervous asthenopia, the optic nerve, its ganglia, or the retina, or all these together, are at fault. In this form, rest to the eyes from all work is commonly the most essential remedy. With the more frequent muscular asthenopia, from errors of refraction, rest gives only a partial and temporary relief; the true remedy for it is proper *correction* of the visual defect by glasses adapted to it.

**Strabismus** (squint, or cross-eyes) is an obvious defect, from the overaction of either the internal (convergent) or external (divergent) recti muscles. Double vision must result from it. Practically, however, in cases of permanent or long continued strabismus, the mind becomes accustomed to attend to only one of the images seen; so that the inconvenience is less than might be expected. To correct this deformity, the *stronger* rectus muscle is sometimes divided by the surgeon.

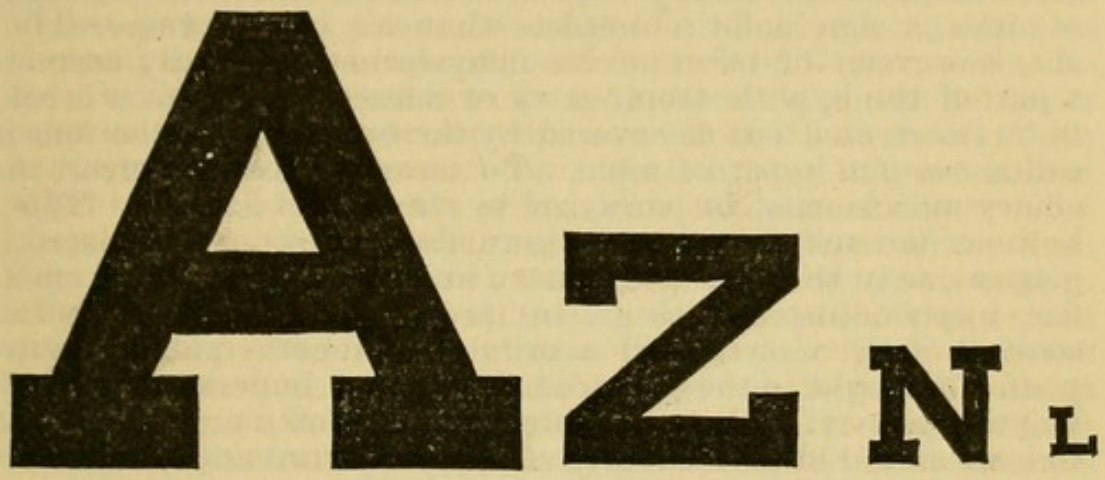
**Diagnosis.**—First, it is always desirable to ascertain the *acuteness of vision* of the patient examined. For this, Jäger devised *test-types* to be read at a definite distance. They run from 1 to 20; the two extremes being these:

Brilliant, a, b, c, d, e, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z.




[1] Dr. John Green (Carter on the Eye, Amer. edition, p. 448, *note*) writes thus: "There is unfortunately a very considerable class of asthenopic cases whose chief characteristic is discomfort or pain in using the eyes, in the treatment of which spectacles either afford no relief or play a comparatively unimportant part."

Snellen's types are more scientifically contrived for exact comparison of visual acuteness. They are square letters, the limbs and subdivisions of which are measured to fifth parts of their height. They are numbered according to the distance, in Paris feet,[1] at which a normal eye can read them distinctly. Thus, No. XX, or 20, can be, or ought to be, read at the distance of twenty feet; No. XL, or 40, at forty feet, and so on. The following are taken from a set of test-types modified from Snellen's by Dr. J. Green.[2]



80 40 20 8

A person with deficient sight may be able, at twenty feet, to distinguish only the letter which, with perfect vision, he should read at forty feet. His vision is then but $\frac{20}{40}$ or $\frac{1}{2}$ of normal sight. Or, at ten feet, he may read only the letter which should be legible at two hundred feet. His vision is, then, $\frac{10}{200}$ or $\frac{1}{20}$. This is often expressed (V indicating visual acuteness) $V=\frac{10}{200}$; or, abridged, $V=\frac{1}{20}$. In perfect vision, $V=\frac{20}{20}$ or 1.

Near-sighted persons may be able to see nothing at all clearly at a distance of ten feet. For these, test-types are procurable from opticians (and from some booksellers) which can be held in the hand and used at short distances.

In the absence of test-types, a rough determination of visual acuteness may be made by trying at what distance a patient can count the number of fingers held up between him and the window or some other sufficient light.

More exact examination of the *refraction* of the eyes is to be effected by testing them with lenses. These are distinguished according to their focal length, in inches. A *convex* lens whose focus for parallel (or solar) rays is twelve inches from it, is said to have a power $= +\frac{1}{12}$; one twice as strong, bringing parallel rays to convergence at half the distance, $= +\frac{1}{6}$. A *concave* lens, which causes parallel rays to *diverge* as though they proceeded from a point 12 inches in front of it, is described as $-\frac{1}{12}$; if six inches, $-\frac{1}{6}$. The + and — signs are thus convenient to discriminate between convex and concave glasses.[3]

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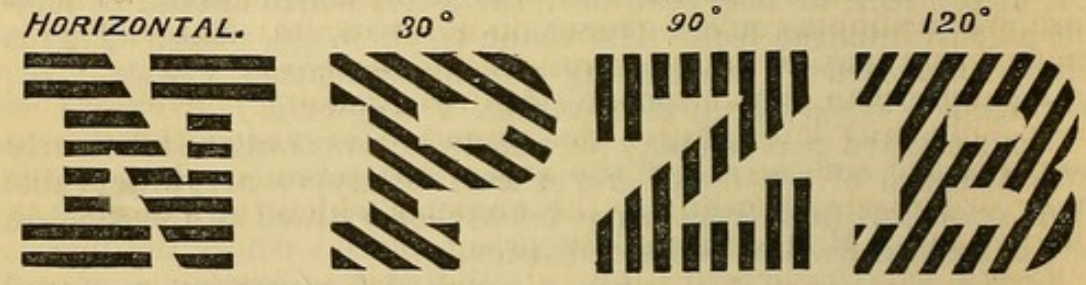
[1] A Paris foot is a little more than $12\frac{3}{4}$ of our inches.

[2] Carter on the Eye, Amer. edition.

[3] Cases of lenses assorted for such examinations are prepared and sold by several dealers.

*Myopia* is measured by the power of the concave lens required to afford distinct vision of distant objects. If a lens having a power of $-\frac{1}{12}$ (that is, causing the rays of light passing through it to diverge as if from a point 12 inches from it) will correct the myopia, this is described as $M=\frac{1}{12}$. Greater degrees are expressed by the fractions $\frac{1}{8}$, $\frac{1}{6}$; lesser, $\frac{1}{20}$, $\frac{1}{30}$, etc.

*Hypermetropia* is estimated by the power of the strongest *convex* lens through which vision of objects at a distance is distinct and comfortable to the eye. (In *all* these examinations, the sight of *each* eye should, for a complete diagnosis, be tested *separately*.) As, however, the effort of accommodation habitually corrects a *part* of the hypermetropic error of refraction, that part is said to be *latent*, and that discovered by the correction of the lens is called *manifest* hypermetropia. To ascertain the *total* error, the ciliary muscle must be paralyzed by the use of atropia. This,[1] however (as well as testing the muscular *convergence* by prismatic glasses), may be left to specialists; since correction of the manifest hypermetropia, with glasses progressively adapted to the comfort of the wearer, will usually answer every practical purpose. Formulæ descriptive of degrees of hypermetropia are written thus: $H=\frac{1}{45}$, is that degree in which a convex lens of 45 inches focal length will give satisfactory correction. Often it goes as far as $H=\frac{1}{12}$; sometimes $\frac{1}{8}$, or, rarely, $\frac{1}{4}$ or $\frac{1}{3}$. If comfortable vision is not obtained by either concave or convex glasses, *astigmatism* may be suspected. This is best detected and defined by the use of letters such as those contrived by Dr. O. M. Pray, of New York, a selection from which is here presented.




If a letter made with horizontal lines looks clear and dark, while one with the lines *vertical* is more indistinct, the eyes are (or the eye, if single, is) ametropic in the vertical meridian, and *vice versa*. To ascertain whether the ametropia is *myopic* or *hypermetropic*, we must find whether a *concave* or a *convex* lens will afford it correction. Cylindrical lenses are used for correction of astigmatism; as will be again said presently

When defective vision remains which is not accounted for by any of these errors of refraction, its origin or nature will have to be ascertained by the aid of the ophthalmoscope,[2] along with a

[1] If used, one drop of a solution of sulphate of atropia, 4 grains to f℥j, may be inserted between the lids two or three times, an hour apart; leaving two hours after the last insertion before the examination. As the disturbance of vision produced by atropia does not go off for four or five days, it should be explained to the patient, and he should be provided with convex glasses to use during that interval.

[2] The ophthalmoscope will also aid or confirm the diagnosis of errors of refraction. In myopia of high degree, for example, an inverted image can be obtained without the intervention of an object lens. Other appearances also are distinctive.

careful inquiry into the whole history and semeiology of the case. Two groups of cases (Förster) are likely to be met with : 1. Optic neuritis, retinitis, retinal degeneration of Bright's disease, hemiopia of cerebral apoplexy, and impaired vision from alcoholism. 2. Syphilitic choroiditis, pigmentary retinitis, and detachment of the retina. (For the further study of these, see works on the Ophthalmoscope, as well as upon Ophthalmic Surgery.)

**Correction.**—Commonest and simplest of all, is the case of *presbyopia.* The elderly person finds it difficult to read or see to do fine *near* work ; while his view of objects at a distance is unchanged, at least until quite advanced age. His *accommodation*, for near vision, needs to be helped or substituted by *convex* glasses. It is a mistake to postpone using these, after any strain is felt in reading without them.[1] At first they may be needed only in reading fine print, or by artificial light at night; later (as presbyopia is gradually *progressive*) at all times in reading. They should not (if there is no other error of vision) be used in looking at distant objects. If the glasses are not too high on the nose, they may be *looked over* when the eyes are lifted from the book or near work. Sometimes the upper half of each glass is removed for the same purpose ; but that is not necessary. *Too* strong glasses strain the eyes, and should not be worn ; but it is *worse* to withhold sufficient aid to the eyes when it is needed.

As the convex lenses, by furnishing or substituting accommodation, enable the presbyopic person to bring objects near to his eyes, this demands *convergence*, without corresponding action of the accommodating ciliary muscle. This may cause discomfort from incoordination of the two sets of ocular muscles. Therefore, when simple convex glasses do not work satisfactorily, *prismatic* lenses may be added to relieve the *convergence.*

A prism (being virtually one side or section of a convex or concave spherical lens) shifts the direction of vision through it towards the side on which the *edge* of the prism is placed ; and more or less so, according to the angle at which the sides of the prism meet. If the edge of the prism, placed before the eye, is outward, the base being inward, the axis of vision is moved towards the temple. If the edge is inward, the direction is moved towards the nose.

We may then unite prismatic lenses (with their edges outward) to the proper convex lenses, to give repose to the muscles of convergence as well as of accommodation, in presbyopic eyes. The right prisms, as well as convex lenses, may be selected by comparative trial ; although oculists have precise rules for their determination. Glasses in which this combination has been made are called *orthoscopic.* (See Fig. 143.)

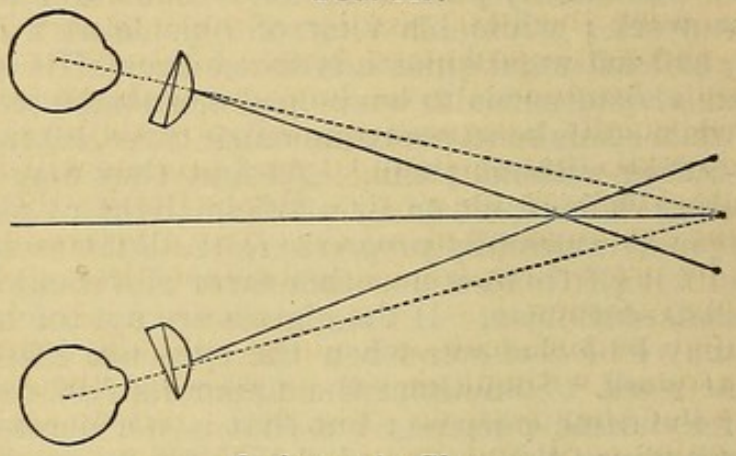
Convex glasses of $\frac{1}{36}$ will not be, generally, too high in power to begin with. As years go on, these will come to be insufficient, and $\frac{1}{30}$, $\frac{1}{24}$, $\frac{1}{18}$, $\frac{1}{15}$ will be required. Few, even in late old age, will need a higher power than $\frac{1}{12}$.

*Hypermetropia* is not rare even in young persons. Some ophthalmologists assert that it is more common at all ages than

[1] *Rapidly increasing* presbyopia is one of the signs of *glaucoma.* See p. 124.

emmetropia or ideally perfect visual refraction. During childhood and youth, slight degrees of it are overcome by ciliary muscular accommodation; to be made manifest when the lens grows less elastic, by premature presbyopia. Considerable degrees of hypermetropia, however, cause great inconvenience, and, from strain in efforts of vision (as with children in school) serious asthenopia may be produced.

FIG. 143.



Orthoscopic Glasses.

Correction of *hypermetropia* is obtained by the use of convex glasses, bringing rays of light to a focus upon the retina which, without such an increase of their convergence, would meet behind the abnormally flat or shortened eye.

Authorities advise that convex glasses for hypermetropic eyes (which do not, unaided, have correct vision at *any* distance) should be worn *all the time*, for distant as well as near vision. This is certainly most important for the higher degrees of hypermetropia. When presbyopia comes on, with loss of power to accommodate for near vision (pushing the near point farther from the eye) two pairs of glasses may be needed. One *stronger* pair will serve for reading or other near work; the accustomed weaker glasses for ordinary vision at a distance. Dr. Benjamin Franklin introduced the plan of putting together two half-lenses in the same frame; the upper half weaker, for distant sight; the lower half, stronger, for reading or near work.

*Myopia* is corrected by *concave* glasses, which produce divergence, or diminish convergence, of the rays of light, and thus push back their focus so as to make it fall upon the retina, giving clear images. This makes it practicable to see things at ordinary distances, instead of their being brought close to the face. It is very important for myopia to be early detected and cared for; as, more than hypermetropia, it tends to be progressive, and to induce disorder, and even serious organic changes in the eye. Some authorities declare that "every near-sighted eye is a *diseased* eye."

Cohn, in Germany, and, after him, Loring, Derby, Risley, and others in the United States, have shown by extended investigations that errors of vision, especially *myopia* and *astigmatism*,

increase remarkably in schools, colleges, and universities. In some German universities the near-sighted students constitute 60 per cent. of the whole number. It is not nearly so bad in any institutions in the United States; but still the evil exists. Hygienic conditions have a large influence in this matter, especially *deficiency of light in reading*, and stooping or bending over the desk, so as to use the eyes *habitually too near to the book or work*. Dr. Risley, of Philadelphia, in a recent report[1] of elaborate observations made in the public schools of different grades, shows that, under the best possible conditions, *healthy*, *normal* eyes may go through a prolonged course of study without disadvantage. But, he adds, "given an eye with an anomaly of refraction, especially astigmatism, the probabilities are, other things being equal, that the educational process will be fraught with pain and danger to the eye." Hence follows the propriety of the careful examination of all eyes that give trouble early in life; so as, by proper treatment, to protect them from injury and increasing disorder.

Near-sighted persons can get along tolerably (unless their myopia is extreme) without glasses, in walking about, requiring them most when they read or write, etc. But, to see the world aright, for enjoyment and mental development, such persons ought to wear glasses generally; the *stronger* pair for distant objects, the *weaker* ones for reading or fine work.

Age changes the myopic eye by lessening its power of accommodation within the short range between its near and far point of vision. Although nothing is then carried so near for sight, and thus the "short-sightedness" is less, the far point is not often pushed farther off. Some persons, however, having slight myopia, find it to be so neutralized by the flattening of the lens with age, as to be able to do without glasses at the time of life when others need to wear them. Again, with moderate myopia, the presbyopic change may put back the far point to such a distance that convex glasses are needed for reading, while concave ones are required in order to see clearly at a distance. A clergyman, for example, may be unable to see his congregation before him, and yet, without "old-sight" glasses, he cannot read his sermon at the ordinary distance. This state of things may be remedied on Franklin's plan—by having the upper half of each glass *concave*, for distant sight, and the lower half *convex* for near use.

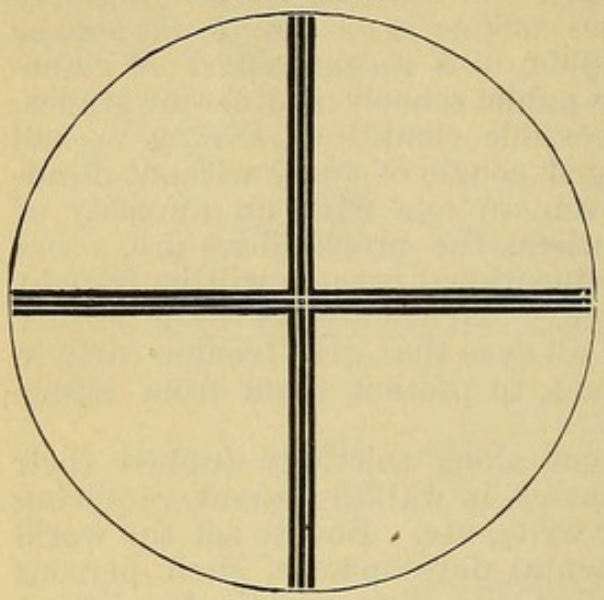
*Astigmatism* is to be corrected by *cylindrical* lenses. If the corneal curvature were made sharper from *side to side* than from above downwards, the eye would thereupon become myopic for *vertical* lines, without change in regard to horizontal lines. Or, if the *upper and lower* curves of the cornea (or crystalline lens) were made sharper, myopia in the *horizontal* meridian only would result.

Briefly, then, it may be said that "when astigmatism produces myopia for lines of a given direction, we may correct it by a concave cylinder with its axis in the same direction. When it pro-

[1] Phila. Med. Times, July 30, 1881, p. 673.

duces hypermetropia for lines in a given direction, we may correct it by a convex cylinder with its axis in the same direction."[1] When, along with astigmatism, there is myopia, hypermetropia, or presbyopia, the appropriate correction must be made for both errors; one side of each lens being made cylindrical for the astigmatism, and the other side spherical, *i. e.*, a section of a sphere, convex or concave, according to the kind of ametropia present.

FIG. 144.



Attention to even slight deficiencies of sight ought never to be neglected. As has been well said by an authority already quoted, "*wherever there is discomfort, there is a possible or probable source of disease.*"

**Color-blindness** has attracted much attention of later years. Its importance grows especially out of the danger of accidents from mistakes made in minding signals on railroads, and in navigation. Lives are said to have been lost from such blunders on the part of signal-men, switch-tenders, engineers, pilots, etc.

*Inability to distinguish red from green* is the most marked form of this defect,[2] which is nearly (though not quite) always congenital. About *one man in every twenty-five* is more or less color-blind; the proportion amongst women is very much less.

Examination to determine the existence, nature, or degree of color-blindness, must be made with great care. Merely *naming* the different colors will not suffice, as acquaintance with the terms used may be very much a matter of education.[3] Therefore Holmgren's method is much the best: of placing before the person under examination carefully selected *colored worsteds*, which he is required, in succession, to *match*, from a large number of skeins of different colors, placed promiscuously together.[4]

While aggravated color-blindness does not seem capable of correction by any treatment, lesser degrees of it may probably be, at least in early life, mitigated, if not removed, by *training* the eyes to recognition of different colors by frequent practice.

(On *Disinfectants*, see the end of the book.)

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[1] Carter, *op. citat.*, p. 488.

[2] John Dalton, the eminent chemist, was subject to this; whence it is sometimes called *daltonism*.

[3] Savages discriminate only between *strong* colors. Gladstone has shown that even the Greeks of the Homeric period had a very limited vocabulary for colors.

[4] W. Wood & Co., New York, have prepared an inexpensive and convenient set of "Ophthalmic Test-Types and Color-Blindness Tests," with lenses, etc., and Explanatory Text.

# FORMULÆ.

EVERY physician should acquire such knowledge of the remedies he employs as to prescribe and combine them according to the indications of particular cases; not by the routine of names of diseases; and still less by fixed receipts or formulæ. While this is obvious, all *routine* being, as such, bad practice, a beginner may yet find advantage, and a practitioner of experience may occasionally save time, by having some *exemplars* of prescriptions at hand for reference. A selection of such examples is, therefore, given. Many of the recipes are original, and all are carefully made; the number being very much less extended than it might easily have been, in accordance with the principle above laid down. Those first given will, for convenience, follow mainly the order of the diseases for which they are most likely to be required, as those diseases are treated of in Part II., of this book. (See a later page, for *metric* prescriptions.)

The doses in these prescriptions, unless otherwise stated, are intended for adults. To reduce the dose of any drug (except narcotics, and, perhaps, mercurials) according to the age of a child, the rule suffices to divide the dose for an adult in proportion to the number of years of the child's age, increased by 12. Thus, for a child of two years, the dose will be $\frac{2}{14}$ths (2 divided by 2+12) or $\frac{1}{7}$th of that for an adult; for a child of three years (3 divided by 3+12=15), $\frac{3}{15}$ths or $\frac{1}{5}$th, etc. Opium and other narcotics act more powerfully in proportion upon children; so that their dose should be reduced in a greater degree. Calomel and other mercurials do not so readily affect the glands, at least, in children as in adults.

*Simplicity* is made an especial aim in the following formulæ; considering in this the advantage rather of the *tyro* than of the practitioner of experience.

## MEDICINES REFERRED TO IN PART II.

### 1. *Solution of Tartar Emetic.*

℞.—Tartrate of Antimony and Potassium, two grains; Water, four fluidounces; dissolve. Take one or two teaspoonfuls every two, three, or four hours.

*In active pneumonia, pleurisy, severe bronchitis, pericarditis*, etc.

### 2. *Quinine Solution.*

℞.—Sulphate of Quinine, half a drachm; Aromatic Sulphuric Acid (Elixir of Vitriol), a fluidrachm and a half; Oil of Cloves, four drops; Mucilage of Gum Arabic, a fluidounce; Peppermint Water,

enough to make in all four fluidounces; mix. Take a teaspoonful or two every three or four hours, in *asthenic pneumonia, low fevers*, etc., as a supporting remedy; larger doses, or the same at shorter intervals, for *intermittent fever*, etc.

3. *Ammonia Mixture.*

℞.—Carbonate of Ammonium, one drachm; Mucilage of Gum Arabic, four fluidounces; Orange-flower Water, or Peppermint Water, two fluidounces; mix. Dose, a dessertspoonful, or tablespoonful, every hour.

*In cases of general prostration, typhoid pneumonia, influenza of old people*, etc.

4. *Nitrate of Potassium.*

℞.—Nitrate of Potassium, two drachms; Powder of Gum Arabic, or White Sugar, two drachms; divide into twelve papers. Take one every two or three hours.

*In mild pneumonia, bronchitis*, etc.

5. *Wine of Ipecacuanha.*

℞.—Wine of Ipecacuanha, half a fluidounce. Take twenty drops every two or three hours, in a tablespoonful of water.

*In tonsillitis, erysipelas*, etc.

6. *Calomel, Ipecacuanha, and Nitre.*

℞.—Calomel, and Ipecacuanha powder, each six grains; Nitrate of Potassium, half a drachm, or a drachm; mix, and divide into twelve powders. Take one powder every three hours.

*In pneumonia, pleurisy*, etc.

7. *Solution of Acetate of Ammonium.*

Dissolve two scruples of Carbonate of Ammonium in four fluidounces of Water, and add pure Vinegar slowly, until it ceases to effervesce. This will substitute the "liquor ammonii acetatis" or Spiritus Mindereri. Dose, a dessertspoonful, or a tablespoonful, with as much of water, every two or three hours; in any *febrile affection*, where purging is not desirable, as a *diaphoretic*.

8. *Acetate of Potassium.*

℞.—Acetate of Potassium, five drachms and a half; Sweet Spirits of Nitre, two fluidrachms; Water, enough to make eight fluidounces; dissolve. Take a tablespoonful every three or four hours.

*In feeble cases of pneumonia, instead of tartar emetic; also as a diuretic, in pleuritic effusion*, etc.

9. *Calomel, Opium, and Tartar Emetic.*

℞.—Calomel, six grains; Opium, three to six grains; Tartar Emetic, a grain and a half; mix, and divide into twelve powders. Take one every three or four hours in water.

*In acute pleurisy.*

10. *Squills and Digitalis.*

℞.—Powder of Squills, half a drachm; Powder of Digitalis, eight to sixteen grains; mix, and divide into sixteen pills. Take one thrice daily.

*In pleuritic effusion.*

11. *Compound Spirit of Juniper.*

℞.—Compound Spirit of Juniper, two fluidounces. Take one or two teaspoonfuls thrice daily, in a wineglassful of water.

*As a diuretic, in pleuritic effusion*, etc., *especially in feeble cases.*

12. *Juniper Infusion and Cream of Tartar.*

℞.—Bruised Juniper Berries, one ounce; infuse for two hours in a pint of Hot Water; pour off, and add a tablespoonful or two of Bitartrate of Potassium. Stir and drink in portions through the day.

*In dropsical effusion of any kind.*

13. *Squills, Nitre, and Digitalis.*

℞.—Nitrate of Potassium, two drachms; Oxymel of Squills, a fluidounce; Tincture of Digitalis, half a fluidrachm; Vinegar, a tablespoonful; Sugar and Gum Arabic, each two drachms; Water, enough to make in all six fluidounces; mix. Take a tablespoonful every three hours.

*In acute bronchitis, influenza*, etc.

14. *Squills and Tartar Emetic.*

℞.—Tartar Emetic, one grain; Syrup of Squills, four ounces; mix. Take a tablespoonful every three or four hours.

*In bronchitis, with dry cough.*

15. *Squills and Paregoric.*

℞.—Syrup of Squills, three fluidounces; Paregoric (Camphorated Tincture of Opium), one fluidounce; mix. Take a teaspoonful three or four times daily, or two teaspoonfuls at night.

*In bronchitis or influenza, after loosening the cough.*

16. *Muriate of Ammonia.*

℞.—Chloride of Ammonium, three drachms; Mucilage of Gum Arabic, four fluidounces; mix. Take a tablespoonful four times daily.

*In chronic bronchitis*, etc.

17. *Copaiba Mixture.*

℞.—Balsam of Copaiba, three fluidrachms; Compound Spirit of Lavender, two fluidrachms; White Sugar and Gum Arabic, each two drachms; Water, enough to make six fluidounces; mix. Take a tablespoonful thrice daily.

*In chronic bronchitis.*

18. *Lobelia and Ipecacuanha.*

℞.—Tincture of Lobelia and Wine of Ipecacuanha, each half a fluidounce; mix. Take one-half teaspoonful every half hour until expectoration or nausea occurs.

*In asthma.*

19. *Musk Mixture.*

℞.—Musk, two scruples; Syrup of Orange, one fluidounce; Mucilage of Gum Arabic, three fluidounces; mix. Take a tablespoonful every two or three hours.

*In spasmodic cough of any kind, or other spasmodic affections.*

20. *Hydrocyanic Acid.*

℞.—Dilute Hydrocyanic Acid, sixteen drops; Syrup of Wild Cherry, and Camphor Water, each one fluidounce; mix. Dose, a teaspoonful every two or three hours.

*In violent, troublesome cough.*

21. *Nitro-muriatic Acid.*

℞.—Nitro-muriatic Acid, half a fluidounce (or Nitric Acid, one fluidrachm and a half; Muriatic Acid, two and a half fluidrachms). Take three or four drops twice or thrice daily, with water, *in a glass.*

*In general or gastric debility, chronic or subacute jaundice,* etc.

22. *Bromide of Potassium.*

℞.—Bromide of Potassium, half an ounce; Peppermint or Cinnamon Water, or Pure Water, six fluidounces. Dose, from a dessertspoonful to a tablespoonful.

*In insomnia, hysteria, spermatorrhœa,* etc.

23. *Citrate of Iron.*

℞.—Citrate of Iron, two drachms; Orange-flower Water, five ounces and a half; Simple Syrup, half an ounce. Take from a teaspoonful to a tablespoonful thrice daily, before or after meals.

*For anæmic children.*

24. *Ipecacuanha and Alum.*

℞.—Powder of Ipecacuanha and Powder of Alum, each half a teaspoonful; mix with water. Repeat in ten minutes if it does not vomit.

*In threatening croup.*

25. *Calomel and Nitrate of Potassium.*

℞.—Calomel, six to twelve grains; Nitrate of Potassium, one drachm; Sugar, one scruple; mix, and divide into twelve powders. Take one every three hours.

*In inflammatory croup.*

26. *Nitrate of Silver Solution.*

℞.—Nitrate of Silver, five to ten grains; Rose-water, or Distilled Water, half a fluidounce; dissolve. Apply with a camel's-hair pencil to the throat, *in membranous croup, or scarlet-fever.*

27. *Tincture of Aconite Root.*

℞.—Saturated Tincture of Aconite Root, one teaspoonful. To be *rubbed gently into the skin for neuralgia.*

28. *Chloroform Liniment.*

℞.—Chloroform, three fluidounces; Olive Oil, four fluidounces; mix.

*Pure chloroform*, prevented from evaporating by oiled silk or a watch-glass, acts as a strong rubefacient; burning like mustard.

29. *Ointment of Veratria.*

℞.—Veratria, ten to twenty grains; Pure Lard, one ounce; mix.

*In severe neuralgia;* applied to the part.

30. *Cod-liver Oil.*

℞.—Cod-liver Oil, Syrup of Ginger, and Mucilage of Gum Arabic, each two fluidounces; Oil of Cloves, six drops; mix. Take a tablespoonful three or four times daily.

*In wasting diseases.*

31. *Cod-liver Oil and Glycerin.*

℞.—Cod-liver Oil and Glycerin, each two fluidounces; Gum Arabic, two drachms; Oil of Bitter Almonds, two drops; Oil of Cloves, twelve drops. Take a tablespoonful thrice daily.

32. *Cod-liver Oil and Glycerin, Iron, and Quinine.*

℞.—Take of Citrate of Ammonium, Iron, and Quinine, each ten grains; Cod-liver Oil and Glycerin, each two fluidounces; mix. Dose, a tablespoonful.

33. *Iodide of Iron.*

℞.—Syrup of the Iodide of Iron, half a fluidounce. Take twelve to twenty drops, in water, thrice daily.

*In anæmia, scrofula*, etc.

34. *Tincture of Nux Vomica.*

℞.—Tincture of Nux Vomica, half a fluidounce. Take from ten to thirty drops, thrice daily.

*In nervous debility, aggravated dyspepsia*, etc.

35. *Wild Cherry and Lactucarium.*

℞.—Syrup of Wild Cherry, and Syrup of Lactucarium, each two fluidounces; mix. Take a dessertspoonful or two, at night, or one or two teaspoonfuls in the daytime.

*In frequent and troublesome cough; as in phthisis.*

36. *Hoffmann's Anodyne, Squills, and Morphia.*

℞.—Syrup of Squills, a fluidounce and a half; Hoffmann's Anodyne (Compound Spirit of Ether), and Solution of Morphia (one grain in the ounce), each a fluidounce; Camphor Water, and Mucilage of Gum Arabic, of each a fluidounce and a quarter; mix. Dose, from a teaspoonful to a tablespoonful.

*In troublesome coughs.*

37. *Carbonate of Potassium and Nitre.*

℞.—Carbonate of Potassium, and Nitrate of Potassium, each two drachms and a half; Water, eight fluidounces; dissolve. Take a tablespoonful thrice daily.

*In gouty attacks.*

38. *Digitalis, Squills*, etc.

℞.—Citrate of Potassium, two hundred grains; Tincture of Squills, two fluidrachms; Wine of Colchicum Root, one fluidrachm; Liquor of Acetate of Ammonium, two fluidrachms; Infusion of Digitalis, two fluidounces; Peppermint Water, enough to make eight fluidounces; mix. Take half a wineglassful thrice daily.

*In dropsical effusions.*

39. *Cream of Tartar and Dandelion.*

℞.—Bitartrate of Potassium, an ounce; Extract of Taraxacum, half a drachm; Decoction of Taraxacum, eight fluidounces; mix. Take half a wineglassful two or three times a day.

*In dropsy or jaundice.*

40. *Cider Mixture.*

℞.—Bruised Juniper Berries, Mustard Seed, and Ginger, each half an ounce; Bruised Horseradish and Parsley Root, each an ounce; sound old Cider, a quart; infuse. Dose, a wineglassful thrice daily.

*In dropsy.*

41. *Acetate of Lead Pills.*

℞.—Acetate of Lead, half a drachm; Opium, five grains; Conserve of Roses, or Crumb of Bread, a sufficient quantity; mix, and divide into twenty pills. Take one thrice daily, watching the effect.

*In hypertrophy of the heart.*

42. *Digitalis.*

℞.—Powder of Digitalis, twelve grains; divide into twelve pills. Take one thrice daily.

*In cases of over-rapid action of the heart.*

43. *Digitalis.*

℞.—Tincture of Digitalis, half a fluidounce. Take ten drops thrice daily, in water.

*As above.*

44. *Veratrum Viride.*

℞.—Norwood's Tincture of Veratrum Viride, half a fluidounce. Take from two to five drops every three or four hours. If nausea or prostration follow, withdraw or diminish the dose.

*In hypertrophy of the heart, and inflammatory fever.*

45. *Colchicum and Magnesia.*

℞.—Wine of Colchicum Root, one fluidrachm; Husband's Magnesia, one drachm; Peppermint Water, four fluidounces; mix. Take a tablespoonful thrice daily.

*In gout and gouty rheumatism.*

46. *Colchicum and Alkalies.*

℞.—Wine of Colchicum Root, one fluidrachm; Bicarbonate of Potassium, and Rochelle Salts, each two drachms and a half; Peppermint Water, four fluidounces; mix. Take a tablespoonful thrice daily.

*In gout and gouty rheumatism.*

47. *Hoffmann's Anodyne, Ammonia, and Soda.*

℞.—Bicarbonate of Sodium, four scruples; Aromatic Spirit of Ammonia, one fluidrachm; Compound Spirit of Ether, one fluidounce; Compound Tincture of Cardamom, three fluidrachms; Camphor Water, and Mucilage of Gum Arabic, each a fluidounce and a quarter; mix. Take a dessertspoonful or tablespoonful at once.

*In angina pectoris, or gout of the stomach or heart.*

48. *Warner's Cordial and Laudanum.*

℞.—Tincture of Rhubarb and Senna, a fluidounce and a half; Syrup of Ginger, three fluidrachms; Laudanum, one fluidrachm; mix. Take a teaspoonful at once, in hot water.

*In angina pectoris, or spasmodic gout.*

49. *Chloroform, Hoffmann's Anodyne*, etc.

℞.—Chloroform, and Aromatic Spirit of Ammonia, each two fluidrachms; Hoffmann's Anodyne, and Paregoric, each half an ounce; Mucilage of Gum Arabic, half an ounce; mix. Take a teaspoonful at once.

*In angina pectoris, retrocedent gout*, etc.

50. *Glycerin and Rose Water.*

℞.—Glycerin, one part; Rose Water, five parts; mix. Use as a *lotion* for the skin, or a mouth-wash.

51. *Prepared Chalk and Gum Arabic.*

℞.—Equal parts of finely powdered Prepared Chalk, and Powder of Gum Arabic; mix.

*Apply to ulcerated places in the mouth.*

52. *Borax, Myrrh*, etc.

℞.—Borate of Sodium, two drachms; Powdered Myrrh, one drachm; Water, six fluidounces; mix.

*Use as mouth-wash, or gargle.*

53. *Sulphate of Zinc and Rose Water.*

℞.—Sulphate of Zinc, from two to ten or twenty grains; Rose Water, a fluidounce; dissolve.

*Use as a mouth-wash, with care, in severe cases.*

54. *Chlorate of Potassium.*

℞.—Chlorate of Potassium, half an ounce; Water, six fluidounces; dissolve. Take a tablespoonful every three or four hours.

*In ulceration of the mouth or throat, diphtheria*, etc.

55. *Muriatic Acid and Honey.*

℞.—One part of Hydrochloric Acid, and two parts of Honey; mix. To be applied to the throat in diphtheria, with a soft sponge, firmly fastened to a (probang) piece of whalebone.

*In diphtheria.*

56. *Tincture of Chloride of Iron.*

℞.—Tincture of Chloride of Iron, half a fluidounce. Take from ten to thirty drops thrice daily, in water.

*In anæmia, diphtheria, menorrhagia, leucorrhœa, asthenic erysipelas*, etc.

57. *Chlorinated Soda and Glycerin.*

℞.—Labarraque's Solution of Chlorinated Soda, one fluidrachm; Bower's Glycerin, and Water, each two fluidounces; mix.

*Use as mouth-wash, in gangræna oris.*

58. *Creasote and Glycerin.*

℞.—Creasote, two or three drops; Bower's or Price's Glycerin, and Water, each half a fluidounce; mix.

*Use as mouth-wash, in cancrum or gangræna oris, or severe aphthæ or thrush.*

59. *Alum, Brandy, and Water.*

℞.—Alum, one drachm; dissolve in six fluidounces of Water; add two fluidounces of Brandy.

*To wash the mouth in salivation.*

60. *Tannic Acid Solution.*

℞.—Tannin, ten to thirty grains; Water, a fluidounce; dissolve.

*To be applied with a hair pencil, to enlarged tonsils,* etc.

61. *Iodide of Potassium.*

℞.—Iodide of Potassium, one to two drachms; Cinnamon or Peppermint Water, six fluidounces; dissolve. Take a tablespoonful thrice daily.

*As alterative in syphilitic rheumatism, and in many other affections.*

62. *Nitrate of Silver Pills.*

℞.—Nitrate of Silver, five grains; Opium, two grains and a half; mix, and divide into twenty pills. Take one thrice daily.

*In chronic gastritis.*

63. *Subnitrate of Bismuth.*

℞.—Subnitrate of Bismuth, one to three drachms; divide into twelve powders. Take one three or four times daily, in water.

*In gastric or intestinal irritation.*

64. *Lime-Water and Milk.*

Mix together equal parts of clear Lime-water and good Milk. Take a dessertspoonful or tablespoonful of the mixture at once.

*To check vomiting, or give nourishment when the stomach is irritable.*

65. *Effervescing Draught.*

Dissolve two drachms and a half of Bicarbonate of Potassium in four fluidounces of Water. Pour out, for administration, a tablespoonful of this solution, and add to it a tablespoonful of water. Then add a tablespoonful of fresh Lemon-juice; or of a solution containing two drachms of Citric Acid in four fluidounces of Water.

*In fever with irritability of stomach; also, in sea-sickness.*

66. *Cardamom and Potassa Mixture.*

℞.—Bicarbonate of Potassium, one drachm; Compound Tincture of Cardamom, a fluidounce; Syrup of Ginger, two fluidrachms; Orange-flower Water, enough to make four fluidounces; mix. Take a dessertspoonful at once.

*To relieve nausea and vomiting.*

67. *Ammonia, Soda, and Morphia.*

℞.—Bicarbonate of Sodium, four scruples; Aromatic Spirit of Ammonia, one fluidrachm; Solution of Morphia, two fluidrachms; Cinnamon Water, enough to make four fluidounces. Take one or two teaspoonfuls at once.

*For vomiting.*

68. *Creasote, Soda, and Morphia.*

℞.—Creasote, eight drops; Bicarbonate of Sodium, one drachm; Solution of Morphia, a fluidrachm and a half; Peppermint Water, enough to make four fluidounces; mix. Take one or two teaspoonfuls at once.

*For vomiting.*

69. *Calomel Powders.*

℞.—Calomel, two grains; divide into eight powders. Take one every two hours.

*For vomiting,* etc.

70. *Spice Poultice.*

℞.—Powdered Cloves, Ginger, and Cinnamon, each one or two teaspoonfuls; Wheat Flour, a tablespoonful; Brandy, or Whisky, enough to make a mass moist enough to spread upon thin, soft flannel. Double the flannel over it, and apply it to the abdomen.

*In obstinate vomiting,* etc.

71. *Nux Vomica, Iron, and Quinine.*

℞.—Pill of Carbonate of Iron (Vallet's Mass), two scruples (or Quevenne's Metallic Iron per hydrogen, one scruple); Sulphate of Quinia, one scruple; Alcoholic Extract of Nux Vomica, five grains; mix, and divide into twenty pills. Take one, thrice daily.

*In prolonged atonic dyspepsia, general debility, or ganglionic cachexia.*

72. *Tincture of Gentian and Rhubarb.*

℞.—Compound Tincture of Gentian, and Tincture of Rhubarb, each two fluidounces; mix. Take two teaspoonfuls before each meal.

*In dyspepsia.*

73. *Gentian and Rhubarb Pills.*

℞.—Extract of Gentian, and Powder of Rhubarb Root, each half a drachm; mix, and divide into twenty pills. Take one or two thrice daily.

*In dyspepsia, flatulence, or tendency to colic.*

74. *Gentian, Rhubarb, and Blue Mass.*

℞.—Extract of Gentian, and Powder of Rhubarb, each half a drachm; Blue Mass, four grains; Oil of Cloves, four drops; mix, and divide into twenty pills. Take one three or four times daily for a few days.

*To prevent recurring bilious colic or sick headache.*

75. *Rhubarb Pills.*

℞.—Rhubarb Root, and Castile Soap, each half a drachm; Oil of Anise, four drops; mix, and divide into twenty pills. Take one or two as required.

*For slight constipation.*

76. *Rhubarb and Colocynth.*

℞.—Rhubarb, Castile Soap, and Compound Extract of Colocynth, each half a drachm; mix, and divide into twenty pills. Take one or two as required.

*For constipation.*

77. *Rhubarb and Aloes*, etc.

℞.—Rhubarb, two scruples; Aloes, one scruple; Extract of Nux Vomica, four grains; mix, and divide into twenty pills. Take one as required.

*For obstinate constipation.*

78. *Carminative Mixture.*

℞.—Bicarbonate of Sodium, one drachm; Compound Tincture of Cardamom, one fluidounce; Spirit of Camphor, one fluidrachm (or, Paregoric, half a fluidounce); Spiced Syrup of Rhubarb, half a fluidounce; Peppermint Water, enough to make four fluidounces. Take a teaspoonful at once.

79. *Oil of Cajuput.*

℞.—Oil of Cajuput, half a fluidrachm; Compound Spirit of Lavender, half a fluidounce; Syrup of Ginger, two fluidrachms; Mucilage of Gum Arabic, enough to make two fluidounces. Take a dessertspoonful at once.

*For flatulent pain in the bowels; also, in chronic rheumatism or gout.*

80. *Ammonio-ferric Alum.*

℞.—Ammonio-ferric Alum, two scruples; Cinnamon Water, four fluidounces; dissolve. Take a tablespoonful every two or three hours.

*An excellent tonic astringent.*

81. *Creasote Pills.*

℞.—Creasote, twenty drops; Conserve of Roses (or Extract of Gentian), one drachm; mix, and divide into twenty pills. Take one every two, three, or four hours.

*As astringent, in hæmatemesis, ulcer of stomach,* etc.

82. *Podophyllum*, etc.

℞.—Resin of Podophyllum, two grains; Fluid Extract of Rhubarb, and Fluid Extract of Senna, each a fluidounce; Oil of Cloves, four drops; Syrup of Ginger, half a fluidounce; Mucilage of Gum Arabic, enough to make four fluidounces. Dose for an adult, a tablespoonful.

*For constipation.*

83. *Suppository of Soap.*

Cut a piece of good Yellow Soap to the shape, and rather less than the size, of the last joint of the little finger. Dip it in Castor Oil, Olive Oil, or Lard, and introduce it within the rectum.

*To act upon the bowels, instead of an enema.*

84. *Nux Vomica, Colocynth, and Soap.*

℞.—Compound Extract of Colocynth and White Soap, each half a drachm; Extract of Nux Vomica, five grains; mix, and divide into twenty pills. Take one night and morning.

*For torpor of the bowels.*

85. *Aloes, Rhubarb, and Belladonna.*

℞.—Rhubarb and Aloes, each half a drachm; Extract of Belladonna, three grains; Oil of Cloves, three drops; mix, and divide into twenty pills. Take one twice daily.

*For habitual constipation.*

86. *Calomel and Opium Pills.*

℞.—Calomel and Opium, each six grains; mix, and divide into twelve pills. Take one every two, three, or four hours.

*In peritonitis, bilious colic,* etc.

87. *Pills of Opium and Ipecacuanha.*

℞.—Powder of Opium and Powder of Ipecacuanha, each six grains; mix, and divide into twelve pills. Take one every three hours.

*In typhlitis.*

88. *Cerate of Carbonate of Lead.*

℞.—Carbonate of Lead, two drachms; Simple Cerate, one ounce; mix.

*For external use in chronic ophthalmia, periostitis, hemorrhoids,* etc.

89. *Aromatics,* etc., *for Colic.*

℞.—Aromatic Spirit of Ammonia and Spirit of Camphor, each a fluidrachm; Tincture of Ginger, two fluidrachms; Bicarbonate of Sodium, four scruples; Peppermint Water, enough to make four fluidounces. Dose, a tablespoonful.

90. *Carminative Anodyne.*

℞.—Spiced Syrup of Rhubarb, Compound Tincture of Cardamom, Paregoric, and Cinnamon Water, each a fluidounce; mix. Dose, from a dessertspoonful to a tablespoonful.

*For crapulent colic.*

91. *Chloroform Mixture.*

℞.—Chloroform, a fluidounce; Camphor Water, Peppermint Water, and Mucilage of Gum Arabic, each a fluidounce; mix. Dose, from a teaspoonful to a dessertspoonful, *repeated cautiously.*

*For colic,* etc.

92. *Chloroform Paregoric.—No.* 1.

℞.—Chloroform, Laudanum, Spirit of Camphor, and Aromatic Spirit of Ammonia, each a fluidrachm and a half; Creasote, three drops; Oil of Cinnamon, eight drops; Alcohol, two fluidrachms; mix. Dose, from ten drops to half a teaspoonful, in water.

*In cholera.*

93. *Chloroform Paregoric.—No.* 2.

℞.—Chloroform, two fluidrachms; Spirit of Camphor, a fluidrachm and a half; Laudanum, a fluidrachm; Oil of Cinnamon, five drops; Alcohol, three and a half fluidrachms; mix. Dose, ten drops to half a teaspoonful, in water.

94. *Carminative for Infants.*

℞.—Bicarbonate of Sodium, half a drachm; Aromatic Spirit of Ammonia, half a fluidrachm; Solution of Morphia, half a fluidrachm;

Syrup of Ginger, half a fluidounce; Camphor Water, enough to make two fluidounces; mix. Dose, a teaspoonful, repeated if necessary.

*In colic.*

95. *Podophyllum, Rhubarb*, etc.

℞.—Resin of Podophyllum, one grain; Simple Syrup of Rhubarb, a fluidounce; Oil of Fennel, one drop; mix. Dose, ten drops to a teaspoonful.

*For constipation in infants.*

96. *Castor Oil and Spiced Syrup of Rhubarb.*

Mix one tablespoonful of Castor Oil thoroughly with two tablespoonfuls of Spiced Syrup of Rhubarb; administer immediately after mixture. This is the least disagreeable way of taking castor oil.

97. *Castor Oil and Laudanum.*

To the above prescription, add ten, twenty, or thirty drops of Laudanum.

*Useful in incipient acute dysentery.*

98. *Assafœtida Mixture.*

Rub one drachm of Assafœtida gradually with four ounces of Water, until thoroughly mixed. Then add two fluidounces of Syrup of Ginger.

*Dose, for a child, a teaspoonful.*

99. *Magnesia and Ammonia Mixture.*

℞.—Best Magnesia (Husband's or Henry's), a drachm; Aromatic Spirit of Ammonia, a fluidrachm; Peppermint Water, four fluidounces; mix. To be shaken before administration. Take a teaspoonful every half hour.

*In common summer cholera morbus.*

Half a fluidounce of Paregoric may be added to the above, if there is *much* purging.

100. *Chloroform and Camphor.*

℞.—Chloroform, half a troyounce; Camphor, one drachm; the yolk of one egg; Water, six fluidounces. Rub the yolk in a mortar, first by itself, then with the Camphor, previously dissolved in the Chloroform, and lastly, with the Water, gradually added. This is the "Mixture of Chloroform" of the United States Pharmacopœia.

*Dose, from a teaspoonful to a tablespoonful.*

101. *Spiced Rhubarb and Magnesia.*

℞.—Spiced Syrup of Rhubarb, half a fluidounce; Magnesia (Husband's), fifteen grains; Cinnamon Water and Camphor Water, each two fluidrachms; mix. Take in two doses, three hours apart.

*As a corrective in slight diarrhœa.*

102. *Chalk Mixture.*

℞.—Prepared Chalk, two drachms; White Sugar and Gum Arabic, each a drachm and a half; Tincture of Kino, two fluidrachms and a

half; Laudanum, twenty to forty drops; Peppermint Water, enough to make six fluidounces; mix. Dose, a tablespoonful.

*In diarrhœa.*

103. *Camphor Mixture.*

℞.—Compound Spirits of Lavender, a fluidounce; Spirit of Camphor, a fluidrachm; Laudanum, half a fluidrachm; Sugar and Gum Arabic, each a drachm and a half; Cinnamon Water, enough to make six fluidounces; mix. Dose, a tablespoonful once in three hours.

*In diarrhœa.*

104. *Lead and Morphia Mixture.*

℞.—Acetate of Lead, eight to sixteen grains; Acetate of Morphia, one grain; Gum Arabic, two drachms; Cinnamon Water, enough to make eight fluidounces; mix. Take a teaspoonful every three or four hours.

*In obstinate diarrhœa.*

105. *Catechu and Paregoric.*

℞.—Tincture of Catechu and Paregoric, each, half a fluidounce; mix. Take a teaspoonful every three or four hours, with water.

*In severe diarrhœa.*

106. *Tannic Acid and Opium.*

℞.—Tannic Acid, thirty-six grains; Powder of Opium, three to four grains; mix, and divide into twelve pills. Take one every three or four hours.

*To check diarrhœa.*

107. *Calomel, Soda, and Ginger.*

℞.—Calomel, two grains; Bicarbonate of Sodium, one scruple; Powder of Ginger, twelve grains; mix, and divide into twelve powders. Give one three or four times daily.

*In incipient cholera infantum.*

108. *Mercury with Chalk and Cinnamon.*

℞.—Mercury with Chalk, and Powder of Cinnamon, each twelve grains; mix, and divide into twelve powders. Give one thrice daily.

*In the early stage of cholera infantum.*

109. *Ammonia, Rhubarb, and Paregoric.*

℞.—Aromatic Spirit of Ammonia, twenty-five drops; Paregoric, half a fluidrachm to a fluidrachm; Spiced Syrup of Rhubarb, a fluidounce; Peppermint Water, enough to make two fluidounces; mix. Give a teaspoonful every three hours.

*In cholera infantum.*

110. *Rhatany and Paregoric.*

℞.—Tincture of Krameria, and Paregoric, each a fluidrachm; Sugar and Gum Arabic, each half a drachm; Cinnamon Water, diluted, enough to make two fluidounces; mix. Give a teaspoonful every two, three, or four hours.

*To check the diarrhœa of cholera infantum.*

111. *Blue Mass and Ipecacuanha.*

℞.—Blue Mass, twelve grains; Powder of Ipecacuanha, six to twelve grains; mix, and divide into twelve pills. Take one every three hours.

*In incipient dysentery.*

112. *Blue Mass, Ipecacuanha, and Camphor.*

℞.—Blue Mass, eight grains; Ipecacuanha, six grains; Camphor, twelve grains; mix, and divide into twelve pills. Take one every three hours.

*In an early stage of dysentery.*

113. *Camphor, Ipecacuanha, and Opium.*

℞.—Camphor, eighteen grains; Ipecacuanha, six grains; Opium, three or six grains; mix, and divide into twelve pills. Take one every three or four hours.

*In dysentery.*

114. *Acetate of Lead and Opium Pills.*

℞.—Acetate of Lead, twelve to twenty-four grains; Opium, three to twelve grains; mix, and divide into twelve pills. Take one every three or four hours.

*In dysentery.*

115. *Enema of Laudanum and Starch.*

Prepare half an ounce of Starch, thin enough to be drawn into a small syringe; add from twenty to sixty or more drops of Laudanum, according to the case; mix, and inject into the bowel.

*In severe dysentery, retention of urine, very painful hemorrhoids,* etc.

116. *Enema of Sulphate of Zinc and Laudanum.*

To four fluidounces of Flaxseed Tea, made without boiling, add forty drops of Laudanum, and from four to ten grains of Sulphate of Zinc; mix, and inject into the rectum.

*In obstinate chronic dysentery.*

117. *Quinine, Ipecacuanha, Camphor, and Opium.*

℞.—Quinine, two scruples; Camphor, two scruples; Ipecacuanha, ten grains; Opium, ten grains; mix, and divide into twenty powders (or pills). Take one every three or four hours.

*In asthenic malarious dysentery.*

118. *Ointment of Galls and Opium.*

℞.—Powder of Galls, two drachms; Opium, ten grains; Lard, one ounce; mix. Apply as ointment.

*For piles.*

119. *Spermaceti Ointment and Opium.*

℞.—Ointment of Spermaceti, Ointment of Rose Water (Cold Cream) or Glyceramyl, an ounce; Opium, ten grains; mix. To be used as ointment.

*For piles.*

120. *Belladonna Ointment.*

℞.—Extract of Belladonna, a drachm; Spermaceti Ointment, an ounce; mix. Use as ointment.

*For painful piles.*

121. *Tannic Acid Wash.*

℞.—Tannic Acid, twenty to thirty grains; Water, six ounces; dissolve. To be injected (cooled with ice) into the rectum *for bleeding piles.*

122. *Soda and Sweet Spirit of Nitre.*

℞.—Bicarbonate of Sodium, three drachms; Sweet Spirit of Nitre, six fluidrachms; Peppermint Water, enough to make six fluidounces; dissolve. Take a tablespoonful three or four times daily.

*In uric acid gravel.*

123. *Benzoic Acid and Soda.*

℞.—Bicarbonate of Sodium, two drachms; Phosphate of Sodium, half an ounce; Benzoic Acid and Gum Arabic, each two drachms; Sweet Spirit of Nitre, half a fluidounce; Peppermint Water, enough to make six fluidounces; mix. Take from a teaspoonful to a tablespoonful, occasionally.

*In gravel.*

124. *Opium Suppositories.*

℞.—Opium, one or two grains; Cacao (Cocoa) Butter, a sufficient quantity; mix, and introduce into the rectum.

*For painful hemorrhoids, dysmenorrhœa, irritation of the bladder,* etc.

125. *Belladonna Suppositories.*

℞.—Extract of Belladonna, one to four grains; Cacao Butter, a sufficient quantity; mix, and introduce into the bowel.

*For painful hemorrhoids,* etc.

126. *Benzoic Acid.*

℞.—Benzoic Acid, two drachms; Cinnamon Water, six fluidounces; dissolve. Take a tablespoonful thrice daily.

*In irritation of the bladder, incontinence of urine,* etc.

127. *Croton Oil.*

℞.—Croton Oil, four drops; Crumb of Bread or Conserve of Roses, a sufficient quantity to make four pills; mix, and divide. Take one every four hours, until they operate.

*As a powerful cathartic, in rare cases.*

128. *Lead-water for the Eyelids.*

To a fluidounce of pure River, Well, or Spring Water, add one drop of Goulard's Extract of Subacetate of Lead. *Apply this with a camel's-hair pencil, to the outside of the lids, frequently.*

129. *Alum Eye-water.*

℞.—Two to four grains of Alum; Water, one fluidounce; dissolve. Drop into the eye from a quill or a hair pencil, once or twice daily.

130. *Collyrium of Nitrate of Silver.*

℞.—Nitrate of Silver, two to four grains; Distilled Water, one fluidounce; dissolve. Apply to the inside of the lids with a hair pencil, or drop between the lids.

131. *Atropia Solution for the Eye.*

℞.—Sulphate of Atropia, two to four grains · Water, one fluidounce; dissolve. Drop into the eye once or twice daily.

*To dilate the pupil; as in iritis.*

132. *Lotion for the Ear.*

℞.—Glycerin and Warm Water, each half a teaspoonful; mix. Pour into the ear from a teaspoon (in preference to a syringe) twice daily.

*For otalgia, or irritation of the ear.*

133. *Olive Oil and Laudanum.*

Mix half a teaspoonful of warm Olive Oil with five or ten drops of Laudanum; pour it into the ear.

*For earache.*

134. *Bromide of Ammonium.*

℞.—Bromide of Ammonium, two drachms; Water, four fluidounces; Aromatic Spirit of Ammonia, one fluidrachm; dissolve. Take a dessertspoonful thrice daily.

*In hysteria*, etc.

135. *Resin of Jalap.*

℞.—Resin of Jalap, one scruple; divide into three parts. Give one every four hours till they operate.

*An active cathartic.*

136. *Podophyllum Pills.*

℞.—Resin of Podophyllum, two grains; Turkey Rhubarb, eight grains; Oil of Anise, two drops; divide into eight pills. Take one or two at once.

*Cathartic and cholagogue.*

137. *Strychnia.*

℞.—Sulphate of Strychnia, half a grain; Conserve of Roses, sixteen grains; mix, and divide into sixteen pills. Take one or two thrice daily.

*Cautiously, in many cases of paralysis.*

138. *Stimulating Liniment.*

℞.—Oil of Turpentine, Spirit of Camphor, Water of Ammonia, and Olive Oil, each two tablespoonfuls; mix well together, for external application.

*In chronic rheumatism, bruises, sprains,* etc.

139. *Sassafras Liniment.*

℞.—Oil of Sassafras, two fluidrachms; Water of Ammonia, a tablespoonful; Camphorated Soap Liniment, three fluidounces; mix.

*For swelling of joints,* etc.

140. *Cod-liver Oil.*

℞.—Cod-liver Oil, twenty-four drachms; Alcohol, twelve drachms; Essence of Peppermint, twenty-four grains; mix. Take a dessertspoonful thrice daily.

*In phthisis, chronic rheumatism,* etc.

141. *Enema of Castor Oil, Soap, and Molasses.*

Mix together a tablespoonful of Oil, and the same of Molasses, with a pint of warm Water, in which a little Castile or good yellow Soap has been dissolved. Inject into the rectum with a syringe.

*To empty the bowels promptly.*

142. *Phosphate of Iron.*

℞.—Phosphate of Iron, one drachm; divide into twelve powders. Take one thrice daily, in water.

*A good chalybeate tonic.*

143. *Assafœtida Pills.*

℞.—Assafœtida, one drachm; divide into twenty pills. Take one every two or three hours.

*For hysterical nervousness.*

144. *Solution of Morphia with Valerian.*

℞.—Solution of Sulphate of Morphia (one grain to the fluidounce), and Fluid Extract of Valerian, each one fluidounce; mix. Take one or two teaspoonfuls, as required.

*In delirium tremens.*

145. *Pills of Opium, Camphor, and Hyoscyamus.*

℞.—Opium, four to eight grains; Camphor, twelve grains; Extract of Hyoscyamus, a scruple; mix, and divide into twelve pills. Take one every three or four hours; or, one or two at night.

*A good calmative.*

146. *Gallic Acid.*

℞.—Gallic Acid, two drachms and a half; Syrup of Cinnamon, four fluidounces; mix. Take a dessertspoonful every two, three, or four hours.

*As astringent, in hemorrhages, diabetes,* etc.

147. *Oil of Turpentine Mixture.*

℞.—Oil of Turpentine, two to four fluidrachms; Compound Spirit of Lavender, half a fluidounce; Laudanum, twenty minims; Sugar and Gum Arabic, each two drachms; Water, enough to make six fluidounces; mix. Take a tablespoonful at once.

*In hemorrhages, typhoid fever,* etc.

148. *Glyceramyl.*

Mix together two drachms of Starch, and two fluidounces of Bower's or Price's Glycerin, cold; heat gradually to about 240° Fahr., stirring all the time; then let it cool.

*A very soothing local emollient.*

149. *Neutral Mixture.*

℞.—Citrate of Potassium, two drachms; Lemon Syrup, half a fluidounce; Water, three and a half fluidounces; mix. Dose, a tablespoonful every two or three hours, with one of water, *in fever.* The lemon syrup may be omitted without disadvantage.

150. *Spiritus Mindereri with Nitre.*

℞.—Liquor of Acetate of Ammonium, three fluidounces and a half; Sweet Spirit of Nitre, half a fluidounce; mix. Take a tablespoonful every two or three hours, with a little water.

*In typhoid fever.*

151. *Jalap and Squills.*

℞.—Resin of Jalap, half a drachm to a drachm; Squills, twelve grains to a scruple; mix, and divide into twelve powders. Take one at once.

*As cathartic, in cerebral congestion, hydrocephalus,* etc.

152. *Sulphite of Sodium.*

℞.—Sulphite of Sodium, two to four drachms; Mucilage of Gum Arabic, six fluidounces; mix. Take a tablespoonful every three or four hours.

*In zymotic diseases, as glanders,* etc.

153. *Assafœtida and Expectorants.*

℞.—Syrup of Ipecac, two fluidrachms and a half; Syrup of Squills, three or four fluidrachms; Mixture of Assafœtida, enough to make two fluidounces; mix. Give one or two teaspoonfuls at once.

*In hooping-cough.*

154. *Belladonna Mixture.*

℞.—Extract of Belladonna, one grain; Mucilage of Gum Arabic, two fluidounces; mix. Give one or two teaspoonfuls thrice daily.

*In severe hooping-cough.*

155. *Fluid Extract of Hyoscyamus.*

℞.—Fluid Extract of Hyoscyamus, half a fluidrachm; Orange-flower Water, or Camphor Water, four fluidounces; mix. Give from a teaspoonful to a tablespoonful, every three or four hours.

*In severe hooping-cough.*

156. *Chlorate of Potassium.*

℞.—Chlorate of Potassium, two drachms and a half; Peppermint Water, four fluidounces; dissolve. Take a tablespoonful every three hours.

*In diphtheria, ulcerated sore mouth,* etc.

157. *Chlorate of Potassium and Chloride of Iron.*

℞.—Chlorate of Potassium, two drachms; Tincture of Chloride of Iron, one fluidrachm; Simple Syrup and Peppermint Water, each two fluidounces; mix. Take a tablespoonful every three hours.

*In diphtheria.*

158. *Creasote in Glycerin.*

Dissolve four to eight drops of Creasote in two fluidounces of Glycerin, diluted with an equal bulk of Water.

*Use as gargle.*

159. *Quinine Pills.*

℞.—Divide twenty grains of Sulphate of Quinine into ten or twenty pills. Take one as required.

*For intermittent fever,* etc.

160. *Sulphate of Cinchonia Solution.*

℞.—Sulphate of Cinchonia, forty-eight grains; Aromatic Sulphuric Acid (Elixir of Vitriol), a fluidrachm and a half; Compound Tincture of Cardamom, half a fluidounce; Peppermint Water, enough to make four fluidounces. Take a teaspoonful or two as required.

*For intermittent fever,* etc.

161. *Sulphate of Cinchonia Pills.*

℞.—Sulphate of Cinchonia, two scruples; divide into twenty pills. Take one as required.

*As a tonic, or for intermittent.*

162. *Quinine and Iron Pills.*

℞.—Sulphate of Quinine, a scruple; Pill of Carbonate of Iron (Vallet's Mass), a drachm; mix, and divide into twenty pills. Take one three or four times daily.

*An admirable tonic, after intermittent,* etc.

163. *Capsicum Pills.*

℞.—Powdered Capsicum, a drachm; divide into twelve pills. Take one every hour or two.

*In the chill of pernicious fever.*

164. *Calomel, Quinine, Camphor, and Opium.*

℞.—Calomel, Quinine, and Camphor, each eight grains; Opium, two grains; divide into eight pills. Take one every half hour, hour, or two hours.

*In pernicious fever.*

165. *Nitro-muriatic Acid, Nitre, and Camphor Water.*

℞.—Nitro-muriatic Acid, half a fluidrachm; Sweet Spirit of Nitre, half a fluidounce; Camphor Water, five and a half fluidounces; dissolve. Take a tablespoonful every two or three hours.

*In low fevers.*

166. *Nitric Acid.*

℞.—Nitric Acid, forty drops; Water, eight fluidounces; dissolve. Take one or two tablespoonfuls every three hours.

*In typhus fever.*

167. *Guaiacum.*

℞.—Tincture of Guaiacum, two fluidounces. Take a teaspoonful thrice daily, in water.

*For chronic rheumatism.*

168. *Nitre, Sulphur, and Guaiacum.*

℞.—Nitrate of Potassium, an ounce and a half; Sulphur, an ounce; Guaiacum, half an ounce; add two nutmegs, and a half pint of molasses; mix. Take a teaspoonful or two at night.

*For chronic rheumatism.*

169. *Iodide of Mercury.*

℞.—Green Iodide (Protiodide) of Mercury, twelve grains; Conserve of Roses, a scruple; divide into twelve or twenty-four pills. Take one twice daily.

*In syphilis.*

170. *Donovan's Solution.*

℞.—Liquor of the Iodide of Mercury and Arsenic, half a fluidounce. Take from three to five drops twice or thrice daily.

*In secondary syphilis, obstinate cutaneous eruptions,* etc.

171. *Injection for Gonorrhœa.*

℞.—Sulphate of Zinc, four grains; Water, two fluidounces; dissolve.

*Use once daily.*

172. *Injection for Gonorrhœa.*

℞.—Solution of Subacetate of Lead (Goulard's) half a drachm to a drachm; Water, four fluidounces.

*Use once daily.*

173. *Injection for Gonorrhœa.*

℞.—Chloride of Zinc, two grains; Glycerin and Water, each a fluidounce; dissolve.

*Use once daily.*

174. *Copaiba Mixture.*

℞.—Copaiba, half a fluidounce; Compound Spirit of Lavender, two fluidrachms; Sugar and Gum Arabic, each two drachms; Peppermint Water, enough to make six fluidounces. Take a tablespoonful thrice daily.

*In gonorrhœa.*

175. *Cubebs Mixture.*

℞.—Oil of Cubebs, two drachms; Sweet Spirit of Nitre, half a fluidounce; Sugar and Gum Arabic, each two drachms; Peppermint Water, enough to make six fluidounces; mix. Take a tablespoonful thrice daily.

*In gonorrhœa.*

176. *Lugol's Solution.*

℞.—Iodine, six drachms; Iodide of Potassium, a troyounce and a half; Distilled Water, a pint; dissolve. Dose, five or six drops, twice daily, in water.

*In scrofulous affections.*

177. *Glycerole of Zinc.*

℞.—Oxide of Zinc, half a drachm; Bower's or Price's Glycerin, four fluidounces; mix. Apply externally, as an emollient. Shake before using it.

178. *Cold Cream with Zinc.*

℞.—Acetate of Zinc, two grains, dissolved in one fluidrachm of Rose Water; mix with one ounce of Ointment of Rose Water (Cold Cream).

*Apply externally, for erythema.*

179. *Lead Ointment.*

℞.—Carbonate of Lead, four grains; Glycerin, a fluidrachm; Simple Cerate, one ounce; mix.

*For chronic erythema,* etc.

180. *Glycerole of Lead.*

℞.—Carbonate of Lead, one drachm; Glycerin, four fluidounces; mix.

As a local application for *ophthalmia* (*to the outside of the lids with a hair pencil*), *inflamed hemorrhoids, erysipelas, periostitis*, etc.

181. *Ointment of Oxide of Zinc.*

℞.—Oxide of Zinc, two drachms; Lard, one ounce, mix. Apply locally, for *eruptions on the face*, etc.

182. *Colchicum and Ipecacuanha.*

℞.—Wine of Colchicum Root, and Wine of Ipecac., each, two fluidrachms; mix. Take twenty drops, in water, thrice daily.

*In pustular diseases of the skin.*

183. *Ointment of Sulphuret of Potassium.*

℞.—Sulphide of Potassium, and Carbonate of Sodium, each, two drachms; Lard, two ounces; mix.

*For tinea capitis*, etc.

184. *Sulphite of Sodium and Glycerin.*

℞.—Sulphite of Sodium, two ounces; Glycerin, four fluidounces; Water, enough to make a pint; mix.

*Use as lotion, in chronic diseases of the skin.*

185. *Stimulating Embrocation.*

℞.—Aromatic Spirit of Ammonia, Spirit of Rosemary, and Glycerin, each a fluidounce; Tincture of Cantharides, three fluidrachms· Rose Water, enough to make eight fluidounces; mix.

*For the scalp, in premature baldness.*

186. *Cantharides and Castor Oil Pomade.*

℞.—Balsam of Tolu, two drachms; Oil of Rosemary, twenty minims; Tincture of Cantharides, two fluidrachms; Castor Oil, four fluidrachms; Lard, an ounce and a half; mix.

*For premature baldness.*

187. *Ointment of White Precipitate.*

℞.—Ammoniated Mercury, one scruple; Glycerin, a fluidrachm; Oil of Bitter Almonds, three drops; Lard, or Simple Ointment, an ounce; mix.

*For acne rosacea*, etc.

188. *Iodide of Sulphur Ointment.*

℞.—Iodide of Sulphur, one scruple; Lard, one ounce: mix.

*For army itch*, etc.

189. *Astringent Powder.*

℞.—Powder of Krameria, half an ounce; Prepared Chalk, two drachms; Dry Starch, an ounce and two drachms; mix.

*To be dusted on the skin in eczema, lichen agrius*, etc.

190. *Juniper Tar Soap.*

℞.—Oil of Juniper (Huile de Cade), Soft Soap, and Alcohol, each a fluidounce; mix.

*Apply as local alterative, in obstinate skin diseases.*

191. *Anti-Pruriginous Lotion.*

℞.—Oil of Juniper, and Alcohol, each a fluidounce; Water, six fluidounces; mix.

*For itching of the skin in prurigo senilis,* etc.

192. *Acid Lotion.*

℞.—Hydrochloric Acid, twenty drops; Water, four fluidounces; dissolve.

*For obstinate itching.*

193. *Lotion of Blue Vitriol.*

℞.—Sulphate of Copper, six grains; Elderflower Water, two fluidounces; dissolve.

*Use as lotion for chronic erythema,* etc.

194. *Lotion of Corrosive Sublimate.*

℞.—Bichloride of Mercury, four grains; Alcohol, and Distilled Water, each a fluidounce; dissolve.

*In favus,* etc., *as parasiticide.*

195. *Astringent and Sedative Lotion.*

℞.—Creasote, eight drops; Tincture of Krameria, two fluidrachms; Hydrocyanic Acid, eight drops; Distilled Water, four fluidounces: mix.

*In irritative and obstinate skin diseases.*

196. *Sedative Lotion.*

℞.—Cyanide of Potassium, fifteen grains; Water, eight ounces; dissolve. Apply externally. It should be kept in a dark place.

*For lichen or prurigo.*

197. *Sulphuro-alkaline Ointment.*

℞.—Two drachms of Sulphur; one drachm of Carbonate of Potassium; one ounce of Lard; mix.

*For itch.*

198. *Iodide of Potassium and Glycerin.*

℞.—Iodide of Potassium, half an ounce; Glycerin, two fluidounces; mix. Use as lotion.

*For scabies, army itch,* etc.

199. *Iodide of Potassium and Iodide of Sulphur.*

℞.—Iodide of Potassium, half an ounce; Iodide of Sulphur, a drachm; Glycerin and Rose Water, each two fluidounces; Oil of Bitter Almonds, three drops; mix.

*For itch,* etc.

200. *Ointment of Carbonate of Potassium.*

℞.—Carbonate of Potassium, one drachm; Glycerin, one fluidrachm; Lard, an ounce; mix.

*For eczema, herpes,* etc.

201. *Aloes Pills.*

℞.—Powder of Aloes, one to two scruples: Oil of Cloves, four drops; mix, and divide into twenty pills. Take one twice or thrice daily.

*For amenorrhœa.*

202. *Aloes and Iron.*

℞.—Aloes, twenty grains; Quevenne's Metallic Iron (per hydrogen), half a drachm; Oil of Cloves, three drops; mix, and divide into twenty pills. Take one thrice daily.

*For amenorrhœa.*

203. *Camphor, Lavender, Paregoric, and Ginger.*

℞.—Spirits of Camphor, one fluidrachm; Paregoric, two fluidrachms; Tincture of Ginger, half a fluidrachm; Compound Spirit of Lavender, half a fluidounce; Water, enough to make two fluidounces; mix. Take a dessertspoonful every hour or two.

*In dysmenorrhœa.*

204. *Alum Lotion.*

℞.—Alum, two drachms; Water, eight fluidounces; dissolve. Inject into the vagina, once or twice daily.

*For leucorrhœa.*

205. *Glycerole of Tannin.*

℞.—Tannic Acid, one ounce; Glycerin, four fluidounces; mix, and dissolve by a gentle heat. Inject daily.

*For ozœna, gonorrhœa, or leucorrhœa.*

206. *Santonin.*

℞.—Santonin, half a drachm; divide into twelve pills. Take one twice daily.

*An excellent vermifuge.*

207. *Senna and Pink-Root Infusion.*

℞.—Leaves of Senna, and Root of Spigelia, each half an ounce; Boiling Water, a pint and a quarter; infuse, covered, for two hours. Take a wineglassful morning and night.

*A good vermifuge.*

208. *Fluid Extract of Senna and Spigelia.*

℞.—Fluid Extract of Senna and Spigelia, a dessertspoonful; take it in the morning, on an empty stomach.

*For worms.*

209. *Suppository of Santonin.*

℞.—Santonin, twelve grains; Cacao Butter, a sufficient quantity to make four suppositories; mix, and divide. Introduce one into the bowel at bedtime.

*For seat-worms, a very efficient remedy.*

210. *Corrosive Sublimate Lotion.*

℞.—Corrosive Chloride of Mercury, a scruple; Water, four fluidounces; dissolve. Use as a wash.

*To destroy lice.*

211. *Cocculus Indicus.*

℞.—Seeds of Cocculus Indicus, eighty grains; Prepared Lard, an ounce. Bruise the seeds well in a mortar, and mix with the lard.

*To destroy lice.*

212. *Carbolic Acid and Glycerin.*

℞.—Carbolic Acid, one or two drachms; Glycerin, a fluidounce; Water, enough to make eight fluidounces; mix. Use as a lotion.

*To destroy lice, or relieve pruritus.*

213. *Carbolic Acid Gargle.*

℞.—Carbolic Acid, twenty minims; Acetic Acid, half a drachm; Honey, two drachms; Tincture of Myrrh, two drachms; Water, enough to make six fluidounces. Mix together the acids first, and then, gradually, the honey and water.

*In diphtheria.*

214. *Carbolated Glycerin.*

℞.—One fluidounce of Carbolic Acid (melted); nine fluidounces of Bower's or Price's Glycerin. Mix over a water-bath at 120° Fahr., stirring until incorporated. Use as injection, in *ozæna*, etc., *diluted* with ten or twenty times its bulk of water.

215. *Hebra's Petroleum Unguent.*

℞.—Petroleum and Alcohol, each one ounce; Balsam of Peru, one drachm; Oil of Rosemary and Oil of Lavender, each fifteen minims. To be applied externally.

*For itch.*

## MISCELLANEOUS PRESCRIPTIONS.

216. *Syrup of Iron, Quinine, and Strychnia.*

℞.—Ferri Sulphatis, ʒv; Sodii Phosphatis, ʒvj–ʒj; Quiniæ Sulphatis, gr. cxcij; Acidi Sulphurici Diluti, quantum sufficit; Aquæ Ammoniæ, quantum sufficit; Strychniæ, gr. vj; Acidi Phosphorici Diluti, fʒxiv; Sacchari Albi, ʒxiv. Dissolve the sulphate of iron in one ounce of boiling water, and the phosphate of sodium in two ounces of boiling water. Mix the solutions, and wash the precipitated phosphate of iron until the washings are tasteless. With sufficient diluted sulphuric acid, dissolve the sulphate of quinia in two ounces of water. Precipitate the quinia with ammonia water, and carefully wash it. Dissolve the phosphate of iron and the quinia thus obtained, and also the strychnia, in the diluted phosphoric acid. Then add the sugar, dissolve the whole, and mix, without heat.

Dose, a tablespoonful thrice daily, in *anæmia*, *chlorosis*, *leucocythæmia*, etc. This is a favorite prescription with Dr. Aitken.

217. *Chlorodyne.*

℞.—Chloroformi fʒss; Ætheris Sulphurici, ♏xc; Olei Menthæ Piperitæ, gtt. viij; Resinæ Cannabis Indicæ, gr. vj; Capsici, gr. ij. Mix, shake occasionally, and allow it to stand for a few days. Also Morphiæ Muriatis, gr. xvj; dissolve by the aid of heat in fʒij of Water; to which, when cold, add of Scheele's Hydrocyanic Acid,

℥lxv; Perchloric Acid, f℥j; of Simple Syrup (or treacle), f℥ij. Add this gradually to the first mixture, and add enough water to make four fluidounces in all. Dose, thirty minims.

*A powerful narcotic, whose 'pretensions, however, have been exaggerated.*

Dr. Edward Smith has given the following as the recipe for chlorodyne:—

℞.—Chloroformi, f℥iv;
Morph. Muriat., gr. xx;
Æther. Rectificat., f℥ij;
Ol. Menth. Pip., ℥viij;
Acid. Hydrocyan. Dilut., f℥iv;
Tinct. Capsici, f℥vj;
Mist. Acaciæ, f℥j.
Theriacæ[1] ad, f℥v.

218. *Dr. Hammond's Alterative for Syphilis.*

℞.—Potassii Iodidi, ℥j; Hydrargyri Bichloridi, gr. vj; Aquæ, f℥xij; misce.

Take a tablespoonful thrice daily.

*In syphilitic rupia,* etc.

219. *Cinchonated Syrup of Iron.*

℞.—Ferri Phosphatis, ℥j;
Aquæ, f℥jss; solve.
Cinchoniæ Sulphatis, ℈j;
Acidi Sulphurici Diluti, gtt. xx.
Aquæ, f℥jss; solve.

Misce, et adde Syrupi Aurantii quantum sufficit ut fiat mistura, f℥iv. Dose, a dessertspoonful, as a tonic.

220. *Antidote for Arsenic.*

℞.—Liquoris Ferri Tersulphatis (U. S. P.), et
Aquæ Ammoniæ, āā f℥iv;
Aquæ, Oj; misce.

Pour this mixture into a small muslin bag, strain and wash it; then mix the precipitate with half a pint of water. Give a tablespoonful every five minutes.

221. *Compound Rhubarb Pills* (U. S. P.).

℞.—Pulveris Radicis Rhei, gr. xxiv; Aloes, gr. xviij; Myrrhæ, gr. xij; Olei Menthæ Piperitæ, ℥ij; Aquæ, q. s.; misce bene, et divide in pil. no. xij.

*A good, active cathartic.*

222. *Compound Cathartic Pills* (U. S. P.).

℞.—Extracti Colocynthidis Compositi, gr. xvj; Extracti Jalapæ (pulv.), et Hydrargyri Chloridi Mitis, āā gr. xij; Gambogiæ, gr. ijss; Aquæ, q. s.; misce, et divide in pil. no. xij.

*A decidedly active cholagogue cathartic.*

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[1] Molasses.

223. *Effervescing Solution of Citrate of Magnesium* (U. S. P.).

℞.—Magnesii Carbonatis, ℥v; Acidi Citrici, ℥vijss; Syrupi Limonis (vel Syrupi Acidi Citrici), f℥ij; Aquæ q. s. Dissolve the citric acid in four fluidounces of water, and add four drachms of the carbonate of magnesium, previously rubbed with three fluidounces of water. When the reaction has ceased, filter into a strong glass bottle holding twelve fluidounces; into which the syrup has been introduced. Rub the remaining carbonate of magnesium with two fluidounces of water, pour into the bottle, cork quickly, and secure the cork with twine. Dose, from half a tumblerful to a whole bottle.

*The least disagreeable of all cathartic medicines.*

224. *Hope's Mixture.*

℞.—Aquæ Camphoræ, f℥iv; Acidi Nitrosi, ♏xxx; Tincturæ Opii, ♏xx; misce.

Dose, a tablespoonful, every two or three hours.

*In diarrhœa and asthenic dysentery.*

225. *Quinine and Chloride of Iron.*

℞.—Quiniæ Sulphatis, ℈j; Tincturæ Ferri Chloridi, f℥ijss. Fiat solutio.

Dose, fifteen drops, in solution.

*In diphtheria, asthenic erysipelas,* etc.

226. *Quinine for Children.*

℞.—Quiniæ Sulphatis, ℥ss; Pulveris Gummi Acaciæ, ℥ss; Syrupi Zingiberis, f℥iv; misce.

Dose, a teaspoonful (one grain of quinine) or less, *as required, in intermittent,* etc.

227. *Effervescing Fever Powders.*

℞.—Acidi Citrici, ℥v; divide in partes xij. *Wrap each of these in a white paper.*

℞.—Potassii Bicarbonatis, ℥vjss; divide in partes xij. *Wrap each of these in blue paper.*

For use, dissolve the acid powder in four tablespoonfuls of cold water in a tumbler, and add, with stirring, the other powder. One dose every two or three hours will be suitable *in inflammatory or remittent fever,* etc.

228. *Liquid Substitute for Dover's Powders.*

℞.—Vini Ipecacuanhæ, ♏xvj; Tincturæ Opii, ♏xiij; Spiritûs Ætheris Nitrici, f℥j; misce. To be taken with water, at bedtime.

*For influenza,* etc.

229. *Soda Powders.*

℞.—Sodii Bicarbonatis, gr. xxiij.

℞.—Acidi Tartarici, gr. xx.

Dissolve each in four tablespoonfuls of water, separately; then pour the solutions together, and drink while effervescing. Ginger syrup may be added if desirable.

230. *Scudamore's Gout Mixture, Modified.*

℞.—Magnesii Sulphatis, ℥j; Magnesiæ Optimæ, ʒij; Vini Colchici Radicis, f℥j; Aquæ Menthæ Piperitæ, f℥x. Misce.

Dose, a tablespoonful every hour until it operates.

231. *Black Wash.*

℞.—Hydrargyri Chloridi Mitis, ʒj; Liquoris Calcis, f℥iv; misce. Apply on lint.

*A popular lotion for chancre.*

232. *Yellow Wash.*

℞.—Hydrargyri Chloridi Corrosivi, gr. xvj; Liquoris Calcis, f℥viij; misce. *For Chancre.* Apply on lint.

233. *Volatile Liniment.*

℞.—Aquæ Ammoniæ et Olei Olivæ, āā f℥ss. Misce.

*To bathe an inflamed throat,* etc.

234. *Iodine Ointment.*

℞.—Iodinii, ℈j; Potassi Iodidi, gr. iv; Aquæ, ♏vj; Adipis, ℥j. Misce.

*For tumors, chronic inflammation of joints,* etc.

235. *Tar Ointment.*

℞.—Picis Liquidæ, et Sevi (vel Adipis), āā ℥ij. Mix with the aid of heat, and strain through muslin.

*For tinea capitis,* etc.

236. *Glycerin Ointment.*

℞.—Cetacei, ℥ss; Ceræ Albæ, ʒj; Olei Amygdalæ Dulcis, f℥ij; Glycerinæ, f℥j.

Melt the wax and spermaceti with the oil of almonds at a moderate heat; put these into a mortar, add the glycerin, and triturate until cold.

*For chapped hands,* etc.

237. *Calomel and Camphor Ointment.*

℞.—Hydrargyri Chloridi Mitis, gr. viij; Camphoræ, ℈j; Glycerinæ, f℥j; Cetacei, ℥ss; Adipis, ℥jss. Misce.

*For lichen or herpes of the face,* etc.

238. *Sulphur Ointment.*

℞.—Sulphuris, ℥j; Adipis, ℥ij; misce.

*For itch,* etc.

239. *Lozenges for Hoarseness.*

℞.—Pulveris Cubebæ, ℥ss; Ammonii Chloridi, ℥j; Olei Eucalypti, f℥j; Pulveris Glycyrrhizæ, Sacchari Albi, et Gummi Acaciæ, āā ʒiij; Syrupi Tolutani, q. s.

Rub the powders thoroughly together, then add the oil, lastly the syrup. Divide the mass into lozenges of ten grains each.

240. *Liquorice and Opium Lozenges* (U. S. P.).

℞.—Opii Pulveris, ℥ss; Glycyrrhizæ, Gummi Acaciæ, et Sacchari Albi, āā ℥x; Olei Anisi, f℥j. Rub the powders thoroughly together,

then add the oil of anise, and lastly add enough water to form a mass. Divide into lozenges, each of ten grains.

Like "Wistar's Cough Lozenges," these are very soothing to cough, when taken at night.

### 241. *Rhubarb, Magnesia, and Charcoal.*

℞.—Pulveris Rhei Radicis, Magnesiæ Optimæ, et Carbonis Animalis Purificati, āā ℥j; Pulveris Zingiberis, ℥ss; misce. Divide into three parts, and take one each morning, on rising.

*For "biliousness,"* etc.

### 242. *Iodide of Lead Ointment.*

℞.—Plumbi Iodidi, ℥j; Adipis, ℥j; misce.

*For scrofulous and other tumors.*

### 243. *Liniment of Iodide of Potassium.*

℞.—Potassii Iodidi, ℥j; Glycerinæ, f℥j; Tincturæ Saponis Camphoratæ, f℥iij; Olei Limonis, gtt. iv; misce.

*For swollen joints,* etc.

### 244. *Phosphate of Manganese.*

℞.—Manganesii Phosphatis, ℥j; Acidi Phosphorici Diluti, ♏xxv; Ferri Phosphatis, ℥jss; Syrup Cinnamomi, f℥j; Aquæ, f℥vij; misce. Take a teaspoonful or two, thrice daily.

*For anæmia, hysteria,* etc.

### 245. *Stevens' Saline Draught.*

℞.—Sodii Chloridi, ℈iv; Potassii Chloratis, gr. xxviij; Sodii Carbonatis, ℥ij; Aquæ, f℥vj; dissolve. Take two or three tablespoonfuls every half hour, as the "saline treatment" of *cholera.*

### 246. *Radcliffe's Phosphorus Pills.*

Take of Phosphorus, six grains; Suet, six hundred grains. Melt the Suet in a stoppered bottle capable of holding twice the quantity indicated. Put in the Phosphorus, and, when liquid, agitate the mixture until it becomes solid. Roll into three-grain pills, and cover with gelatin. Each pill will contain one thirty-third of a grain of phosphorus.

### 247. *Trousseau's Syrup of Lime.*

Saturate Simple Syrup with unslaked Lime. Or mix two ounces of Lime and eight ounces of Sugar in a mortar, and pour over them a pint of boiling Water. Take half a teaspoonful two or three times daily, in milk.

*For rheumatism.*

### 248. *To make a Sponge-Tent.*

Cut a small, elongated, conical piece of sponge, dip it in water, and bind it tightly, with fine strong twine or cord, around a central wire; then dry it, remove the cord, coat it with a mixture of equal parts of wax, lard, and glycerin, and fasten a piece of tape four inches long to the larger end.[1]

[1] Or, before wetting the sponge, pass the tape *through it,* from end to end; so that both ends of the tape may be used to withdraw the tent.

*For uterine dilatation*, etc. *Great care is necessary in its use.*

The dried stem of the sea-tangle (laminaria digitata) is preferred for the same purpose by some practitioners; and strips of slippery elm bark by others.

249. *Carbolized Sponge-Tent.*

Prepare a piece of clean sponge as above, and, before wrapping it, saturate it with a mixture of twelve grains of crystallized carbolic acid in an ounce of gum mucilage.

*Use as above.*

250. *Richardson's Styptic Colloid.*

Dissolve, in Absolute Aclohol, as much pure Tannin as it will take up with several days' digestion. Then add enough washed Ether to make the thick tincture quite fluid. Saturate this with *Xyloidin* or Gun-cotton. Lastly, add a few drops of Tincture of Benzoin.

*To be applied externally, for open cancer, hemorrhage, gangrene.*

251. *Styptic Colloid, modified.*

Dissolve one drachm of pure Tannin in as little Absolute Alcohol as will take it up, and then add it to one fluidounce of Collodion. Use externally.

*In open cancer, hemorrhage, gangrene*, etc.

252. *Phosphorized Oil.*

Add two parts of Phosphorus to one hundred parts of Oil of Almonds; warm gently by a water-bath for twenty minutes in a bottle almost closed from the air; then cool and pour off. Dose, a portion equal to one-hundredth to one-fiftieth of a grain of Phosphorus.

*In locomotor, ataxy, neurasthenia*, etc.

253. *Phosphorus Pills.*

Take of Phosphorus, 2 grains; Rice-flour, 200 grains; White Soap, 250 grains; Oil of Anise, and Glycerin, each 50 drops. Mix carefully, and divide into 100 pills.

*A powerful tonic, in nervous exhaustion.*

254. *Sir H. Thompson's Emollient Injection for the Bladder.*

Dissolve one ounce of Borax and two fluidounces of Glycerin in two ounces of Water. Of this, for use, add two or three teaspoonfuls to four fluidounces of warm Water.

*Inject into the bladder through a catheter; in cystitis, or irritable bladder.*

255. *Brown-Séquard's Prescription for Epilepsy.*

Take of Iodide of Potassium, one drachm; Bromide of Potassium, one ounce; Bromide of Ammonium, two drachms and a half; Bicarbonate of Potassium, two scruples; Tincture of Columbo, one fluidounce; Water, five fluidounces; dissolve. Dose, a teaspoonful, with a little water, before each meal, and three teaspoonfuls at bedtime.

256. *Carbolic Acid.*

Mix eight grains of Crystallized Carbolic Acid with two fluidounces, each, of Cinnamon Water and Mucilage of Gum Arabic. Dose, a *tablespoonful* every three or four hours.

257. *Hydrate of Chloral.*

Dissolve half an ounce of Hydrate of Chloral and twenty drops of Essence of Peppermint in four fluidounces of pure Glycerin. Dose, a dessertspoonful (two teaspoonfuls) *with a tablespoonful of water.*

258. *Syrup of Lacto-Phosphate of Calcium.*

Take of Phosphate of Calcium, sixteen grains; Lactic Acid, thirty-three grains; Simple Syrup, a fluidounce. Mix. Dose, one or two teaspoonfuls, thrice daily.

*In rickets,* etc.

259. *Anti-pruriginous Lotion.*

Mix together two drachms of Borax, twenty grains of Hydrochlorate of Morphia, half a drachm of Hydrocyanic Acid, one fluidounce of Glycerin, and eight fluidounces of Rose Water (or Distilled Water).

*Use as a wash in pruritus vaginæ,* etc.

260. *Carbolic Liniment.*

Take of Carbolic Acid, one fluidounce; Liniment of Camphor (saturated solution of Camphor in Olive Oil), three fluidounces. Mix well together. Apply with camel's-hair pencil.

*For neuralgia, inflamed corns, bunions,* etc.

261. *Lead, Carbolic Acid, and Glycerin.*

Take of Carbolic Acid, half a fluidounce; Solution of Subacetate of Lead (Goulard's Extract), one fluidrachm; Glycerin, enough to make a four ounce mixture. Apply with a large camel's-hair pencil.

*For inflamed corns, bunions,* etc.

262. *Salicylic Acid.*

Take of Salicylic Acid, one drachm; Citrate of Ammonia, one drachm; Glycerin, two fluidrachms; Brandy, six fluidrachms. Distilled Water, five fluidounces. Dissolve. Dose, one or two tablespoonfuls.

*For acute inflammatory rheumatism.*

263. *Liquor Picis Alkalinus.*

Take of Tar, two fluidrachms; Caustic Potassa, one drachm; Water, five drachms. Mix together, and use diluted.

*For chronic eczema,* etc.

264. *Acid Syrup of Iron.*

Take of Tincture of Chloride of Iron, three fluidrachms; Dilute Phosphoric Acid, half a fluidounce; Syrup of Lemons, three fluidounces. Mix. Dose, a dessertspoonful.

*An agreeable tonic, for anæmia,* etc.

265. *Meigs' Aromatic Syrup of Galls.*

Take of Pulverized Galls, half an ounce; Pulverized Cinnamon, two drachms; Pulverized Ginger, half a drachm; Best Brandy, half a pint. Mix, and leave the mixture to stand in a warm place for two hours. Then burn off the brandy, holding lumps of sugar in the flame.

Strain through filtering paper. Dose, 15 to 40 drops every three hours.

*For infantile diarrhœa.*

### 266. *Squibb's Cholera Mixture.*

Take of Laudanum, Tincture of Capsicum, and Spirits of Camphor, each a fluidrachm; Chloroform, three fluidrachms; Alcohol, enough to make a fluidounce. Mix. Dose, 20 to 40 minims.

### 267. *Churchill's Hypophosphites.*

Dr. F. Churchill recommends a formula, which he calls "Liquor Ferri Hypophosphitis Compositus," and of which the following is the percentage composition:

| | |
|---|---|
| Ferrous hypophosphite . . . . | 2.77 |
| Calcium hypophosphite . . . . | 3.5 |
| Sodium hypophosphite . . . . | 3.5 |
| Magnesium hypophosphite . . . | 1.99 |
| Hypophosphorous acid . . . . | 1.66 |
| Water . . . . . | 86.58 |
| | 100.00 |

One fluidrachm is equal to 6.7 grains of the mixed salts.

*In phthisis,* etc.

### 268. *Basham's Mixture.*

Take of Liquor of Acetate of Ammonium, six fluidounces; Acetic Acid, three drachms; Tincture of Chloride of Iron, five drachms; Alcohol, two fluidounces; Syrup and Water, each four fluidounces. Mix.

Dose, a teaspoonful three or four times a day.

*In anæmic dropsy,* etc.

### 269. *Four Chlorides* (A. H. Smith).

Take of Corrosive Sublimate, one or two grains; Solution of Chloride of Arsenic, a fluidounce; Tincture of Chloride of Iron, and Dilute Hydrochloric Acid, each four fluidrachms; Simple Syrup, three fluidounces; Water, enough to make in all six fluidounces. Dose, a dessertspoonful, in water, after each meal.

*A powerful alterative; e. g., in chlorosis, anæmic syphilitic cases,* etc.

### 270. *Pills of Phosphorus, Iron, Quinine, and Nux Vomica.*

Take of Phosphorus (for each pill) one hundredth of a grain; Pill of Carbonate of Iron (Vallet's), two grains; Sulphate of Quinine, one grain; Extract of Nux Vomica, one quarter of a grain. To be taken thrice daily.

*A powerful nervine tonic.*

### 271. *Bland's Pills of Iron.*

Take of Dried Sulphate of Iron, and Carbonate of Potassium, each two drachms; Simple Syrup, a sufficient quantity to make a mass. Divide into 48 pills. One to be taken three or four times daily.

272. *Phosphorated Cod Liver Oil* (Squibb).

Take of Phosphorus, one grain; Cod Liver Oil, ninety grains. Mix, with great care. Dose, one or two drops, in a tablespoonful of Cod-Liver Oil.

273. *Phosphorus Mixture.*

Dissolve, with gentle heat, one grain of Phosphorus in five fluidounces of Absolute Alcohol. Mix together one fluidrachm of Essence of Peppermint, two fluidrachms of Alcohol, and a fluidounce and a half of Glycerin. Add this mixture to the Solution of Phosphorus in Alcohol, while it is warm. Dose, 20 to 30 minims.

274. *Gregory's Powder.*

Mix together two ounces of Rhubarb with one ounce of Ginger and six ounces of Magnesia. Dose, about a teaspoonful; as a *stomachic laxative.*

275. *Compound Senna Powder* (Blackwell).

Take of Pulverized Senna, Washed Sulphur, and White Sugar, each half an ounce; Pulverized Fennel Seed, and Pulverized Liquorice, each two drachms. Mix. Dose, a teaspoonful.

*A moderate laxative.*

276. *Iodoform with Cod-Liver Oil.*

Take of Iodoform, four grains; Cod Liver Oil, three ounces and a quarter (by weight); Aniseed Oil, twenty-five drops. Mix. Dose, from a teaspoonful to a tablespoonful.

277. *Bitter Syrup of Iodide of Potassium.*

Take of Iodide of Potassium, one ounce; Tincture of Quassia, and Simple Syrup, each half a fluidounce. Dose, a quarter to a half a teaspoonful.

278. *Iodide of Potassium with Digitalis.*

Take of Iodide of Potassium, half a drachm; Tincture of Digitalis, half a fluidounce; Syrup of Gum Arabic, four fluidounces. Mix. Dose, a dessertspoonful four times daily.

*In aneurism of aorta,* etc.

279. *Aloes with Nux Vomica.*

Take of Extract of Nux Vomica, five grains; Ipecacuanha, ten grains; Aloes and Assafœtida, each half a drachm. Mix, and divide into twenty pills. One to be taken at night.

*For habitual constipation.*

280. *Colocynth and Nux Vomica.*

Take of Extract of Nux Vomica, ten grains; Pulverized Black Pepper, one scruple; Compound Extract of Colocynth, two scruples. Mix, and divide into twenty pills. One to be taken at night.

*A tonic laxative, in obstinate constipation.*

281. *Quinine with Hydrochloric Acid* (Fothergill).

Take of Sulphate of Quinine, half a grain; Dilute Hydrochloric Acid, three drops; Orange Syrup, twenty minims; Water, enough to make two fluidrachms. Mix, for a single dose.

*In infantile remittent.*

282. *Quinine, Iron, and Chlorate of Potassium.*

Take of Sulphate of Quinine, half a drachm; Tincture of Chloride of Iron, three fluidrachms; Chlorate of Potassium, four drachms; Simple Syrup, half a fluidounce; Peppermint Water, enough to make in all two fluidounces. *Take a teaspoonful every three or four hours; or half a teaspoonful every two hours.*

*In malignant diphtheria.*

283. *Benzoate of Sodium* (Letzerich).

Take of Benzoate of Sodium, four scruples; Syrup of Orange, two and a half fluidrachms; Peppermint Water and Distilled Water, each a fluidounce and a half. Mix. Dose, from a teaspoonful to a tablespoonful, according to age.

*In diphtheria, or scarlet fever.*

284. *Salicylic Acid with Acetate of Potassium.*

Take of Salicylic Acid, two drachms and two scruples; Acetate of Potassium, five drachms and one scruple; Glycerin, a fluidounce; Water, enough to make four fluidounces. Mix. Dose, a teaspoonful.

*In rheumatic fever.*

285. *Salicylic Acid with Bicarbonate of Potassium.*

Take of Salicylic Acid, three drachms; Bicarbonate of Potassium, six drachms; Water, two fluidounces. Mix. Dose, a teaspoonful every three hours.

*In acute rheumatism.*

286. *Salicylic Acid with Citrate of Potassium.*

Take of Salicylic Acid, four drachms and four scruples; Citrate of Potassium, one ounce; Glycerin, four fluidounces; Alcohol, one fluidounce; Cinnamon Water, enough to make eight ounces. Dose, a dessertspoonful.

*In acute rheumatism.*

287. *Salicylate of Sodium.*

Take of Salicylic Acid, three drachms; Bicarbonate of Sodium, two drachms; Glycerin and Water, each two fluidounces. Mix. Dose, a tablespoonful every four hours.

*In acute rheumatism.*

288. *Salicylic Acid with Acetate of Ammonium.*

Take of Salicylic Acid, two drachms; Solution of Acetate of Ammonium, and Water, each four fluidounces. Mix. Dose, a tablespoonful.

*In acute rheumatism.*

289. *Anti-emetic Mixture.*

Take of Dilute Hydrocyanic Acid, twenty drops; Compound Tincture of Gentian, three fluidrachms; Subnitrate of Bismuth, one drachm; Aromatic Spirit of Ammonia, one fluidrachm; Syrup of Ginger, a fluidounce; Water, two fluidounces. Mix. Take a dessertspoonful at once.

290. *Soda Mint Mixture.*

Take of Bicarbonate of Sodium, one drachm; Aromatic Spirit of Ammonia, two fluidrachms; Peppermint Water, four fluidounces. Mix. Take from a teaspoonful to a tablespoonful at once.

291. *Carminative Mixture.*

Take of best Magnesia, one drachm; Aromatic Spirit of Ammonia, forty minims; Tincture of Assafœtida, a fluidrachm; Essence of Peppermint, fifteen drops; Syrup of Gum Arabic, a fluidounce; Water, enough to make four fluidounces. Dose, a teaspoonful to a tablespoonful.

*For infants' colic,* etc.

292. *Bismuth, Pepsin, and Strychnia* (Pepper).

Take of Subnitrate of Bismuth, and of Pepsin, each a drachm and a half; Sulphate of Strychnia, one grain; Compound Tincture of Cardamom, enough to make in all four fluidounces. Mix. Take a teaspoonful thrice daily, in water.

*In atonic dyspepsia.*

293. *Nitromuriatic Acid with Nux Vomica* (Pepper).

Take of Dilute Nitromuriatic Acid, and Tincture of Nux Vomica, each half a fluidrachm; Compound Tincture of Gentian, enough to make in all four fluidounces. Mix. Take a teaspoonful, in water, after each meal.

*In atonic dyspepsia.*

294. *Mercury with Iron* (Otis).

Take of Blue Pill two grains; Dried Sulphate of Iron, one grain. One such pill to be taken twice or thrice daily. They should be omitted if signs of salivation appear.

*In anæmic cases of syphilis.*

295. *Iron and Nux Vomica.*

Take of Tincture of Chloride of Iron, and Tincture of Nux Vomica, each a fluidrachm; Water, a fluidounce. Dose, a teaspoonful.

296. *Compound Solution of Phosphoric Acid with Iron.*

Take of Phosphate of Iron, one-half grain; Phosphate of Potassium, one-quarter of a grain; Phosphate of Magnesium, half a grain; Phosphate of Calcium, three grains; Syrupy Phosphoric Acid, six and a half minims; Water, enough to make one fluidrachm: a single dose. To be taken thrice daily.

*For general debility, anæmia,* etc.

297. *Cantharides with Iron.*

Take of Tincture of Chloride of Iron, fifteen drops; Tincture of Cantharides, five drops. Mix. Take twice daily, in water.

*For sexual exhaustion and impotence.*

298. *Nux Vomica and Phosphorus.*

Take of Extract of Nux Vomica, a quarter of a grain; Phosphide of Zinc, one-sixth of a grain; Extract of Gentian, two grains. Mix, in a pill, to be taken twice daily.

*For impotence.*

299. *Iron and Digitalis with Phosphoric Acid.**

Take of Tincture of Chloride of Iron, a fluidrachm and a half; Dilute Phosphoric Acid, two fluidrachms; Tincture of Digitalis, one fluidrachm; Water, enough to make in all one fluidounce. Mix first the Tincture of Chloride of Iron and Phosphoric Acid, and afterwards add the Tincture of Digitalis. Dose, half a teaspoonful to a teaspoonful.

*In exophthalmic goitre,* etc.

300. *Quinine, Iron, and Nux Vomica.*

Take of Sulphate of Quinine, two scruples; Tincture of Chloride of Iron, four fluidrachms; Tincture of Nux Vomica, four fluidrachms; Hydrochloric Acid, half a fluidrachm; Simple Syrup, one fluidounce; Water, enough to make three fluidounces. Dose, a teaspoonful, thrice daily.

*In anæmia, neurasthenia,* etc.

301. *Iron with Chloride of Ammonium* (T. G. Stewart).

For each minim of Tincture of Chloride of Iron, add half a grain of Chloride of Ammonium.

*When iron does not agree with the digestive system.*

302. *Iron with Hydrochloric Acid* (Fothergill).

Take of Tincture of Chloride of Iron, five minims; Dilute Hydrochloric Acid, ten minims. Take, in water, three or four times daily.

303. *Modified Dover's Powder* (Chisholm).

Substitute the Bromide of Potassium, in equal quantity, for the Sulphate of Potassium, in the ordinary formula for Dover's Powder.

304. *Chloral, Bromide of Potassium, and Opium.*

Take of Hydrate of Chloral, one drachm; Bromide of Potassium, one drachm; Laudanum, one fluidrachm; Simple Syrup, half a fluidounce; Cinnamon Water, enough to make two fluidounces. Mix. Dose, from a dessertspoonful to a tablespoonful, at night.

*For insomnia.*

305. *Valerian, Lupulin, and Lactucarium.*

Take of Tincture of Lupulin, a fluidounce; Elixir of Valerianate of Ammonium, and Syrup of Lactucarium, each half a fluidounce. Mix. Dose, a teaspoonful or two, at bedtime.

*For insomnia, or nervous restlessness at night.*

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* This makes an almost perfectly clear solution, which may be made entirely so by filtration.

306. *Bromide of Potassium and Hyoscyamus.*

Take of Bromide of Potassium, half a drachm; Tincture of Hyoscyamus, half a fluidrachm; Camphor Water, a fluidounce. To be taken at bedtime.

*For chordee or spermatorrhœa.*

307. *Anaphrodisiac* (Bartholow).

Take of Tincture of Gelsemium, one fluidrachm; Tincture of Belladonna, two fluidrachms. Mix. Dose, 15 drops, in water, thrice daily.

308. *Chloral with Bromide of Potassium.*

Take of Hydrate of Chloral, five grains; Bromide of Potassium, twenty grains; Peppermint Water and Simple Syrup, each two fluidrachms. Mix. Dose, from a teaspoonful to a tablespoonful.

*For nervous restlessness; as night-terrors in children.*

309. *Nitre with Camphor and Ammonia.*

Take of Nitrate of Potassium, one drachm; Sweet Spirit of Nitre, two fluidrachms; Camphor Water, a fluidounce and a half; Solution of Acetate of Ammonium, enough to make four fluidounces. Mix. Dose, a tablespoonful every three or four hours.

*A calmative diaphoretic.*

310. *Aconite with Nitre and Citrate of Potassium.*

Take of Tincture of Aconite Root, five minims; Sweet Spirit of Nitre, one fluidrachm; Citrate of Potassium, one drachm; Water, enough to make two fluidounces. Mix. Dose, a tablespoonful, every two, three, or four hours.

*A sedative diaphoretic.*

311. *Ipecacuanha with Nitre.*

Take of Nitrate of Potassium, one drachm; Sweet Spirit of Nitre, two fluidrachms; Wine of Ipecac, one fluidrachm; Water, enough to make four fluidounces. Mix. Dose, a tablespoonful, every three hours.

*A good diaphoretic mixture.*

312. *A Sedative Diaphoretic.*

Take of Wine of Antimony, five drops; Tincture of Hyoscyamus, fifteen drops; Solution of Acetate of Ammonium, half a fluidounce. Mix, and take every four or six hours.

313. *Diuretic Pills.*

Take of Squills and Digitalis, each half a drachm; Nitrate of Potassium, one drachm. Mix, and divide into thirty pills. Take one thrice daily.

314. *Expectorant Mixture.*

Take of Chloride of Ammonium, two drachms; Syrup of Senega and Syrup of Squills, each two fluidrachms; Syrup of Wild Cherry Bark, a fluidounce; Deodorized Tincture of Opium, half a fluidrachm; Fluid Extract of Liquorice, two fluidrachms; Water, enough to make two fluidounces. Mix. Dose, one or two teaspoonfuls, every four hours.

*In chronic bronchitis.*

315. *A Calmative Expectorant.*

Take of Chloride of Ammonium, two drachms; Hoffmann's Anodyne, six fluidrachms; Syrup of Wild Cherry Bark, a fluidounce; Camphor Water, enough to make two fluidounces. Mix. Dose, a dessertspoonful.

*In chronic bronchitis, phthisis,* etc.

316. *Sedative Expectorant Mixture.*

Take of Acetate of Morphia, one grain; Tincture of Bloodroot (Sanguinaria), two fluidrachms; Wine of Ipecacuanha, one fluidrachm; Fluid Extract of Wild Cherry Bark, half a fluidounce; Syrup of Senega, a fluidounce and a half; Syrup of Gum Arabic, enough to make four fluidounces. Mix. Take from a dessertspoonful to a tablespoonful every 3 or 4 hours.

*For bronchial cough,* etc.

317. *Sedative Cough Mixture.*

Acetate of Morphia, six grains; Cyanide of Potassium, one-fourth of a grain; Fluid Extract of Wild Cherry Bark, six fluidounces; Syrup of Tolu, two fluidounces. Mix. Take a teaspoonful at once.

*For irritative bronchial cough,* etc.

318. *Chloride of Ammonium Mixture.*

Chloride of Ammonium (Muriate of Ammonia), two drachms; Extract of Liquorice, one drachm; Vinegar of Opium, half a fluidrachm; Syrup of Orange, two fluidounces; Distilled Water, four fluidounces. Mix. Take a tablespoonful three or four times daily.

*In chronic bronchitis.*

319. *For Troublesome Hooping-Cough,* etc.

Take of Hydrate of Chloral, a scruple; Wine of Ipecacuanha, two fluidrachms; Orange Syrup, half a fluidounce; Mint Water, one fluidounce. Mix. Take a teaspoonful or two occasionally.

320. *Lobelia and Hoffmann's Anodyne.*

Take of Tincture of Lobelia, half a fluidrachm; Compound Spirit of Ether, two fluidrachms and a half; Camphor Water, five fluidrachms. Dose, a teaspoonful.

*In asthma,* etc.

321. *Gallic and Sulphuric Acid Mixture* (Pepper).

Take of Gallic Acid, two drachms; Aromatic Sulphuric Acid (Elixir of Vitriol), one fluidrachm; Glycerin, a fluidounce; Water, enough to make six fluidounces. Mix. Dose, a tablespoonful as required.

*For hæmoptysis.*

322. *Spigelia, Senna, and Santonin* (J. L. Smith).

Take of Fluid Extract of Spigelia and Fluid Extract of Senna, each four fluidrachms; Santonin, eight grains. Mix. Dose, one or two teaspoonfuls.

*An excellent vermifuge.*

323. *Scammony and Cream of Tartar* (G. Johnson).

Take of Resin of Scammony, five grains; Bitartrate of Potassium, twenty grains; Ginger, eight grains. Mix. To be taken at once.

*In uræmia.*

324. *Laxative Pills.*

Take of Resin of Podophyllum, two grains; Extract of Hyoscyamus, six grains; Castile Soap, ten grains. Mix, and divide into 24 pills. Take one at night.

325. *Laxative Pills.*

Take of Podophyllin, two grains; Extract of Nux Vomica, six grains; Aloes, twelve grains; Extract of Gentian, thirty-six grains. Mix, and divide into 24 pills. Take one at night.

326. *For Diarrhœa.*

Take of Aromatic Sulphuric Acid (Elixir of Vitriol), two fluidrachms; Extract of Logwood, two drachms; Paregoric, half a fluidounce; Syrup of Ginger, enough to make six fluidounces. Mix. Take a tablespoonful at once.

327. *Bismuth and Opium* (J. L. Smith).

Take of Deodorized Tincture of Opium, sixteen drops; Subnitrate of Bismuth, two drachms; Simple Syrup, half a fluidounce; Water, a fluidounce and a half. Mix. Dose, a teaspoonful for a child one year old.

*In infantile summer diarrhœa.*

328. *Nitrate of Iron and Columbo* (J. L. Smith).

Take of Solution of Nitrate of Iron, eighteen drops; Tincture of Columbo, two fluidrachms; Simple Syrup, two fluidounces. Mix. Dose, a teaspoonful for an infant.

*In protracted infantile diarrhœa,* etc.

329. *For a Severe Cold in the Head.*

Take of Hydrochlorate of Morphia, one grain; Subnitrate of Bismuth, six drachms; Gum Arabic, in powder, two drachms. Mix. Use as snuff in the course of two or three days.

330. *Benzoic Acid with Copaiba.*

Take of Benzoic Acid, four scruples; Sweet Spirit of Nitre, half a fluidounce; Copaiba, four fluidrachms; Sugar and Gum Arabic, each two drachms; Aniseed Oil, ten drops; Camphor Water, enough to make eight fluidounces. Take a tablespoonful thrice daily.

*In inflammation of the bladder, gonorrhœa,* etc.

331. *Carbolic Acid for Atomization.*

Take of Carbolic Acid, thirty-two grains; Glycerin, two fluidounces; Lime-water six fluidounces. Mix. To be sprayed into the throat.

*In diphtheria.*

332. *Carbolic Acid with Chlorate of Potassium* (J. L. Smith).

Take of Carbolic Acid, thirty-two grains; Chlorate of Potassium, three fluidrachms; Glycerin, three fluidounces; Water, five fluidounces. Mix. To be sprayed into the throat.

*In diphtheria.*

333. *Salicylic Acid for Atomization* (J. L. Smith).

Take of Salicylic Acid, half a drachm; Glycerin, two fluidounces; Lime-water, eight fluidounces. Mix. To be sprayed into the throat.

*In diphtheria.*

334. *Gargle of Salicylic Acid* (Letzerich).

Dissolve fifteen grains of Salicylic Acid in thirty drops of Absolute Alcohol; then dissolve this in eight fluidounces of Distilled Water. Use as gargle.

*In diphtheria.*

335. *Borax and Zinc Wash.*

Take of Borax, twelve grains; Sulphate of Zinc, one grain; Camphor Water, a fluidrachm; Distilled Water a fluidounce. To be applied to the eyelids.

*In ophthalmia of new-born infants.*

336. *Borax Solution.*

Take of Borax, three grains; Water, and Rose-water, each a fluidounce. Mix. To be applied to the cleansed conjunctiva.

*In ophthalmia neonatorum, early stage.*

337. *Atropia with Glycerin.*

Take of Sulphate of Atropia, one grain; Glycerin, half a fluidrachm; Water, two fluidrachms. Mix. To be dropped into the eye.

*In ophthalmia neonatorum, late stage.*

338. *Benzoin Gargle.*

Take of Compound Tincture of Benzoin, two fluidrachms; Glycerin, half a fluidounce; Water, enough to make four fluidounces. Mix. To be used as a gargle.

*In ulceration of the throat, from syphilis or laryngeal phthisis.*

339. *Morphia Powder* (Lauder Brunton).

Mix one grain of Sulphate of Morphia with twelve grains of Pulverized Starch. Divide into six powders. One to be blown through a tube into the larynx.

*In laryngeal phthisis, or syphilitic sore throat.*

340. *Chlorinated Soda with Borax.*

Take of Borax and Bicarbonate of Sodium, each two drachms; Labarraque's Solution of Chlorinated Soda, a fluidrachm; Glycerin, a fluidounce; Water, enough to make eight fluidounces. Mix. To be sprayed into the nostrils.

*In ozœna.*

341. *Carbolic Acid and Borax for Atomization.*

Take of Carbolic Acid, one grain; Borax and Bicarbonate of Sodium, each two grains; Glycerin, a fluidrachm; Water, enough to make a fluidounce. Mix. To be sprayed into the nostrils.

*For chronic nasal catarrh.*

342. *Application for Chronic Nasal Catarrh* (H. Allen).

Take of French Gelatin, a drachm; dissolve it in a small portion of Water; then add to it, of Glycerin, ten drops; Pulverized Iodoform, three drachms and a half; Carbolic Acid, five grains. Rub together into a smooth paste. *To be applied to the nostril on a pledget of cotton.*

343. *Boracic Acid Wool* (Woakes).

Take of Cotton Wool, one drachm; Glycerin, ten minims; Boracic Acid, one drachm; Alcohol, six fluidrachms. Mix, saturate the wool, and dry it. To be introduced into the nostrils.

*In chronic nasal catarrh*, etc.

344. *Opium Wool* (Woakes).

Take of Cotton Wool, one drachm; Glycerin, ten minims; Laudanum, half a fluidounce. Mix, saturate the wool, and dry it. To be introduced into the nostrils.

*In painful nasal affections.*

345. *Perchloride of Iron Wool* (Woakes).

Take of Cotton Wool, one drachm; Glycerin, ten minims; Tincture of Chloride of Iron, one fluidounce. Mix the Glycerin with the Tincture, saturate the wool with the liquid, and dry it. To be introduced into the nostrils.

*In chronic nasal catarrh, ozæna*, etc.

346. *Zinc and Tar Ointment* (Bulkley).

Take of Tar Ointment, an ounce; Oxide of Zinc, two drachms; Cold Cream (Ointment of Rose-water), three ounces. Mix.

*For infantile eczema.*

347. *Ointment of Atropia with Opium and Iodoform.*

Take of Sulphate of Atropia, six grains; Opium, twelve grains; Iodoform, a drachm; Vaseline, enough to make three ounces. Mix. Apply externally.

*For painful piles*, etc.

348. *Iodoform and Tannic Acid* (Sturgis).

Take of Tannin and Iodoform, equal parts; triturate them well together. Apply the powder locally.

*For chancroidal ulcers.*

349. *Iodoform and Mercury Ointment.*

Take of Oleate of Mercury, half a fluidounce; Iodoform, twenty-four grains; Oleic Acid, a fluidounce. Mix. Apply externally.

*For swollen joints, syphilitic eruptions, or parasitic affections of the skin.*

350. *Chloroform with Vaseline.*

Mix together equal parts of Chloroform, Ether, and Vaseline.

*An anodyne liniment, for contusions, sprains, chronic rheumatism*, etc.

351. *Lead Ointment* (Hebra).

Mix together, with the aid of heat, three ounces and six scruples of Litharge and fifteen ounces of Olive Oil; then add three fluidrachms of Oil of Lavender.

*A soothing unguent, in affections of the skin.*

352. *Ointment of Oleate of Zinc* (Crocker).

Rub together an ounce of Oxide of Zinc and eight ounces of Oleic Acid, and then leave the mixture to stand for two hours. Heat gently in a water-bath, and add, stirring, nine ounces of Vaseline.

*A soothing unguent.*

353. *Liniment of Chloral and Camphor.*

Pulverize an ounce of Gum Camphor, with aid of a few drops of rectified spirit. Mix this with an ounce of Hydrate of Chloral. When this mixture becomes liquid, add to it enough Glycerin to make six fluidounces. Apply locally.

*For neuralgia.*

354. *Croton Oil and Iodine.*

Take of Croton Oil, half a fluidrachm; Ether, one fluidrachm; Tincture of Iodine, two fluidrachms and a half. Mix. To be painted upon the skin with a camel's-hair pencil.

*A counterirritant, for chronic pleurisy*, etc.

355. *Liniment for Neuralgia.*

Take of Camphor, one ounce; Hydrate of Chloral, half an ounce; Chloroform, a fluidounce and a half; Soap Liniment, two and a half fluidounces. Apply externally.

356. *Acid Lotion of Corrosive Sublimate.*

Take of Bichloride of Mercury, eight grains; Hydrochloric Acid, sixteen minims; Water, eight fluidounces. Mix. Apply as a wash.

*In lupus.*

357. *Styrax and Sulphur Ointment* (Bulkley).

Take of Styrax, one or two drachms; Sulphur Ointment, three or four drachms; Simple Cerate, an ounce. Mix. Apply externally.

*For itch.*

358. *Carbolic and Hydrocyanic Acids, with Morphia.*

Take of Carbolic Acid, twelve grains; Acetate of Morphia, eight grains; Dilute Hydrocyanic Acid, one fluidrachm; Glycerin, a fluidounce; Water, enough to make four fluidounces. Mix. To be applied locally.

*For troublesome pruritus.*

359. *Antipruriginous Ointment* (Bulkley).

Take of Tar Ointment, three drachms; Belladonna Ointment, two drachms; Tincture of Aconite Root, half a fluidrachm; Oxide of

Zinc, a drachm; Ointment of Rose-water (Cold Cream), three drachms. Mix. Apply locally.

360. *For Pruritus.*

Take of Camphor and Hydrate of Chloral, each a drachm; Cold Cream (Unguent. Aquæ Ros.), one ounce. Mix. To be applied locally (to a sound skin).

361. *Antipediculous Wash* (Bulkley).

Rub well together one drachm of Caustic Potassa, two drachms of Carbolic Acid, and four fluidrachms of Water. For local application.

*To get rid of lice.*

362. *Sulphite of Sodium and Carbolic Acid* (Morrison).

Take of Carbolic Acid, half a drachm; Sulphite of Sodium, three drachms; Water, six fluidounces. Mix. Apply externally.

*For poison-vine eruption.*

363. *Odorless Iodoform Ointment* (Lindemann).

Take of Iodoform, sixteen grains; Balsam of Peru, thirty grains; Vaseline, Lard, and Ointment of Glycerin, each two drachms. Mix. For external application.

*For scrofulous tumors,* etc.

364. *Zinc with Huile de Cade.*

Take of Empyreumatic Oil of Juniper (oleum cadini), of soft soap (sapo viridis), and of alcohol, each two ounces; Oil of Lavender, one fluidrachm. Mix.

*A stimulating ointment for alterative effect in skin diseases.*

365. *Vaseline and Lead-plaster* (Piffard, Hebra).

Take of Vaseline and Diachylon Plaster, equal parts. Dissolve and incorporate them together by aid of heat. Add a few drops of bergamot (for odor). Apply externally.

*For eczema.*

366. *Corrosive Sublimate with Borax* (Bulkley).

Take of Bichloride of Mercury, eight grains; Pulverized Borax, two drachms; Dilute Acetic Acid, two drachms; Alcohol, two fluidounces; Water, enough to make four fluidounces. Mix. Apply locally with hair pencil.

*For chloasma, or brownish discoloration of the face in spots or patches.*

367. *Iodoform Paste* (Bronson).

Take of Iodoform, one drachm; Mucilage of Gum Arabic and Glycerin, each ten drops; Oil of Peppermint or Oil of Cloves, one drop. Mix. For local application.

*For piles,* etc.

368. *Iodoform and Oxide of Zinc with Benzoated Vaseline.*

Take of Benzoated Vaseline (one ounce of Gum Benzoin to five ounces of Vaseline), one ounce; White Wax, two drachms and a half;

Oxide of Zinc, one drachm and one scruple; Iodoform, two drachms. Apply externally.

*For irritated ulcers or severe irritation of the skin.*

369. *Ointment for Contusions.*

Mix one part of Iodoform with thirty parts of Lard or Vaseline. Apply locally with gentle friction. (A minim of Tincture of Musk to an ounce will deodorize the ointment.)

370. *Chloral and Camphorated Oil.*

Mix together one ounce of Hydrate of Chloral with four fluidounces of Camphorated Oil (Olive Oil saturated with Gum Camphor).

*Rub in over affected muscles in trichinosis.*

371. *Carbolic Acid and Glycerin* (Bill, Bergonzini).

Mix together two parts of Carbolic Acid and one part of Bower's or Price's Glycerin. To be placed for five minutes in contact with the skin, as anæsthetic, before opening an abscess.

372. *Lotion for Freckles.*

Take of Sulphocarbolate of Zinc, two drachms; Glycerin, three fluidounces; Alcohol, half a fluidounce; Rose Water (or Water), enough to make eight fluidounces. Apply locally.

373. *For Sore Nipples.*

Take of Compound Tincture of Benzoin, a sufficient quantity. Apply it to the nipple with a camel's-hair pencil after each time of suckling.

374. *For Sore Nipples.*

Take of Iodoform, one drachm; Glycerin, a fluidounce. Mix. Apply with a camel's-hair pencil.

375. *Suppository of Ergot* (Barker).

Take of Aqueous Extract of Ergot, two scruples; Cacao Butter, one drachm. Mix, and divide into twelve suppositories. Introduce one into the rectum, twice or thrice daily.

*For menorrhagia or excessive leucorrhœa.*

376. *Antispasmodic Suppository.*

Take of Opium, eight grains; Camphor, half a drachm; Extract of Belladonna, three grains; Cacao Butter, enough to make six suppositories. One to be used at night.

*In painful piles, inflammation of the bladder,* etc.

377. *Injection Brou.*

Take of Sulphate of Zinc, eight grains; Acetate of Lead, fifteen grains; Tincture of Catechu, one drachm; Laudanum and Water, each three fluidounces. Mix, and use for urethral injection in *gonorrhœa.*

## EXPLOSIVE PHARMACAL COMPOUNDS.

The following combinations of medicinal substances may *ignite* or *explode*, if agitated or warmed, as by carrying about the person:

Iodine with soap liniment or camphor liniment; chloride or iodide of ammonium with phosphorus, arsenic, oil of turpentine, olive or cod-liver oil; concentrated solution of permanganate or of bichromate of potassium in alcohol; nitromuriatic acid with alcoholic "essences" or alcoholic extracts; tannin with dry chlorate of potassium or hydrochlorate of morphia; hypophosphite of calcium with chlorate of potassium and lactate of iron; chlorate of potassium with catechu; golden sulphuret of antimony with chlorate of sodium; tincture of perchloride of iron with chlorate of potassium and glycerin; nitrate of silver with essence of bitter almonds; oxide of silver in pills.

## METRICAL PRESCRIBING.

Probably a generation may pass before it will become common to write prescriptions according to the metrical or decimal system. But that system has so much in its favor, and is so largely employed already in scientific works, especially upon the continent of Europe, that it is likely, in the end, to prevail. Every student will do well, therefore, to familiarize himself with it.

For the immediate purposes of the practitioner, a few particulars only require to be kept in mind.[1]

Accurately stated, a *gramme* is equal to 15.45234874 *grains*, Apothecaries' weight. A Kilogramme (1000 grammes) equals 2.679227 Troy pounds.

A *cubic centimetre* is equal to 16.231169 minims. A *litre* equals 1.056717 wine quarts.

When the transition from our present system to the metrical has been fully effected, there will, of course, be no more difficulty than now, in regard to the most minute precision with it in prescriptions. But, while becoming acquainted gradually with the new method, it may for a time be, with advantage, chiefly resorted to for combinations of medicines in which a small difference of amounts will not be important.

This being understood, *approximative* equivalency can be made available and convenient, as follows:[1]

A *gram* (adopting, as preferable, the English spelling) is *about* equal to 15 grains. A *kilogram* is about equal to $2\frac{1}{2}$ Troy pounds ($2\frac{1}{4}$ Avoirdupois pounds).

A *cubic centimeter* is *about* equal to 15 minims. A *liter* is about a quart measure.

It will be convenient also to remember that a meter is rather less $1\frac{1}{9}$ yard (39.37079 inches); a yard is somewhat more than 9 decimeters; a decimeter is not quite 4 inches; a centimeter is nearly $\frac{2}{5}$ of an inch; and a millimeter is somewhat less than $\frac{1}{25}$ of an inch.

From these approximations we may proceed to accept 4 *grams* as equal to a *drachm*, and 4 *cubic centimeters* as equivalent to a *fluidrachm*. Instead of cubic centimeter, we may call it (A. B. Taylor) *fluigram*. Then we have a simple statement:

| | |
|---|---|
| 15 *grains*, | 1 gram. |
| 4 grams, | 1 drachm. |
| 15 *minims*, | 1 fluigram. |
| 4 fluigrams, | 1 fluidrachm. |

[1] See Oldberg's "The Metric System in Medicine," Philada., 1881.

Whence these rules follow:

To convert *grains* into grams, or *minims* into fluigrams, *divide by* 15.

To convert grams into *grains*, or fluigrams into *minims*, *multiply by* 15.

To convert grams into *drachms*, or fluigrams into *fluidrachms*, *divide by* 4.

To convert *drachms* into grams, or *fluidrachms* into fluigrams, *multiply by* 4.

With a similar approximation (8 drachms being equal to one ounce) we may say:

To convert *ounces* into grams, or *fluidounces* into fluigrams, *multiply by* 30.

To convert grams into *drachms*, or fluigrams into *fluidounces*, *divide by* 30.

To prevent mistakes, it will be well to use *capital letters* for the metrical abbreviations in prescriptions: Gm for gram, fGm for fluigram. It is actually *unnecessary to employ any other terms* in metrical prescribing; as all other differences may be expressed by *decimal notation*. Thus a *grain* ($\frac{1}{15}$ of a gram) is (approximately) .06 Gram; a *minim* ($\frac{1}{15}$ of a fluiGram) .06 fluiGram. Half a Gram will be written .50 Gm; half a fluiGram, .50 fGm; etc.

There may be a convenience, however, sometimes, in speaking or writing of a deciGram ($\frac{1}{10}$ Gram) and centiGram ($\frac{1}{100}$ Gram). It is important also to remember that a deciGram (dGm) is equal to $1\frac{1}{2}$ *grain;* and $\frac{1}{10}$ of a fluiGram (dfGm) equals $1\frac{1}{2}$ *minim.*

Roughly, a teaspoonful may be counted as 5 fGm; a wineglassful, 75 fGm; a fluidounce, 30 fGm; four fluidounces, 125 fGm; eight fluidounces, 250 fGm.

It becomes, with the acceptance of these approximate equivalencies, a matter of simple calculation, to *translate* a prescription in grains and drachms, or minims and fluidrachms, etc., into one of Grams or fluiGrams and their decimal subdivisions. It will, however, with most practitioners, be difficult to write metrical prescriptions with ease and confidence, until they have grown familiar with *metrical doses*. For an extended table of these, the reader may be referred to Dr. Oldberg's work[1] upon this subject. The enumeration on the next page of doses of some leading medicines may suffice for our present purpose.

It will be observed that (with the exception of a few new remedies) the drugs named are such as are likely to be often used. Their metrical doses can thus, with practice, be rendered familiar. Moreover, except tartar emetic, extract of belladonna, sulphate of morphia, extract of nux vomica, pilocarpin and nitrate of silver, their doses are not usually less than a grain or a minim. Therefore, the approximative character of such doses, already referred to, will not necessarily cause inconvenience. This will especially be the case, so long as the prescriber observes the important practical rule, to give, of all *powerful* medicines, when *first administered* to a patient, the *smallest* doses likely to have sufficient effect.

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[1] The Metric System in Medicine, p. 127.

## TABLE OF DOSES.[1]

| *Medicine.* | *Apothecaries' Weights or Measures.* | *According to Metric System.* |
|---|---|---|
| Acid, Nitro-muriatic, | 2 to 5 minims | .1 to .5 fGm |
| Æther, Nitrous, Spirit of | ¼ to 1 fluidrachm | 1 to 5 fGm |
| Æther, Comp. Spirit of, | ½ to 2 fluidrachms | 2 to 10 fGm |
| Aloes, | 2 to 15 grains | .1 to 1 Gm |
| Ammonium, Carbonate, | 2 to 5 grains | .1 to .5 Gm |
| Ammonium, Chloride, | 5 to 20 grains | .3 to 1.5 Gm |
| Antimony and Potassium Tartrate | 1/32 to ¼ grain | .0015 to .015 fGm |
| Assafœtida, | 3 to 10 grains | .2 to .75 Gm |
| Belladonna, Extract, | ¼ to ¾ grain | .015 to .05 Gm |
| Bismuth, Subnitrate, | 5 to 15 grains | .3 to 1 Gm |
| Camphor, | 1 to 10 grains | .05 to .75 Gm |
| Camphor, Spirit, | 5 to 30 minims | .3 to 2 fGm |
| Catechu, Tincture, | ¼ to 1 fluidrachm | 1 to 5 fGm |
| Chloral, Hydrate, | 5 to 30 grains | .3 to 2 Gm |
| Chloroform, | 5 to 60 minims | .3 to 4 fGm |
| Colchicum Root, Wine, | 10 to 20 minims | .75 to 1.5 fGm |
| Creasote, | 1 to 2 minims | .1 to .2 fGm |
| Digitalis, Tincture, | 10 to 20 minims | .75 to 1.5 fGm |
| Ergot, Wine, | ½ to 1 fluidrachm | 2 to 4 fGm |
| Hyoscyamus, Extract, | 1 to 4 grains | .1 to .4 Gm |
| Iron, Chloride, Tincture, | 10 to 30 minims | .75 to 2 fGm |
| Jaborandi, | 5 to 60 grains | .3 to 4 Gm |
| Jaborandi, Fluid Extract | ¼ to ½ fluidrachm | 1 to 2 fGm |
| Jalap, Resin, | 2 to 5 grains | .1 to .3 Gm |
| Kino, Tincture, | ¼ to 1 fluidrachm | 1 to 5 fGm |
| Lactucarium, Syrup, | 1 to 3 fluidrachms | 5 to 12 fGm |
| Lead, Acetate, | ½ to 3 grains | .03 to .2 Gm |
| Lobelia, Tincture, | 10 to 30 minims | .75 to 2 fGm |
| Morphia, Sulphate, | ⅛ to ¼ grain | .008 to .015 Gm |
| Nux Vomica, Extract, | ¼ to 1 grain | .015 to .05 Gm |
| Nux Vomica, Tincture, | 10 to 30 minims | .75 to 2 fGm |
| Oil, Cod-Liver, | 1 to 4 fluidrachms | 4 to 16 fGm |
| Opium, | ⅛ to 1 grain | .008 to .05 Gm |
| Opium, Tincture, | 5 to 20 minims | .3 to 1.5 fGm |
| Pilocarpin, | ⅛ to ¾ grain | .008 to .05 Gm |
| Potassium, Arsenite, Solution, | 2 to 10 minims | .1 to .75 fGm |
| Potassium, Chlorate, | 5 to 20 grains | .3 to 1.5 Gm |
| Potassium, Iodide, | 5 to 30 grains | .3 to 2 Gm |
| Quebracho, | 10 to 45 grains | .75 to 3 Gm |
| Rhubarb, | 2 to 30 grains | .1 to 2 Gm |
| Squills, Syrup, | ½ to 1 fluidrachm | 2 to 5 fGm |
| Silver, Nitrate, | ¼ to 1 grain | .015 to .05 Gm |
| Wild Cherry Bark, Syrup | 1 to 2 fluidrachms | 5 to 10 fGm |

[1] *Approximately* compared; preferring, when practicable, for metrical doses, numbers divisible by 10 or 5. These doses are for adults.

## EXAMPLES OF METRICAL PRESCRIPTIONS.

℞.—Potass. Chlorat., 5 Gm.
Aquæ, q. s. ut ft. 100 Gm.
M. Dose, from a teaspoonful to a tablespoonful.

℞.—Vin. Ipecac., 5 fGm.
Tinct. Opii, 5 fGm.
Sp. Ath. Nitr., 50 fGm.
Syrup Simp., q. s. ut ft. 100 fGm.
M. Dose, a teaspoonful with water.

℞.—Tinct. Aconit. Rad., 50 fGm.
Sp. Ath. Nitr., 50 fGm.
Liq. Potass. Citrat., q. s. ut ft. 100 fGm.
M. Dose, a tablespoonful.

℞.—Acid. Salicyl., 2 Gm.
Ammon. Carb., 3 Gm.
Chloral. Hydr., 3 Gm.
Syr. Simp., 50 Gm.
Aquæ, q. s. ut ft. 100 Gm.
M. Dose, a dessertspoonful.

℞.—Potass. Iodid., 10 Gm.
Syr. Ferri Iodid., 20 fGm.
Tinct. Calumbæ, q. s. ut ft. 100 Gm.
M. Dose, a teaspoonful with water.

℞.—Potass. Bromid. 10 Gm.
Tinct. Ammon. Valerianat, 20 fGm.
Tinct. Lupulin, 30 fGm.
Tinct. Digital., 30 fGm.
Aquæ, q. s. ut ft. 100 fGm.
M. Dose, a dessertspoonful.

℞.—Syr. Scill. et
Syr. Ipecac. et
Tinct. Opii Camph. et
Glycerin. āā, 25 fGm.
M. Dose, a teaspoonful.

*Brown Mixture.*

℞.—Ext. Glycirrhiz., 3 Gm.
Sacch. et Acac. āā, 3 Gm.
Tinct. Opii Camph., 12 fGm.
Vin. Antimon., 6 fGm.
Sp. Ath. Nitr., 3 fGm.
Aquæ, q. s. ut ft. 100 fGm.
M. Dose, a dessertspoonful to a tablespoonful.

℞.—Pulv. Jalapæ, 20 Gm.
Potass. Bitart., 80 Gm.
M. Dose, a teaspoonful.

℞.—Pulv. Opii et
Pulv. Ipecac. et
Pulv. Gum Camph. āā, 5 Gm.
M. et div. in pil. no. 100. One to be taken at a time.

℞.—Pulv. Opii, 2 Gm.
Acid. Tannic., 15 Gm.
M. et div. in pil. no. 100. One to be taken at once.

*For Chancre* (Bouchardat).

℞.—Ferri Perchlorid., 12 Gm.
Acid. Citric, 4 Gm.
Aq. Destillat., 24 Gm.
M. Use as wash.

*For Epistaxis.*

℞.—Ergotin, 2 Gm.
Glycerin, 30 fGm.
M. Inject 20 drops at once, hypodermically.

## ALIMENTARY PREPARATIONS.

*Toast Water.*

Cut a slice of stale bread half an inch thick, and toast it brown, without scorching. Pour over it a pint of boiling water; cover closely till it cools; then pour off and strain it.

*Rice Water.*

Take of rice, two ounces; water, two quarts. Boil it for an hour and a half, then add sugar and nutmeg to taste. Some prefer *salt.*

*An excellent drink in diarrhœa, dysentery,* etc.

*Barley Water.*

Wash two ounces of pearl barley with cold water; put the barley in a pint and a half of fresh cold water, bring it to the boiling-point, and boil for twenty minutes in a covered vessel. Strain, sweeten to taste, and flavor with lemon juice and a little lemon peel. (In some cases, the lemon had better be omitted.)

*Boiled Flour.*

Tie up a quart of flour in a pudding bag, tightly; put it into a pot of boiling water, and leave it there, boiling, for several hours (all day, or all night, will not be too long). Then take out the flour ball, and dry it near the fire. Peel off and throw away the thin outer portion, and grate down the mass, with a nutmeg-grater, into a powder.

One or two teaspoonfuls of this may be rubbed into a paste with a small portion of milk, then stirred into a pint of milk, which is to be *scalded*, i. e., just brought to the boiling-point, without being boiled.

Useful in *infantile diarrhœa*, etc.

*To Keep Ice for the Sick.*

Cut a piece of clean flannel about eight inches square. Put this

over the top of a glass tumbler, pressing the flannel down to half or more of the depth of the tumbler. Then bind the flannel fast to the tumbler with a tape or cord. When the ice has been put into this ice-cup, lay upon it another piece of flannel, three or four inches square. It will keep thus for hours.

*Oatmeal Gruel.*

Boil a pint of water in a saucepan; when boiling, mix with it two tablespoonfuls of oatmeal (previously rubbed smooth with a little cold water), half a pint of milk, and a little salt. Let it then simmer for half an hour; strain it through a hair-sieve, sweeten, and add a little nutmeg. A few raisins may be added before the boiling.

*Vegetable Soup.*

Put two potatoes, one tomato, and a piece of bread, into a quart of water; boil it down to a pint. Then throw in a little chopped celery or parsley, and salt. Cover, and remove from the fire.

*Bread and Butter Broth.*

Spread a slice of well-baked bread with good fresh butter; sprinkle it moderately with salt and black pepper. Pour a pint of boiling water over it, cover, and let it stand a few minutes before use.

*Lime-water and Milk.*

Take of clear saturated lime-water and fresh milk, each a wine-glassful; mix. Let a tablespoonful or less be taken at once. This will sometimes remain upon an irritable stomach which will retain nothing else.

*Chicken Broth.*

Clean half a chicken and remove the skin; pour on it a quart of cold water, and salt to taste; add a tablespoonful of rice, and boil slowly for two or three hours; skim well, and add a little parsley.

*Panada.*

Cut two slices of stale bread, without crust; toast them brown, cut them up into squares of about two inches, lay them in a bowl and sprinkle with salt and a little nutmeg. Pour on a pint of boiling water, and stand to cool.

*Arrowroot.*

Mix a tablespoonful, or a tablespoonful and a half, with a little cold water, till it makes a paste. Boil a pint of water, stir in the arrowroot, and boil it a few minutes. Sweeten with white sugar. Brandy, whisky, or wine may be added if necessary; and half or all *milk* may be used instead of water. A little lemon- or orange-peel added before boiling will improve the flavor.

*Tapioca.*

Cover two tablespoonfuls of tapioca with a teacupful or more of cold water, and soak for two or three hours, or over night. Put it then into a pint of boiling water, and boil it until it is clear and of the desired consistence. Sugar, nutmeg, or wine, etc., may be added as required

*Sago Jelly.*

Mix well together four tablespoonfuls of sago, the juice and rind of one lemon, and a quart of water. Sweeten to taste, let it stand half an hour, and boil it, stirring constantly, until clear. Then add a wineglassful of wine; currant wine will do.

*Beef-tea.*

Chop a pound of lean beef into very small pieces, pour over it a pint or less of cold water, cover, and let it stand two hours by the side of the fire. Then put it on the fire and boil it for half an hour. Remove the scum, skim off all the oil drops, and salt to taste. Pour it off, but *do not filter or strain it,* unless through a coarse sieve. *Good beef-tea should have a rich brown appearance when stirred.*

*Frozen Beef-tea.*

Place a convenient portion of beef-tea, in a bottle or other vessel, in an ice-cream freezer; and freeze it as cream would be frozen in making ice-cream. This will be useful in *protracted cholera infantum,* etc.

*Farina Gruel.*

Mix two tablespoonfuls of farina with a quart of water, and let this boil until it becomes thick. Add a pint of milk and a little salt, and then boil for a quarter of an hour longer. Sweeten according to taste.

*Indian Meal Gruel.*

Stir a tablespoonful of Indian meal till it becomes smooth in half a teacupful of cold water. Then mix it well with a teacupful of boiling water, and boil it until it is sufficiently thickened. Salt or sweeten to taste.

*Rice Milk.*

Boil a tablespoonful of rice for an hour and a half in a pint of fresh milk, then rub it through a fine sieve. Add a full teaspoonful of sifted white sugar, and boil again for two or three minutes.

*Essence of Beef.*

Cut up a pound of lean beef into small pieces, put it into a pint bottle, without water, cork it loosely, and immerse the bottle to its neck in cold water in a stewpan. Bring the water to a boil, and let it boil for two hours. Then pour off (do not filter) the essence.

*Extract of Raw Beef.*

Cut up good lean beef *very fine,* and put it with cold water (half a pint to a pound) in a bottle. Soak it for twelve hours, shaking it half a dozen times or more during that time. Then strain it off with pressure through a cloth; or, better, pour it through a coarse sieve. Mutton or chicken may be treated in the same way.

*Oatmeal with Beef-tea.*

Mix a tablespoonful of oatmeal quite smoothly with two tablespoonfuls of cold water. Add this to a pint of strong beef-tea, and heat to the boiling-point, stirring all the time. Boil for five minutes. Then remove from the fire, skim, and serve for use.

*Roast Oysters.*

Place a dozen fresh oysters, in the shell (the shells should be spontaneously closed if good), upon a moderately strong fire, and allow them to remain there until the shells begin to open a little. Then remove them, open them at once, and serve them, with a little black pepper, and salt if they need it. This is the method of cooking oysters most favorable to their digestibility.

*Liebig's Broth.*

Chop half a pound of beef, mix it well with one drachm of table salt, four drops (ten would be better) of muriatic acid, and eighteen ounces of distilled water. Macerate for an hour, and strain through a fine hair sieve. Dose, a teacupful. This contains the *soluble* constituents of the meat; but not all its nutritive elements.

*Liebig's Food for Infants.*

Mix together half an ounce of wheat flour, the same of malt flour, seven and a quarter grains of bicarbonate of potassium, and an ounce of water. Add five ounces of fresh milk, and put the whole upon a gentle fire. When it begins to thicken, take it from the fire, stir it for five minutes, heat and stir again until it becomes quite fluid; finally boil it for a short time. Filter through a sieve to separate the bran; it is then ready for use. It will keep for twenty-four hours. Its effect is slightly aperient.

*Camplin's Bran Loaf for Diabetes.*

Take two or three quarts of wheat bran, boil it in two successive waters for ten minutes, each time straining it through a sieve, then wash it well with cold water (on the sieve), until the water runs off perfectly clear; squeeze the bran in a cloth as dry as you can, then spread it thinly on a dish, and place it in a slow oven. If put in at night let it remain until the morning, when, if perfectly dry and crisp, it will be fit for grinding. The bran thus prepared must be ground in a fine mill, and sifted through a wire sieve of sufficient fineness to require the use of a brush to pass it through; that which does not pass at first ought to be ground and sifted again, until the whole is soft and fine.

Take of this bran-powder three Troy ounces; three fresh eggs; an ounce and a half of butter, and rather less than half a pint of milk. Mix the eggs with part of the milk, and warm the butter with the other portion; then stir the whole well together, adding a little nutmeg and ginger, or other spice. Just before putting into the oven, stir in, first, thirty-five grains of bicarbonate of sodium, and then three drachms of dilute hydrochloric acid. Bake the loaf in a basin (well buttered) for an hour or rather more.

*Meigs' Gelatin Food for Infants.*

Soak for a short time in cold water a scruple (a piece two inches square) of prepared gelatin; then boil it in a half pint of water ten or fifteen minutes, until it dissolves. Stir into this (previously made into a paste with a little cold water), at the end of the boiling, a teaspoonful of arrowroot; also, from three to eight fluidounces (accord-

ing to the age of the child) of milk; and, lastly, from half a fluid-ounce to two fluidounces of cream, and a moderate amount of loaf sugar.

*Egg Broth.*

Boil (after it has stood, mixed, half an hour) two ounces of pearl sago in half a pint of water, until it is smooth and thick. Beat the yolks of four fresh eggs with half a pint of cream; then mix with the sago, and stir the whole well with a quart of boiling beef-tea, just poured off. A tablespoonful of whisky or half a glass of Sherry wine may be added if required.

*Wine Whey.*

Boil half a pint of milk, and, while boiling, add a glass of Madeira or Sherry wine. Separate the curd, by straining through muslin or a sieve. Sweeten the whey to taste, and grate upon it a little nutmeg.

*Egg and Wine or Brandy.*

Beat up a raw fresh egg, and stir with it two tablespoonfuls of wine, or one of brandy. Sweeten or not, according to taste.

*Caudle.*

Beat up a raw egg with a wineglassful of Sherry, and add to it half a pint of hot gruel. Flavor with lemon-peel, nutmeg, and sugar.

*Milk Punch.*

Into a tumblerful of milk put one or two tablespoonfuls of brandy, whisky, or Jamaica rum. Sweeten, and grate nutmeg on top.

*Ferruginous Chocolate.*

Mix sixteen ounces of chocolate with half an ounce of carbonate of iron. Divide the mass into cakes of one ounce each. One may be dissolved in half a pint of hot milk, to be taken night and morning.

*Koumiss of Cow's Milk.*

To a quart of cow's milk, add a teaspoonful of sifted white sugar, and a teaspoonful of brewer's yeast. Leave it to stand for some hours until fermented; then serve for use, or else put away in strong bottles, well corked.

## DISINFECTANTS.

The best preventives of infection are **ventilation** and **cleanliness.** No agencies can be made to take the place of these. The following are the most available temporary aids in purification of insalubrious places:

For disinfection of **privies**: *sulphate of iron*, a pound dissolved in a gallon of water; or the same amount of *chloride of lime* may be thoroughly mixed in water. Common *tar* will deodorize a privy (except a slight odor of its own) very promptly.

Burnet's Liquid consists of solution of *chloride of zinc*, twenty-five grains in each fluidrachm of water. Of this a pint may be put into a gallon of water for use.

For **water-closets, bed-pans,** etc., Labarraque's solution of *chlorinated soda* may be employed—a fluidounce to a quart of water; or *permanganate of potassium*,[1] ten grains to a quart of water; or carbolic acid, twenty grains to the pint or quart. *Coal tar* possesses the virtues of carbolic acid in a dilute form. Fluid carbolic acid may be used diluted with 50 to 100 parts of water; or the impure acid, a fluidounce to a gallon of water. Common petroleum is not a bad disinfectant. Tar is a very good one.

**Drinking-water** may be disinfected by the addition (after filtration) of enough permanganate of potassium to render it just perceptibly pink in a strong light. *Boiling* will render impure water much safer to drink.

**Articles of clothing,** contaminated by discharges, etc., from patients, if very bad, should be *burned*. Otherwise, they should be *boiled* thoroughly; or, at least, plunged into boiling water. Solution of permanganate of potassium (an ounce to three gallons of water) is sometimes used. Woollens and all clothing which cannot be washed, as well as bedding, should be exposed for several hours to a *dry heat* of from 200° to 250° Fahrenheit.

**Occupied rooms and houses** may be disinfected (besides ventilation) by diffusing in spray through the air Ledoyen's liquid (solution) of *nitrate of lead*, made by dissolving one pound of litharge in seven ounces of nitric acid and two gallons of water. Or, by placing in shallow vessels the solid *chloride of lime* (bleaching salt). Or, sprinkling a solution of carbolic acid, 1 part to 100 of water. Fresh whitewashing is beneficial to the air of a cellar. *Charcoal* and *quicklime* are absorbent (especially the former) of gases, and thus aid in purifying the air. They may be combined, as in what is called "calx powder." But the best way to disinfect an unhealthy or suspected house or room is, to burn in it, with closed doors and windows (all occupants of course being first removed) *sulphur;* to the amount of a pound and a half for every thousand cubic feet of space.

**Hospital wards** may be disinfected (besides ventilation and cleansing) by Ledoyen's liquid, chloride of lime, *bromine* left exposed to the air in shallow vessels, or *iodine*, heated moderately. Emptying the

[1] The *crude* permanganate is much cheaper than the crystallized, and will answer.

wards, however, and fumigating them for several hours with burning sulphur, will be much more effectual.

**Heaps of filth,** solid or semi-liquid, may be covered with charcoal, two or three inches deep, or with *dry earth.* **Drains, ditches,** and **sewers** may be disinfected with sulphate of iron, coal tar, chloride of lime, etc. A pound of good chloride of lime will suffice for a thousand gallons of running sewage.

*Chloralum* and *Salicylic acid* are good antiseptics and disinfectants.

On the subject of *ozone* as a disinfectant, the reader is referred to works on chemistry and hygiene.

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